



THE BROWNES' HOLE CAVE, STOKE SAINT MICHAEL, SOMERSET, ENGLAND

In memory of the late Patrick Montague Browne, 1930-1951, Student of Mines Engineering at the University of Manchester, Cave Explorer, Author and Mountaineer

Andrew Edwards and Colin Wisbey, Curator of Frome Museum, Frome, Somerset, England

Emeritus Professor Andrew Chamberlain

Professor Danielle Schreve

Jenna Davenport

Neil Adams

Doctor Timothy Knowles



DECEMBER 8, 2022
FROME MUSEUM, FROME, SOMERSET

The answer to a 70 year question posed by Frome Museum Staff members has finally been revealed with the help of Graham Mullan of the University of Bristol, Linda Wilson of the University of Bristol and Professor Andrew Chamberlain of the University of Bournemouth

Patrick Montague Browne, a pupil of King's School, Bruton discovered Brownes' Hole in the Woods at Stoke Lane, Stoke St Michael in 1947. Subsequent excavations recovered both human and mammal skeletal remains from that same Cave. The mammal remains were later washed and examined by the late Herbert E Balch of Wells and Mendip Museum . In addition, the late Dr Wilfred Jackson of Buxton Museum, Derbyshire (1951) and Professor Danielle Schreve from the Royal Holloway College (2015), London kindly travelled to Frome to examine these remains that were of Hyaena, Bison, Bear, Reindeer and Woolly Rhinoceros . This collection of remains or "assemblage" is similar to the types of mammal remains that were previously also found at Hyaena Den at Wookey Hole and Pin Hole Cave, Cresswell Crag, Derbyshire. Naturally, all volunteers at Frome Museum including Simon Carpenter and Colin Wisbey, the Curator of the Frome Museum, were interested in the date of the Human remains collected from Brownes' Hole. More specifically, Frome Museum needed to know if the Human remains were of the same age as the Hyaena remains

Linda Wilson and Graham Mullan from the University of Bristol Speleological Society kindly visited Frome Museum in order to undertake an initial assessment of these human remains from Brownes' Hole and the nearby Stoke Lane Swallet. In addition, Emeritus Professor Andrew Chamberlain a Bioarchaeologist of Bournemouth University, also kindly travelled to Frome Museum to offer his expert insights and advice. By working together, Graham Mullan, Professor Andrew Chamberlain, Linda Wilson, the Trustees of Frome Museum and myself applied for funding from the British Cave Research Association in order to get these human remains Radiocarbon dated. In addition, Human remains from another Stoke Lane Cave site, called Stoke Lane Swallet, were also examined. These consisted of one almost complete Human Skull and several Human Skull fragments that were also housed at Frome Museum. It was decided to send these off for Radiocarbon dating as well. It needs noting that no Hyaena or Woolly Rhinoceros remains were found at Stoke Lane Swallet

Dr Timothy Knowles of the University of Bristol Chemistry Department undertook the Radiocarbon dating procedures on all the Human bone samples

In a commentary kindly provided by Emeritus Professor of Bioarchaeology at Bournemouth University, Andrew Chamberlain:

"The results of the Radiocarbon dating from Brownes' Hole indicate that the Human long bone was relatively recent in age. Dating back to the last Century BC. Just prior to the date that a Roman Coin was also deposited at Brownes' Hole. Professor Andrew Chamberlain explains to us that many of the Caves on Mendip were used as natural burial chambers at around that time. This included the Wookey Hole Cave that was also used for Cave burials"

Professor Chamberlain continues to comment on the rest of the results:

"The results from the dating of the Skulls recovered from nearby Cave called Stoke Lane Swallet indicated that they were much older than those at Brownes' Hole. They were approximately 4,200 and 3,800 years old. We might refer to this as the Bronze Age. The age difference of 400 year raises questions about the use of the Stoke Lane Swallet site. Approximately 4,000 years ago the bone chamber, where the skulls were deposited, would have been more accessible than it is today. Requiring experienced caving skills and is not recommended for inexperienced exploration without

a qualified Cave guide. Bronze Age finds on Mendip are particularly rare. There is an equivalent site at Bone Hole Cheddar Gorge that may also have been used as a burial chamber. This period is sometimes referred to as the Beaker Period, owing to the Pottery Sherds dated back to this time resembling Beakers. Professor Chamberlain concludes that the Stoke Lane Swallet site was used by the Beaker Period people on 2 separate occasions as a burial chamber separated by several hundreds of years”

This project has spanned over 70 years and is based at Frome Museum and has involved many Scientists and Volunteers during that time. Any enquiries about the finds from Brownes’ Hole and Stoke Lane Swallet need to be directed to Colin Wisbey of Frome Museum or Brian Marshall at the Reception desk at Frome Museum. Both of whom can arrange an appointment to view the Browne’s personal diaries, note books and some of these specimens and other artefacts recovered over that 70 year time span

Press release to Frome Times, Written by Author Andrew Edwards, March 2023

This report contains photographs of material that has been assembled as the “Browne Collection” of Frome Museum, Somerset, England

Permission to view the entire collection of materials can be kindly requested by contacting the Curator of Frome Museum, Somerset, Mr Colin Wisbey. Opening times vary but are usually Wednesday to Saturday 10 am – 2 pm

1 North Parade, Frome BA11 1AT

01373 454611



Figure 1 - A photograph of Frome Museum, home to the Browne Collection, Frome, Somerset. Note: To the North of the Town Centre bridge



Discover Frome and Tourist Information

Frome tourist information is currently situated close to the main Car Park in the Centre of Frome. The Tourist Information Office is called “Discover Frome” and is situated in the Round Towner of the Black Swan Arts Gallery and Bridge Café



Figure 2 - The Discover Frome, Tourist Information Office is currently situated next to the centrally located Car Park in Frome



Figure 3 - Inside the Discover Frome Office are Maps of suggested walks around the Town as well as guidebooks that are available for sale. Any of the sites mentioned in this publication can be located along with appropriate public access footpaths using Ordnance Survey Maps that can be found in the Office. Please note: Quarries are dangerous places and cannot be visited without prior permission of the Quarry owners and the wearing of suitable Personal Protective Equipment

**This report is dedicated to the late Patrick Montague Browne
Mountaineer, Mendip Cave Explorer and Student of Mines
Engineering at Manchester University**

Born: 1930, Frome, Somerset – 1951, Llanberis Pass, North Wales

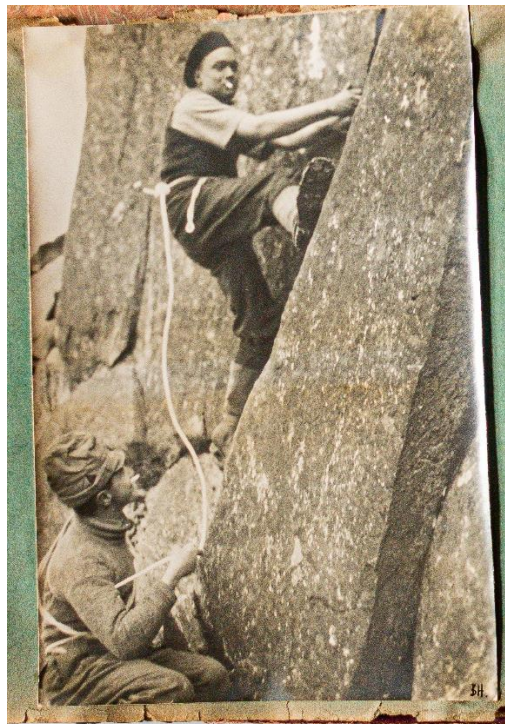


Figure 4 - Patrick Montague Browne leading an ascent of the North Buttress route on Tryfan, Ogwen Valley, North Wales



Figure 5 - Brownes' Hole as it looks today, Stoke Lane, Stoke Saint Michael, Frome, Somerset

Lead Authors and other Contributors:

Andrew Edwards, BSc(Hons), Biomedical Sciences, University of Bradford,
West Yorkshire and co-worker to Colin Wisbey, Curator of Frome Museum,
Frome, Somerset

This publication also contains significant contributions from:

**With reference to the work of Jenna A. Davenport: “The Spatial Distribution
of Dens of Spotted Hyaena (*Crocuta crocuta*) in the Middle and Upper
Pleistocene of Britain”**

*A thesis submitted to The University of Manchester for the Degree of Masters
of Philosophy in the Faculty of Science and Engineering 2021, School of Natural
Sciences, Department of Earth and Environmental Sciences*

Professor Danielle C. Schreve PhD of the Royal Holloway, University of London

Neil Adams, Curator of Fossil Mammals, The Natural History Museum

Professor Andrew Chamberlain, Emeritus Professor of Bioarchaeology,
Bournemouth University

Dr Timothy Knowles of the University of Bristol, for providing the Radiocarbon
Dating Results data

Vince Simmonds, An overview of the Archaeology of the Mendip Caves and
Karst, Mendip Cave Registry and Archive

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***Foreword by Anita Collier, Leader of Frome Town Council,
December 10th 2022***

“The importance of the quarrying industries in Somerset cannot be underestimated for many reasons. Much of what they produce is used locally to help build our Towns, Roads and Villages. As you might imagine, disturbing the ground at such depths, as is necessary, has led to many opportunities for finding fossil remains of prehistoric fauna, plants and humans.

It is wonderful to think that all these priceless treasures that have been found in the Caves of Mendip are making such an invaluable contribution to our knowledge of history”



*Figure 6 – Cloford Quarry, Frome, Somerset (ST 18444) is one of the many geological sites of scientific interest on Mendip. This is the site where the earliest Mammal remains from Britain have been found, named *Microlestes Moorei*, after its finder Charles Moore in 1850. The Quarry is sometimes referred to as the “*Microlestes Quarry*”, David I. Whiteside et al, 2017*

In 1850 a person named Charles Moore travelled to Cloford, Frome, Somerset in order to examine the prehistoric mud and silt deposits that had become exposed in fissures at both the Cloford and Holwell Quarries. These quarries are both situated only 2 miles to the West of Frome, Somerset. This was, at that time, possibly the most important find on Mendip apart from the finds from Aveline's Hole and Gough's Cave. Moore discovered that in many Quarries there are fissures which contain what can be described as "mustard coloured silt". This colouration indicates the prehistoric age of these particular mud deposits in the limestone Quarries of East Mendip. After blasting for limestone has occurred, these muddy fissures become exposed, being fragile they often collapse onto the Quarry floor, making them easy to examine in detail

Another such location is called Limekiln Quarry which is in Mells Village, Somerset. Both Roy Vrench and other members of the University of Bristol Speleological Society, in early 1970 until 1980, excavated some fissures containing "mustard coloured sediment". In these sediments were found Wolverine, Bison, Mammoth and other important Pleistocene mammal species

Figure 7 – The Limekiln Quarry of Mells, Somerset. This is referred to as a Middle Pleistocene find site owing to the types of mammal remains that have been found there by Roy Vrench and members of the University of Bristol Speleological Society in the 1970s-1980s



Significant finds have also been made in quarries such as the Whatley Quarry. Whatley Quarry is within a mile from Limekiln Hill Quarry, Mells. A number of Mammoth remains were found at Whatley by the Quarry workers in 1950



Figure 8 – A view of Whatley Quarry, Mells, Somerset from the Western side. In 1950 remains of a Mammoth were found in this Quarry and were donated to Frome Museum

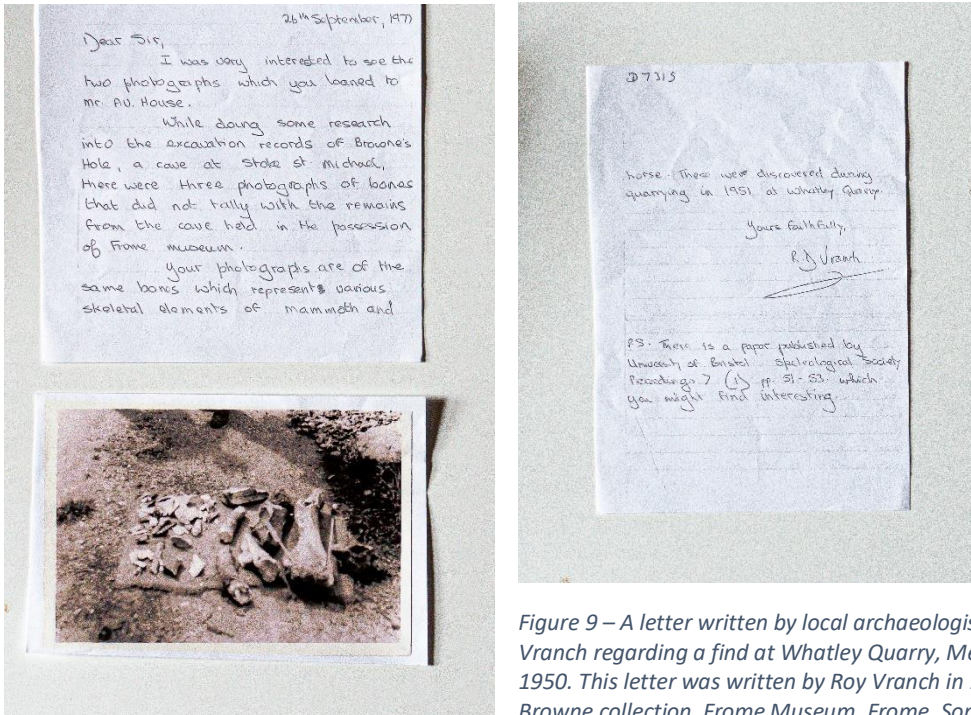


Figure 9 – A letter written by local archaeologist and geologist Roy Vrench regarding a find at Whatley Quarry, Mells, Frome, Somerset in 1950. This letter was written by Roy Vrench in 1977 and is part of the Browne collection, Frome Museum, Frome, Somerset

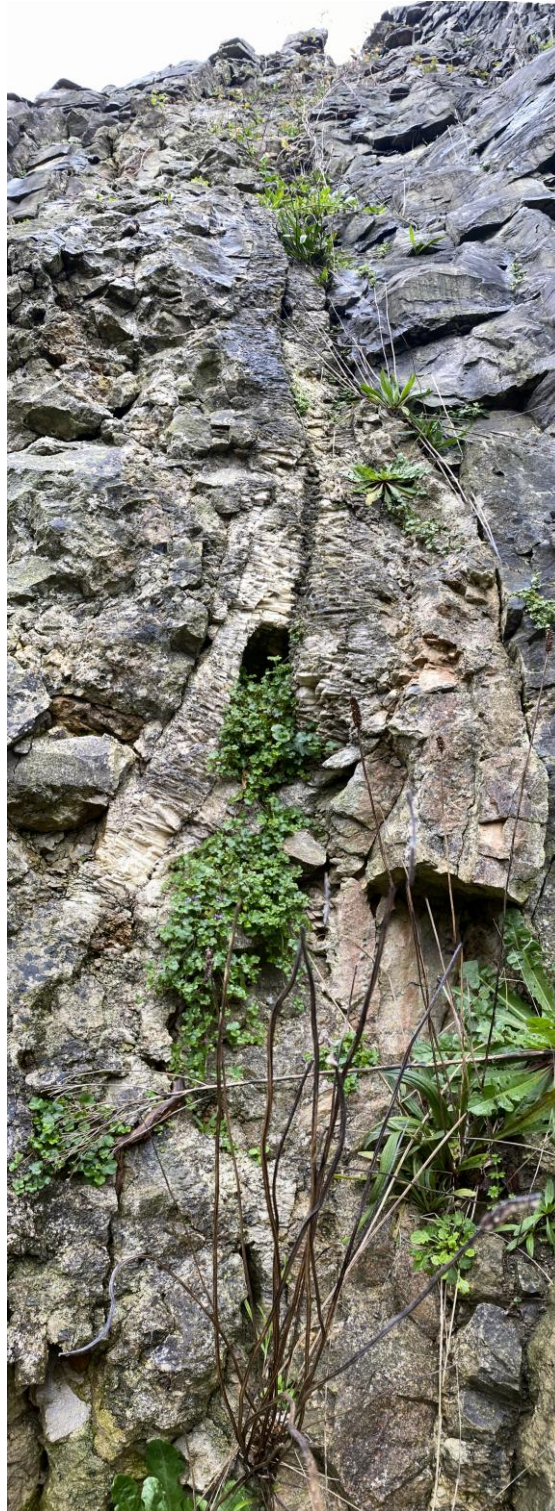
This letter (figure 9) was written by Roy Vrench of Frome Museum with regards to photographs that were possibly taken by the Whatley quarry owner at that time . These photographs were then loaned to local Geologist, Mr Anthony House. Anthony was often on call to assist with the Whatley quarry owners in cases including the discovery of new minerals and fossils, such as those shown in the photograph

Roy was able to confirm that the remains of the Mammoth were kindly offered by the owners of Whatley Quarry at the time to Frome Museum

This relationship of conservation of priceless finds of a historical nature has continued to this day

This photograph serves to illustrate the colour of the Pleistocene bone fissures as they are exposed by blasting of limestone in the quarries

Figure 10 – A closeup view of Cloford Quarry, showing a Neptunian Dyke fissure filled with Calcite crystals. This fissure is similar to one where Moore found the teeth of an early mammal in the 19th Century



Another interesting site, at an undisclosed location, is currently the subject of important research and is only a few miles from the centre of Frome. Frome and its abundant quarries are still at the focus of research into our prehistoric past. Some sites have even yielded the remains of trilobites that existed in our prehistoric oceans millions of years ago



Figure 11 – A site currently being used by research Scientists close to Frome. Note: the age of the soil can be indicated by its colour and in many cases this soil can be thousands of years old. It is thought that there is a Cave underneath this Crag. On Private land but published with landowner's permission. Location not disclosed and no public access allowed

The Earth Science Centre at Moon's Hill Quarry, is situated within the same valley as Brownes' Hole Cave (figure 12)

The Centre was opened by the Princess Royal in 2009 and is sponsored by Wainwright, Aggregate Industries, Tarmac, Hanson, Morris and Perry Limited of Gurney Slade. This impressive Centre provides support for Education groups, local Scientists and is a meeting place for the local Aggregate Companies



Figure 12 – The Earth Science Centre, Moon’s Hill Quarry. An educational and research facility sponsored by local aggregate producers. Opened in 2009 by the Princess Royal



Figure 13 – The Earth Science Centre at Moon’s Hill Quarry also offers transportation to the various aggregate quarry sites of Mendip during the Summer

Introduction

This story seemed destined to never have been written. After the sad death of Herbert Balch, Curator of Wells and Mendip Museum, in 1958, he was replaced as Curator by a Professor Palmer. It was the hope and wish that Professor Palmer would subsequently write the story of Brownes' Hole Cave, Stoke Saint Michael, in full. However, Professor Palmer sadly died soon after Balch in 1962 at the age of 70 years (figure 14)

This story is now being told by myself and Colin Wisbey, Curator of Frome Museum in the memory of the Browne family, Herbert Balch, Professor Palmer and Dr Wilfred Jackson of Buxton Derbyshire

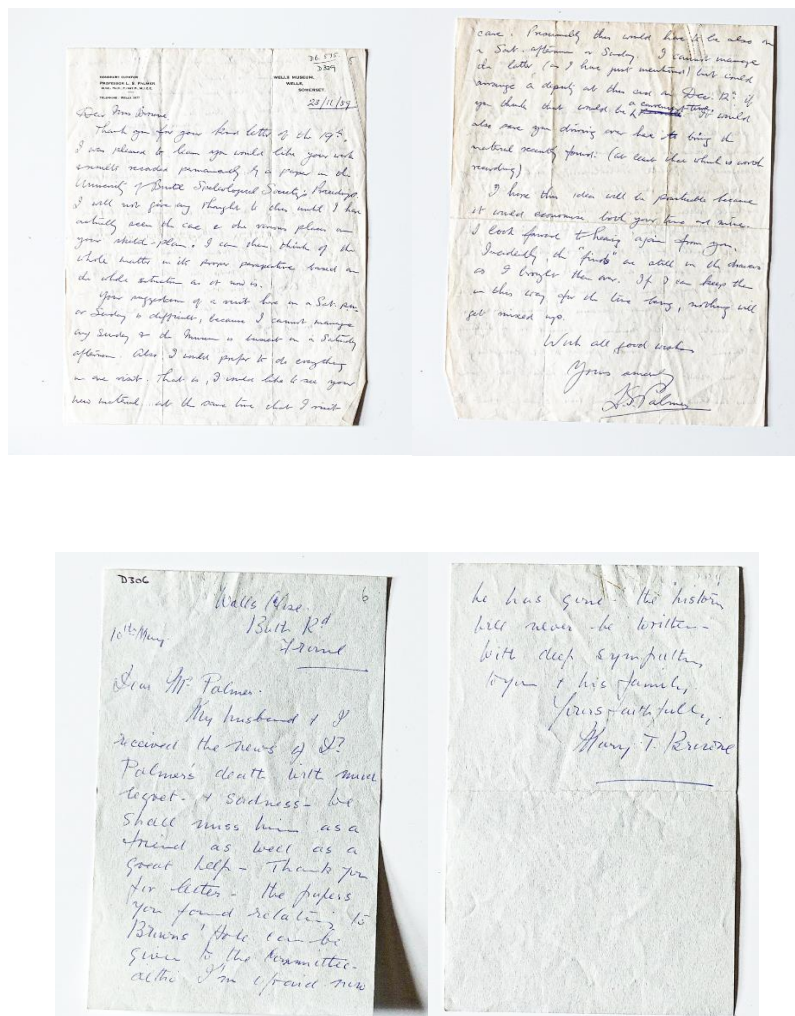


Figure 14 – The letter from Professor Palmer (top of page), Curator of Mells Museum, in 1959, to Mrs Mary Browne, concerning Mrs Browne's wish that the story of Brownes' Hole Cave be published. The letter at the bottom of the page was written by Mrs Mary Browne after she heard of the sad death of Professor Palmer in 1962, just 3 years later

The story starts with an understanding that in 1959, Leslie Montagu Browne, a Coal Merchant from Frome, Somerset, who had saved many precious pleistocene bones that were previously excavated from Brownes' Hole Cave between 1947 and 1953, with his son, Patrick Browne, safely at his home in Trinity Parade, Frome. However, after the tragic death of their son, Patrick, in a climbing accident in Wales, both Leslie and Mary Browne moved to another home at Wells Close, Bath Road, Frome, Somerset. This was a smaller property. The bones needed a new home. The pleistocene bones that were recovered by the Browne family were first offered to Herbert Balch of Wells and Mendip Museum. But upon Balch's sad death, the Brownes' retained these bones in their possession.

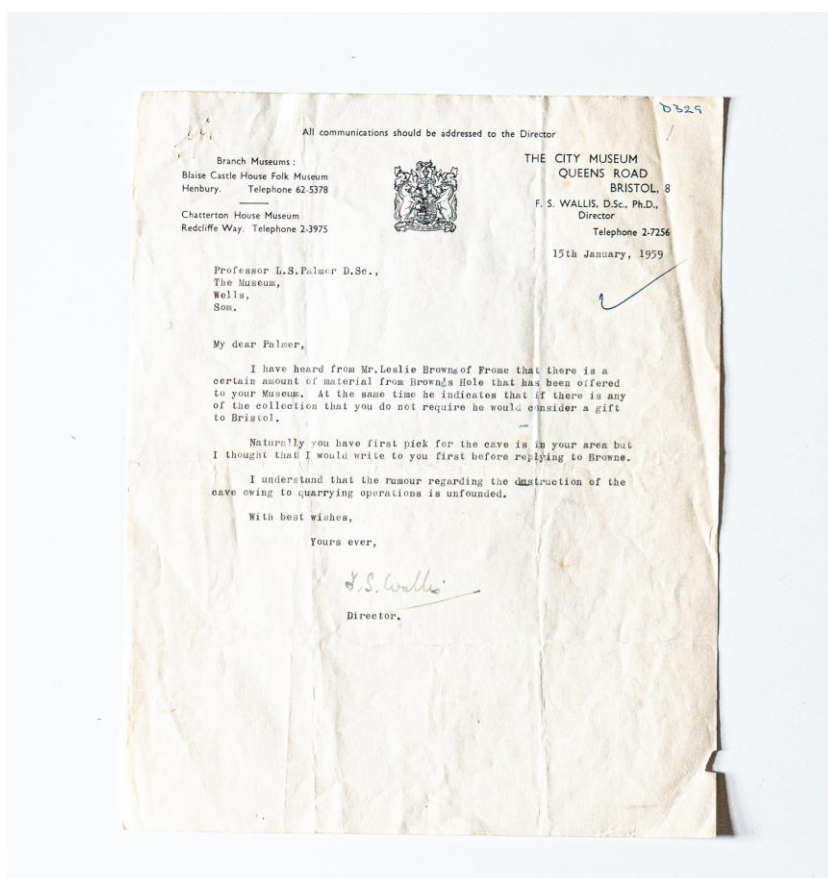


Figure 15 - A letter from a Mr Wallis of Bristol City Museum, was enquiring about the Pleistocene Bones from Brownes' Hole Cave and their whereabouts in 1959. Courtesy of the Browne collection, Frome Museum, Frome, Somerset

There was some confusion as to why the precious Pleistocene bones that were rescued by the Browne family had remained in their possession. The City of Bristol Museum were interested in acquiring them (figure 15), as they had previously been examined by both Herbert Balch of Wells and the eminent Dr James Wilfred Jackson of Buxton, Derbyshire and were of great significance

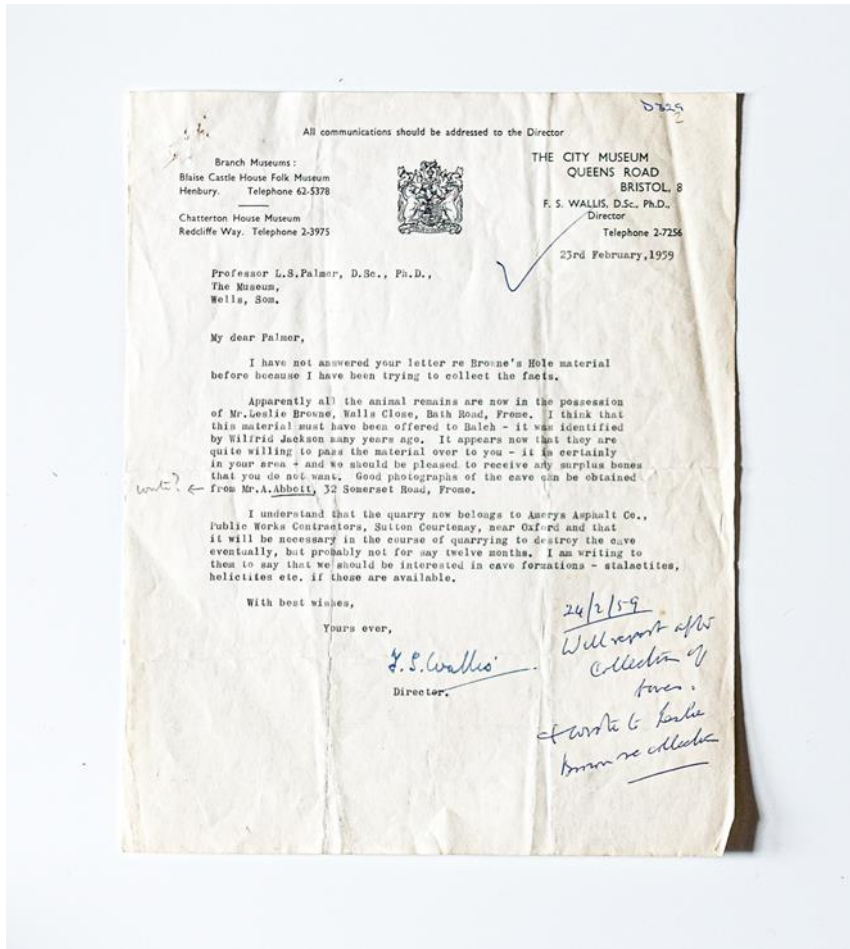


Figure 16 – A subsequent letter sent by Mr Wallis of Bristol City Museum to Professor Palmer clarifies that the Museum in Bristol now understands that the Brownes' Hole Cave Pleistocene bones are in the possession of Leslie Browne, Frome. The bones were examined and identified by both Herbert Balch of Wells and Dr James Wilfred Jackson of Buxton, Derbyshire. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset

The owners of the adjacent Quarry to Browne's Hole, S.C. Gilson and Son, were concerned that no harm should come to the Stoke Lane Valley Caves. They made a request for a plan of both Brownes' Hole Cave and Stoke Lane Swallet Cave to assist in the conservation of both Cave systems (figure 21)



Figure 17 – Photograph of the entrance to Stoke Lane Swallet after the heavy rains of January 2023. Photograph taken by Author, January 2023



Figure 18 – The location of the Stoke Lane Quarry in Cooks Wood. Owned by Gilson and Son. Gilson gave the Brownes' materials to build a railway track and offered to help conserve the Caves in a letter dated 1960. Photograph taken by the Author, January 2023



Figure 19 – The Stoke Lane Valley, leading to the Stoke Lane Caves and Craggs. Photograph taken by Author January 2023



Figure 20 – Looking upwards from the public footpath towards the Brownes’ Hole entrances. Note that Brownes’ Hole is situated under what appears to be an outcrop of limestone crags. Photograph taken by Author, January 2023



Figure 21 - Letter written by the Stoke Lane Quarry owners, Gilson and Son, to Leslie Browne in 1960. Requesting plans of the Caves and information with regards to potential conservation of the Stoke Lane Valley site. Courtesy of the Browne Collection, Frome, Somerset

Acknowledgments

Colin Wisbey, Curator of Frome Museum and all the other volunteers who work tirelessly at Frome Museum in order to make the Museum accessible for all people to use

Brian Marshall, who never ceases to be available in the Museum and who handles all enquiries with diligence, courtesy and care

The Shepton Mallet Caving Club, for being patient in providing many documents regarding Stoke Lane Swallet Caves and their unquavering support

Simon Carpenter, for spending many years helping to put together the Browne Collection at Frome Museum

Roy Vbranch, for spending many hours checking the Brownes' Hole Cave inventory and re-cataloguing Jackson's original inventory of 1951

Jenna A. Davenport, for her research paper : "The Spatial Distribution of Dens of Spotted Hyaena (*Crocuta crocuta*) in the Middle and Upper Pleistocene of Britain"

A thesis submitted to The University of Manchester for the Degree of Masters of Philosophy in the Faculty of Science and Engineering 2021, School of Natural Sciences, Department of Earth and Environmental Sciences

To Emeritus Professor Andrew Chamberlain of Bournemouth University for travelling to Frome to examine human skeletal remains and analysing the results of the Carbon-14 dating of Human remains

Professor Danielle Schreve of the Royal Holloway, University of London, who travelled to Frome in 2015, in order to verify the bone samples and conduct further scientific examination after Dr Jackson's work in 1951

Neil Adams, Curator of Fossil Mammals, The Natural History Museum

Graham Mullan and Linda Wilson of the University of Bristol Speleological Society for their advice and support for applying for a Grant to have human skeletal remains radiocarbon dated

To the staff at South West Heritage, for all their time and consideration in finding documents

To the staff at the British Cave Research Association, for all their time in sourcing documents and for Awarding the Grant to the Frome Museum so that the Human remains can be dated

The Somerset Standard, for allowing us to use their article in 1951 regarding Patrick Browne's tragic death in North Wales

To all the Cavers, Quarry people and Miners of Mendip who have risked their lives and in some cases sadly paid the ultimate sacrifice in retrieving priceless artefacts from the Caves and Swallets of Mendip

To the Quarry owners whom, without their support and diligence, most of the significant Pleistocene finds, would not have been retrieved

To the Trustees of Frome Museum, for making various samples available for photographic and other forms of examination

To the staff at Buxton Museum, for providing the letter concerning Jackson's visit to Frome

The staff of Mountain Rescue England and Ogwen Mountain Rescue, for information about the photographs of the locations where the Brownes' climbed

Dr Timothy Knowles of the University of Bristol, for conducting the Carbon-14 dating on the Human remains

Vince Simmonds and The Mendip Cave Registry and Archive

Nick Ashton, Honorary Professor, University College, London



Figure 22 – Pencil sketch drawing of Brownes' Hole Cave entrance in the Pleistocene by Jane Brayne, 6th September 2016, Evercreech, Somerset. Annotated in pencil by the artist Courtesy of the Browne Collection, Frome Museum, Frome, Somerset

Section 1

Significant findings from Brownes' Hole Cave, the relevant reading and current research



Figure 23 - A representation of the entrance to Brownes' Hole Cave during the Pleistocene, when occupied by Hyaena. This drawing represents some of the mammal remains found within the cave by Patrick Browne 1947-1951. Drawing by Jane Brayne, 6th September 2016, Evercreech, Somerset. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset



Figure 24 – Photograph taken by the Author from the interior of Brownes' Hole Cave and looking through the main entrance, in the Summer of 2022, towards the South West

Significant findings from this Report about the faunal remains discovered in Brownes' Hole, Stoke Lane, Stoke Saint Michael, Frome, Somerset:

In 1947 the late Patrick Montague Browne, a former pupil from the King's School in Bruton and Frome resident, discovered what was described at the time as a fox or badger sized burrow in the Stoke Lane Valley. This was adjacent to an active Oolitic Limestone Quarry, which was owned by the S.C. Gilson and Sons, Quarry Company of nearby Holcombe, Radstock. Excavations by the Browne family over the subsequent 4 years revealed a complete set of mammal fauna from the Pleistocene Era. Subsequently, Dr J.W. Jackson of Buxton, Derbyshire travelled to Frome in 1951 in order to help identify these mammal faunal remains. This assessment was based upon his considerable experience with similar finds from other parts of Britain. Jackson's summary of the major finds from Brownes' Hole Cave are tabulated below:

Pleistocene Mammal (Excludes :Sheep, Dog, Pig, Hedgehog,)	Frequency of occurrence of an individual body part that can be identified from the assemblages taken from Brownes' Hole Cave
Hyaena	13
Bison	6
Ox	51
Red Deer	11
Roe Deer	6
Reindeer	10
Horse (Small)	13
Human	9
Hare	3
Bear	2
Bird	1
Rhinoceros	4
Badger	8
Dog	2
Red Fox	11
Mouse	1

Figure 25 - The Table above summarises the total number of assemblage for each mammal species that we believe to have been deposited in the Pleistocene Era at Brownes' Hole Cave, after Jackson, 1951. Sheep and Hedgehog are excluded as they are not relevant to Davenport's attached survey of Pleistocene Mammals (2021) later in this report

While studying for her PhD at London University in 1997, Professor Danielle Schreve, now of the Royal Holloway, University of London, was successful in demonstrating that a cycle of glacial periods interspersed with interglacial, warmer periods, occurred on Mendip. Over the past 1,000,000 years these glacial periods will probably have caused a series of mass extinctions of the Mammals on Mendip and then a series of warmer periods may have enabled migrations of Mammals back into Mendip across the land bridge from Europe, that existed during much of that time. Schreve refers to this process as “recycling” of the mammal fauna. The key assumption is that all the fauna of Britain became extinct during each of these glacial periods

The collections of mammal assemblage from each separate Cave or den site across Mendip differ from each other in some cases. This is possibly a reflection of the extinction events that occurred between the warmer periods of re-occupation of the Mendips. An excellent example is provided by Neil Adams, a student of Leicester University, who was able to find a Hippopotamus tooth at Westbury Sub-Mendip Quarry in 2015. This was one of the two known locations on Mendip where Hippopotamus assemblage have been found. Therefore, Neil was able to demonstrate that changes in climate were probably driving the different types of mammal fauna being found at different locations. In the case of Mendip, Hippopotamus assemblage were found at Western Mendip sites only. No Hippopotamus remains have been found at Brownes’ Hole Cave nor anywhere else on Eastern Mendip

These collections of faunal species from each find site or Cave are referred to as the “Mammalian Assemblage-Zones” (Carrant A. & Jacobi R.M, 2001 and 2011), Section 9. We could also refer to these as “Mammalian Assemblage Time Periods” and these Zones are named after their respective, significant and standardised find sites. One such site is called Pin Hole Cave, Cresswell Crags, Derbyshire. In this case the full title would be “Mammalian Assemblage-Zone, Pin Hole Cave”. This is also referred to as a dated Marine Isotope Stage 3 site

Marine Isotope Stages (MIS) were initially developed by Cesare Emiliani (1950, 1957) together with John Imbrie and Nicholas Shackleton and the work of

many others (Wright, 2000). The Marine Isotope Stages are used as a means to date periods of time in our prehistory, by using a difference in the ratio of the isotopes Oxygen-16 to Oxygen-18 in core samples from deep beneath the Seabed. William Francis GIAUQUE and Herrick Lee Johnston jointly discovered the existence of the stable Oxygen Isotope of Oxygen, called Oxygen-18, between 1925-1925 at the University of California. Harold Clayton Urey (1931), initially discovered that these stable Oxygen-18 isotope levels in the Sea are reflected in the content of Oxygen-18 discovered in the Calcite skeletons of marine micro-organisms (1947), (Wright, 2000, p 427). In cold periods or periods of glaciation, in the Seawater, the Marine Isotope levels of Oxygen-18 increase compared to levels of Oxygen-16. In warmer periods the Seawater levels of Oxygen-18 compared to Oxygen-16 in Sea water fall. This is reflected in the Seabed core samples and happens on a cyclical basis over many thousands of years in our history

But the correlation between Marine Isotope Stages and corresponding terrestrial glacial and interglacial stages is not as strong as Scientists would like it to be. This is the reason for the further development of a “Mammal Assemblage-Zone” method of estimating or identifying both cooler and warmer periods that have occurred on the land. This is largely based upon the Mammal remains that have been discovered in Caves and shelters across Britain, see sections 8 and 9

An MPhil student of the University of Manchester (2021) called Jenna A. Davenport of the School of Natural Sciences, Department of Earth and Environmental Sciences, further developed the works of Currant, Jacobi and Danielle Schreve by identifying the types of Mammalian assemblage collections that have been found specifically in some of the Hyæna Cave shelters across Pleistocene Britain and has correlated or compared these collections with their associated Marine Isotope Stages

The following is taken from Davenport, J.A. (2021), page 30, Based upon the work of Currant and Jacobi (2001 and 2011)

MIS	Date	Climate	Sea levels	Fauna	Humans
MIS 5e	128,000-116,00 BC	Summer temperatures warmer by +3-+5 C Winter temperatures the same as today	5.5-9m increase in Sea levels. Britain separated from Europe	Common Shrew, Arctic Hare, Bank Vole, Water Vole, Field Vole, Wood Mouse, Wolf, Red Fox, Brown Bear, Badger, Spotted Hyaena, Wild Cat, Lion, Straight-Tusked Elephant, Narrow-Nosed Rhinoceros, Wild Boar, Hippopotamus, Red Deer, Fallow Deer, Giant Deer, Bison	Absent
MIS 5c	103,000-96,000 BC	Milder than MIS 5e	20m lower than present levels. Britain separated from Europe	Wood Mouse, Northern Vole, Field Vole, Water Vole, Bank Vole, Straight-Tusked Elephant, Woolly Mammoth, Narrow-Nosed Rhinoceros, Spotted Hyaena, Wolf, Badger, Red Deer, Roe Deer, Bison, Common Shrew	Absent
MIS 3	60,000-25,000 BC	Climate warm until 40,000 BC and much colder at 39,000 BC onwards	Sea levels 60-90m below current levels. Britain connected to Europe (Doggerland in existence)	Arctic Hare, Red-Cheeked Suslik, Wolf, Red Fox, Brown Bear, Stoat, Polecat, Spotted Hyaena, Lion, Woolly Mammoth, Wild Horse, Woolly Rhinoceros, Giant Deer, Reindeer, Bison	Present

Figure 26 - This Table is taken directly from Davenport (2021, Page 30). Based upon the work of Currant and Jacobi (2001 and 2011). Davenport has identified assemblages that have been found in Hyaena Den or Shelters from over 80 sites in Britain. Looking at the Table above and comparing with the frequency distribution of finds identified by Jackson, Figure 2, it is reasonable to assume that the dating of Brownes' Hole Cave assemblage would be placed at Marine Isotope Stage-3 (60,000-25,000 BC)

In conclusion, the significant find, from examination of the complete collection of mammal assemblages from Brownes' Hole alone, would date Brownes' Hole Cave Mammalian Assemblage-Zone to having been occupied in the third Marine Isotope Stage or MIS-3. This correlates to a dating of the pleistocene occupation of Brownes' Hole Cave to approximately between 60,000-25,000 BC.

Radiocarbon dating using the Carbon-14 isotope would also assist in offering a more precise estimate of age for the human artefacts that were also found in Brownes' Hole Cave, provided the human remains are no older than approximately 60,000 BC

In March 2023, the University of Bristol released the results of the Radiocarbon dating on 3 samples of Human skeletal remains. Two from Stoke Lane Swallet Cave and One from Brownes' Hole Cave . These Caves are on opposite side of the same valley from each other. A statement from Emeritus Professor Andrew Chamberlain, a Bioarchaeologist from the University of Bournemouth, offers a detailed interpretation of these radiocarbon dating results:

The answer to a 70 year question posed by Frome Museum has finally been revealed with the help of Graham Mullan of the University o Bristol, Linda Wilson of the University of Bristol and Professor Andrew Chamberlain of the University of Bournemouth

By working together, Graham Mullan, Professor Andrew Chamberlain, Linda Wilson, the Trustees of Frome Museum and myself applied for funding from the British Cave Research Association in order to get these human remains Radiocarbon dated. In addition, Human remains from another Stoke Lane Cave site, called Stoke Lane Swallet, were also examined. These consisted of one almost complete Human Skull and several Human Skull that is also housed at Frome Museum. It was decided to send these off for Radiocarbon dating as well. It needs noting that no Hyaena or Woolly Rhinoceros remains were found at Stoke Lane Swallet

Dr Timothy Knowles of the University of Bristol Chemistry Department undertook the Radiocarbon dating procedures on all the Human bone samples In a commentary kindly provided by Professor Andrew Chamberlain.

“The results of the Radiocarbon dating from Brownes' Hole indicate that the Human long bone was relatively recent in age. Dating back to the last Century BC. Just prior to the date that a Roman Coin was also deposited at Brownes' Hole. Professor Andrew Chamberlain explains to us that many of the Caves on Mendip were used as natural burial chambers at around that time. This included the Wookey Hole Cave that was also used for Cave burials”

Professor Chamberlain continues to comment on the rest of the results.

“The results from the dating of the Skulls recovered from nearby Cave called Stoke Lane Swallet indicated that they were much older than those at Brownes’ Hole. They were approximately 4,200 and 3,800 years old. We might refer to this as the Bronze Age. The age difference of 400 year raises questions about the use of the Stoke Lane Swallet site. Approximately 4,000 years ago the bone chamber, where the skulls were deposited, would have been more accessible than it is today. Requiring experienced caving skills and is not recommended for inexperienced exploration without a qualified Cave guide. Bronze Age finds on Mendip are particularly rare. There is an equivalent site at Bone Hole Cheddar Gorge that may also have been used as a burial chamber. This period is sometimes referred to as the Beaker Period, owing to the Pottery Sherds dated back to this time resembling Beakers. Professor Chamberlain concludes that the Stoke Lane Swallet site was used by the Beaker Period people on 2 separate occasions as a burial chamber separated by several hundreds of years”

In the second analysis, using Davenport’s designation process, as applied to British Hyaena Den mammal assemblage collections we can use the tabulation process shown below, to help give the Hyaena Den at Brownes’ Hole Cave at least one of three designations or uses during its occupation (Davenport, 2021, page 32), (Diedrich and Zac, 2006), (Diedrich, 2011b and 2011c):

Assemblage type	Associated with Prey Depot	Associated with a Communal Den	Associated with a Natal Den	Correlations with Brownes’ Hole Assemblage
Abundance of prey remains	X	X	-	X
Acid etched bones	X	X	-	X (Schreve, 2015)
Gnaw marks on bones	X	X	X	X (Schreve, 2015)
Coprolites (manure)	X	X	-	Not known
Cannibalism	X	X	-	X (Possible)
Natal to young juvenile Hyaena remains	-	-	X	- None
Older aged juveniles to elderly Hyaena remains	-	X	-	Elderly remains
Adult to early Hyaena remains	X	-	-	- None
Nibbling sticks	-	Less frequent	X	None
Deciduous Teeth	-	X	X	None ?

Figure 27 - This Table was developed by Davenport (2021, page 32), from the works of Diedrich and Zac (2006), Diedrich (2011a and 2012b). This enables an analysis of finds from a suspected Hyaena Den to be used in order to classify a suspected Den into one of 3 kinds; Prey Depot, Communal Den and Natal Den. On this basis, assuming that we have all the assemblages that were removed from Brownes’ Hole Cave available for analysis, Brownes’ Hole Cave appears to have been used as a Communal Den

Therefore, in conclusion, Brownes’ Hole Cave presents *at this stage* as a Communal Hyaena Den of the 3rd Marine Isotope Stage, *which could possibly* date from approximately 60,000-25,000 BC. With a much later human occupation

Summary of the Mammal Assemblage-Zones for Britain largely based upon Currant, A. and Jacobi, R. 2001,2011, Chapter 10, page 165, without material from Chris Stringer's book "Homo Britannicus" (2006)

Name of MAZ principle find site	Approximate dates or MIS	Significant mammalian feature	Notes
Cromerian interglacial Westbury Sub-Mendip Quarry, Somerset	MIS 19, 787,000 BP Earth's Magnetic reversal:780,000 BP	Hippopotamus (Neil Adams), Primitive Cave bear, primitive Rhinoceros, Wild dog, Jaguar, Scimitar-toothed Cat, Mimomys savini vole	Warmer. An anomaly discovered by Neil Adams in 2015, at Westbury Sub-Mendip Quarry, Somerset. A warm period immediately after the last magnetic polar reversal
	MIS 18, 760,000 BP		Cooler
Cromerian interglacial Pakefield, Cromer, Suffolk	MIS 17, 712,000 BP	Human artefacts, Voles: <i>Mimosys pussilus (rare after 650,000 BP)</i> , <i>Mimosys savini</i>), Hippopotamus, Rhinoceros, straight-tusked elephant, 3 species giant deer, scimitar-toothed cat, lion, hyaena, wolf, bear	Warmer, evidence of human stone tools. Dating attempted by amino acid conversion from Laevo rotatory molecules to Dextro rotatory molecules after death of shellfish. The proportion of Dextro rotatory amino acid molecules increases with age after death of the shellfish
	MIS 16, 659,000 BP		Cooler
	MIS 15, 621,000 BP		Cooler
	MIS 14, 568,000 BP		Cooler
Cromerian interglacial Boxgrove, Chichester, Sussex (Also at Westbury Sub-Mendip)	MIS 13, 528,000 BP	Homo Heidelbergensis, bison, horse, red deer, roe deer, elephant, rhinoceros, lion, hyaena, wolf, boar, 10 species of large and small carnivore, bat, mole, Arvicola terrestris cantiana vole	Warmer
Anglian Ice Advance	MIS 12, 474,000 BP		Cooler
Hoxnian Interglacial Swanscombe Doggerland	MIS 11, 427,000 BP	Homo Neanderthalensis (female), rhinoceros, mussels, pike, eel, perch, salmon, dolphin, two types of beaver, cormorant, osprey, badger, marten, rabbit, hare, shrew, vole, red, roe, fallow deer, boar, wolf, horse, bison, giant ox, giant deer, straight-tusked elephant, two kinds of rhinoceros, lion, macaque monkey	Warmer. Evidence of Neanderthal tools found along Suffolk and Kent coastlines
	MIS 10, 364,000 BP		Cooler
	MIS 9, 334,000 BP		Warmer
	MIS 8, 301,000 BP		Cooler
Crayford, London	MIS 7, 244,000 BP	Corbicula fluminalis, Clam	Warmer
Bacon Hole, Gower, Wales	MIS 6, 190,000 BP	Small Horse	Cooler. Land bridge crossing to Europe possibly open. No Humans
Bacon Hole, Gower, Wales and Banwell Bone Cave, Somerset, Joint Mitnor Cave, Devon	MIS 5e, 130,00 BP	Spotted Hyaena, Narrow-nose rhinoceros, Hippopotamus	Warmer. High sea level event Island Britain ?. No humans
	MIS 5d, 115,00 BP	Very little	Cooler. Possible extinction event. Island Britain ?. No humans
	MIS 5c, 106,000 BP		Warmer. Island Britain ?. No humans
	MIS 5b, 93,000 BP	Very little	Cooler. Possible extinction event. Island Britain ?. No humans
Banwell Bone Cave, Somerset	MIS 5a, 85,000 BP	Island fauna of Britain. Bear, Wolverine, Bison	Warmer. Closure or flooding of land bridge to Europe. Island Britain. No humans
Dating above is often achieved by Uranium series decay, dating below is achieved by radiocarbon dating			
Brean Down, North Somerset	MIS 4, 74,000BP	Woolly mammoth, Wild horse	Cooler. Land bridge to Europe probably opened once more to allow European animals to migrate back to Britain. No humans
Pin Hole Cave, Derbyshire Brownes' Hole Cave, Mendip	MIS 3, 60,000BP	Human artefacts, Woolly mammoth, Wild horse and Hyaena, Bison, Woolly Rhinoceros	Warmer. Possibly migrated from Europe to Britain after a cooler period
Dimlington Stadial	MIS 2, 24,000BP	Modern human, Woolly Mammoth, Musk Ox	Cooler. Musk Ox is a cooler period indicator species as they can survive extreme cold climates
Gough's Cave, Cheddar, Somerset	MIS 1, 11,600BP	Modern human, Mammoth, Reindeer, Auroch	Warmer period. Possible human scouting groups to Britain
Allerod oscillation	MIS 1, 11,130-12,600 BP	Moose, Elk, Auroch	Warm and moist period. England and Wales were connected across the Bristol Channel by means of a Birch woodland
Younger Dryas, Chelm's Hole, Cheddar	MIS 1, 10,150-10,995BP	Reindeer, Red deer	Incomplete mammalian assemblage due to Cave destruction by quarrying activities

Section 2

The life of Patrick Montague Browne



Figure 28 - Drawing by Jane Brayne, 6th September 2016, Evercreech, Somerset. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset



Figure 29 - The entrance to Browns' Hole Cave, Stoke Lane, Photograph taken by Author, Andrew Edwards, January 2023

Dedication

*This report is dedicated to the life of Patrick Montague Browne of 5 Trinity Parade,
Frome, Somerset and latterly of Walls Close, Bath Road, Frome*

Brownes' Hole Cave, Stoke S^t Michael, Frome, Somerset

OS ST 66898 47556, East: 366897, North: 147556,

125m North East of Stoke Lane Swallet 240 degrees to the South West

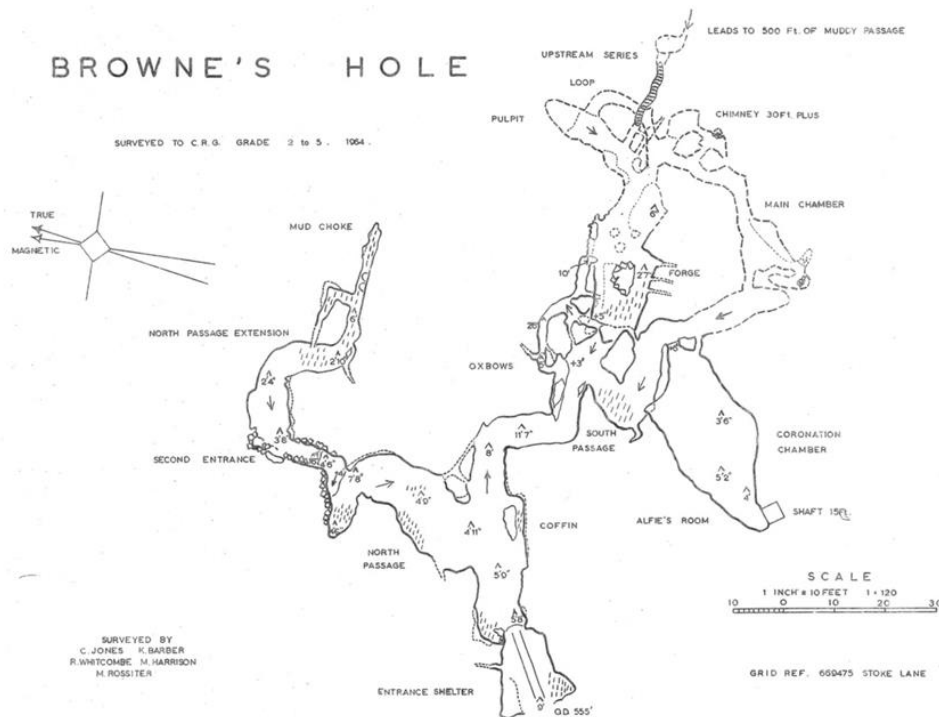


Figure 30 -Survey of Brownes' Hole Cave. Named after the late Patrick Montague Browne of Frome, born October 1930 (Frome), deceased August 1951 (Llanberis Pass, Gwynedd, Wales). Map courtesy of the Browne Collection, Frome Museum, Frome, Somerset

Born in 1930, Frome, Patrick was the only son of both Leslie and Mary Browne. Leslie Browne was a Coal merchant in Frome, he had Offices at 27 Christchurch Street East, Frome and at the close by Wallbridge railway sidings. It is also thought that Patrick was the only grandson of a Rhodesian pioneer called Henry Browne (Somerset Standard, August,1951) . Patrick's paternal



Figure 31 -The Marriage of Leslie M Browne to Mary Turner Reynolds in Devon, 1929. Registered at St Thomas, Exeter



Figure 32 - 27 Christchurch East, Frome, Somerset. Offices of the Frederick Bendle and Sons, Coal Merchants. Patrick's Maternal Grandparents' Company Office

grandfather, may also have been referred to as Harry Browne. Nonetheless, Harry Browne was born in 1870, Brentwood, Middlesex. Harry married his wife, Patrick's grandmother, Laura in 1896, in Devon. Laura's birth was recorded in 1871, Frome, Somerset. Her father, Patrick's maternal great-grandfather, was Frederick Bendle, born 1842, the founder of Frederick Bendle and Son, Coal Merchants, 27 Christchurch East, Frome. Sadly, by 1891, Frederick Bendle was Widowed.

Frederick Bendle, Patrick's maternal great-grandfather, also had a Son, William Bendle, Patrick's great-uncle, who was born in 1879. William Bendle was eventually Married on 15th August 1910 at Holy Trinity House, Cheshire, England, to Dorothy Helen Lyon. They moved to Heaton, Northumberland and at the age of 32 years he Practised as a Doctor of Medicine. This left the Bendle Coal Merchants of Frome without an heir. But this was to change when Leslie Browne, Patrick's father, was born. Leslie, Patrick's father, was born in Sidbury, Devon in 1901. Leslie's Birth was recorded as Honiton. But in the Census of 31st March 1901, Harry Browne, Patrick's paternal grandfather, is recorded as living in Otterton, Devon with his wife Laura Browne, Patrick's grandmother and their new born son, Leslie. The district where they lived was recorded as being at St Thomas, this refers to a part of Exeter. This explains why, in 28th October 1929, the Registration of Marriage between

Leslie M Browne and Mary T Reynolds (Patrick's mother) is listed as "St Thomas", Exeter. In the 1911 Census, Harry Browne, Patrick's grandfather, is listed as living in Tynte's House, Tent Lane, Mells, Somerset, as a "Rock excavator" in the local Quarries. This is close to Lime Kiln Hill Quarry and Whatley Quarry. Leslie, their son was to work for Patrick's great-grandfather, Frederick Bendle, at their family owned Coal Merchants in Frome. Subsequently, Patrick Browne was born in the Autumn of 1930 in Frome.



In a portrait of Patrick Browne is written underneath “alias Harry Lyne”. A possible reference to the famous film titled “The Third Man”. One could speculate that he adopted his love of exploring from his paternal grandfather (Somerset Standard August, 1951). It is possible that Patrick’s paternal grandfather, Henry Browne, had travelled to Rhodesia as either a farmer or a Copper mine prospector to the North of that Country. Though his reasons for travelling to Rhodesia are not established, it would be nice to think that Patrick gained his interest in mining from his ancestors. Indeed, Patrick was educated in Frome at the preparatory school for Frome Grammar and was later educated at the prestigious King’s School Bruton. Weekends were spent exploring Mendip’s Caves and Swallets with his father Leslie Browne

Figure 33 – Above. Photograph of Patrick Montague Browne. Alias "Harry Lyne" after his paternal Grandfather "Harry" prospector of Rhodesia. Photograph Courtesy of the Browne Collection, Frome Museum, Somerset

Figure 34 – Bottom left-The view from behind the family home of the Brownes' in Frome circa 1950. The greenhouses are no longer in situ. Courtesy of the Browne Collection, Frome Museum, Somerset



Figure 35 – Above right- The exterior of 5 Trinity Parade, one time residence of the Browne family of Frome, Somerset. Photograph taken December 2022

Occasional Holidays were spent in Scotland and North Wales with his father. One specific location was at the Old Barn at Blaen Nant Farm, in the Ogwen Valley (OS GF SH644 608) not far from Mount Tryfan (OS SH 66454 595500).



Figure 36 - A series of photographs taken of training expeditions to North Wales. Where the Browne family together with Morris, Crabtree, Cattle and Len navigated the considerable distance through to North Wales to stay in the Bunk House in the Ogwen Valley, at Blaen Nant Farm, close to the base of Tryfan. Courtesy of Frome Museum, Somerset (OS SH 66454 595500)

The charge was according to whether they stayed at the dry end of the hut, which was 6d per night or the wet end of the Hut, which was 3d per night. In the next photograph, the Browne's are photographed ascending Tryfan on the North Buttress route on the Eastern face of Tryfan

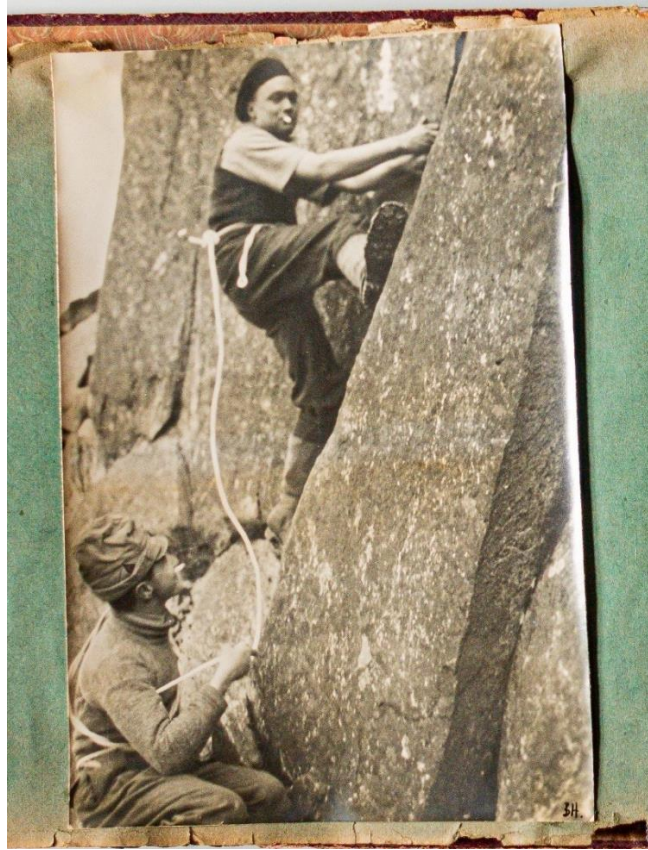


Figure 37 - Patrick Montague Browne ascending Mount Tryfan via the Eastern face of the North Buttress route using Hemp rope. Courtesy of the Browne Collection, Frome Museum, Somerset OS SH 66454 59500

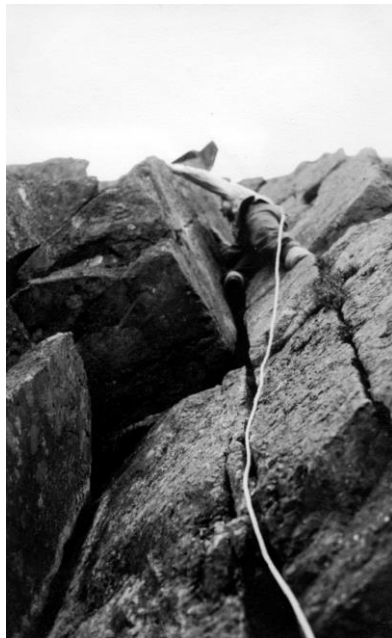


Figure 38 - Two additional photographs from the Ogwen Valley showing the ascent of Tryfan via the Eastern face of the North Buttress route. It is believe that Morris is leading in the photograph on the right. Photograph courtesy of the Browne Collection of Frome Museum, Somerset OS SH 66454 59500

Patrick's first job was in the Offices of Messrs Bendle Coal Merchants of Frome. The Great Western railway provided sidings at a place called Bendle's Wharf. The sidings have since been built upon. But the original mineral railway exists today and is used by the Whatley Limestone Quarry, Mells, which is currently owned and operated by Hanson Aggregates. Quarrying industries provide a significant source of employment for the people of Frome



Figure 39 - The site of Bendle's Coal Wharf was to the right of this panorama, under the new property development called "Bendall's Wharf". This is where Patrick's father, Leslie Browne, had an Office. This is also where Patrick gained his first employment with a coal merchant in Frome, Somerset



Figure 40 - Bendle's Coal Wharf had sidings that were situated at the spot from where this photograph was taken. Messrs Bendle and Company supplied most of Frome and the surrounding area with its domestic coal. The Wharf was to the left of this panorama

Thereafter Patrick graduated from King's School, Bruton and studied Mines Engineering at Manchester University. For part of that time whilst at University, Patrick lived in Bethesda and pursued his love of Climbing and Mountaineering as well as working for a Mining Company in North Wales. Patrick also worked for the Saunders-Roe Catalina Flying Boat Factory on Anglesey (figure 41)



Figure 41 - While Patrick Browne became a student of Mines Engineering at Manchester University, he was employed by the famous Saunders-Roe Catalina Flying Boat factory at Beumaris, Anglesey, North Wales. At this site Catalina flying boats were converted for reconnaissance purposes. One such flying boat spotted the German flagship, the Bismark. This photograph was taken by Martyn Jones, a photographer on the popular Flickr site, who has given me permission to use this for our publication

The temptation to go climbing with his friends whilst on vacation from the University was always in his mind. Manchester was 106 miles from the Ogwen Valley and there was an adequate rail service owing to the quarrying activities at Bethesda. On one occasion, at the age of 21, Patrick chose to lead a group consisting of himself and 2 friends to a base camp in the next valley from Ogwen, this is called the Llanberis Pass. He had previously been to this location twice before.

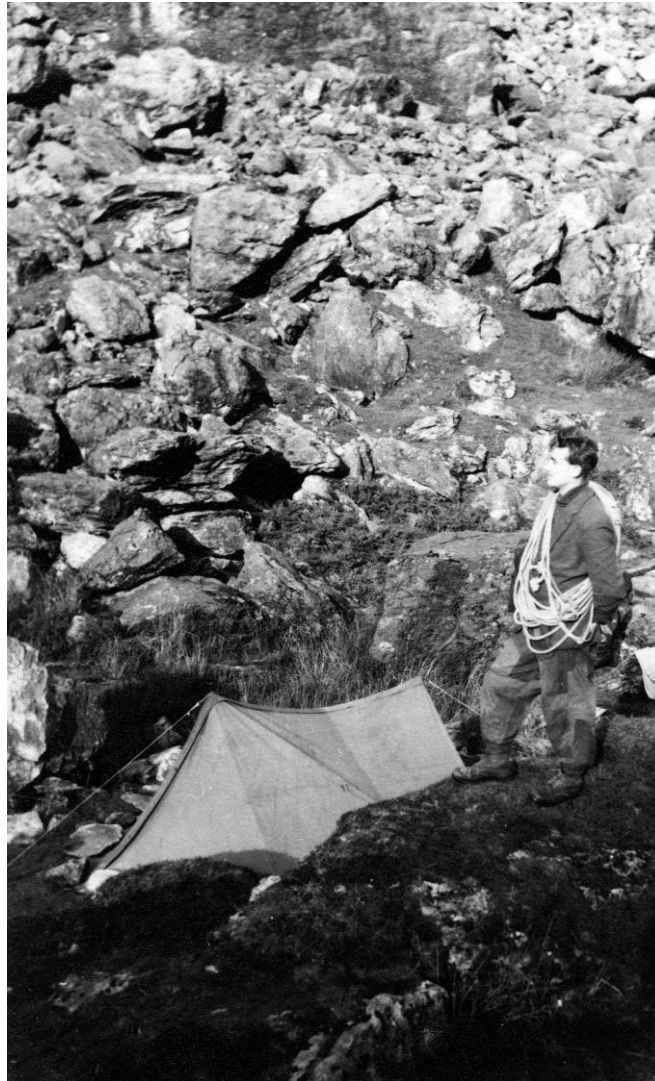


Figure 42 - The base Camp in the Llanberis Pass, close to the place where Patrick was leading a team of himself and 2 others on a training climb of Clogwyn y Grochan. Courtesy of the Browne Collection, Frome Museum, Somerset (OS SH 62287 57213)

They were now situated at the foothills of Mount Snowdon (OS SH 60930 54287), the highest Mountain in England and Wales, they pitched a simple tent close to some Craggs which they planned to climb which are called Clogwyn y Grochan. His associates were called Derek Greenwood a 16 year old Schoolboy from London and Bryan Helsby, of Woodland Avenue, Gorton, Manchester, an apprentice Machinist. After the first pitch, both Greenwood and Helsby tied themselves to an appropriate rock. Browne was progressing towards the second pitch. His ascent progressed well, until he reached an overhang, just before reaching the top he lost his foothold and was heard to say "I can't make it !...I'm coming off !" and Patrick fell 60 feet past his companions. His second prepared himself, took hold of the rope and took in the slack. Briefly, the Rope was taut, however, being made from damp hemp material, it was not able to take his weight. The second found himself holding onto the end of a

loose length of rope. Browne had firstly crashed into the Rock and the Rope had broken at a running belay, Browne fell headlong into the rocks at the bottom. Patrick died instantaneously from fractures sustained to his Cranium. Patrick Montague Browne's body was laid to rest in Caernarfon, Gwynedd, North Wales



Figure 43 - This is the story of Schoolboy, Patrick Montague Browne's discovery of a Pleistocene Hyaena Den at Stoke St Michael, Somerset. Pencil Drawing by Jane Brayne, 6th September 2016, Evercreech, Somerset. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset

Section 3

The discovery of the Brownes' Hole Cave



Figure 44 - Drawing by Jane Brayne, 6th September 2016, Evercreech, Somerset. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset



Figure 45 - The entrance to Brownes' Hole Cave, Stoke Lane, Photograph taken by the Author, Andrew Edwards

Introduction to the Geology of Stoke Lane, where Brownes' Hole is situated:

“Stoke Lane Quarry quarried Vallis Limestone member, from the lower Carboniferous era - 300mya, part of the Burrington Oolite subgroup, a form of crinoidal rich oolitic limestone. For further information please read the British Geological Survey, East Mendip walkers guide listed below”

<https://www2.bgs.ac.uk/mendips/localities/stokestmichael.html>

https://www2.bgs.ac.uk/mendips/rocks/lowerC_rocks.htm

Business Manager

Somerset Earth Science Centre

Moons Hill Quarry

Mendip Road

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Radstock

BA3 5JU

T: 01749 840156

M: 07870 271588

www.earthsciencecentre.org.uk

Facebook/MendipRocks

Charity no. 1122738

Background to Patrick Montague Browne's discovery of Brownes' Hole Cave, Stoke St Michael, Frome, Somerset:



Figure 46 – “The Waggon and Horses” Pub. The meeting place of the Browne family and other Cavers situated on top of the Mendip Hills and only a few miles to the West Stoke Lane Swallet. This is quite possibly where Balch met with the Browne family in order to discuss the finds of archaeological significance that were taken from Brownes' Hole Cave. The Pub is still in existence today and to my knowledge local Cavers still meet in the Pub on a regular basis. Photograph courtesy of the Browne Collection, Frome Museum, Frome, Somerset (OS ST 64959 45636)

The first official published reference to the Brownes' Hole Cave appears in Herbert E. Balch's famous book titled "Mendip, Its Swallets and Rock Shelters", on page 122. Mr P.M. Browne, a pupil of King's School, Bruton whilst visiting Stoke Lane Swallet, explored what can be described as a burrow entrance hole that was wide enough for a Fox or Badger to gain entrance. The discovery is estimated to have been made by Patrick Browne in August 1947. What emerged after further exploration was a dry swallet that we now call "Brownes' Hole". Named after the late Patrick Montague Browne himself and then subsequently the Browne family

Figure 47 - A letter from the Gilson and Son Quarry Company of Holcombe, Near Bath. The landowners of the Stoke Lane Valley, where the Brownes' Hole Cave is situated. Please note that after the Cave and its precious artefactual contents were recovered in 1947, the Quarry owners were concerned about conserving the Cave. This letter is dated in 1960 and is part of the Browne Collection, Courtesy of Frome Heritage Museum, Somerset

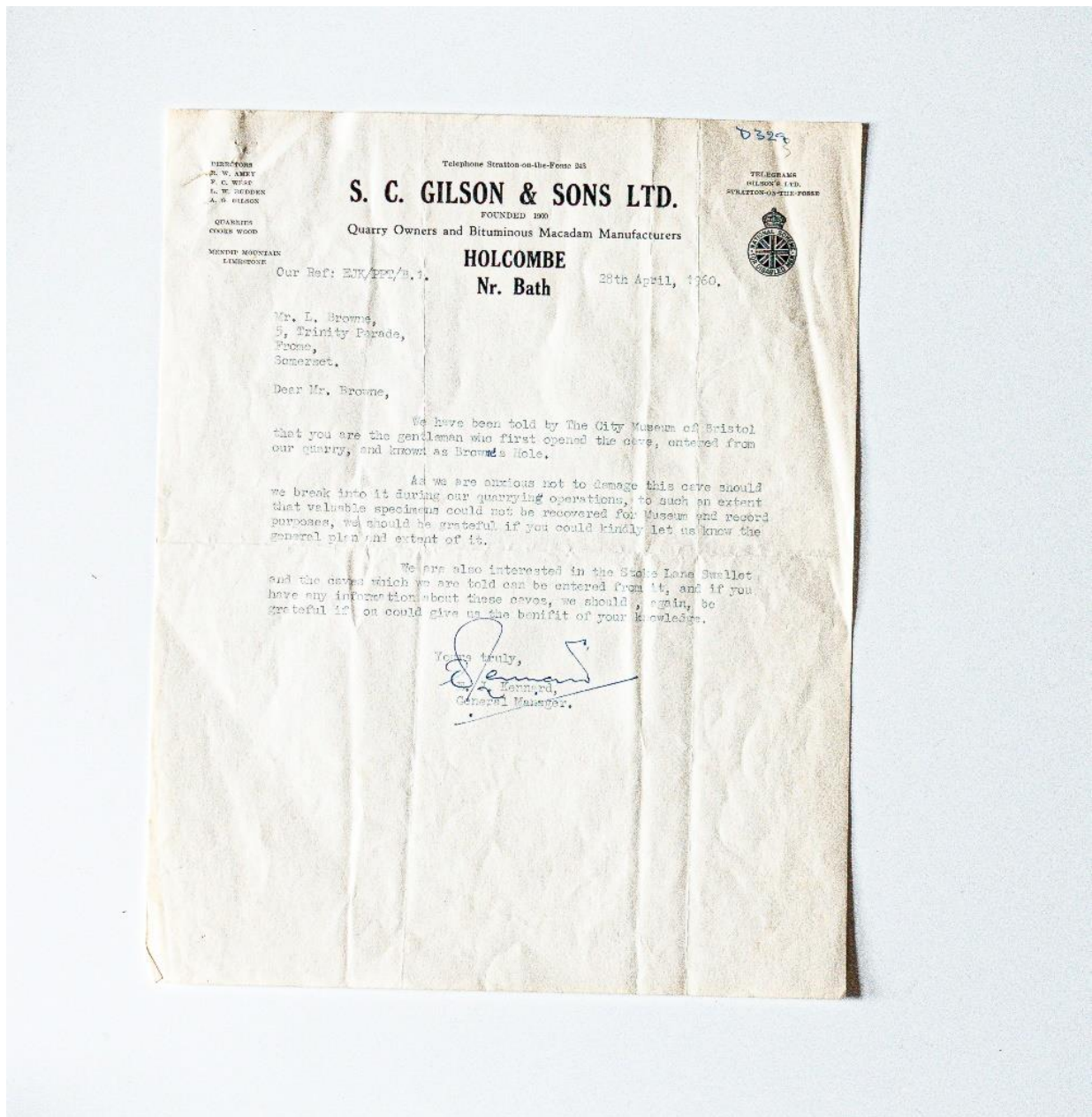




Figure 48 – The Brownes' Hole Cave main entrance. Photograph taken by Author Andrew Edwards June 2022 (OS ST 66891 47560)

The entrance is horizontal and faces approximately South West. This indicates that the entrance offered a warm aspect in the afternoon sunshine for its inhabitants. It is not known for how long the Cave has been dry but the possibility of either seismic activity from the close by extant Moon's Hill Volcano and nearby Quarrying activity could have diverted the water course that originally helped to carve out the interior of the passages. At this stage it needs mentioning that the Quarry owners at that time, Messrs Cullen and Treasure, were concerned that they do not harm the Cave by halting further works close by



Figure 49 - Stoke Lane facing towards the Brownes' Hole Cave and Stoke Lane Swallet. Photograph taken by Author, Andrew Edwards, Summer 2022. Note: The gentle undulation of the valley indicating that at one time a considerable amount of water may well have once flowed through there. Possibly from upwellings, as suggested by Patrick Montague Browne (OS ST 66527 47205)

Patrick Montague Browne offers the following synopsis of the Brownes' Hole Cave and using his own words he describes the Cave as:

"A sub-water table, phreatic with definite current flow to the West. The bedding joint plane anastomosis seen in various points. Water table leaving the Cave clear of mud fill and dry. There was no clay fill epoch and the Calcite formations were formed. Vadose action soon ensued but this was in no wise severe. It took the form of a meandering stream of small size, laying red grit in the terminal tunnel, forming the sink pot by vadose abrasive and solutional action. Also, welling up the stream mineralised and began to meander up the entrance tunnel into the Valley. This valley probably integrated with the cave in phreatic times forming a great, clear rising of subwater table flow

For some reason the Vadose stream ceased to flow three or four times for considerable periods of time until there came either a second rising of the water table or the great floods. At any rate the Vadose stream's work at modification was ended by the partial filling of the Cave by turbulent muddy waters, with no great current, welling up from the depths of the system. Although this can hardly be considered a phreatic state of affairs, the Cave-making continued by solution as if it were. Air was trapped in pockets in "the forge". This surface was below the true surface of the water. It was a "depressed surface". Gradually the Cave was filled with mud, clay and silt from the slowly moving waters. Another change deposited stratified layers of sand. All passages below the water were soon filled with mud. Again, the water table fell. The top of the fill was lowered by compaction and Vadose conditions reclaimed the Cave and are now in the process of removing the fill"

Patrick Browne, Wednesday 4th May 1949



Figure 50 - The interior of the Brownes' Hole Cave including "the Pulpit" with its characteristic overhang. Courtesy of the Browne Collection, Frome Museum, Somerset

The other members of the party responsible for the initial digging are; Leslie Browne (father), Mrs Browne (Mother), Messrs Kendrick of Frome, Mr Stock (the Farmer) and many other volunteers. All of whom opened up the first 80 feet

of the Cave and Caverns in the first

3 months of the operation (British Caver, 1949, Volume 19 and reprinted from Somerset Standard 28th November 1947). This number of people whilst working in a relatively dry Cave environment in the Summer made remarkably good progress. Further descriptions about the interior of the Brownes' Hole Cave include the entrance passageways. The entrance is situated on a relatively steep bank and is currently surrounded by deciduous woodland and hearts tongue ferns. In order to gain entry one has to huddle down slightly to approximately 5 feet in height and to continue in this manner for some 20 feet. After 20 feet you arrive at a left bend with a narrow tunnel. This is 10 feet in length which has to be negotiated on one's stomach and work along on one's elbows. After this short crawl one has to walk along a long crevice in an upright position. Finally, one had to negotiate a 10 foot high bank mud and silt and a rope is advised at this point. After this one has to negotiate around a rock face and travel through a narrow opening into a chamber where there are many stalagmites and stalactites. Most of these chambers were described as having been silted up and much of the work had to be carried out one's hands and knees or flat on the stomach in order to avoid the stalactites. Finally, one arrives at a room in which one can stand and it is believed that this is the location of the original watercourse. This is possibly the source of much of the silt that had been observed. At this point there is a sheer rise to the

roof. To one side is a remarkable formation that is called “the Pulpit” and facing this formation is another resembling a waterfall, British, Caver, 1949, Volume 19, 28th November 1947



Figure 51 - This Bronze plaque hangs outside Wells and Mendip Museum, Somerset. Herbert Balch was a close friend of Patrick Browne and Herbert mentions Patrick and his Caving expeditions in at least one of his books. Balch worked with Patrick as a mentor and assisted Patrick by cleaning Patrick's finds from the Brownes' Hole Cave. Balch was a self-taught naturalist and he wrote several diaries that can be read on request at Wells and Mendip Museum. Patrick helped Balch excavate the famous Badger Hole Cave. Herbert Balch sadly died 7 years after the tragic death of Patrick Browne

Section 4

The excavation at the Brownes' Hole Cave



Figure 52 - Drawing by Jane Brayne, 6th September 2016, Evercreech, Somerset. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset



Figure 53 - The entrance to the Brownes' Hole Cave, the Browne family and their friends sitting on their 2 excavation waggons. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset

The excavations and a focus on the methods used for removing the artefacts:

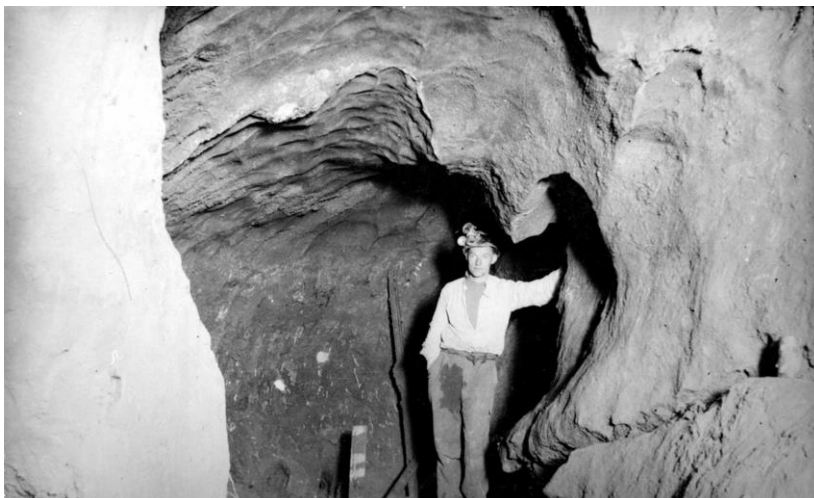
The following observations are taken from primary source material written by the Browne family and their associates at the immediate time after each excavation of the Brownes' Hole Cave and is held at Frome Museum, referred to as "the Browne Diaries"



Figure 54 - Mrs Browne at the sorting Table in the Stoke Lane valley. Using sunlight to help sort the bones from the mud and silt. Courtesy of the Browne Collection, Frome Museum, Somerset

From the description of the main passages of the Brownes' Hole Cave it is clear that the first 80 feet are relatively simple to negotiate. This process was accompanied by careful emptying of this silt onto sorting tables which were erected further up the valley of Stoke Lane in the sunlight.

Figure 55 - Stocks Chamber is the location where a large Bear Canine was found. It was thought that it was from a Cave Bear. Courtesy of the Browne Collection, Frome Museum, Somerset



In 1947 at least 4 named individuals were consistently involved. An assumption is made that they created a chain gang within the Cave by means of buckets passed to the long passage at the entrance. Surnames that signed the log on a consistent basis were; Lucy, Browne, Course, Stock, Lambert, McGuire, Kendrick, Chivers, Percy and Candy. It seems that there were no significant incidents or accidents reported in the late 1940's and with a consistent experienced and trained team of workers this possibly reduced the likelihood of incidents. Personal protective equipment included safety helmets and lamps. Lamps possibly ensured that the collection of artefacts was more meticulous.

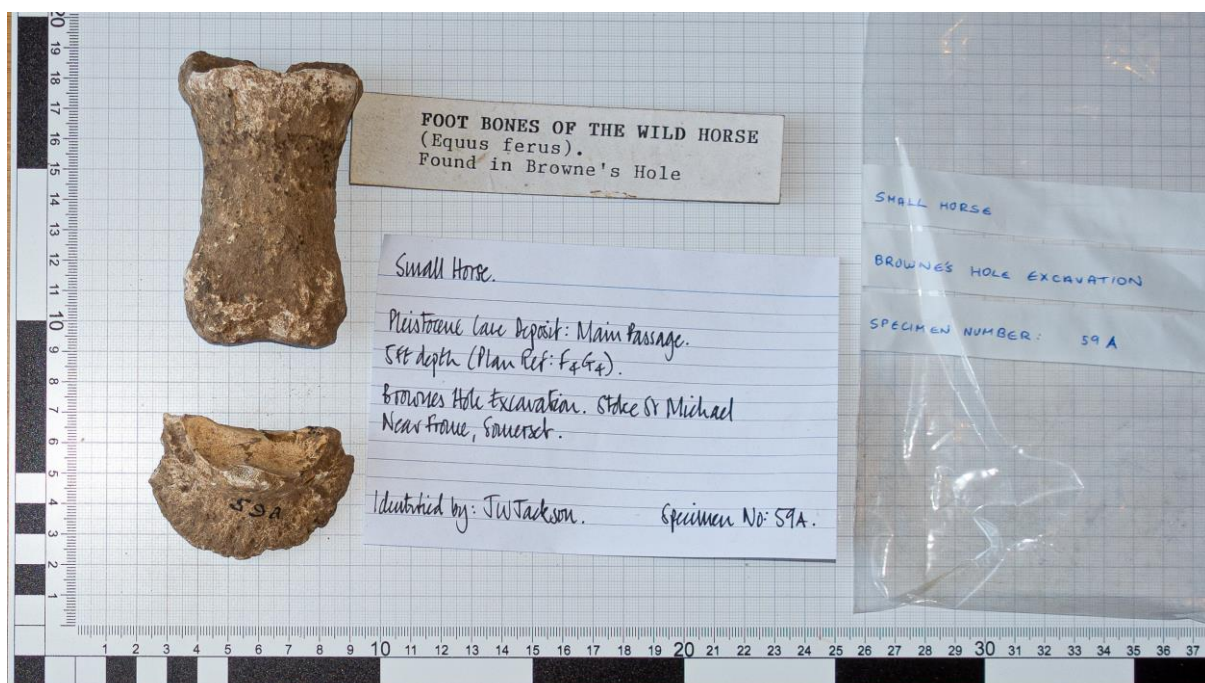


Figure 56 - Bones of a small Horse found at the entrance tunnel to the Brownes' Hole Cave. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset. (Small Horse is one of a group of assemblages which Davenport -2021, identifies with the Marine Isotope 3 era of approximately 57,000 BC)

Leslie Browne was responsible for the removal of mud and silt from the entrance area prior to August 4th 1947. There is a report of many

bones being found on August 12th 1947 in the wide chamber, which I assume is after the 10 feet crawl and just before the muddy vertical climb. The bones here were mainly Badger. In the stalactite chamber more bones of Badger and Fox were found. At this juncture the Brownes' concluded that the stalactites were formed many years ago when considerably more water was entering the Cave.

The final passage was opened by Patrick Browne on 31st August 1947, again finding bones of Badger and Fox. It was sensed that a steep exit route was found leading out of the Caves as air movement was felt.

The slow and meticulous digging at the primary entrance revealed pieces of pottery and flint. This indicated human habitation. At the entrance of the Cave bones of a small horse were also found together with a red deer antler.

Reading the early diaries dated 1947, the main area for finding faunal remains seems to be at the Cave entrance. Bones were taken to Herbert Balch, a self-taught Naturalist from Wells for cleaning and more specific identification. Balch had considerable experience at this stage of identifying faunal material from Caves and was regarded as the immediate specialist

On October 5th 1947 a table was set up outside the Cave for sorting the bones that were recovered from the main entrance passage. Horse teeth were found close to the stalactite formation. The Brownes and their colleagues appear to have taken a great deal of effort focussing on specific parts of the Cave to explore on each occasion. They sorted the silt from each section before moving onto the next with meticulous care.

There are references to cleaning chambers such as on October 13th 1947, whereby they were collecting the smallest artefacts of bone material. From what I read, the further the diaries progress, within 2 months the operation went from one of excavation, observation, qualitative assessment then onto quantitative summation of the finds. This will be covered later when Jackson arrived to assist with the initial cataloguing of the finds. This evolution of approach was possibly due to the finding of bones at the entrance and with the involvement of Herbert E Balch.



Figure 57 - A pictorial representation commissioned by Frome Museum showing how the South West facing entrance to the Brownes' Hole Cave may have been used by Hyaena at some stage in the past. Somerset. Coloured drawing by Jane Brayne, 6th September 2016, Evercreech, Somerset. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset



*Figure 58 - Local Quarry owners, the Gilson Brothers, assisted the team by providing rails in order to construct at least one railway into the Cave. This assisted in the excavation of the mud and silt. Courtesy of the Browne Collection, Frome Museum, Somerset (OS ST 66900 47505)
NOTE: Stanton appears in this photograph, however, his role is not certain as he is not mentioned by Patrick Browne in Patrick's personal log*

On October 19th 1947 there is reference to a location they called "Stocks Point". This is a chamber from which a great deal of material was excavated. It took a whole day to painstakingly clean the excavated material which consisted of charred material, bone and red deer antler. Thereafter, cleaning the finds is a daily activity as artefacts are given due care and attention. On 25th October 1947 along a passage leading from Stock's Chamber, a large Canine Tooth of what they believed to be a Cave Bear was recovered together with a large flint scraper.

In August 28th 1948 the land owner Gilson Brothers, kindly lent the Browne family a railway system. More specifically the rails. This was run into the Cave with what appeared to be 2 carriages being used to move the silt and mud. It seems that this might have developed Patrick's interest in Mines Engineering, which he later studied in

Manchester. Increased efficiency of moving heavy mud and silt reduced fatigue in the finders and therefore quite possibly enabled the finders to devote more time and energy to retrieving the important bone artefacts

There are many references to excavations taking place in the Curtain Chamber. It is believed that an adult Human jaw bone was discovered in the Curtain Chamber along with more Red Deer Antler. In addition a Human tibia was also found at that location, that had been flattened by squatting. Another Human tibia was also found at Stock's Point. One of these Human tibia has been sent

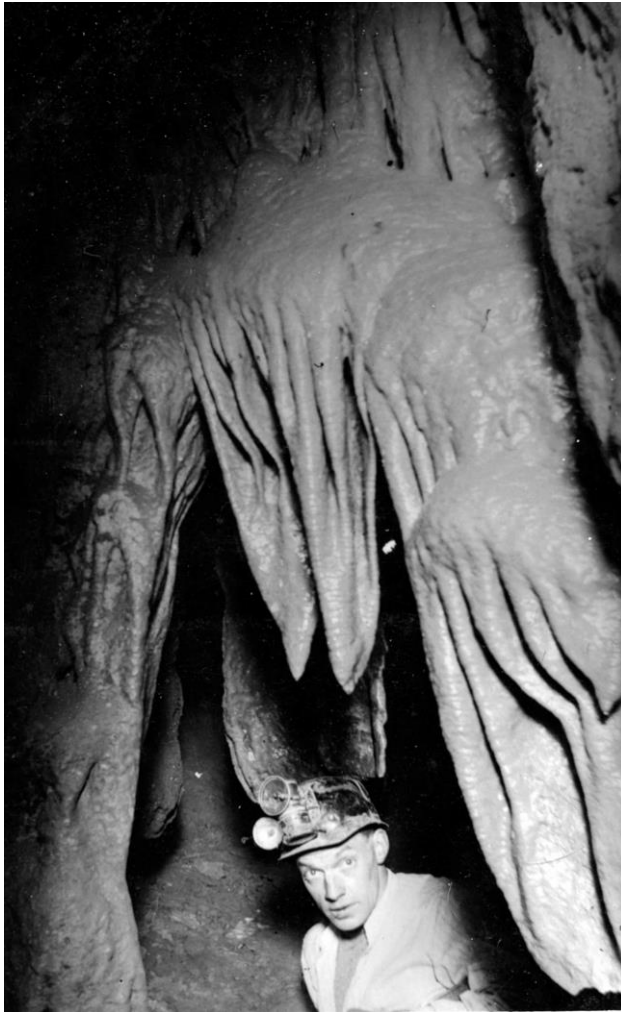


Figure 59 - The Curtain chamber is the location of what is believed to have been a human jaw and a human tibia were both found. The human tibia is currently being examined at the University of Bristol for radiocarbon dating. Courtesy of the Browne Collection, Frome Museum, Somerset

to the University of Bristol for radiocarbon dating. An additional find from Stocks Point is Hyaena Teeth

On August 22nd 1948, in the section referred to as “the Forge” Candy and the Browne family found two more Canine Teeth from Hyaena and many other Bones. Again, all were meticulously cleaned and sorted. Explorations continued at another swallet local to the Brownes’ Hole Cave in November 1948 in order to establish if any of the tunnels inter-connected. There was a wider concern about whether that water could enter the Brownes’ Hole Cave should there be heavy rain.

In addition, November 28th 1948, excavations in the North passage recovered what are referred to as

“the usual” Badger, Chicken and Rodent bones. By this time the term “backdoor” or “tradesmen’s entrance” or second opening had been established. Interesting to note that a Compass was used whilst surveying the Cave underground as several references have been made to this

In 1949 explorations at “Hunting Lodge Swallet”, Priddy. This is the site of the only record of Patrick Montague sustaining an injury is at Hunting Lodge Swallet when he slipped up with a bucket. The maximum number of bucket loads being hauled from Hunting Lodge seems to be 9 in one shift. Sunday 30th January 1949, a reference is made to diverting a stream that seems to flow from Stoke Lane Pond away from the Brownes’ Hole Cave in order to secure safety inside the Cave

Saturday February 15th 1949, a survey of the Brownes’ Hole Cave was undertaken from the entrance to Tallenham Corner. This was undertaken by

Patrick and Leslie Browne. March 20th 1949, the backdoor entrance was further developed so that material could be hauled out through that exit by means of buckets and pulleys, they were assisted by Nash and Porter. Saturday March 26th 1949 saw more meticulous sorting of silt taken from what they referred to as the Deer tunnels.

April 2nd 1949, there is an entry mentioning a Mr Unwin of Shepton Mallet Museum. Unwin had recently started a Shepton Mallet Caving Club. Unwin promised to identify all the bones that have been recovered from the Brownes' Hole Cave

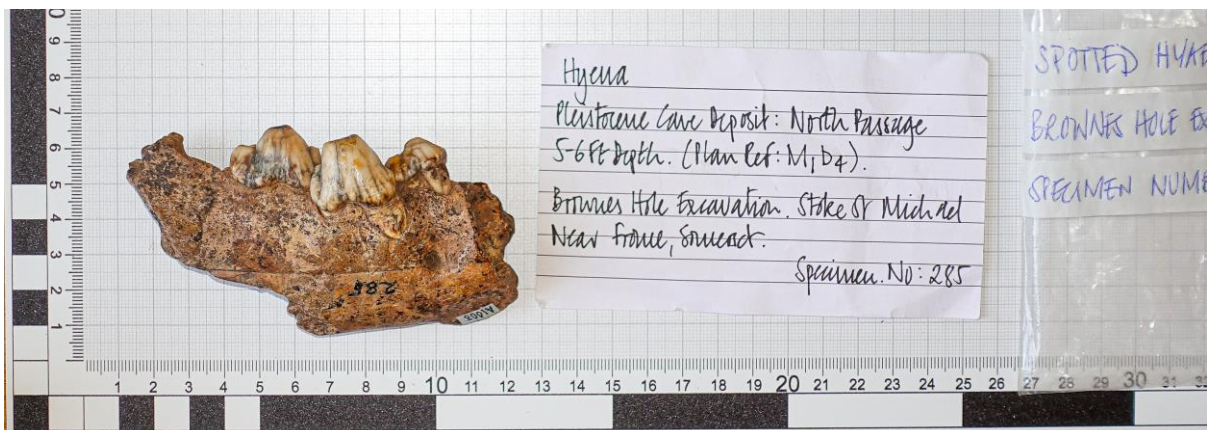


Figure 60 - A section of both Hyena Jaw and some teeth found at the North passage section of Brownes' Hole. These remains appear to be from an elderly Hyena which possibly died of natural causes. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset (This find is consistent with the Davenport Pleistocene dating as being from the Marine Isotope Stage -3 era of approximately 57,000 BC)

5th May 1949, Patrick Browne mentions that he entered the Brownes' Hole Cave alone in order to conduct an Archaeological Survey. His task was to fix a baseline. This was fixed from the "Coffin" to the wall backing the "St. C". Patrick then proceeds to write his extensive survey and assessment of the Cave, that is quoted at the start of this section

Saturday August 13th 1949, the 1st Evercreech Scout Group camped in the field one of the group members found either a Hyena Tooth and a Deer Tooth. An important juncture here is that the Hyena Tooth is described as "Hyena Commis". This may possibly have been identified by Balch with some knowledge of Pleistocene specimens as Jackson had not at this time arrived at Frome

Sunday September 25th 1949, behind the Arch, part of Hyena Jaw with 3 Teeth was recovered. Even at this stage significant finds were still being made

Saturday February 24th 1950, there are concerted efforts to continue surveying the North passage of the Cave. Conducted by R. Kennedy and Leslie Browne. This work is described as unpleasant and slow but was completed in detail



Figure 61 - A panorama of the second entrance to the Browns' Hole Cave, from which a railway was extended into the North passage. Note: the extent of the spoil that was left in the vicinity. Photograph taken by Author January 2023



Figure 62 - Looking down into the second entrance which measures approximately 1 meter by 0.75 meter. Photograph taken by Author, January 202

Section 5

Dr James Wilfred Jackson and his examination of the finds from Browne's Hole Cave— A Pleistocene Mammalian Assemblage-Zone collection from a Cave on Mendip



Figure 63 - Drawing by Jane Brayne, 6th September 2016, Evercreech, Somerset. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset

Species	Find Numbers
BEAR.	128, 260 ^b
DOG.	129, 131
FOX.	150 ^d , 229, 232, 299, 298, 297, 296, 295, 301, 302, 303
BIRDS.	141 ^b
PIG.	171, 219, 291, 142
HEDGEHOG.	184 ^a , 229 ^a
MOUSE.	194 ^a
RHINOCEROS.	189, 245, 249, 249
<i>Index</i>	
POTTERY.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13
BRONZE II.	
FLINTS.	14, 17, 18, 19, 20, 21, 22, 26, 38, 242, 243, 244
COINS.	15, 16
STONES.	23, 27, 171
CRINOIDS.	24, 33, 351, 344, 345
IRON.	25, 35, 188
HYAENA.	31, 32, 39, 40, 194, 267, 261, 270, 271, 272, 285, 286, 287
BISON.	34, 162, 240, 241, 272-277
OX.	191, 192, 212, 214, 216, 222, 223, 225, 226, 234, 237, 251, 254, 258, 441, 442, 446, 447, 50, 52, 53 ^b , 56, 57 ^b , 60, 61, 62, 63, 71, 72, 75, 89, 83, 86, 89, 94, 97, 103, 107, 109, 114, 117, 122, 134, 137, 143, 145, 170, 173, 174, 179, 184, 185
RED DEER.	43, 53 ^a , 77, 82, 106 ^a , 111, 112, 129, 157, 182, 198
ROE DEER.	51, 74, 153, 155, 165, 226
REIN DEER.	149, 156, 160, 161, 164, 168, 224, 252, 253, 257
HORSE.	48, 58, 59 ^a , 79, 94, 96, 101, 151, 152, 153, 262, 266, 267
SHEEP.	54, 64, 73, 76, 84, 85, 90, 90 ^b , 91, 93, 102, 103, 110, 112, 133, 146, 150, 155, 170, 176, 177, 180, 183, 187, 191, 201, 204, 251, 258, 259, 289
HUMAN.	55, 85, 102, 110, 203, 227, 233, 234, 235
BADGER.	70, 87, 90, 167, 168, 227, 300, 305
HARE.	90 ^a , 141 ^a , 228

Figure 64 - The summary of finds catalogued in Dr James Wilfred Jackson's own handwriting. Written in 1951. Courtesy of the Browne Collection, Frome Museum, Somerset

In 1951, upon hearing the news of the important finds at Brownes' Hole, Dr James Wilfred Jackson, recently retired from Manchester Museum, arrived in Frome in order to identify the bones, taken from the Brownes' Hole Cave, which had previously been cleaned by Herbert E. Balch, Curator of Wells and Mendip Museum. Dr Jackson was invited either by Patrick Montague Browne, whilst Patrick was at Manchester University at that date or someone else such as Herbert E. Balch of Wells. Dr J. Wilfred Jackson had recently moved to Buxton in 1944. However, one of his most famous post-War publications was for the Museum of Manchester Geology Department. He wrote an important Chapter for the Book "British Caving" titled "Archaeology and Caving" in 1953 and 1962

Jackson had bought together in printed form, for the first time since Dawkin's "Cave Hunting" book, details of all the historical backgrounds and palaeontology of every bone Cave in Great Britain up to that date in time

Jackson was also invited by the University of Bristol Spelaeological Society by Professor Tratman to deliver a talk about the finds from Brownes' Hole Cave

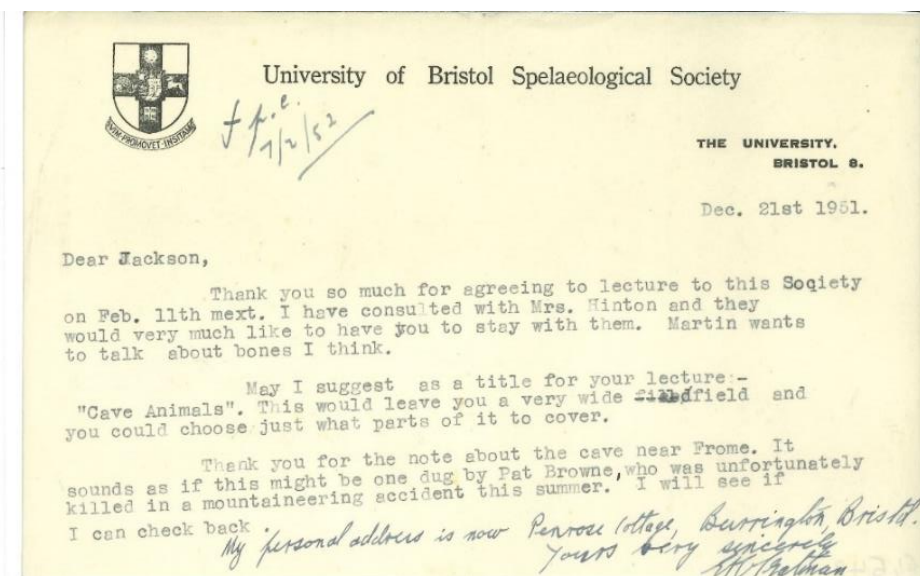


Figure 65 - An invitation letter, dated December 21st 1951, at that time Patrick Montague Browne had died in North Wales. This letter was sent to Dr Jackson of Buxton, to request that Jackson deliver a talk about the finds from the Brownes' Hole Cave, Somerset. Courtesy of Buxton Museum, Derbyshire

Jackson meticulously catalogued all of the material that was taken from the Brownes' Hole Cave and kept a Log Book, which can be seen on request by visiting Frome Museum, Somerset

In addition, it seems that Jackson may have worked with Leslie Browne or Patrick Browne in the drafting of a Map with grid references (figure 69). The precision of the recording was such that the precise location and depth in the ground each artefact was taken from the Cave was recorded in each case

The summative documents at the back of Jackson's inventory (figure 64) show the predominance of Pleistocene material taken from the Brownes' Hole Cave. This included Hyaena, Rhinoceros, Bison, Reindeer, Bear and Small horse. Donovan (2021) uses collections of mammalian assemblage, taken a specific location, in order to help date those locations. In this case, such a combination of finds, possibly but not necessarily including human remains, would be associated with the Marine Isotope Stage 3, which is approximately 57,000 BC. A warm period before the last significant Ice Age.

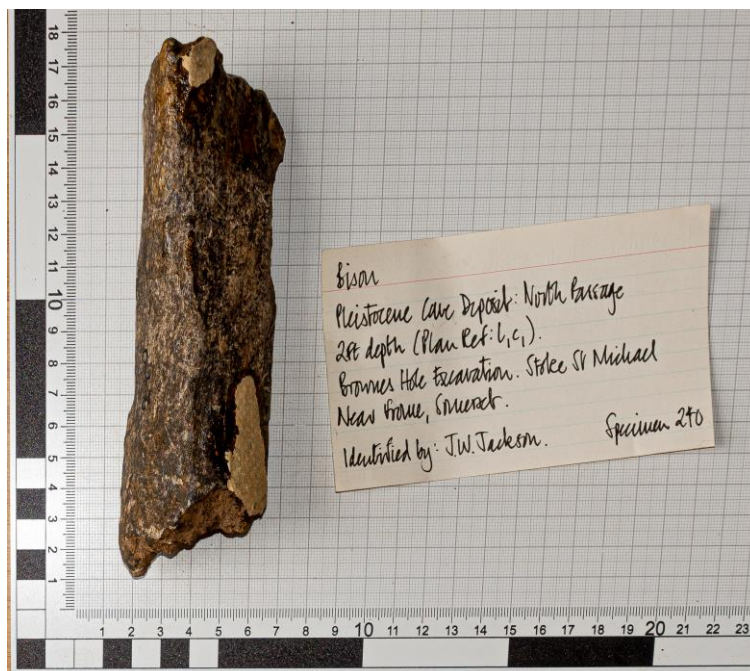


Figure 66 - Fragment of Pleistocene Bison bone. Taken from the north passage of the Brownes' Hole Cave. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset. (This find is consistent with the Davenport Pleistocene dating as being from the Marine Isotope Stage -3 era of approximately 57,000 BC)

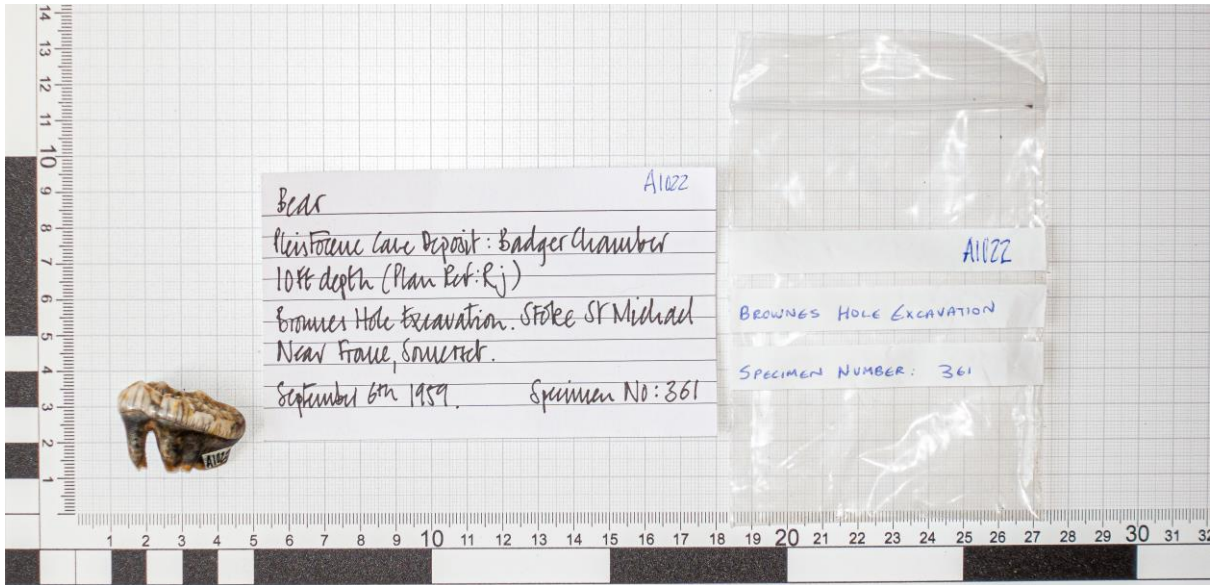


Figure 67 - Bear Molar taken from the Badger Chamber of the Brownes' Hole Cave. Courtesy of Frome Museum, Frome, Somerset. (This find is consistent with the Davenport Pleistocene dating as being from the Marine Isotope Stage -3 era of approximately 57,000 BC)



Figure 68 - Looking from inside the Brownes' Hole Cave and facing the entrance. Facing South West offers a warm aspect to its occupants. Photograph taken by the Author, Andrew Edwards, Summer 2022. Note: the Cave is passable and almost horizontal but one has to huddle in order to progress into the Cave. (OS ST 66920 47550)

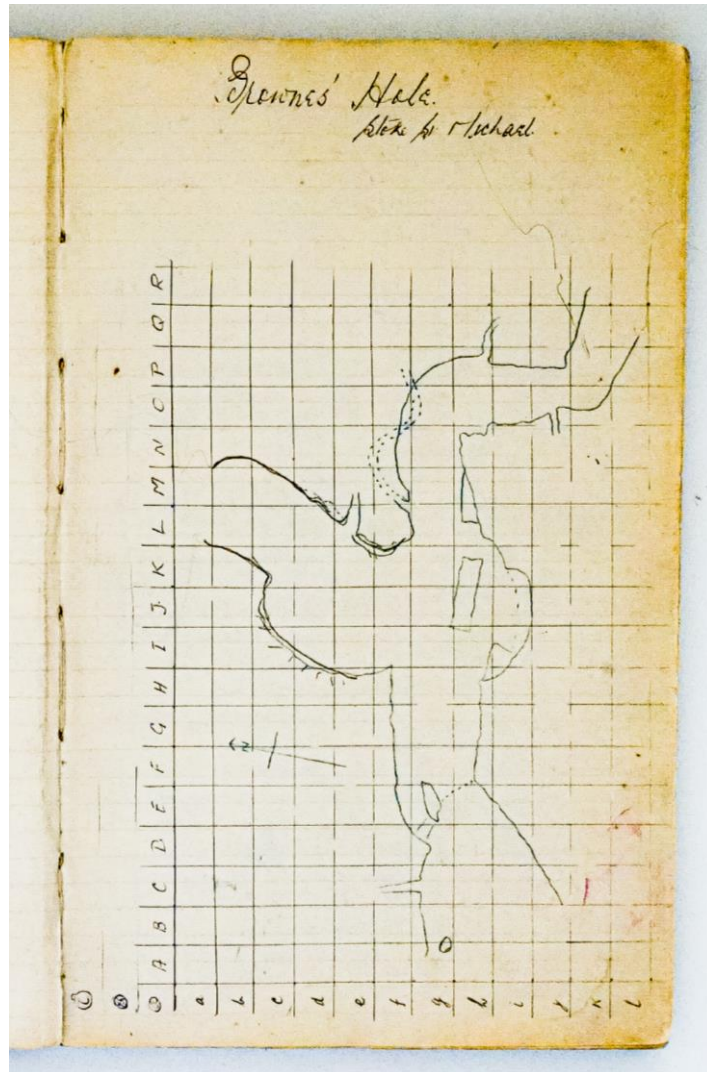


Figure 69 - A map taken from Dr Jackson's log of the Brownes' Hole Cave finds that are kept at Frome Museum, Somerset. Courtesy of the Browne Collection, Frome Museum, Somerset

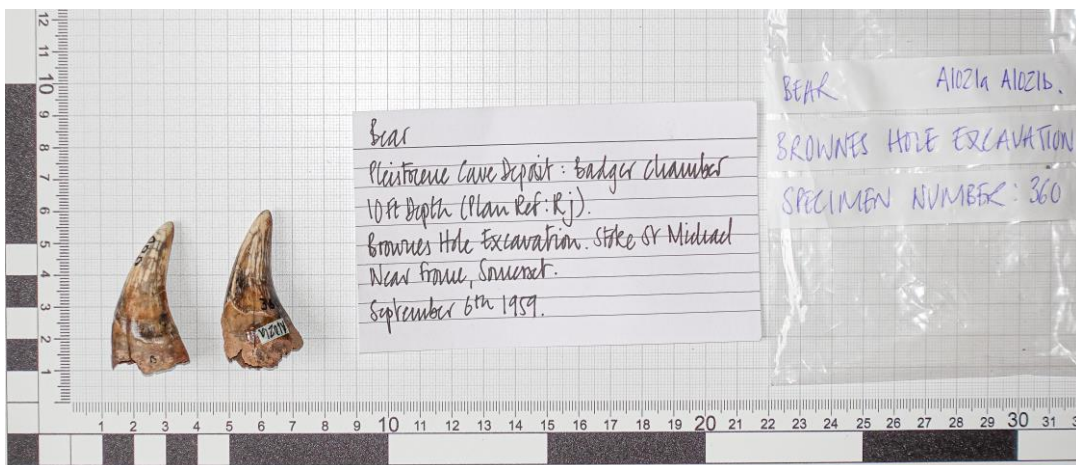


Figure 70 - Pleistocene Bear Canines taken from the Badger Chamber of the Brownes' Hole Cave. Courtesy of The Browne Collection, Frome Museum, Frome, Somerset. (This find is consistent with the Davenport Pleistocene dating as being from the Marine Isotope Stage -3 era of approximately 57,000 BC)

BEAR. 128, 360 ^o	
DOG. 129, 131.	
FOX. 130 ^o 229, 232, 299, 298, 297, 296, 296, 301, 302, 303	
BIRDS. 141 ^a	
PIG. 171, 219, 281, 292	
HEDGEHOG. 184 ^a , 229 ^a	
MOUSE. 184 ^a	
RHINOCEROS. 189, 245, 248, 249.	
	<u>Index</u>
	POTTERY. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13.
	BRONZE II.
	FLINTS. 14, 17, 18, 19, 20, 21, 22, 26, 38, 208, 205, 206.
	COINS. 15, 16.
	STONES 23, 27, 171.
	COINOLDS. 24, 33, 351, 344, 345
	JACON. 25, 35, 188
	HYAENA. 31, 32, 39, 40, 194, 267, 261, 270, 271, 282, 286, 286, 291
	BISON 34, 162, 240, 241, 272-277,
	OX { 191, 192, 212, 214, 216, 222, 223, 225, 226, 236, 237, 257, 274, 288, 41, 42, 46, 47, 50, 52, 53 ^a , 56, 57 ^a , 60, 61, 62, 63, 71, 72, 75, 80, 83, 86, 89, 98, 99, 103, 104, 109, 114, 117, 122, 134, 137, 143, 145, 172, 173, 174, 179, 186,
	RED DEER. 43, 53 ^a , 77, 82, 108 ^a , 111, 112, 139, 157, 182, 198.
	ROE DEER. 57, 74, 133, 135, 165, 206.
	REIN DEER 149, 156, 160, 161, 164, 188, 224, 252, 253, 257,
	HORSE. 48, 58, 59 ^a , 78, 94, 96, 101, 103, 105, 170, 262, 266, 167.
	SHEEP 54, 64, 73, 74, 84, 85, 90, 90 ^a , 91, 93, 107, 108, 110, 115, 133, 146, 150, 155, 170, 172, 177, 180, 183, 187, 190, 202, 234, 257, 268, 284, 284 ^a , 287
	HUMAN 55, 95, 102, 116, 203, 227, 233, 234, 235.
	BADGER 70, 87, 90 ^a , 157, 166, 207, 300, 305
	HARE 90 ^a , 141 ^a , 228.

Figure 71 - The final summative log at the back of Dr Jackson's inventory for the Brownes' Hole Cave finds. Courtesy of the Browne Collection, Frome Museum, Somerset



Figure 72 - Pleistocene Reindeer lower Mandible . The Browne Collection, Frome Museum, Frome, Somerset. (This find is consistent with the Davenport Pleistocene dating as being from the Marine Isotope Stage -3 era of approximately 57,000 BC)

No	Description	No	Situation	map Ref	Depth from Ref	Date	Association
364	* Bone Splinter	1	Bridge Chamber R J		10	Sept 1859	
365	* Bone Splinter	1	" "	"	"	" "	
366	* jaw. (Bazui)	1	" "	"	"	" "	
367	* jaw jaw tooth	1	" "	"	"	" "	
368	* tooth Hyena?	1	-	-	-	-	
369	* Fragment of Skull	1	-	-	-	-	
370	* " "	1	-	-	-	-	
371	* 6 Bone Fragments	6	-	-	-	-	

Figure 73 - The final listing from Dr Jackson's log of the Browne's Hole Collection .Note: 371 items were examined and listed by Dr Jackson in 1951. Courtesy of the Browne Collection, Frome Museum, Somerset

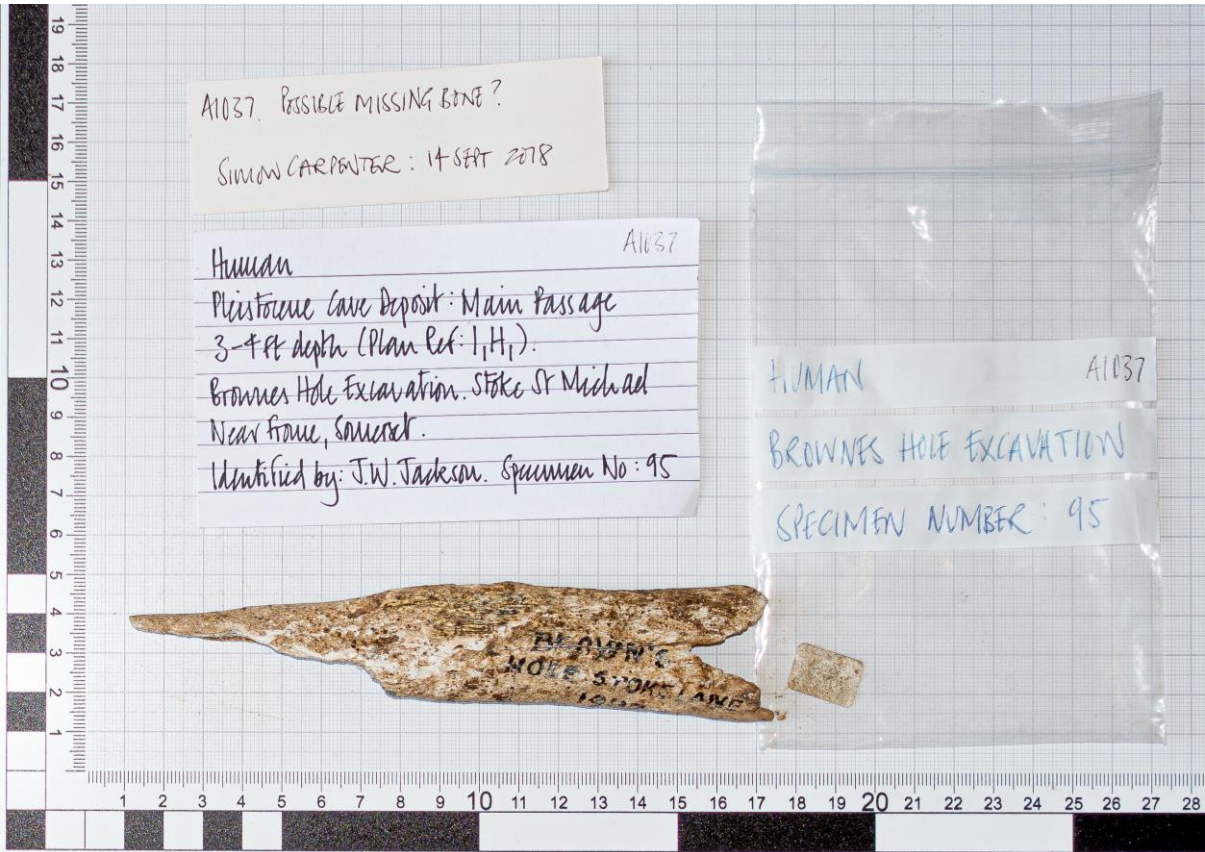


Figure 74 - Section of Human long bone. Collected from the Brownes' Hole Cave. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset. (This find is consistent with the Davenport Pleistocene dating as being from the Marine Isotope Stage -3 era of approximately 57,000 BC)

Page	Number	Location	Material	Notes	Age	Signature
29	241	Bone (Horn?)	Nth Passage	2485 5'	Indt. probably horse	
31	242	Red Stone	"	2485 2'		JWJ
33	243	"	"	4180 2'		JWJ
34	244	Bone splint	"	2485 4'	Indt	
35	245	Bone	"	2502 4'	Rhinoceros (? Woolly)	
36	246	Bone	"	2502 3'	Astragalus ground by Hyena	Pleistocene JWJ
37	247	Tooth	"	2502 3'	Hyena Lucasi	Pleistocene JWJ
38	248	Bone	"	2502 4'	Rhinoceros (Woolly)	Imperfect leg bone
39	249	Bone	"	2502 4'	Rhinoceros?	Fragment of jaw
41	250	Bone	"	2502 2 1/2'	Indt	
42	251	Tooth	"	2502 3'	Ox (Bos sp?)	Tooth bone
43	252	Tooth	"	2502 3'	Ruminant	upper molar
44	253	Bone	"	2502 2'	Ruminant	pt. of scapula
45	254	Bone	"	2502 2'	Ox?	part of rib
46	255	Bone splint	"	2502 4'	Indt	
47	256	"	"	2502 4'	Indt	
48	257	Bone splint	ENTRANCE	2502 4'	Ruminant?	pt. of shank bone
49	258	Bone	Nth Passage	2502 3'	Ox (Bos sp?)	Astragalus
50	259	Bone splint	"	2502 3'	Indt	
51	260	"	"	"	Indt	
52	261	"	"	"	Indt	
53	262	Leg Tooth	"	2502 2'	Hyena	Fragment of Pelvic muscle (of upper claw tooth) 2nd molar right
54	263	Bone splint	"	2502 1'	Horse	Fragment of astragalus
55	264	"	"	"	Indt	
56	265	"	"	"	Indt	
57	266	Tooth	"	2502 5'	Indt	
58	267	Bone splint	"	2502 4'	Horse	Fragment of astragalus (horse) distal end of horn
59	268	"	"	2502 4'	Indt	Fragment of astragalus
60	269	Leg Bone	"	2502 3'	Indt	
61	270	Hyena	"	2502 1/2'	3rd Metacarpal (splint) fossil	Fragment of astragalus (horse) distal end of horn

Figure 75 - This photograph clearly illustrates the considerable amount of detail that Jackson had included in each entry into the log of the Brownes' Hole Cave finds. Each line is signed "JWJ". Courtesy of the Browne Collection, Frome Museum, Somerset

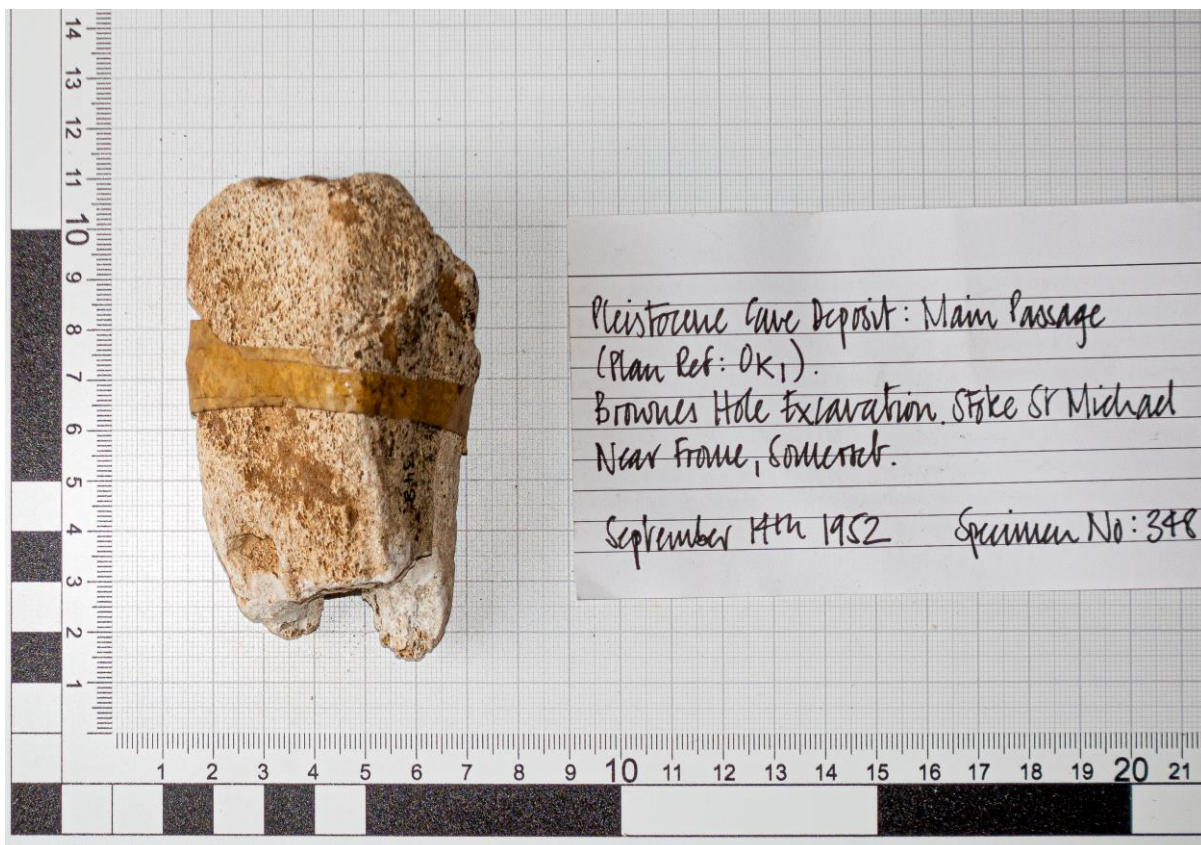


Figure 76 – Pleistocene Rhinoceros Molar fragment. Taken from the North passage of the Brownes' Hole Cave. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset. (This find is consistent with the Davenport Pleistocene dating as being from the Marine Isotope Stage -3 era of approximately 57,000 BC)

Section 6

Modern Scientists and their role in examining the Mendip Pleistocene remains



Figure 77 - Drawing by Jane Brayne, 6th September 2016, Evercreech, Somerset. Courtesy of the Browne Collection, Frome Museum, Frome, Somerset



Figure 78 The interior of the Earth Science Centre for Education and Research. At Moon's Hill Quarry, Stoke Saint Michael, Somerset

A brief explanation for the somewhat unusual faunal remains that were rescued from the Brownes' Hole Cave, Stoke St Michael and other parts of Mendip, Somerset:

As geologists and geographers, alongside many other Scientists, study remains of Hyaena, Bison, Hippopotamus, Rhinoceros and other mammals that have been found on the Mendip Hills, but are nowadays associated with mainland Africa, it has become apparent that climate change has been a frequent global phenomenon for many millions of years. It seems that there have been many years of warming, which result in the migration of mammals which would usually prefer the warmer climates to the south, further North. There have also been periods of exceptional cooling, which have seemingly seen these same mammals either becoming extinct in Northern Europe or migrating further South. In terms of Mendip, the fauna of greatest significance are the Hippopotamus. It seems that Hippopotamus probably lived on the Western side of the Mendip Hills where there would have been ample warm water at a place we now refer to as "the Somerset Levels". A PhD Science researcher called Neil Adams, under the supervision of Professor Danielle Schreve of the Royal Holloway, the University of London, discovered a Hippopotamus molar tooth in a collapsed cave at Westbury sub-Mendip Quarry, (OS ST 50729 50373)



Figure 79 - The teams from the University of Bristol Speleological Society and Professor Andrew Chamberlain examining Human remains from Stoke Lane Swallet. Together with the Curator of Frome Museum, Colin Wisbey. May 2022

Human Remains from Browne's Hole

In view of the proximity to Stoke Lane Slocker, the human material from Browne's Hole was also examined, alongside a briefer look at the faunal material.

The record cards contain both the museum accession numbers (marked in pen on tippex) and the numbers given to the material by J W Jackson (marked in pen on the specimens).

Museum no.	JWJ no.	Identification	Comments
A1030	118	Right femur	Mislabelled as human tibia. Do not date as less confident it is from The same collection.
A1035		Left ulna	
A1037	95	Tibia	Specimen is dated in faint ink 1945. Misidentified as fibula fragment.
A1036	235	Fibula	
A1028	233	Right side mandible	1 heavily worn molar.
A1032	102	Left first metatarsal	
A1034			Misidentified as human foot. Possibly bear.
A1032	227		Very similar to A1034 but AC confident this is human.
A1033	203		Misidentified as human. Possibly bear.

Best candidates for dating are A1030 or A1032, in that order of preference.

Figure 80– (Above) - Professor Andrew Chamberlain reviewed what were thought to be the Human remains from the Brownes' Hole Cave. The above Table is a Summary of his findings, including his recommendations for which artefacts would be best suited for Radiocarbon dating. Human remains being found alongside Hyaena remains further supports the likelihood that this shelter dates to the Marine Isotope Stage-3, dating From approximately 57,000 BC (Donovan, 2021)

Figure 81 (Below)—The Hippopotamus Molar, found by Neil Adams, at Westbury Sub-Mendip Quarry, Somerset. At that time Neil was researcher in the Centre for Palaeobiology Research at the University of Leicester. Neil is now mammalian vertebrate collections curator, Natural History Museum, London. It is believed that this exceptionally rare find is dated to around 750,000 BC. Hippopotamus assemblages are associated with the warmest of interglacial periods in our history. Therefore, they are used as an indicator of significant Global Warming events which have happened in the past. Hippopotamus remains have only been found on the West side of Mendip as none have been found in East Mendip. Note the measurement ruler indicates 2 cm. Photograph courtesy of Neil Adams, the University of Leicester



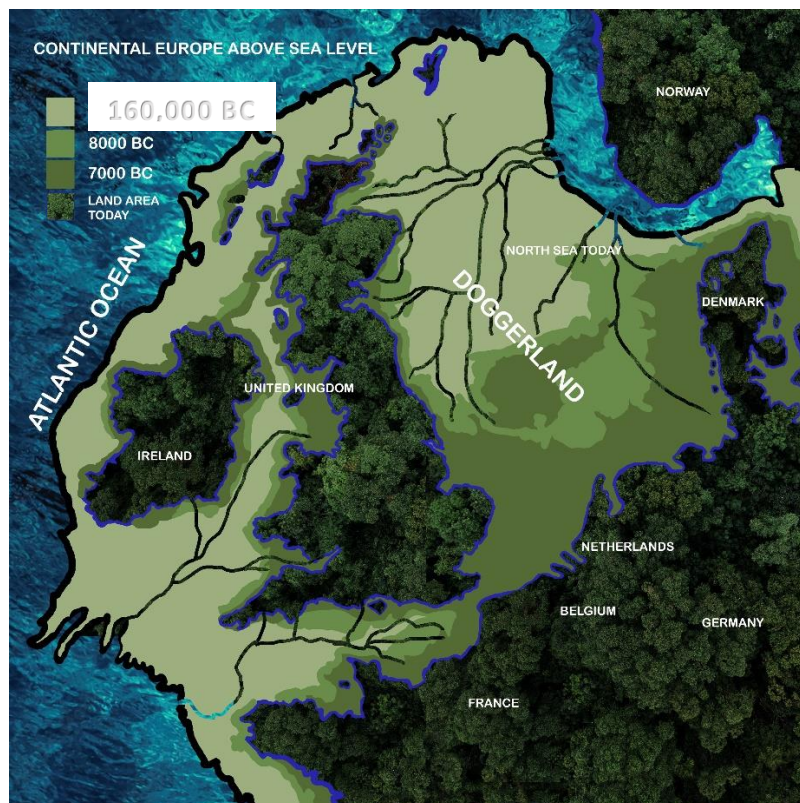
Neil Adams found what is believed to be the oldest Hippopotamus assemblage to have been found in Great Britain to date (figure 81). “This is dated to at least 780,000 BC. This would we referred to as an Early Pleistocene find site that would probably date back to at least 1,000,000 years”, Neil Adams, personal communication. Considering that Hippopotamus prefer particularly warm climates, the question that needs answering at this point is how did the climate of Great Britain become so warm at that time ?.

It needs to be noted at this point that the drivers for the interglacial warm periods of 1,000,000 years ago and earlier are thought to have been different to those causing the warmer periods of 125,000 years ago. However, whatever the driving forces between these warming periods are, the cyclical warming and cooling of planet Earth has been in occurrence for many millennia. Hippopotamus are an important indicator of what we may refer to as periods of “Global warming” in our Earth’s history



Figure 82 - A photograph of the Hippopotamus remains found at the Milton Fissure, from outside the glass display cabinet in the Balch Room, Wells and Mendip Museum, Wells, Somerset. This assemblage was found by Herbert E. Balch in 1937. The Milton Fissure assemblage is believed to be 125,000 years old and represents one of the warmer interglacial periods. This site faces West, similar to the Westbury Sub-Mendip site and is situated on the same Western aspect of the Mendip Hills, only a few miles apart from each other. No Hippopotamus remains have been found at the Brownes' Hole Cave, Stoke Saint Michael, Mells or any locations further East of Wells. Note: Spotted Hyaena teeth were also found alongside the Hippopotamus remains at New Milton. Photograph taken by the Author, Andrew Edwards in the Balch Room, Wells and Mendip Museum, Somerset. With kind thanks to David Walker curator of Wells and Mendip Museum for allowing me to photograph this display cabinet

Figure 83 (Below)- An illustration by Frome Artist, Elizabeth Ashard, showing how Sea levels around Great Britain have changed in the past 160,000 years



It is clear from the map drawn by Elizabeth Ashard of Frome, that there have been significant changes in the sea levels around Great Britain for at least the past 160,000 years

These cyclical changes in sea level and atmospheric temperature and the causes of these cycles have been the focus of much research. The answers to the possible causes of these cyclical changes have been investigated by scientists and this work is covered in detail by Chris Stringer in his book "Homo Britannicus, the incredible story of human life in Britain", page 55.

At this point it needs to be noted that the drivers for the interglacial warming at this stage differ to the drivers of the global warming phases over 1,000,000 years ago

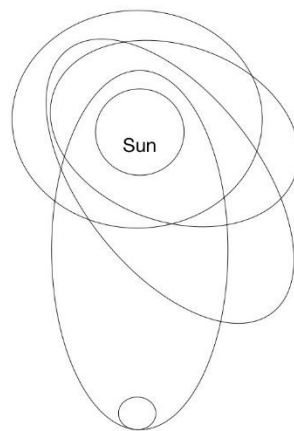
Chris Stringer outlines how an understanding of ice ages and what may influence these is necessary. Johannes Kepler (1609) first observed that all the planets orbit the Sun in a slightly eccentric manner. Milankovitch (1998) developed calculations which predicted that there are eccentric movements of the Earth around the Sun which cycle every 100,000 years. In essence the Earth orbits the Sun eccentrically, at some stage in a 100,000 year cycle or revolution

around the Sun, the Earth becomes significantly closer than at other times (figure 84).

Figure 84 (Below)- In an attempt to help explain why the Earth gets warmer approximately every 100,000 years I have drawn the Earth's orbit starting in year 1, a warm year, year 25,000 an intermediate year and year 50,000 a cool or glacial year. Notice how the orbit of the Earth around the Sun changes from elliptical (warm years) to non-elliptical (cooler years)

Year 50,000 - Earth equidistant from Sun -
 at this phase a specific location on Earth is never closer to the Sun
 for any more than a few days of the year when compared to
 day 1 of the cycle

This is thought to give rise to lengthy periods of global cooling or "Ice Age" periods.
 In particular, this is because not one single part of the planet is closer to the Sun than
 any other part of the planet regardless of the day length that specific location or spot on the surface
 experiences.



Year 25,000 - Earth's orbit evolves away from being elliptical
 and becomes more equidistant from Sun.
 The Earth is no longer closer to the Sun as a part of its annual orbit

Year 1 - Global warming or interglacial period.
 When the Earth is closer to the Sun for over 6 months
 of the year from any one location
 on the planets' surface compared to Year 50,000 of the 100,000
 Year cycle. At any given moment in time a place on the surface
 of the planet will be the closest to the Sun that it has ever
 been in the 100,000 year cycle. Heat from the warmest location at
 any one time on the Planet's
 surface dissipates to other parts of the Planet via
 clouds of water vapor and the Oceanic currents. These Greenhouse gases
 such as water vapor keep the entire planet warm regardless of whether a specific
 location is facing the Sun or in darkness

In addition, the Earth has a tilt which means that every 41,000 years parts of the Earth are more significantly tilted towards the Sun that at other times (figure 85).

Figure 85 (Below) - Many people are familiar with the ideas of Seasonal variations between Summer and Winter. This is because the Earth itself spins on an axis. But that axis of spin changes every year to the extent that every 20,000 years the Earth's rotational axis is the opposite to where it is at any precise point in time. This is not necessarily a Global effect in the sense that this alone would not account for Global warming

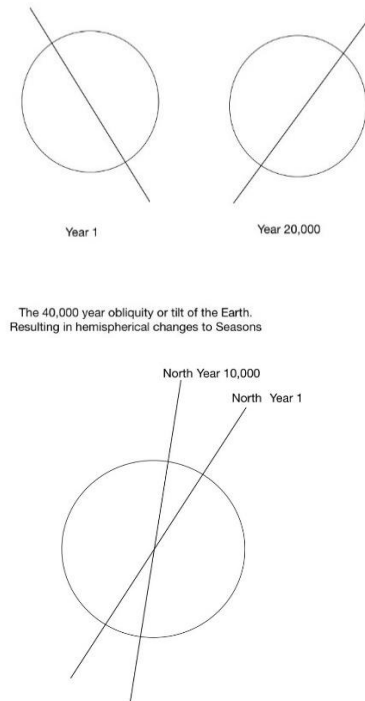


Figure 86 (Above) - This diagram attempts to show how the Earth can wobble on its own axis as well as tilt towards or away from the Sun. This again might affect Seasonal variations in the Northern and Southern Hemispheres to some extent

Finally, we have something referred to as “precession” which lasts approximately 23,000 years. The “precession is simply the Earth’s wobble on it’s own axis (like a gyroscope that can wobble as it slows down – except the Earth’s spin doesn’t actually slow down) (figure 86).

It is clear from what Chris Stringer has written that at specific times in the 100,000 year cycle the whole Earth may experience warming and cooling. Every 41,000 years specific hemispheres will experience regional warming and cooling in addition to this Global warming and Cooling. This would exaggerate a Cool period in the North and Warmer period in the North of Europe.

This is used to explaining why animals may possibly migrate across the land bridge between England and France at what we now call the “Dover Straits”

If evidence of Hippopotamus are found on Mendip at a time such as 780,000 years ago, this would demonstrate a particularly warm period of time.

Hippopotamus cannot survive in Cold waters and would become extinct in

what we might refer to as “Ice Ages” or cooler periods. So, on Mendip at approximately 780,000 BC we must have experienced a warm climactic period.

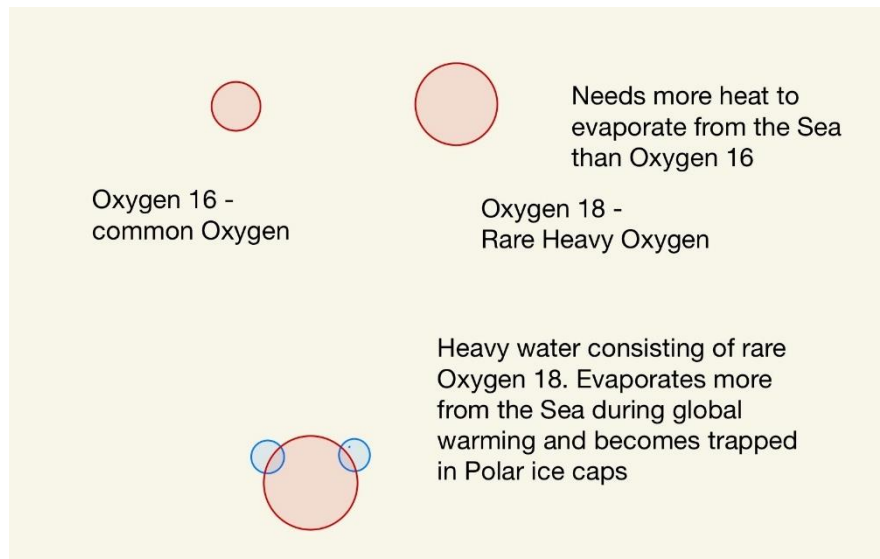


Figure 87 - The heavy isotope of Oxygen called Oxygen-18 is stable. The amount of Oxygen-18 on the surface of the planet does not change. But the distribution of Oxygen-18 between the Oceans and Arctic Ice does vary to a significant extent. In warmer global periods the amount of Oxygen-18 in the Arctic Ice increases and in the colder Global periods the amount of Oxygen-18 in the Arctic Ice decreases

In addition, Chris Stringer mentions that there are 2 important types of Oxygen. These are referred to as Isotopes of Oxygen. Oxygen-16 is the type of Oxygen that we inhale in order to keep us alive. A heavier version of Oxygen also exists. This is called Oxygen-18. Though Oxygen-18 is rarer than Oxygen-16, it tells us something important about global warming. If we assume that most of the Oxygen-18 on the planet is combined with Hydrogen in the form of water and assume that Oxygen-18 water is found in the Sea.

The “Marine Isotope Stages” were initially developed by Cesare Emiliani (1950, 1957) together with John Imbrie and Nicholas Shackleton and the work of many others (Wright, 2000). The Marine Isotope Stages are used as a means to date periods of time by using a difference in the ratio of the isotopes Oxygen-16 to Oxygen-18 in core samples from deep beneath the Seabed. William Francis Giaque and Herrick Lee Johnston jointly discovered the existence of the stable Oxygen Isotope of Oxygen, called Oxygen-18, between 1925-1925 at the University of California. Harold Clayton Urey (1931), initially discovered that stable Oxygen-18 isotope levels in the Sea are reflected in the content of Oxygen-18 discovered in the Calcite skeletons of marine micro-organisms (1947), (Wright, 2000, p 427). In cold periods or periods of glaciation the

Marine Isotope levels of Oxygen-18 increase compared to levels of Oxygen-16. In warmer periods the levels of Oxygen-18 compared to Oxygen-16 in Sea water fall. This is reflected in the Seabed core samples

The reasons for these differing levels of the Oxygen-18 isotope in Sea water are related to its comparatively heavy mass when considered alongside Oxygen-16. I will refer to Oxygen-18 water as “Heavy water”, not to be confused with water molecules that contain the Hydrogen -2 isotope called Deuterium. This is because its mass is higher than the vast majority of the water found in the Oceans. Oxygen-18 water will only evaporate into the air if there is enough heat energy in the atmosphere to enable it to evaporate . At the warmest times of the Earth’s orbits around the Sun, the amount of Oxygen-18 water in the atmosphere increases. This is a strong indicator that is used by Scientists taking ice bore samples in the Arctic, for example, when they analyse how much Oxygen-18 is found at each layer of Ice they can estimate the temperature of the global atmosphere at that time. Ice Age periods will have a lower amount of Oxygen-18 than interglacial or warm periods of time

It follows that most of the Pleistocene mammals that we associate with much warmer climates today were probably living in Britain at a time when the Earth was experiencing its most extreme elliptical orbits around the Sun. Bearing in mind that these warm periods lasted for at least 10,000 – 20,000 years. The global warming in these interglacial periods was accelerated by increased water evaporation from the Oceans, this is in addition to the presence of the greenhouse gas carbon dioxide. That this water vapour was a powerful greenhouse gas in its own capacity, that acted as a heat blanket over the surface of most the planet

Milankovitch (1998) offered a new method of dating both Ice core samples by means of predicting the dates in years at which the Ice core samples would have the highest ratio or proportion of Oxygen-18 to Oxygen-16 as being times when there were warm periods. The reverse is true for the sediment core samples taken from the Sea bed off Greenland, Miami and other parts of the world. The Marine animals that we often refer to as Plankton, have a siliceous skeleton, Urey.H.C. (1931) . As is the case for other Oceanic organisms. This skeleton is made from a material called Calcite. Calcite contains Oceanic Oxygen. It is fair to assume that at times when the land experiences a cool period or Ice age, the amount of Oxygen-18 locked into this Calcite skeleton

increases and when the land is experiences a temperate climate, the marine animal skeletons contain less Oxygen-18 by proportion to Oxygen-16

This brings us to the most significant part of the geological time scale. The periodicity of what geologists and geographers refer to as the Marine Isotope Stages

In direct correlation with the eccentric movements of the Earth around the Sun, the Oceanic core samples from at least 3 locations around the globe have established a series of 100,000 year cycles of heating and cooling. These are called MIS or Marine Isotope Stages. These are numbered starting with odd numbers (the most recent) as MIS-1, this odd number assignment refers to the current warm stage on the land. This is the same for all the MIS odd numbered phases. The odd numbers all refer to warm phases. The even numbered stages such as MIS-2 refer to the glacial or cold stages. It needs mentioning here that the Oceanic core samples provide a far more reliable source of data regarding the dates of terrestrial warming and cooling events. This is because the land is subject to more variables than the ocean floor (Schreve,D.C., 1997, page 17).

In both 2001 and 2011 both Andrew Currant, of the Natural History Museum, Cromwell Road, London and Roger Jacobi, of the Department of Prehistory, The British Museum, London, jointly worked on a project to create what they refer to as the “Mammalian Biostratification Scheme” (Currant, A. and Jacobi, R. 2001, 2011). The assumptions are that during each Glacial period Britain was inhospitable for life. In such glaciations most of the mammal fauna died. During the warmer periods between these glaciations, mammals returned to Britain, possibly by the land bridge . But the mammals which returned to Britain were slightly different on each subsequent occasion. This created the possibility of Zones of time or Mammalian Assemblage Zones which could be dated by simply examining all the mammalian assemblage from a specific site, such as a cave Brownes’ Hole and comparing these assemblage to specific sites identified by Currant and Jacobi (Currant, A. and Jacobi, R. 2001,2011).

Professor Danielle Schreve of the Royal Holloway, the University of London, worked on developing a way of sorting Pleistocene mammal assemblages into Zones or groups. These zones could in turn correlate with the Marine Interglacial Stages and their corresponding dates, as appropriate. A good example is when Schreve, 1997, page 18, refers to the Hippopotamus fauna of the MIS-5, substage 5e, with a correlation to radiometric data to 120,000 BC. Schreve places before us a fair and significant assumption that with each Glacial phase in Britain there are national extinctions which Schreve refers to as “recycling events”. This indirectly gives rise to opportunity for physically and morphologically evolving Pleistocene fauna to re-appear from Europe, across the land bridge in Eastern Britain at that time, in the next, subsequent interglacial or warm period. This principal is further developed by Davenport (2021) in her dissertation about the evolution of Spotted Hyaena in Britain between the Glacial phases. Davenport (2021, Page 30, Table 1.3) using her research, would identify the Brownes’ Hole assemblage as being from the MIS 3. A relatively warm period dating from at least 57,000 BC. This precedes the last Ice Age

The occurrence of the Spotted Hyaena at the Brownes’ Hole Cave, Stoke Saint Michael, Somerset:



Figure 88- This panorama shows the valley bottom where the Brownes’ Hole Cave is situated. There are many Caves and Shelters in this Valley and it is possible that additional Hyaena Den locations may be situated here. But these have yet to be discovered and excavated. The Brownes’ Arch is to the left of centre. Photograph taken by principal Author, Andrew Edwards

Davenport (2021) has recently completed the first complete report of 48 known Hyaena Dens from the Pleistocene period of Great Britain. Davenport (2021, page 11) refers to Hyaena as the most important Pleistocene mammal from the point of view of their “bone hoarding behaviour”. Meaning that the Spotted Hyaena are excellent at gathering bones from their surrounding habitat at the date that they lived and storing these bones in Caves or shelters.

Naturally, Hyena behaviour have been of considerable value to Balch, Jackson, Stringer, Carrant, Jacobi and Schreve. Davenport (2021, page 11) refers to 3 stages in Great Britain when Spotted Hyaena were most significantly present, these are MIS 5e, 5c and 3. It is believed that Spotted Hyaena was the dominant carnivore during these time periods. Davenport also reports that both Neanderthals and modern humans were absent during MIS 5e and 5c. However, Davenport reports that Humans lived alongside Hyaena during MIS 3. Davenport studied 85 known Hyaena Dens of which 37 were classified or categorised into one or more of 3 Den types of “random” location, but close to fresh water, where it was assumed there would be a regular food supply.

It is thought that Spotted Hyaena arrived in the Cromerian Complex (Middle Pleistocene 800,000 - 500,000 BC) into locations such as West Runton Freshwater Bed, North Norfolk (Stuart, 1975). In addition, Lewis et al (2010) found evidence of gnawing marks in mammoth bones and fossil Hyaena manure at the same location. At this point Davenport (2021) first formulates a hypothesis that the presence of gnawing marks on bones and a coincidental amount of Hyaena manure in a location may indicate the presence of a Hyaena Den. Indeed, at a locater stage in her dissertation, Davenport sets out the criteria by which one can classify a Cave or Shelter as a Hyaena Den and the converse meaning a location which is not conclusively proved to have been a Hyaena Den

The Pleistocene Hyaena is thought to have been larger than the modern Hyaena by 25% (Rohland et al 2005 and Sauque et al 2017). Davenport similarly reports that Glaciation Period Hyaena were larger than Hyaena that lived in the interglacial periods

I refer the reader to Davenport’s outstanding piece of work for more detail on this matter

The only further comment I would like to make is that by using Davenport’s copyright method of categorising Hyaena Den shelters, is that the Brownes’ Hole Cave was most likely a Communal Den and with reference to some of the specimens, having been identified by Professor Danielle Schreve in 2015, as having passed through a digestive system of a Carnivore. Additionally, many of the pieces may be of elderly, deceased colony members that have been subject to cannibalism. As previously mentioned, it is believed that, by using both the work of Schreve, D.C. (1997) and Davenport (2021, Page 30, Table 1.3) it is established that the Brownes’ Hole Cave assemblage is probably from

Marine Isotope Stage 3, or the Pin Hole Cave Mammalian Assemblage Zone (Carrant, A.P. & Jacobi, R.M., 2001, 2011) which dates back to approximately 57,000 BC or before the significant last Ice Age



Figure 89 - The entrance to Brownes' Hole Cave shelter, January 2023. Photograph taken by Author

Section 7

The Radiocarbon dating of some of the Human remains found at both Stoke Lane Swallet Cave and Brownes' Hole Cave

The raw data kindly provided by Dr Timothy Knowles of the University of Bristol is presented below for reference purposes:



Monday, 13 February 2023

Report on Radiocarbon Age Determination
for BRAMS-6339



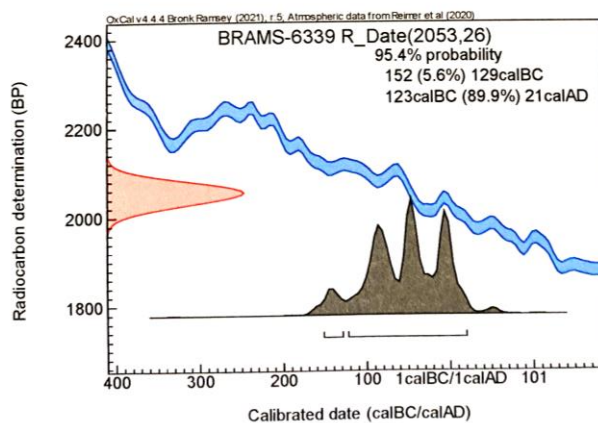
Submitter:	Graham Mullan
Submitter's Code:	AID29
Project:	Brown's Hole
Sample material:	Bone
Pretreatment Code:	BC

F ¹⁴ C	0.7745 ± 0.0025
Result	2053 ± 26 BP
Indicative δ ¹³ C	-18.4 ‰

The result is given in uncalibrated radiocarbon years Before Present (BP). Data given are corrected for isotopic fractionation using the ¹³C/¹²C ratio measured on the AMS. The δ¹³C value was measured on the AMS and may have been subject to additional isotopic fractionation. The error associated with this value is typically ±1‰.

Calibration Plot

Calibration was performed using OxCal software v4.4 and the IntCal20 atmospheric calibration curve

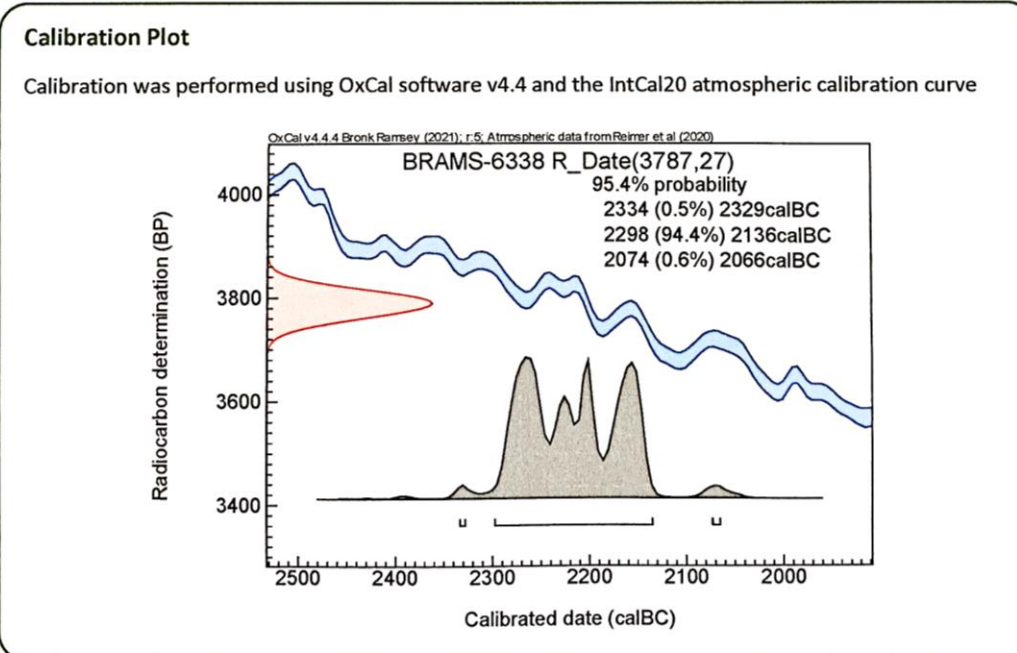


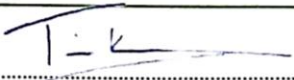
Dr. Timothy Knowles
BRAMS Manager

Submitter:	Graham Mullan
Submitter's Code:	C3 (FHM)
Project:	Stoke Lane
Sample material:	Bone
Pretreatment Code:	BC

F¹⁴C	0.6241 ± 0.0021
Result	3787 ± 27 BP
Indicative δ¹³C	-21.3 ‰

The result is given in uncalibrated radiocarbon years Before Present (BP). Data given are corrected for isotopic fractionation using the ¹³C/¹²C ratio measured on the AMS. The δ¹³C value was measured on the AMS and may have been subject to additional isotopic fractionation. The error associated with this value is typically ±1‰.




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Dr. Timothy Knowles
BRAMS Manager

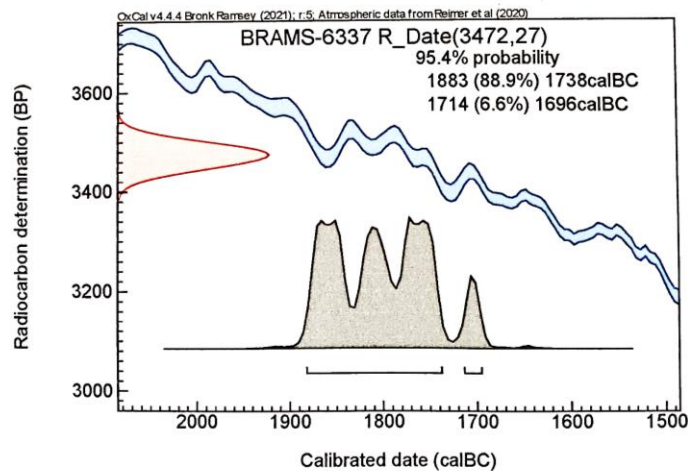
Submitter:	Graham Mullan
Submitter's Code:	C1 (FHM)
Project:	Stoke Lane
Sample material:	Bone
Pretreatment Code:	BC

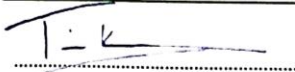
F ¹⁴ C	0.6491 ± 0.0022
Result	3472 ± 27 BP
Indicative δ ¹³ C	-19.5 ‰

The result is given in uncalibrated radiocarbon years Before Present (BP). Data given are corrected for isotopic fractionation using the ¹³C/¹²C ratio measured on the AMS. The δ¹³C value was measured on the AMS and may have been subject to additional isotopic fractionation. The error associated with this value is typically ±1‰.

Calibration Plot

Calibration was performed using OxCal software v4.4 and the IntCal20 atmospheric calibration curve




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Dr. Timothy Knowles
BRAMS Manager

Section 8

The Biostratification of Britain compiled from the works of many Authors. Dating back to 800,000BP

Key to the Biostratification Table for Britain shown on the subsequent pages

Features in the table	Significance	Notes
<i>Dimlington Stadial</i>	A period of the Pleistocene	A period of time that has previously been identified within the Pleistocene. Always <i>bold italics</i>
"Banwell Bone Cave", Somerset, ST 3822 5881	"Name of Mammal Assemblage-Zone" type locality site	This site is accepted as typical of its type in terms of assemblage and time period
<i>Rhinoceros Hole, Wookey, Somerset, ST 532 479</i>	A site identified as having a similar or identical Mammalian Assemblage to Banwell Bone Cave but is NOT the accepted representative site-type	<i>These minor sites are always written in italics</i>
	A glacial or cooler period	
	A warmer or interglacial period	
<i>A cold phase in a warm zone</i>	A brief cool period in a warm period	

Summary of the Mammal Assemblage-Zones and evidence for the human prehistoric occupation of Britain

Currant, A. and Jacobi, R. 2001,2011, Chapter 10, page 165 onwards, Currant, A. and Schreve, D. (2004),

Chris Stringer (2006), Nick Ashton (2017), Mansfield, R.W and Donovan D.T, (1989),

Meiklejohn, C., Chamberlain, A.T. and Schulting, R.J.(2011) , Vince Simmonds (2016)

Compiled by Author: Andrew Edwards (2023)

Name of find site and Ordnance Survey location	Approximate dates before present or Marine Isotope Stage	Significant mammalian finds	Notes
<p>Palaeolithic(Pal) 3.3 million -10,000 years BC</p> <p>Lower Palaeolithic (LP) 700,000 (or 500,000)-70,000 BP</p> <p>Lower Palaeolithic, according to South Western Archaeological Research Framework, 700,000-250,000 or 200,000 BP</p> <p>Cromerian "Happisburgh Site 3" Happisburgh, Norfolk Coast</p>	<p>Earliest date that Hominins were known to have used stone tools</p> <p>MIS-20 Pre-Magnetic Pole reversal of the Earth</p> <p>At least 780,000 BP and older according to deposition of iron in sediments</p> <p>Oldest Human find site outside Africa</p>	<p>Rhinoceros, Hippopotamus, Elephant or Mammoth leg bones in fragments, Southern Mammoth tooth found (3rd Molar) large species 4 m high and weighing 10 tonnes, tusks over 2 metres long, Extinct horse <i>Equus suessenbornensis</i>, Giant elk (2 metres tall, antler span of 2.5 m), Bovid, Red deer, Giant beaver (<i>Trogontherium cuvieri</i>), Extinct Northern Vole (<i>Microtus oeconomus</i>), Lemming, Mouse</p> <p>Humans: Stone tools, less than 100 flint artefacts have been found. Flakes, Cores, Tools and a few with notches and a retouched flake. Most have some cortex of the opposite side to the cutting edge for grip. Homo antecessor or "pioneer man", cousin of Homo erectus. Over Winter food could be Pignuts, Bladderwrack (Sea weeds), shellfish and Bullrush tubers. Estuarine and Coastal habitation</p>	<p>Human footprints found in compacted sediments along shoreline. 3D modelling of footprints possible. The people were approximately 5 feet 9 inches tall. Fits in with estimates from Homo antecessor (Atapuerca, Burgos, Northern Spain). At least five in the group, one adult male with women and children. Walking in southerly direction along the Estuary</p> <p>Average July temperatures 16-18 degrees C, average January temperatures -3-0 degrees C. Winters are therefore 3-6 degrees C cooler than today. Like Germany of Southern Scandinavia.</p> <p>Southern Mammoth and the Horse became extinct around 800,000 BP. Giant Elk and Red deer arrive at approximately 1,000,000 BP. These are all time indicators for this Mammal Assemblage-Zone 950,000 BP and 850,000 BP two warm peaks. Happisburgh site 3 was on the original river flow path of the River Thames, which was more Northerly at that date from its current position</p>
<p>Cromerian interglacial "Westbury Sub-Mendip" Quarry, Somerset</p>	<p>MIS 19, 787,000 BP Earth's Magnetic reversal: 780,000BP</p>	<p>Hippopotamus (Neil Adams), Primitive Cave bear, Primitive Rhinoceros, Wild dog, Jaguar, Scimitar-toothed Cat, Mimomys savini vole. Poor quality stone implements, 2 bifacially worked worked stone tools</p>	<p>Warmer. An anomaly discovered by Neil Adams in 2015, at Westbury Sub-Mendip Quarry, Somerset. A warm period immediately after the last magnetic polar reversal</p>
<p>Cromerian interglacial</p> <p>"Pakefield", Cromer, Suffolk And later at Happisburgh "The Crag Basin" or "Cromer Forest-bed formation"</p> <p><i>West Runton, Norfolk. West Runton freshwater bed</i></p> <p><i>Norton Subcourse</i></p>	<p>MIS 18, 760,000 BP</p> <p>MIS 17, 712,000 BP</p>	<p>Human artefacts, Voles: <i>Mimosys pusillus</i> (rare after 650,000 BP), <i>Mimosys savini</i>), Hippopotamus, Rhinoceros, straight-tusked elephant, 3 species giant deer, scimitar-toothed cat, lion, hyaena, wolf, bear</p> <p>Pakefield, many stone tools found in situ in year 2000. Steppe mammoth, Extinct Rhinoceros hundsheimensis (last found at Iberian Peninsula 900, 000 – 800,000 BP), Giant deer, Bison</p> <p>West Runton Mammoth is a fossilised skeleton of a Steppe mammoth(Mammuthus trogontherii), Bull, Height of 4m and 9 tonnes. Displacement of right knee with associated chronic pathology post-injury. Extinct Rhinoceros, Extinct Horse (Equus altidens), Giant Hyaena (Pachycrocuta brevirostris), Spotted Hyaena, Lion, European Jaguar (Panthera gombaszoegensis), Sabre-toothed cat, many small mammals, Desman, Pine Marten, Noctile bat (Nyctalus noctula), Barbary Macaque, But NO humans. Similar to Pakefield site. Pakefield has Hippopotamus but NOT West Runton</p>	<p>Warmer, evidence of human stone tools. Human markings on a Bison hind foot bone. Britain connected to Netherlands and North West France. Humans attracted to "Mediterranean Climate of Summer and Temperate Winters". Dating attempted by amino acid conversion from Laevo rotatory molecules to Dextro rotatory molecules after death of shellfish. The proportion of Dextro rotatory amino acid molecules increases with age after death of the shellfish</p> <p>July temperature range: 18 C – 23 C January temperature range: -6 C- +4 C Occasional Mediterranean Climates with water chestnut and Portuguese crowberry growing.</p>
<p>Cromerian</p>	<p>MIS 16, 659,000 BP</p>		<p>Cooler. No site currently established</p>

Cromerian	MIS 15, 621,000 BP		Cooler. No site currently established
Cromerian	MIS 14, 568,000 BP		Cooler. No site currently established
<p>Cromerian interglacial "Boxgrove", Chichester, Sussex</p> <p>(Also at Westbury Sub-Mendip and Batscombe Quarry, Cheddar)</p> <p>Maidscross Hill, Lakenheath, Suffolk, Lower reaches of River Bytham</p> <p>High Lodge, Mildenhall, West Suffolk, National Grid Reference: TL 73918 7539</p> <p>Happisburgh Site 1, Norfolk</p> <p>Corfe Mullen, Northwest Bournemouth, Dorset</p> <p>Warren Hill, Suffolk</p> <p>Waverly Wood, Gravel Pit, Coventry, Head of the Bytham River</p>	<p>MIS 13, 528,000 BP</p> <p>600,000BP</p> <p>500,000BP</p> <p>500,000 BP</p> <p>600,000BP ?</p>	<p>Homo Heidelbergensis, bison, horse, red deer, roe deer, elephant, rhinoceros, lion, hyaena, wolf, boar, 10 species of large and small carnivore, bat, mole, Arvicola terrestris cantiana vole (evolved from Mimosys pusillus and has unrooted teeth), Sabre-toothed Cat ?</p> <p>Human flint implements, handaxes, oldest handaxe site in Northern Europe ?, 2 groups of handaxe, one is thick and crude, the other is Ovate and refined, cordiforms with less edge abrasion. Possibly 2 groups of peoples</p> <p>Right upper premolar of <i>Stephanorhinus hundsheimensis</i>, Extinct 2-horned Rhinoceros. This mammal became extinct at 450,000BP in other parts of Europe. Straight-tusked elephant, horse, medium-sized deer, large bovid.</p> <p>1200 fresh flint artefacts found at location Controversy over unusual stone tools that appear to be elegant scrapers, likened to Mousterian scrapers of France, but dating the site preceeds 100,000BP</p> <p>Unusual scrapers include a large, thick flake retouched to produce an elegant scraping edge. For removing fatty materials from inner hides</p> <p>Water vole with unrooted teeth (Arvicola cantiana) dates this site, Extinct beaver, Bank vole (<i>Clethrionomys glareolus</i>), Red deer, Roe deer, Indeterminate bison, indeterminate Rhinoceros, Extinct frog (<i>Pliobatrachus cf. langhae</i>), last member of Palaeobatrachidae to become extinct.</p> <p>Humans: one handaxe and 300 other artefacts, flakes used for stripping meat from hide. Roe deer and bison bones have cut marks.</p> <p>Many handaxes found during gravel pit extractions, similar to those found at Boxgrove. Ovate in shape with tranchet resharpening removal at the tip</p> <p>Produced over 2,000 handaxes. Two groups of handaxe. The majority are refined ovate and cordiforms. Some resemble those from Maidscross, they may have originated from there and therefore might be 600,000 BP</p> <p>Water vole teeth without roots, (<i>Arvicola cantiana</i>) and amino acid ratios L:D form racemisation, Extinct Shrew (<i>Sorex Araneus</i>), Pine Vole (<i>Pitymys arvaloides</i>), Extinct european mole (<i>Talpa Europaea</i>), Straight-tusked elephant, Horse (<i>Equus ferus</i>), Humans very little evidence of only 1 quartzite flake from Channel 1. Quarry discard heaps include a wonderful Andesite handaxe, from local rocks and other quartzite and Andesite tools. Indicates</p>	<p>Warmer. Britain connected to Netherlands and North West France.</p> <p>By 500,000BP "Big Cats" disappear</p> <p>Beetle remains offer estimates of climates: July temperatures were 15 degrees C – 6 degrees C January temperatures were -4 – 1 degrees C Similar to Northern Britain and Southern Scandinavia today</p> <p>Possible processing of animal skins in evidence at this time from the tools that have been found at the site. Developing ways of living in a colder climate. Absence of handaxes and flakes from handaxe manufacture</p> <p>Beetles give estimation of Summer temperatures of between 12-15 degrees C Average winters were temperatures of -11 to -3 degrees C. Harder to estimate Winter temperatures.</p> <p>Boxgrove humans and Corfe Mullen could be the same people</p> <p>July temperatures 15 degrees C leading to average July temperatures of 10 degrees C as shown below, by the invertebrates that were present and their natural food types: Ostracods: <i>Ilyocypris decipiens</i>, <i>Candona granulatus</i> indicates slight cooling in more recent times Beetles: <i>Elmis aena</i>, <i>Oulimnius tuberculatus</i>, like flowing water (at base of layers), <i>Helophorus aquaticus</i> prefers still and poorly oxygenated water</p>

<p>Anglian Ice Advance</p> <p><i>“Boxgrove”, Chichester, West Sussex</i></p> <p><i>“Ostend”, Norfolk</i></p> <p><i>Trimlington, Norfolk</i></p> <p><i>Mundesley, Norfolk</i></p>	<p>MIS 12, 474,000 BP</p>	<p>The Southern part of Britain may have experienced a mild thaw in the Summers allowing very hardy plants and animals to survive</p> <p>Sea levels fell at Boxgrove as water was locked up in the Polar Ice caps. Cliffs collapsed under a sludge, which buried flint supplies. But some knapping was in evidence. The cooling was sudden, then slow, then sudden again</p> <p>Extinct Shrews and Voles: <i>Sorex rutonensis</i>, <i>Sorex savini</i>, <i>Pliomys episcopolis</i> still living. Water Vole (<i>Arvicola cantiana</i>) living in ponds, Pine vole and woodmice living in woodlands.</p> <p>Narrow-skulled Vole (<i>Microtus gregalis</i>) a cold indicator has been found</p> <p>Northern Vole (<i>Microtus oeconomus</i>)</p> <p>Weasels (<i>Mustela nivalis</i>), possibly fed on the Voles and Mice</p> <p>Horse and bison possible</p> <p>Bison, early species (<i>Bison priscus</i>) <i>Steppe Bison</i></p> <p>A brief warm period sees the Northern Vole and Narrow-skulled shrew retreat (disappear)</p> <p>At this time the remaining shrews were joined by Water Shrew (<i>Neomys fodiens</i>) and Pygmy Shrew (<i>Sorex minutus</i>, Field vole and Common Vole (<i>Microtus arvalis</i>), Hazel Doremous, Slow Worm and Robin.</p> <p>Occasional larger bones of and teeth of Horse, Bison, Extinct Rhinoceros, Extinct Bear (<i>Urus deningeri</i>), early form of Cave Bear with a domed head. Wolf was probably its predator.</p> <p>Ground Squirrel (<i>Citellus citellus</i>), Collard lemming (<i>Dicrostonyx</i>), Field Vole (<i>Microtus agrestis</i> / <i>arvalis</i>), Narrow-Skulled Vole (Cool indicator species)</p> <p>Unknown predator indicated by Stomach-acid etched bones in the vicinity and scat around the Pool</p> <p>Musk Ox (<i>Praeovibos priscus</i>), usually found in herds, Wolves and Bears were probably predators in the Early Anglian</p> <p>Wolverine or Glutton (<i>Gulo gulo</i>), scavenging and stealing from Wolves</p>	<p>Cooler. Huge freshwater lake forms in Southern North Sea. Possibly isolating Britain by 125,000 BP</p> <p>In addition, as the Glaciation forms and advances further South, the River Thames become blocked with the Ice. A lake therefore forms in Central Southern England, just North of Salisbury Plain. The Thames is forced to flow further South than before</p> <p>The line of extreme Glacial limit starts at Northern Essex, Hornchurch, Finchley, North Chilterns to the Coast of South Wales. The South was treeless and Polar desert-like</p> <p>Unusual rocks are carried from Scandinavia across the “North Sea” and are deposited at places like Happisburgh. This Ice sheet became an Ice wall to the North of the North Sea. To the South Kent was joined with France at the Kent-Artois Anticline. As the temperatures warmed a lake formed behind this land bridge and filled with melt water from the Polar Ice melt, the River Rhine and other locations that were thawing. The lake was the size of Belgium. 30,000 Km³, 500 billion tonnes of water. The land bridge was probably only 30-40m high. The Chalk was soft and was rapidly eroded by the volume of water overflowing the land bridge at the Dover strait. The overflow caused basins to be gouged by the water flowing over the land bridge. Flow rates were probably 40-60 Km³ flowing at 30 m/s. Perhaps Britain was becoming an island</p> <p>Summers: 10 degrees C Winters: -10 degrees C</p> <p>Northern Tundra species present. Typical of Steppe of Central Northern Asia</p> <p>Collard lemmings have water claws specialised for digging through snow and frozen ground</p> <p>Reindeer also reported in early Anglian Stage sites, eating lichens</p>
<p>Hoxnian Interglacial</p> <p>“Swanscombe”, Kent</p>	<p>MIS 11, 427,000 BP</p> <p>All Hoxnian phases 11c, 11b and 11a</p> <p>Dating is possible by reference to geography. The River Thames is now flowing further South than before 427,000BP. Therefore, find sites along the Thames indicate human and mammal occupation of Thames sites after this date indicate post 427,000BP</p>	<p>Pre-Homo Neanderthalensis (female), rhinoceros, mussels, pike, eel, perch, salmon, dolphin, two types of beaver, cormorant, osprey, badger, marten, rabbit, hare, shrew, vole, red, roe, fallow deer, boar, wolf, horse, bison, giant ox, giant deer, straight-tusked elephant, two kinds of rhinoceros, lion, macaque monkey</p> <p>Human: Thousands of Handaxes. Henry Stoppes, 11,000 artefacts now in Cardiff, National Museum of Wales</p> <p>The beds of the River Thames. The lowest beds are similar flint to Clacton. Simple cores, flakes and flake tools but no handaxes. MIS 11c</p> <p>The middle beds have many thousands of handaxes. Small and pointed. MIS 11b</p> <p>Upper loam contains smaller, twisted ovates, similar to Elvenden MIS 11a</p> <p>Swanscombe Skull. Dentist Alvan T. Marston, of Clapham, Barnfield Pit, Swanscombe, discovered occipital bone of Human Skull in</p>	<p>Warmer.</p> <p>The River Thames now flows further South through the London Basin. The English Channel is now formed. As Ice melted, further North, Sea levels rise and close the land bridge to Europe. East Anglia had experienced mass extinctions prior to this date. The Bytham River was “destroyed” and replaced by the Kennet, Lark, Little Ouse and Wissey. The Stour, Waveney and Yeo start flowing into the North Sea. Two inland lakes form; the Hoxne Lake and the Marks Tey Lake</p> <p>The complete Technocomplex of Flint Tools at Swanscombe indicates that the first people arriving after the Anglian Glaciation only made simple, small flake tools. No handaxes in MIS 11c. After retreating to Europe, there were fewer large flint lumps available to make handaxes. Therefore, the ability and knowledge to make handaxes in Europe (in the Ice Age) was forgotten. Upon re-colonisation, they continued to make these very small tools (to begin with)</p> <p>Southfleet Road Elephant Butchery site. Discovered in Channel Tunnel Rail Link in 2003. Simple cores</p>

<p><i>Hoxne Lake Bed, Suffolk, 500 m across</i></p>	<p>Hoxne Zones 1,2,3 only MIS 11c,11a</p>	<p>1935. In the Middle Gravels and Left Parietal of the same Skull in 1937. Wymer family and Adrian Gibson, in 1955, discovered the third part of the Swanscombe Skull in the upper middle gravels, the right parietal bone of the skull. Probably a female. Same lineage as <i>Homo Heidelbergensis</i>. But several features of early <i>Homo Neanderthalensis</i>. Flat parietal bones and breadth across the base show she was not modern human. Small pit called the suprainiac fossa in the middle of the occipital bone is the biggest clue. Usually referred to as pre-neanderthal. This species made the handaxes found in the middle gravels.</p> <p>Pollen analysis indicates mixed deciduous woodland of Oak, Elm and some Hazel. In addition, Pine. Grasslands with Alder. Traight-tusked elephant, Merck's Rhinoceros, Giant Deer, Aurochs, Horse, Red deer, Wild boar, Fallow deer, Pine marten, Barbary macaque, Rabbit, Beaver, Extinct small mole, range of shrews and voles, Lion, Wild cat, Wolf, Cave bear</p> <p>Human: Large handaxes, a pollen profile was created in 2012 by Pettitt and White. Shows a cool period to warming and back to cooling in 4 distinctive pollen zones. Zone 1- Increased tree cover of Birch and Pine, Zone 2- Oak, Alder, Hazel at the peak were Yew and Elm, Zone 3 – Hazel, Alder, Hornbeam and Wingnut (Wingnut then becomes extinct) then nothing more at Hoxne</p>	<p>and flakes. Straight-tusked elephant. Had become stranded in a bog. Situated under Ebbsfleet International Railway Station.</p> <p>MIS 11c- Clement and warm MIS 11b- Cooler, opening up of forest canopy, horse and grassland voles dominant MIS 11a- Warmer again</p> <p>Swanscombe lower gravels and Clacton Gravels assigned to -Zone 2 Pollen</p> <p>Exotic snails and “Rhenish Fauna, top of lower loam at Swanscombe and top of freshwater beds at Clacton. <i>Theodoxus danubialis native to South East Europe in well oxygenated freshwater. Also well recorded at Greehithe.</i></p> <p>The Rhine and Thames at this stage were confluent. This allowed expansion of European invertebrates into Britain</p> <p>This invasion was for a short period until the rise in Sea levels introduced brackish water and marine species into the river Thames.</p> <p>These marine species are in the Middle gravels at Swanscombe and Estuary Beds at Clacton. These are related to Barnham, Elveden and Beeches Pit.</p> <p>North Sea basin was much “higher” in altitude at this time. Therefore, North Sea was shallower at that date. Not the 40m it is today. Hence sight climate changes had a significant effect on whether Britain was an Island or not</p> <p>The first Humans, after the Anglian Glacial, arrived in the Early Hoxnian, when Sea levels were lower, but slowly rising due to the thaw. At the height of Zone 2 Britain was an Island The drop in Sea levels at the end of Zone 2 and into Zone 3, connected Britain to the mainland again Allowing the handaxe makers onto the mainland</p>
<p>Climactic downturn</p>	<p>End of Hoxne Zone 2. MIS 11b</p>	<p>At the end of Zone 2 is a collapse of the Woodland canopy, called “non-arboreal pollen phase”. Trees replaced with Grasses, Ferns, Heathers and Mosses. Thereafter, Hazel and Yew re-generate slowly</p>	
<p><i>Marks Tey Lake Basin, in Essex, much larger and deeper than Hoxne</i></p>	<p>Hoxne Zone 4 MIS 11b, 11c</p>	<p>Increase in fir (Abies), Birch and Grasslands and decline in the Zone 3 Hazel, Oak and deciduous trees, Wingnut becomes extinct</p>	
<p><i>Barnham, Clay Pit, Thetford, Norfolk</i></p>	<p>400,000BP Peak of Zone 2</p>	<p>Human: A flint assemblage, Handaxes, simpler assemblage deeper down. Pollen: Oak, Hazel, Alder, Pine, Elm, Maple, Lime. European Pond Terrapin, Aesculapian Snake, Green Toad, Moor Frog, Common Tree Frog, Natterjack Toad Mammals: Voles, Shrews, Squirrel, Native Rabbits, Long-eared bat, Extinct small mole (Talpa minor), Russian desman (Desmana moschata), Wild boar, Fallow deer, Red deer, Bovine, Straigh-tusked elephant, Rhinoceros, Bear, Polecat, Large extinct lion (larger than African lion of today) Human: 3,000 flint artefacts excavated. Cores, flakes, simple flake tools, notches and scrapers, Area 4 which is 50m to the East, Handaxes are being made / found, either 2 different groups of Human species or the same species undertaking different tasks at</p>	<p>European Pond Terrapin is a warm Climate indicator, as they leave their eggs to incubate outside in the open air. Air needs to be at least 18 degrees C</p>

<p>Elveden Clay Pit, Thetford, Suffolk</p>		<p>different sites ? Conclusion is that it was 2 different human groups, one with knowledge of Handaxe manufacture</p> <p>Cut marks on a Bison bone are also Human . Possible evidence of humans burning flint</p> <p>Human: Handaxes found in the Clay. Cores, Flakes, Flake Tools and Handaxes. "Opposing lateral edges that have a characteristic S twist"</p>	<p>Beetle Fauna in Zone 2 Peat beds at Hoxne suggest temperatures of: Summer: 15-19 degrees C</p>
<p>Beeches Pit, Former Quarry, Dug for Clay, Thetford Forest, Suffolk</p>		<p>78 taxa of mollusc fauna, richest in Britain, Neniatlanta pauli (found in Basque region), much of the fauna found in France, Belarus, Balkans and Russia, reflects warmer wet summers and dense forests at the Peak of the Hoxnian period Many amphibians: Newts, frogs, Toads, Green Frog, Aesculapian snake, Crested Newt, Palmate Newt, indicates fish-free ponds Mammals: Rabbit, Field Vole, Common Vole (Microtus arvalis), Bank Vole, Wood Mouse, Fallow Deer, Red Deer, Aurochs, Narrow-nosed rhinoceros, Bear</p> <p>Humans: Burned bones, possibly cooking, hearths have been found, fint flakes, flint tools, flint handaxes, oldest evidence of humans using fire in Europe</p>	<p>Evidence of Neanderthal tools found along Suffolk and Kent coastlines. Small vole (extinct during Purfleet MAZ), Giant beaver, Rabbit, Pine vole all specific to the Swanscombe MAZ. No Hyaena in Swanscombe MAZ</p>
<p>Clacton, Jaywick Sands and Clacton, Butlins Holiday Camp, Clacton, Essex</p>	<p>Zone 2 to Zone 3 pollen</p>	<p>Human: large numbers of flakes and cores on the foreshore. Trees: Oak, Alder, Elm, Lime, arrival of Hornbeam. Human implements found throughout all depths. Cores, flakes, flake tools BUT no handaxes. Termed "Clactonian". BUT they created Spears. World's oldest spear found by Warren in 1911. Branch of a Yew Tree. Used for thrusting rather than throwing. Close encounter hunting was involved</p>	<p>This end of Zone 2 collapse of the Tree cover seems to be Europe-wide. Possibly a large meteor strike or volcanic eruption are possible causes. Dottingen in Germany has Volcanic ash just below this pollen phase change and supports the idea of a volcanic eruption.</p>
<p>Minor Quarry, Milton, Weston-super-mare</p>		<p>Merck's Rhinoceros, Forest Rhinoceros</p>	<p>Teeth in Weston-super-mare Museum</p>
<p>G.B. Cave, Burrington Combe Area, Northern Mendip, Somerset</p>	<p>390,000BP</p>		<p>Using Uranium / Thorium diequilibrium method on stalagmites</p>
<p>Hoxne Lake Bed, Suffolk, The Colder to Cool phase</p>	<p>390,000-360,000BP</p>	<p>"Arctic Bed" at top of Hoxne site. Plants: Dwarf Birch, 3 species of Dwarf Willow, 2 Beetle species only found in Russia today: <i>Helophorus obscurellus</i>, <i>Holoboreaphilus nordenskoeldi</i></p> <p>Mammals: Russian desman, water vole, Water shrew, European river otter, Extinct beaver, Grassland and woodland voles and shrews, Elephant, Rhinoceros, Roe deer, Fallow deer, Giant deer, Red deer, Horse, Norway lemming from Arctic tundra, Birch and Willow scrub, feeding off Moss, Sedges and small shrubs</p> <p>Pollen: Alder, Pine, Spruce, Birch and absence of deciduous trees indicates a temperate environment</p>	<p>Perhaps humans returned in bigger numbers in the Hoxnian. With new technology and new ideas. Warm Summers and Mild Winters. Rich deciduous forests. More sites in the Hoxnian than any other Palaeolithic Period. Thousands of handaxes can be found along the River terraces. The Strait of Dover</p>

	MIS 11, shows complex shift between warm and cool towards end of Hoxnian	Human: Along with the bones are flint assemblages. Handaxes and flake tools along with debris from manufacture. Horse was a major part of their diet. Breaking of bones to access marrow. Fine blades used for removing hides to make clothing. Uranium and amino acid racemisation ratios show that this was AFTER the Hoxnian interglacial but before the next Glacial.	<p>was formed but Europe was still accessible from Britain across the North Sea Basin. The Rivers Thames and Rhine flowed as one. Different Human groupings arrived at different times. First arrivals were "Clactonians", lacked the knowledge to make handaxes. Could have arrived from Central Southern Europe with few resources. Clacton Spear shows they had capability of close combat.</p> <p>New Human groups arrived with the knowledge of Handaxe technology. Clactonians could have merged into this new group ?. A large scale event caused a change in culture at end of Hoxnian Pollen Zone 2. Loss of Tree canopy. 300 years of recovery was needed. Possible causes are Volcanic Winter or Meteor strike. The new people had the controlled use of fire (learned from the global catastrophe ?). Beeches Pit has open hearths and many flint tools. Keeping warm, defence, cooking meat to remove pathogens and parasites, removing toxins from tubers such as Yellow Waterlily,</p> <p>The Swanscombe Skull. Had a brain size similar to our own and was probably descended from Homo Heidelbergensis. But before the time that they had acquired Neanderthal-like traits.</p>
Wolstonian	MIS 10, 364,000 BP		Cooler. No humans. Possible depopulation of Britain
Neanderthals evolved from Homo Heidelbergensis in Europe			
<p>Wolstonian or Purfleet Interglacial "Purfleet", Essex <i>Enormous gravel and chalk pits of Purfleet, Thurrock and Grays Bluelands and Greenlands at Purfleet</i></p> <p>Clactonian Technocomplex</p> <p><i>Also: Grays, Thurrock, Belhus Park, Cudmore Grove</i></p> <p><i>Lynch Hill Terrace, Thames, Hillingdon, West Drayton and Yiewsley, London</i></p> <p><i>Hackney Gravels, Deposited by the River Lea (higher ground to the West of current course), Northeast London</i></p>	MIS 9, 334,000 BP	<p>Levallois tools, fallow deer, macaque, beaver, carp, pike, lizard, snakes, white-toothed shrew, water shrew, water vole, elephant, horse, hyaena</p> <p>Cyprideis torosa indicates freshwater. But there is tidal influence.</p> <p>Green Lands Shell Bed: Bithynia tentaculate, Pisidium henslowanum, and Belgrandia marginata, which like slow moving but large rivers. Belgrandia is found in North East Spain and Southern France, not Britain, indicates warmer Summers than today Many vertebra including Agile frog, no longer native to Britain but is found in Europe. Can jump to 2 m high</p> <p>Mammals: Several Voles and Shrews, European Beaver, Macaque, Deer, Horse, Bison, Straight-tusked elephant and Hyaena</p> <p>Over 1,500 handaxes were recovered. But very little bone.</p> <p>Many artefacts but very little fauna and flora</p> <p>Woodland dominated by: Lime, Elm, Field Maple, damper areas: Alder, Willow and Ash. 84 plant Taxa preserved at the Nightingale Estate. Beetles: 254 Taxa. Aquatic invertebrates: Oulimnius troglodytes, Normandia nitens. Slow flowing stagnant water: Benbidion. Weevils, Cockchafer, Rhynchaenus quercus that feed on Oak. Large numbers of dung beetles. Aphodius and Onthophagus indicates presence of large</p>	<p>Warmer. Re-colonisation is difficult owing to the formation of the strait of Dover in MIS 11. Difficult to find stone tools alongside biological evidence. Many thousands of Handaxes have been found along the River Thames and River Solent terraces. Human Levallois tools. Levallois tool making occurs at the division between Homo Neanderthalensis and Homo sapiens. Macaque extinct in Britain after Purfleet MAZ</p> <p>Ostracods used to estimate average temperatures of: July: 16-21 degrees C Januaries: -3 to 3 degrees C</p> <p>Temperatures indicated by Beetles: Average Summer temperature of 18 degrees C Average Winter temperatures of -4 to 1 degrees C</p>

<p>Stoke Newington, London</p> <p>Clactonian Technocomplex</p> <p>Botany Pit, Greenlands Pit, Purfleet,</p> <p>Levallois Technocomplex</p> <p>Cudmore Grove, Colchester, Essex, Thames</p>		<p>mammals. Many are extinct in Britain but live in Central and Southern Europe</p> <p>Human: Handaxes recovered from between Hackney Downs and Highbury. Towards Stamford Hill. Deposited before, during and after the Purfleet Interglacial. Where the River Lea and Thames are confluent. Handaxes generally are pointed in shape. Some are enormous in size. Largest from Furze Platt, Maidenhead. Weighs 2.8 Kg and 30.6 cm long. Lack of associated biological remains makes it hard to date when these people arrived</p> <p>Human: 4,000 flint flakes and occasional handaxes, relating to Levallois technology. Named after a suburb of Northwest paris where the unusual cores were identified. Appeared to be a primitive form of this Levallois technology that had developed locally, in Britain, rather than in Africa or Europe</p> <p>7 metres of Pollen succession. Earliest: Pine, Birch. Occasional: Oak, Alder, Hazel. The Edges had pondweed, Bulrushes and grassy plains. Warming of the climate indicated by: Deciduous woodland, dominant Oak, smaller numbers of Ash, Hazel and lime. Fewer aquatic plants indicates increased salinity of water in the Thames. Final change in climate indicated by a change to: Alder carr, Oak in domination, Hornbeam, Spruce with open ground of grasses, heathers and ferns</p> <p>14 amphibians and reptiles. 7 are non-native to Britain. Crested newt, Common toad, Grass snake, Common lizard, Moor frog, Marsh frog, Viperine water snake, European pond terrapin. Mixtures of wet, damp, dry habitats</p> <p>Mammals: Water shrew, Water vole, European beaver, Red squirrel, Wood mouse, Macaque, Roe Deer.</p>	<p>The pointed Handaxe technocomplex here at Stoke is easily recognised as being pointed. This indicates a distinctive Social or Cultural group manufacturing them. Dating is anywhere from MIS 10 to the start of MIS 8</p> <p>Humans seem to be absent where fauna and flora are present in situ</p> <p>The peak of the Interglacial Britain was probably an Island. These people may have arrived in the cooler periods when the land bridge was more open</p> <p>Levallois technology is distinctive and can be clearly recognised. Flaking down the side of the Nodules. Then flaked across the top to predetermine the final shape of the flake tools needed. Associated with Neanderthals</p> <p>Temperate climate with warmer Summers than exist today.</p>
<p>Wolstonian Harnham, Ring Road South of Salisbury, Wiltshire</p>	<p>MIS 8, 301,000 BP</p>	<p>Human: Several hundred Human artefacts found. Handaxes and flakes. All the mollusc remains are of species that can be found in Britain today. Land gastropod, Trichia hispida. Ranges from warmer, Western Norway. Norther Vole, found in Tundra areas of Europe Mammals: Horse, Bison, Mouse, Red-backed vole</p>	<p>Cooler. Comparatively mild when compared to Anglian Glaciation of MIS 12. Most of the North covered in Ice. Possible human survival further South during a milder phase. One human site, Harnham, Salisbury Did these people survive from the warmer Purfleet Interglacial ? Using handaxes rather than newer Levallois method (which is newer). Is this an older tribe or Society from pre-Levallois ?</p>
<p>Wolstonian Ilford Interglacial Aveley Interglacial "Pontnewydd" Cave, Rhyl, North Wales</p> <p>(South Western Regional Archaeological Framework, Middle Palaeolithic, 250,000-200,000-100,000 BP-40,000 BP)</p>	<p>MIS 7, 244,000 BP Sub divided into stages MIS 7e to 7a Humans may have been absent from the later stages</p>	<p>Wales: Human molar tooth and 17 other human teeth, at least 5 people, 3 aged 12 years, one young adult, one mature adult, early Neanderthal, Beaver, Wood mouse, Roe deer, lemmings, later: Musk ox, Wolves, Reindeer Corbicula fluminalis, Clam (London)</p>	<p>Warmer. Humans arrived early in MIS 7 Early human occupations at Cave entrance. Multi period use site. Many small pointed handaxes were found. But no source of Flint within 50 miles of the Cave. Evidence of heating of tools close to a hearth, dated to 225,000 BP. Presence of Taurodontism, where roots of the teeth merge, only known in Neanderthals. 50% of Neanderthal teeth show Taurodontism. Allows for wear and regrowth of the dentine layer</p>

<p>Acheulian Technocomplex</p>			
<p>Levallois Technocomplex</p>			
<p><i>Ilford, Clay Pits, Ilford, London</i></p>		<p>Taxonomic status of rarer dwarf elephant is debated. But could be a smaller form of Steppe-elephant or small Mammoth. Fewer plates forming the Molars. Also found at Avely, on a terrace of the River Thames 12 Km to the South East. Straight-tusk elephant at the top of the Clays but the dwarf elephant was found above that Mammals: Auroch, Bison, Horse, Red deer, Narrow-nose rhinoceros, Grey wolf, Brown bear, Lion, Jungle cat, Straight-tusk elephant, Ilford mammoth, Horse, Bison. Indicates woodland changing to open grassland. Clays associated with Oak, Pine, Hazel, Lime, Hornbeam, Spruce At top: Hazel and Oak decline, increase in Pine, Birch, Willow, Alder. A change in local circumstances rather than climate change</p>	
<p><i>Ebbsfleet,, Ebbsfleet International, Eurostar, South of Thames, Ebbsfleet Channel, Southern Tributary of River Thames, London</i></p>	<p><i>"Baker's Hole" site</i></p>	<p>Human: One of the most famous Levallois sites in the world. Exceptionally large cores with side knapping and surface removal to enable predetermined shape of final removals. All Levallois flakes have an "all around cutting edge" Mammals: Ilford mammoth, Woolly rhinoceros, Horse, Norway lemming suggest "open Steppe" environment. Temperate conditions Gastropod, freshwater Bithynia tentaculate, found throughout Europe today Land Snail, Pupilla muscorum, prefers open, sandy conditions throughout Southern and Northern Europe today Temperatures increase in another "Temperate Bed": Warmer conditions indicated by: Giant deer, Steppe mammoth, Horse Upper sediments show return to Cool conditions.</p>	<p>Middle deposits at Ebbsfleet suggest Climate changes from Cool, Warm to Cool</p>
<p><i>Crayford, 9 Km West of Ebbsfleet, Brick Earth Pits and Clays, London</i></p>	<p><i>Stoneham's Pit, below a Chalk Cliff</i></p>	<p>Human: In situ flint knapping floor, elongated flakes, could be fitted back onto their cores. Levallois technology on elongated nodules. The end-products were Levallois points rather than flakes. To be taken elsewhere Mammals: Musk Ox, Ilford mammoth, Narrow-nose rhinoceros, Woolly rhinoceros, Horse, Ground squirrel, Mussels that had been articulated (eaten) so contemporary</p>	
<p><i>Creffield Road, West London (nearby Yiewsley as well)</i></p>		<p>Human: 83 Creffield Road, had pits dug to construct Houses. Many artefacts. Immediately above the "Lynch Hill Gravel of the Thames". Early part of Aveyey Interglacial. But no mammalian assemblage to assist with dating the site. Earliest example of a "composite tool" mounting Levallois point onto a shaft Composite Tool: Where the working part is given a handle</p>	<p>All flints local from initial preparation of Levallois Cores. Several highly reduced cores and many Levallois Points. Lack of flints from the initial knapping phases. Possibly for initial core preparation. Semi-prepared cores then taken elsewhere. Returned after hunting trips with reduced cores and damaged points for repair. All are carefully crafted and have removals from the base. Hafted onto a shaft to make spears that were flint-tipped</p>

<p><i>Caddington, Cley Pits on Dunstable Downs, Dunstable, Bedfordshire</i></p> <p><i>Bleadon Cavern, Bleadon Quarry, Mendip, Somerset. ST 3608 5813</i></p>	<p>250,000BP</p>	<p>Human: The sharp tools can be re-joined together. Pits contained handaxes and flakes. One clay pit produced Levallois artefacts. The pits used to be small ponds where humans gathered around. No biological material has been found and dating is difficult</p> <p>The mining operations of early 19th century uncovered this cave and it was re-opened in 1970. Human: Human remains have been recovered but are undated. Cave is gated. <u>Could be a "Big Cat Den" and could date back to 250,000BP</u></p>	
<p>Wolstonian "West Thurrock and Avely", Essex</p>	<p>MIS 7, 244,000 BP</p>	<p>Escaped glaciation. Levallois prepared cores. Elephant and Mammoth skeletons. Brown bear, auroch, wood mouse, pygmy shrew, bank vole, common vole, water vole, beaver, tench, straight-tusked elephant and mammoth together, Horse, Jungle Cat</p>	<p>Escaped glaciation: Earliest arefacts are MIS 8. A connection with Europe possible allowing the migration of an unusual small mammoth to colonised Essex. Cold stage mammals (Reindeer and Mammoth) and warm stage mammals (Red deer and Straight-tusked elephant) living together. Rare and only occurrence of Jungle Cat (Asian species)</p>
<p>Wolstonian "Ilford", Essex, Brundon, and Stoke Tunnel, Suffolk</p> <p><i>Bleadon Cavern, Somerset, ST 3606 5813</i></p> <p><i>Hutton Cavern, Somerset, Not located at the moment</i></p> <p><i>Pontnewydd Cave, Cefn Cave Site, River Elwy, Denbighshire, North Wales</i></p> <p><i>Marsworth, Chalk Pit, College Lake Wildlife Centre, Vale of Aylesbury, Chiltern Hills</i></p> <p><i>(A site that seems to be missing the first</i></p>	<p>MIS 7, 244,000 BP</p> <p>230,000 BP</p> <p>The ONLY Middle-Palaeolithic site in Britain to produce Human remains</p> <p>Uranium-series dating, Tufa: 240,000 BP and 210,000 BP</p> <p>Two different phases, one wooded, one not wooded</p>	<p>Thousand large bones, teeth and tusks. Bison, Bear, Lion, Horse, Hyaena, Elephant and Mammoth. Fifty species shellfish and snails, ninety species of insects</p> <p>Mountain hare, Ground squirrel, Northern vole, Wolf, Red fox, Brown bear, Polecat, Spotted hyaena, Wild cat, Lion, Leopard, Straight-tusked elephant, Mammoth, Horse, Rhinoceros, Wild boar, Red deer, Roe deer, Auroch, Bison</p> <p>Hare, Dwarf hamster, Collard lemming, Red fox, Wolf, Spotted hyaena, Wild cat, Lion, "Ilford-type" Mammoth, Horse, Wild boar, Red deer</p> <p>15 m above the River and entrance is 3m height. Extends back 30m. There is a smaller side entrance. Breccia dated to 230,000 BP</p> <p>Mammals: Merck's Rhinoceros, Narrow-nosed rhinoceros, Red deer, Roe deer, Horse, European beaver, Mountain hare, Northern vole, Norway lemming, Arctic lemming, Wolf, Leopard, Lion, Bear</p> <p>Human: 17 Neanderthal Teeth and a Maxilla fragment. Teeth show "Taurodontism", Pulp cavity and size of molars enlarged at the expense of roots</p> <p>Human: Cut marks on bear bones. Hibernating Bears could be easy prey. Over 1,000 stone tools, made from Flint, Rhyolite and Tuffs. From nearby streams. Many are Levallois cores and flakes. <i>BUT also Handaxes, this is unusual compared to Southeast England</i></p> <p>There may have been 2 different groups of people each making a slightly different tool.</p> <p>A sequence that may cover the entire interglacial. Tufa contains Molluscs that prefer wooded and temperate climates: <i>Discus rotundatus</i>, <i>Azeca goodalli</i> Frog bones Mosses, Willow, Maple, Mountain-Ash, Ash, Pine, Oak, Birch, Hornbeam, Hazel</p>	<p>Taurodontism helps extend the chewing life of the teeth. Analysis showing wear from chewing tough plant materials.</p> <p>At least 5 individuals from this Cave. Maxilla and 2 teeth from a 9 year old. The other teeth from 3 boys, 8, 11 and 14-16 year olds. One adult male. Teeth show hypoplasia that indicates starvation and or disease especially in the Girl. Imbalance of genders suggests this is not a family group. Could not have been a foraging party, because of the number of tools. Must have been used by successive generations. <i>May have been at the extreme edge of the Human excursion into Britain</i></p>

<p>part of MIS 7e, owing to the absence of Human artefacts and presence of Hornbeam throughout)</p>	<p>3 different environmental episodes have been identified. 3 warm peaks and 2 cooler episodes (MIS 7e-MIS 7a)</p> <p>MIS 7e-MIS7c are temperate</p> <p>MIS 7b is a cooler phase</p> <p>But Hornbeam is present throughout the whole sequence. Usually a late arrive after the peak of warm conditions</p>	<p>Trees were rare: Birch, Alder, Willow and occasional Poplar, Oak, Elm, Yew and Hornbeam. Hazel and Redcurrant also present</p> <p>Molluscs indicate marshland, grassland and bare ground: Pupilla muscorum and Trichia hispida</p> <p>92 beetle taxa. None of the beetles are dependent on trees for survival. Cool conditions suggested by: <i>Simplocaria metallica</i>, <i>Pycnoglypta lurida</i>, now found in Scandinavia and Northern Poland</p> <p>Dung Beetles are present and indicate the presence of large mammals.</p> <p>Mammals: (Bones, Teeth and Ivory) Ilford Mammoth, Straight-tusked elephant, Narrow-nosed rhinoceros, Auroch, Bison, Horse, Red deer, Voles and Shrews. Northern Vole suggests cooler conditions. Brown Bear, Lion, Wolf, Red fox. "Open Mammoth Steppe Fauna". BUT no humans in evidence.</p>	<p>Average temperature estimations based on Beetle fauna: July: 15 degrees C January: -5 degrees C</p> <p>Mollusc: <i>Discus rotundatus</i> is usually a late arrival after a Glacial period. Possibly missing the earliest part of MIS 7 ?. Perhaps the first few thousand years of MIS 7e are missing ?</p> <p>But these first few thousand years were discovered at Ebbsfleet, Creffield Road and Pontnewydd. Indicates that people were only living in Britain for the first part of MIS 7e until new sites are discovered</p>
<p>A Mammoth Steppe environment had developed from cooler Winters with reduced precipitation. Neanderthals at this stage seem to arrive "early" in this interglacial (above) and seemed to be working in groups and communities. Showing signs of being able to adapt in order to survive. This required communication and co-ordination. Bigger hunting groups were involved. People had to relate to each other and had to deal with potential conflicts. Specialist sub-groups may have developed for tool making, clothes making and hunting. A society was in evidence. The occupation of Britain seemed to focus around the River Thames and only lasted a few thousand years at the start of the Aveley Interglacial. They may have arrived when Sea levels were low and could easily travel from Europe. As the interglacial warmed the sea levels rose and cut off Britain from Europe. Many may have been isolated from Europe and died of malnutrition and disease or even genetic causes. A viable population needs a minimal number of people in order to succeed. Fallow deer were absent from previous Aveley interglacial</p>			
<p>Wolstonian "Bacon Hole", Gower, Wales</p> <p><i>Crayford, Kent</i></p> <p><i>Banwell Bone Cave ?</i> <i>Banwell, Mendip,</i> <i>Somerset</i> <i>ST 3822 5881</i></p>	<p>MIS 6, 190,000 BP</p>	<p>Small Horse</p> <p>Woolly rhinoceros, Musk ox, lemmings, ground squirrels. Human Levallois</p> <p><i>Equus caballus ?</i>. Many Pleistocene bones discovered by Miners. Floor littered with animal bones Mammals: Bear, Reindeer, Bison and Wolf</p>	<p>Cooler.</p> <p>"Saalian" Ice sheets cover most of Northern Europe and half of Britain, named after River Saale in Germany. Extends as far South as North East Anglia and the Midlands. Severe glaciation, Britain uninhabitable for 50,000 years. BUT in 125,000 BP over a period of 3,000 years Britain becomes slightly warmer than today. Large parts of the Planet become flooded. North Sea is as much as 30m deep. English Channel possibly as wide as today.</p> <p>Most herbivores reach Britain EXCEPT Horses</p> <p>Land bridge crossing to Europe possibly open. No humans. Glaciation causes Sea level to drop by up to 100m</p> <p>Neanderthals in evidence on Island of Jersey</p> <p>Human Levallois tools at Crayford</p> <p>Wild Horse (Balch) disputed</p>
<p>Trafalgar Square is situated upon the old course of the River Thames. At 125,000 BP it was teaming with Wildlife. Hippopotamus would be wallowing in the water alongside Rhinoceros and Elephants along the River Banks. Deciduous forests, Bison, Deer, Wolves and Lions. Neanderthals failed to reach Britain before the Sea levels rose and isolated the Island from the rest of Europe. In addition Horses seem to be missing. Only the first sequence of MIS 5e is recorded from some 39 sites. The second half of MIS 5 has very few sites</p>			
<p>Ipswichian</p> <p>"Bobbithole", Ipswich, Suffolk</p> <p><i>Black Rock, Brighton,</i> <i>Sussex, Kirkdale Cave,</i> <i>Tornewton Cave,</i> <i>Willment's Cave,</i> <i>Isleworth, Casington</i></p> <p>Mousterian Technocomplex</p>	<p>MIS 5e, 130,000 BP</p>	<p>Lowest part of silts and sediments show pollens from: Birch, <i>Betula nana</i> (dwarf Birch), Juniper Shrubs, with some Willow and Pine.</p> <p>Tree cover then increases with Downey Birch, White European Birch, Pine, Elm (first appearance) indicates a slight warming of the climate.</p> <p>Next sequence has Elm, Oak and Maples. Developed further into Birch, Pine, Oak, Maple, Ash, Spruce, Alder, Lime. Hazel's first appearance.</p> <p>Final pollen phase: Peak interglacial, mature mixed forest, Oak, Maple, Hazel, Alder, Ash, Spruce. Montpellier Maple (<i>Acer monspessulanum</i>), found in the</p>	<p>Warmer. High sea level event</p> <p>Island Britain ?. No humans ?. Possible flooding of Dover Strait by the release of freshwater lake that had formed in the Southern North Sea. The absence of horses is very unusual for an interglacial</p> <p>Hippopotamus were living in the Mediterranean and could have swam up the French Coast and then up the Rivers</p> <p>Humans seemed to be absent from Britain but a site called Caors in France (North east of Abbeville) did show some evidence. Mollusc: <i>Belgrandia marginata</i> lived there (now only Mediterranean Southern Europe). So matches Ipswichian sites in Britain. Red deer, Fallow deer, Auroch, Roe deer, Wild boar, Narrow-nosed rhinoceros, Straight-tusked elephant also match the Ipswichian in Britain. Wood mouse, Bank vole, Field vole indicate</p>

<p>“Bacon Hole”, Gower, Wales and “Banwell Bone Cave”, Somerset, “Joint Mitnor “Cave, Devon</p> <p><i>The Gower Caves, 3 Cliffs Bay, Pwll-du Head, 4 Caves looking Southwards towards the Sea, The Coast, Gower Peninsula, South Wales</i></p> <p><i>Deeping St James, Western Fens, Gravel Pits, River Welland flows towards Wash Basin, North of Peterborough, Lincolnshire Border</i></p> <p><i>Trafalgar Square, 28 feet deep, in a bed of sand and gravel, Southwest side of the Square, London</i></p>	<p>Ravenscliff Cave Minchin Hole Bosco’s Den Bacon Hole</p>	<p>Mediterranean, Rhineland of France and Germany today. Alder colonised earlier in mainland Europe indicates Britain was an island</p> <p>Spotted Hyaena, Narrow-nose rhinoceros, Hippopotamus No human faunas. Hyaena feeding from Hippopotamus in Kirkdale Cave, Yorkshire Also: Lion, Elephant, Red deer, Fallow deer, Water vole, Wood mouse, Wood Mouse No horses</p> <p>Bosco’s Den- Completely emptied but had rich faunal contents Ravenscliffe- also subject to extensive clearing. Mammals: Hippopotamus major, young and old, Ursus, Cervus, Arvicola Minchin Hole- largest cave. Mammals: Wood mouse, Bank vole, Field vole, Fallow deer, Wild boar, Lion, Spotted hyaena Fallow deer were absent from previous Aveley interglacial Cory’s Shearwater nesting colony, now only nest in the Azores, Canary Islands and Berlengas off Portugal. Therefore, climate was warm Bacon Hole: Mammals: Straight-tusked elephant, Narrow-nosed rhinoceros, Spotted hyaena, Grey wolf, Cave bear. Temperate deciduous woodland. Other sites: Red deer, Giant deer, Badger, Fox, Wild cat No Humans</p> <p>Pollen: Hazel Scrub, Light woodland, smaller amounts of Pine, Oak, Birch, Maple, Yew. Alder and Ash along water’s edge. 78 plant Taxa. Brittle water nymph and floating fern, now only found in Southern Europe and further East. Suggest warmer Summers and Continental Winters Mammal: Juvenile Straight-tusked elephant, very few other remains. Mollusc: Belgrandia marginata, closest sites today, now found in North West Spain and Southern France. Suggests warmer, more continental climate than today Beetles: Cockchafer survives on Oak leaves and Acorn Weevil drills into Acorns. Hazel fed on by Scolytus rugulosus and Ash fed on by Hylesinus oleiperda. Finally, dung beetles indicates large mammals lived there. Unusual Beetles: Onthophagus massai found today in Sicily and a beetle similar to Heptaaulacus priazzoli found today in Tunisia and Libya. Indicates much warmer climate.</p> <p>Mammals: Hippopotamus, Red Deer at depths of 80 feet beneath new Admiralty Offices. West of the Square. Uganda House, South side of the Square: 60 mollusc species show the Thames was fast flowing, Pear-bearing Mussels, Margaritifera Auricularia Beetles: indicate warmer conditions Plants: Over 100 species of plant seeds and fruit. Hornwort, Spiny Water Nymph, Water</p>	<p>woodland and grassland. Carnivores: Brown bear and Clawless otter. Over 100 bones broken for marrow extraction. Suggests that people brought them to the site. 300 flint artefacts from several layers. Cores, flakes and flake tools. People had ventured to North West France. People were probably not quick enough to reach the Channel before it flooded. Deciduous woodland supports less game. Did Neanderthals choose to migrate further East to open “Steppe” grasslands ?</p> <p>Strange absence of Horse in Britain during the Ipswichian. Also rare in Caors, France. Horse prefer open grasslands rather than woodlands. There may have been a special relationship between Humans and Horses. Were horses the main prey of Humans ?.</p> <p>Temperatures indicated from Beetle Species: Average July temperature: 21 degrees C (warmer) Average Winter temperature: Similar to today</p>
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<p>Victoria Cave, Western Langcliffe Scar, 440 m, Ribblesdale, Settle, Yorkshire</p> <p>Alveston Bone Fissure, ST 6144 8503</p> <p>Milton Hill Fissure, ST 539 468</p> <p>Hutton Bone Caves, ST 3610 5814</p> <p>Rhinoceros Hole, Base levels, ST 532 479</p> <p>Burtle Beds, Somerset Levels, North and South of Polden Hills, South of King Sedgemoor Drain, Chedzoy to Westonzoyland to Otherey, Somerset</p> <p>Grey Lake, Number 2 Quarry, ST 385 336</p> <p>Goatchurch Cavern Burrington Combe, Mendip, Somerset. ST 4758 5823</p> <p>Hutton Cavern -2, Hutton, Mendip, Somerset. ST 3605 5816</p>	<p>Uranium-series dating was estimated to be 125,000BP</p>	<p>Chickweed, Water Chestnut. Water Chestnut can only fruit in temperatures of over 20 degrees C, therefore warm Summers</p> <p>Forests, further afield were: Oak, Hazel, Willow, Yew, Pine, Birch, Montpellier Maple, Mammals: Hippopotamus, Red Deer, Straight-tusked elephant, Rhinoceros, Wild ox, Fallow deer, Cave lion, Hyaena, Bear Missing: Humans and Horse</p> <p>Hyaena jaw. Hyaenas brought the bones to the Cave or by Lion. The Cave sequences over 500,000 years. Upper and lower Cave earths. Mammals: Straight-tusked elephant, Narrow-nosed rhinoceros, Giant deer, Red deer, Hippopotamus. NO human remains nor evidence of Human activity Fallow deer, Straight-tusked elephant, Narrow-nosed rhinoceros</p> <p>Straight-tusked elephant, Hippopotamus</p> <p>Hippopotamus</p> <p>Hippopotamus, Narrow-nosed rhinoceros, Straight-tusked elephant</p> <p>Wolf, Spotted hyaena, Elephant, Narrow- nosed rhinoceros, Hippopotamus, Fallow deer, Red deer, Roe deer, Auroch, Bovine (sp)</p> <p>Excavations conducted by Beard in 1830 and Boyd-Dawkins 1860 and UBSS 1923-25. Mammals: Bear, Horse, Mammoth, Hyaena, Cave Lion</p> <p>Bone fissure recorded by Catcott in 1757 and 1768. Located 40m West of Hutton Cavern. Mammal: A miner described finding the head of a strange animal. "about 3 or 4 feet long" 14 inches broad at the top or hind part and 3 inches at the snout. Shaped like a crocodile. Skull had 4 tusks. 2 tusks on each jaw. With large teeth. Possibly a Hippopotamus. The miner hid the Skull in a nearby wood and both skull and cave are now lost.</p>	<p>Crushed bones indicate involvement of early man in Mendip at this date</p> <p>Hippopotamus bones destroyed in War damage in Bristol</p> <p>Human Mousterian, implement found</p> <p>Absence of Horse indicates a last interglacial age</p>
Devensian	MIS 5d, 115,00 BP	Very little	Cooler. Possible extinction event. Island Britain separated by a large River system. No humans
Devensian	MIS 5c, 106,000 BP		Warmer. Island Britain ?. No humans
Devensian	MIS 5b, 93,000 BP	Very little	Cooler. Possible extinction event. Island Britain ?. No humans
Devensian "Banwell Bone Cave", Somerset	MIS 5a, 85,000 BP	Island fauna of Britain. Great Bear, Wolverine, Bison, Reindeer, Arctic Hare, Arctic Fox, No human fossils. Evidence of major climactic event from MIS 5b ?	Warmer. Closure or flooding of land bridge to Europe. Island Britain. No humans

Dating above is often achieved by Uranium series decay, amino acid racemisation from L form to D form or Mammalian Assemblage Zone association

Dating below is achieved by radiocarbon dating

Neanderthals return to Britain with new skills and technologies. The Devenisan started with a relatively harsh glaciation of the Highlands. Climate oscillations lasted no more than a few hundred years. Warm peaks were too short to allow re-forestation. Britain was Steppe Tundra with cool Summers and cold Winters. Sea levels were at -50m compared to present. Access to Britain was possible by land across the North Sea basin. Doggerland had opened up. Rivers flow through Dover Straight, flowing out to Sea between Brittany and Southern England. The Solent flowed South from the North between the Needles and Portland Bill. The easiest route into Britain was from the East. Steppe Tundra had Woolly Mammoth (3.5m height, 6 tonnes maximum), Woolly Rhinoceros, Horse, Bison, Reindeer, Snow Vole, Northern Vole, Norway Lemming, Arctic Lemming, Mountain Hare, Steppe Pikka, Arctic Fox, Wolverine, Red deer, Giant deer

Middle Palaeolithic (MP), 70,000-35,000BC			
<p>Devensian "Brean Down", North Somerset, ST 295 588</p> <p>"Banwell Bone Cave", Somerset, ST 3822 5881</p> <p><u>Upper Palaeolithic Technocomplex</u></p>	<p>MIS 4, 74,000BP 40,000-70,000BP Upper levels of Cave deposits</p>	<p>Woolly mammoth, Wild horse</p> <p>Upper of 2 connected caves. Beard's collection at Taunton Museum. Implements of Upper Palaeolithic type. Dominated by Bison and Reindeer. Huge form of Brown bear, similar to Polar bear. Mountain hare, Arctic fox, Red fox, Wolf, Brown bear, Otter, Wolverine, Reindeer, Bison</p>	<p>Cooler. Land bridge to Europe probably opened once more to allow European animals to migrate back to Britain. No humans ?</p> <p>"Banwell Bone Cave Mammal Assemblage-Zone", is the formal biostratification Unit</p>
<p><i>Picken's Hole, Compton Bishop, Somerset, ST 3969 5500</i></p>	<p>1 metre wide</p>	<p>Human: Neanderthal remains, 50 Cores, flakes and a broken Handaxe. Made of local Flint / Chert Mammals: Woolly Mammoth, Woolly rhinoceros, Reindeer, Spotted hyaena, Lion, Wolf Bone samples taken Woolly Mammoth, Woolly Rhinoceros Tiny assemblage, one bout coupe handaxe and 3 flakes from their manufacture</p>	<p>Dated to 70,000BP from bone samples Tools similar to Hyaena Den</p>
<p><i>Rhinoceros Hole, Wookey, Somerset, ST 532 479</i></p>	<p>Natural pitfall exposed by quarrying</p>	<p>East side of Wookey Hole. ravine. 16m above present valley floor. 15m below the plateau. A collapsed rock shelter with 2 short passages. Partial excavations in 1900 and 1970's . Human: Mid palaeolithic handaxe and thinning flakes. Mammals: Mid-last glacial faunal remains. Human activity (from dating of Stalactite flowstone, is 100,000-40,000BP. Woolly Mammoth, Wild Horse, Wolverine. Handaxe and thinning flakes</p>	<p>Contains cold fauna. Crude bone implements found in Cave</p>
<p><i>Whatley Bone Fissure, Mells, Somerset, ST 730 482</i></p>	<p>11 other Cave sites listed for the Quarry</p>	<p>Woolly Mammoth, Reindeer, Straight-tusked elephant (suggests earlier warm fauna from Ipswichian)</p>	<p>Wolverine are rare finds on Mendip</p>
<p><i>Bleadon Bone Cave, Or Bleadon Cave, Bleadon, Somerset ST 341 567</i></p>	<p>Not date given</p>	<p>Human: Reference to Human remains. Flint tools. Cave destroyed by Quarrying. Mammals: Some Pleistocene bones were found</p>	<p>Temperate to cold fauna</p>
<p><i>Bleadon Cavern, Bleadon Quarry, Somerset. ST 3608 5813</i></p>		<p>The mining operations of early 19 century uncovered this cave and it was re-opened in 1970. Human: Human remains have been recovered but are undated. Cave is gated. <u>Could be a "Big Cat Den" and could date back to 250,000BP</u></p>	

<p><i>Uphill Caves, 13 Caves, Quarry, Uphill, ST 315 585</i></p> <p><i>Also: Eel Point Cave, Beedings, Whitemoor Haye, Lynford, Coygen</i></p>	<p>Caves 7 and 8 most significant</p>	<p>Caves destroyed by Quarrying and artefacts were kept in Bristol Museum but sadly destroyed by the Blitz on Bristol</p> <p>Late Neanderthal Tools: One Handaxe and several flakes from manufacture or resharpening.</p> <p>Mammals: Woolly Mammoth, Woolly rhinoceros, Reindeer, Bison, Horse. Could have been one of many sites regularly revisited by Neanderthals across Mendip</p>	<p>Mousterian tools, made from Flint, some from Chert</p>
<p>Devensian "Pin Hole Cave", Derbyshire</p> <p><i>Whitemoor Haye, Quarry, Close to River Tame, Tamworth, Staffordshire</i></p> <p><i>The Ismaili Centre, London</i></p>	<p>MIS 3, 60,000BP</p>	<p>Human artefacts, Woolly mammoth, Wild horse</p> <p>Woolly rhinoceros skeleton intact, 17 taxa of plants Plants: Dwarf willow, Dwarf birch Beetles: 156 Taxa, Helophorus glacialis, indicates Cold pools and melted Snow, Crane fly indicates decaying vegetation, No reed swamp Taxa Beetles: 118 Taxa, 44 no longer living in Britain, Helophorus oblongus and Helophorus splendidus, now live in Northern Siberia. Tachinus instabilis lives in Siberia, Alaska and Canada.</p> <p>Mammals: Woolly rhinoceros, Reindeer, Woolly mammoth, Horse, Steppe bison, Wolf. 33 bones and teeth of intact Woolly rhinoceros, aged from 20-30 years old, 2m tall, 3m long and weighing upto 2.5 tonnes, 60 cm nasal horn</p> <p>A trench was dug and sampled. Indicated a rapid climate change between 60,000-40,000BP. Used to be a low terrace of River Thames Mammals: only 1 Bison mandible Beetles: Bembidion indicates sandy and gravel substrates, Dung Beetle indicates mammals were present, lacks diversity, so indicates cold climate, Helophorus obscurellus only found in Kanin Peninsula in Arctic Russia today, Helophorus splendidus unknown in Europe today found in Suberia and Canada</p> <p>The upper layers show a significant increase in temperatures. The warming was so rapid but short lived that there is an absence of established woodland True Mammoth Steppe, has been named the "Pin Hole" mammal Fauna</p>	<p>Warmer. Possibly migrated from Europe to Britain after a cooler period</p> <p>Beetles indicate average temperatures of: <i>July: 8- 11 degrees C</i> <i>January: -22 to -16 degrees C</i></p> <p>Non-biting midges, Chironomids suggest average July tempertures of 10 degrees C</p> <p>Temperatures indicated by Beetle analysis: <i>Summer temperatures of 9 +/- 2 degrees C</i> <i>Winter temperatures of -22 to 10 degrees C</i></p> <p>Shortly after, the upper layers of Beetles indicates warming: <i>Average July temperautues: 17 +/- 1 degrees C</i> <i>Average January temperatures: -4 +/- 6 degrees C</i></p>
<p><i>Cresswell Crag, Brook that empties into the River Trent, 400m long, 50m wide 15m deep, Worksop, Derbyshire</i></p>	<p>Evidence of Human occupation from:</p> <p><i>Robin Hood Cave</i> <i>Pin Hole</i> <i>Church Hole</i> <i>Mother Grundy's Parlour</i> Radiocarbon dating and Uranium-series and ESR dating shows occupation starting from 55,000BP-40,000BP Occupation just a few generations</p>	<p>Robin Hood Cave: most archaeology: 500 artefacts Some made from local Quartzite and Clay iron stone and rarely flint A few handaxes, but mainly scrapers, pebbles shaped as choppers, perhaps breaking bone for marrow. Scrapers and handaxes made from flint and Clay ironstone. Flint from 60km, from Lincolnshire as finished products. Possible Seasonal migrations of people. Pin Hole: "Open Steppe conditions". Mammals: Woolly mammoth, Woolly rhinoceros, Bison, Horse, Giant deer, Reindeer, Arctic hare, Susilk</p>	<p>Neanderthals had evolved. Short, stocky frame, like a Rugby player forward. Adapted to living in the cold. Skulls had changed, sloping forehead, prominent eyebrow ridges, slight protruding teeth, receding chin. Large nose and longer nasal cavities, protects brain from cold air. Brain larger than modern humans at 1,600 cc - 1,300 cc. 100cc larger volume than our own.</p>

<p>Lynford, River Wissey, Drains Central Norfolk, Flows Westwards to Fens, Norfolk</p>	<p>60,000 BP Gravel beds laid down after last glaciation, since 100,000BP Radiocarbon and Luminescence dating of approximately 60,000BP</p>	<p>Robin Hood Cave: Pollen from Juniper, Grassland and herbaceous. Coprolite: Hyaena were in Caves, but could have lived there at a different time to Humans. A prime target would be Reindeer. Excellent pelts for humans. Robin Hood Cave: Evidence of burning. Ash Tree Cave, close by, had a Hearth and Stone Tools and Young Rhinoceros Humerus</p> <p>Human: Late Neanderthal site, Lyndord Quarries, work in 2002 at High Lodge, Lower Palaeolithic site, late middle-palaeolithic site with remains of Mammoth, Trees: Very little, some Birch, Pine, <i>spores of dung fungus from the plains, hence presence of mammals</i> Dung Beetles indicates herds of grazing mammals. Rarity of carcass feeding beetles. Mammals: Horse, Bison, Woolly Mammoth, at least 7 Reindeer individuals. There are over 90% of bones are Woolly Mammoth, 11 individuals, 1,200 teeth, Juvenile to middle-aged animals, 18-45 years of age. Mainly Cranium, Ribs, Vertebrae, under-representation of limbs, legs possibly taken away by hunters or scavengers ?. Lack evidence of butchery. High proportion of pathologies. Minor disease to joints, specifically vertebrae. Injuries to Ribs, some have signs of infections. Could be due to Mammoth, mammoth combat. Possibly caused by human encounters. Spear wounds to vulnerable areas. Perhaps solitary males ?. Herding them into a bog or marshy area. <u>Used tusks and long bones to build shelters.</u> 2,000 flint artefacts, 45 handaxes and 20 scrapers. Handaxes are typical of late Neanderthal. Bout Coupes form. Cordiform or heart shaped handaxes. Lack of flakes indicates they were brought in. A site of repeated visits. <u>Was this site Seasonal ?</u></p> <p><u>Male Reindeer shed antlers in Mid-Autumn. Females shed after calving in Spring. If some Antlers are from Males, one concludes that Reindeer were at least present in Summer and Mid-Autumn. This could be hunting Season for Neanderthals</u></p>	<p>Neanderthal site at Lynford. Many mammoth bones at Lynford show signs of disease and injury of ribs and spine. Small “handaxe” tools. Stone raw materials were usually sourced from within 1 hours’ walk of their Cave. Limited networks of small communities and very little bartering. Neanderthals buried their dead. Extinction of Neanderthals possibly due to competition with modern humans (below) and unstable climactic conditions. Susceptibility to parasites and disease also possible</p> <p>“Open Steppe Fauna” Plant climate estimates: Sea thrift, Winters no colder than -8 degrees C Thyme-leaved sandwort, Lesser Bulrush Summers: 13-14 degrees C Beele estimates: Winter, not consistent with above, several no longer live in Britain. Now can be found in Siberia: Tachinus gracialis, Helophorus aspericollis, Philonthus linki suggest: Summers: Average of 12-14 degrees C Winters: Average of -15 degrees C Perhaps the tolerance of the plants and animals changed compared to today</p> <p>Neanderthals in East Anglia were living in “Open Steppe” conditions. Mammoths provided materials to build shelters. Organised groups of hunters. Revisiting flood plains of the River Wissey. Possible Seasonal Summer visits. Over-Wintering in the Ardenne, Brittany or Normandy is possible in Cave shelters there.</p>
<p>Beedings, Harley’s Castle, Pulborough, Sussex, 90 m above a Greensand Ridge, overlooking Arun Valley</p>	<p>Radiocarbon Dating of bones: 43,000-41,000BP</p> <p>“Leaf points” assigned to this date Examples of “Leaf points” are from:</p>	<p>Human: 2,300 flint artefacts. From fine, black flint. Possibly from South Downs. Elongated blades. Pointed and hafted at the base to mount onto Spears. “Leaf points”. Many broken possibly by tough hide impacts. Some used for engraving or chiselling called “Burins”. Ageing is difficult but a similar site is at Glaston, Rutland water</p>	<p>“Leaf Points” are termed as part of the Lincolnian-Ranisian-Jerzmanowician industries</p> <p>Leaf-points have enabled us to trace a technology linking a distinctive group of people from Britain and across to Europe They appear to be Tools that are made on “Modern Human” blades (in Northern Europe). Could even</p>
<p>Glaston, Shelters, River Welland, South of River Charter, Rutland Water</p>	<p>Radiocarbon Dating of bones: 43,000-41,000BP</p> <p>“Leaf points” assigned to this date Examples of “Leaf points” are from:</p>	<p>Human: 83 flint artefacts. A characteristic Leaf Point. With a broken base. Many of the bones had been broken and chewed, probably by Hyaena. Mammals: Woolly mammoth, Wolverine, Norway Lemming, Spotted hyaena, Woolly Rhinoceros (5 + individuals), Horse (3+), Reindeer (2+)</p>	<p>“Leaf Points” are termed as part of the Lincolnian-Ranisian-Jerzmanowician industries</p> <p>Leaf-points have enabled us to trace a technology linking a distinctive group of people from Britain and across to Europe They appear to be Tools that are made on “Modern Human” blades (in Northern Europe). Could even</p>

	<p><i>Pin Hole, Robin Hood Cave, Cresswell Crags, Ffynnon Beuno, North Wales, Paviland, North Wales, Hyaena Den, Mendips, Brandon, Suffolk Spy and Goyet, Belgium, Ranis, Germany, Poland</i></p>	<p>Wolverine jaw (part of) had been past via Hyaena gastric juices. Some young Hyaena bones, many used as maternity dens Humans: Brought in Horse bones with Human butchery. Spiral fractures from Marrow extraction. Occupation of site, short duration. Hyaenas could have developed a sympathetic co-existence.</p>	<p>stem from an older Middle-Palaeolithic tradition of Tool manufacture.</p>
<p><i>Kent's Cavern, Torbay, Devon</i></p>	<p>44,200-41,500BP Covers LRJ time period</p>	<p>Human: 2 elongated chambers going back 100m. A least 7 leaf-points. From Cave Earth in "Southern Arm". "Pin Hole" fauna. Human maxilla and 3 teeth discovered. From an early Modern Human.</p>	<p>Probable 2,000-3,000 year overlap between Modern Humans and Neandethals both occupying Europe at the same time Interbreeding took place from DNA analysis. But probably from Levany 60,000 years ago ?. Lagar Velho, Portugal, a child with Neanderthal features has been recovered dating to 27,000BP. LRJ technology might be adoption of Modern Human technology by Neanderthals ?. But very little contact between the 2 peoples. Only a few 10,000s Neanderthals lived in Europe at any 1 time ?. Modern Humans might have better developed social groups and communication skills to enable resilience and adaption to Climate changes. By 39,000 BP the Neanderthals were extinct</p>
<p><i>Hyaena Den, Wookey, Rock Shelter, 15m in depth, River Axe flows through entrance, Somerset, ST 5322 4795</i></p>	<p>Before 50,000BP Radiocarbon dating suggests dates of occupation are: 49,000-45,000BP</p>	<p>Woolly Rhinoceros, Reindeer, Horse, Bison, Fox, Wolf, Spotted Hyaena, Brown Bear Possible date based on mammal assemblage present. Some Human remains found in Cave. Mousterian stone tools in Cave. Similar to Banwell Bone Cave MAZ plus, Brown bear, Spotted Hyaena, Lion, Arctic fox, Horse, Woolly Rhinoceros, Mammoth, Giant deer, Red deer, Reindeer, Bison Human: 35 artefacts from site made from local Chert and Flint. 11 handaxes and 1 Flake. The Flake from re-sharpening Handaxes or manufacture. Indicates very brief visits. Charred bone found in 3 areas near the entrance. Human: 2 X bone arrowheads. Fish bones. Flakes, scrapers, Axes of flint and Chert</p>	<p>Cro-Magnon, the Cave site in Les Eyzies in South West France. Humans arrive in Europe in 40,000BP. Possibly from Carpathian Mountains, Romania. Larger bodies and larger brained than modern humans. Flint carried over longer distances. Trade over long distances and many networks. Possible large build "modern human" called Cro-Magnon, male, buried in Ochre. Red and black images left on Cave walls in some parts of Europe, in the parts of Caves not being lived in. Venus statuettes were manufactured. Made from bone or Ivory. Also Cley and pottery statues in France. Notched bones may have been used as Calendars, such as in Cheddar Caves (below) From 50,000-30,000BP there were four peaks, each lasting a few hundred years. Allowing re-occupation of Europe . The low Sea levels meant that the Doggerland land bridge was open. In addition, across the Atlantic seaboard, along Channel River. Steppe-Tundra Grasslands with "Pin Hole" fauna. Caves were main find sites and were full of mud flows, which have disturbed the deposits. Many had become mixed up</p>
<p><i>Kent's Cavern, Torquay, Devon</i></p>	<p>44,000 BP</p>	<p>Modern Human remains, Human Maxilla</p>	
<p><i>Upper Palaeolithic, South Western Archaeological Research Framework, 40,000-10,000BP</i></p> <p><i>Upper Palaeolithic (UP), 35,000-10,000BC</i></p> <p><i>Early Upper Palaeolithic, 35,000-20,000BC</i></p>			

<p><i>Brownes' Hole, Stoke St Michael, Somerset. ST 6693 4757</i></p>	<p>36,400- 34,700BP</p>	<p>A cave on the right bank of a small valley North of Stoke St Michael. Large entrance passage. Leads to a complex of chambers inside with a North entrance. Human: Iron Age and Roman pottery, Roman coins, in entrance and main passage. Fragmentary human and animal remains. Upper palaeolithic flint blade, seven more prehistoric flints also found there. Bronze age and Neolithic material also found. MAZ similar to Hyaena Den Wookey Hole without Mammoth, Giant deer and Lion Human: 2 x tibia, 1X jaw with teeth. Flint blade with flakes (later date, possibly Bronze Age or Roman-British)</p>	
<p><i>Picken's Hole, Crook Peak, Mendip, Somerset. ST 396 550</i></p>	<p>37,000-25,000BP</p>	<p>A very small cave with extensive rock shelter. Partly excavated with Pleistocene remains. Human: Upper Palaeolithic occupation dated to 35,000-30,000BC. Human teeth, flint flakes. <u>The oldest human remains found on Mendip.</u></p>	
<p><i>Badger Hole, Wookey, Mendip, Somerset, ST 5324 4795</i></p>	<p>EUP, Meso, RB</p>	<p>East side of Wookey ravine. 20m above valley floor. 11 m below the plateau of Hyaena Den. Cave mouth 10m wide by 3 m high. 2 short passages lead back to a chamber 6m high. At the back is an opening to the plateau above. Human: Leaf points, lithic tools, evidence of a Mesolithic burial of 7,000BC. Also a burial place in Roman times. Many Romano-British pottery fragments and Aurignacian flint tools such as knives and a lance head associated with Pleistocene finds. Many palaeolithic flints found. Scrapers, Awls, Saws and Leaf Points. Many Roman finds such as a fibula broach, many iron nails, Human bones have been dated to 9,000BP and 1,500BP Mammals: Mammoth, Woolly Rhinoceros, Hyaena,</p>	
<p><i>Bracelet Cave, Or, Hope Wood Cave, Ebbor Gorge, Mendip, Somerset. ST 522 4833</i></p>	<p>30,000-25,000BP</p>	<p>Human: Some fragmentary human bones found in a small rift cave in November 1955. Rock shelter extends back 4m into the cliff face. Bones of at least 9 individual humans found. These were associated with the Roman-British Pottery. But later argued to be Bronze Age. <u>2 Chert Blades described as UP. Being found in a "typical Pleistocene red earth deposit"</u>. Cave name refers to a later Bronze Age gold bracelet. In December 1955. A replica was made for Wookey Hole Museum.</p>	

<p>Sandford Hill, Sandford Rifts, West of Triple Hole, ST 4268 5905</p>	<p>30900 +/- 900 BP Cave destroyed by Quarrying in 1960's</p>	<p>Mountain hare, Lion, Red fox, Wolf, Spotted hyaena, Brown bear, Horse, Woolly rhinoceros, Reindeer, Red deer, Bison</p>	<p>Important points here: Late Neanderthals never travelled further West than the Corgan Cave area, that sometimes Handaxes and other "precious tools" being abandoned indicates that the Hunters intend returning to those sites at a later date</p>
<p>Coygan Cave, River Taf, Laugharne, Carmarthenshire, Wales</p>	<p>MIS 3</p>	<p>Hyaena den and many handaxes found Hyaena had gathered the assemblages. Many had been eroded by stomach acids. Mammals: Woolly Mammoth, Bison, Giant deer, Woolly rhinoceros, Horse, Reindeer, Red deer, Brown Bear, Wolf, Arctic Fox. Similar to Pin Hole Fauna Humans: Stone tools, 3 handaxes, 2 flakes of local rhyolite and diorite. Bout coupes handaxes. Flake scar surfaces on handaxes are worn. Possibly caused by rubbing in a leather pouch / bag. Hyaena main residents. Neanderthals were occasional visitors. Presence of Neanderthals was long enough to sustain wear and tear on handaxes, that were locally made and sourced. <u>The abandonment of highly valued handaxes indicates the intention to return to the site later</u></p>	<p>There are 2 clearly identified warmer peaks that were established by Roger Jacobi: Aurignacians Gravettians Aurignacians: "Colonisers" Occasional groups for brief time periods. They already lived in South East, Central and Southern Europe for 40,000 years. Named after rock shelter "Aurignac" in Southwest France. Evidence comes from Caves of Southwestern England and Wales; Uphill Caves, Hyaena Den, Kent's Cavern and Paviland. Burins busques, Small bladelet cores in Fynnon Beuno Cave and Hoyles Mouth, scrapers from Kent's Cavern. Produced tiny blades taken from thick flakes. Designed for hafting. Burins with sharp chisel ends. Also used used bone or ivory points. First examples of the manufacture of tools from organic materials. Some evidence of burning present. They may have arrived from the South BUT the closest examples on the Continent are Belgium, Goyet and Spy. Suggests they followed the (English) Channel Rivers. Exclusive use of Caves indicates a cold climate. Not known if they were Seasonal visitors. On the Continent Reindeer was their favoured prey in France, Mammoth and Bison in Germany. Sites contain Amber and Marine Shells over 300 Km inland, indicates extent of territory. Possible Trade and Communication over large distances. Holhe Cave, Germany has a series of Ivory sculptures of Mammoth, Horse and Lion and Beads and pendants. Flutes fashioned from Swan and Vulture bones. Indicates that Music was significant. Chauvet, Southern France, Cave paintings of Lion, Hyaena, Bison and Deer</p>
<p>Uphill Caves, Uphill Quarry, Weston-super-mare, ST 315 585</p>	<p>MIS 3</p>	<p>From a range of Ages or dates from MIS 3 onwards: Spotted hyaena Cave lion, Woolly Rhinoceros, Woolly mammoth, Cave bear, Wild horse, Arctic lemming, Reindeer, Steppe bison, Giant deer, Red deer (indicates temperate conditions with forest) There were 13 Caves in Uphill Quarry, bones of many Pleistocene mammals were found here. Caves were close together and might have been inter-connected. Cold climate fauna. Proto-Solutrean</p>	<p>2. Gravettians: (a range of contemporary groups of people across Europe during the Middle part of Upper Paleolithic) Main site: Paviland Cave, 3 Km West of Port Eynon in Gower Peninsula. "Goat's Hole" is the most significant opening. A large South-facing opening. Only accessible at low tide. Cave stretches back 25m. Lit by a natural chimney above. A mammoth tusk was discovered first and then "the Red Lady of Paviland". Burial of a man in his early 20's dating back to 34,000 years. Burial and grave goods are similar to other Gravettian Grave practices elsewhere in Europe. As far as Sungir in Russia and Lagar Velho, Portugal. Skeleton in an alcove covered in Red Ochre. Ochre stained rods and rings of ivory. Other items are Ivory pendant, bead, perforated Reindeer teeth and curious bone pins or spatula. Specific type of stone tool called a "Font-Robert Point". Distinctive tang at the base that helps hafting onto a spear. Named after a site in</p>
<p>Sun Hole, Cheddar, ST 4632 5408</p>		<p>Spotted Hyaena and other Pleistocene mammals "Cheddarian" Flints</p>	
<p>Kent's Cavern, Torquay, Devon</p>	<p>29490 +/- 210 BP 28870 +/- 180 BP 28820 +/- 340 BP 28400 +/- 320 BP 26350 +/- 550 BP 25840 +/- 280 BP 18640 +/- 340 BP</p>	<p>Human Maxilla</p>	
<p>Uphill Quarry Caves, Mendip, Somerset</p>	<p>Remains of at least 7+ Human individuals 28,080BP on bone point from Uphill Site 8, 1710BP on Human Bone from Uphill Site 2</p>	<p>Middle Pleistocene Proto-solutrean and other flints. Antler point</p>	
<p>Flint Jack's Cave, Flint Jack's Hole, Cheddar, Mendip, Somerset. ST 4632 5381</p>		<p>East side of Cheddar Gorge, 15 above the road, 150 m down from Cox's Cave. Roomy Rock Shelter. LP or "Cheddarian Flint" were found. Human remains found by Pavy in 1893. Bones are in British Museum and Woodspring Museum, Weston Super Mare</p>	

<p><i>Paviland Cave (Goat's Hole), Gower Peninsula, Glamorgan</i></p> <p><i>Hunter's Lodge Inn Sink Hole, Priddy, Mendip, Somerset. ST 5494 5012</i></p> <p><i>Primrose Shelter, Pulpit Hole, Ebbor Gorge, Mendip, Somerset. ST 5251 4867</i></p> <p><i>Also: Clifford Hill</i></p>	<p>25,000-30,000BP</p>	<p>Cro-Magnons used a Gravettian burial practice</p> <p>Mammals: Reindeer and Bison. On display at main Bar of the Hunter's Lodge Inn</p> <p>Shallow shelter, trench was excavated for Wookey Hole Caves in 1959. Human: Small late Pleistocene deposit with flints found</p>	<p>Southwest France and found across Europe. 7 places in Britain have these Points. A total of 11 points. These Caves are: Pin Hole, Cresswell Crags, Kent's Cavern, Mildenhall and Ipswich. Possibly a small group with Seasonal trips to Britain. One of nearest sites is Maisieres Canal in Belgium. Which has the same characteristic tools that the sites and Caves in the Ardennes, might be where these Seasonal visitors arrived from. Richer sites are to the South and East. Wide-scale use of bone, antler and ivory for utilitarian tools, jewellery and art. Famous female figurines. Winters were severe and people used Caves as shelter Modern Humans had larger Social groups and probably better communication over longer distances than Neanderthals. This made planning, skill acquisition, knowledge sharing and plan strategies. Societies were more resilient</p>
<p>Dimlington Stadial Upper Middle Palaeolithic, Last Glacial, 23,000-15,000BC</p>	<p>MIS 2, 24,000BP</p> <p>Sea levels fell to -120m</p> <p>16,000BP</p>	<p>Modern human, Woolly Mammoth, Musk Ox</p> <p>Herds return. Modern humans follow the herds. Humans return to Cheddar</p>	<p>Cooler. Musk Ox is a cooler period indicator species as they can survive extreme cold climates. The glaciation extended as far south as Swansea, Wolverhampton and Lincoln. Land bridge to Europe is open. Humans migrate South</p> <p>Herds return as climate warms around 16,000BP.</p>
<p>Woolly Rhinoceros Disappear together with Hyaena and Lion after this date and Woolly Mammoths become rare</p>			
<p>Late upper Palaeolithic (LUP), 15,000-10,000BC</p> <p>Windermere Interstadial</p> <p><i>Low Ray Bay, Western Shore, Lake Windermere</i></p>	<p>15,000BP</p> <p>2 warmer phases sandwiching a sharp cold snap. The Warmer snaps called "Bolling" and "Allerod" Colder snap called the "Older Dryas"</p>	<p>Plants: Sorrels, Grasses, Sedges, Dwarf Willows and Birch trees.</p> <p>14,700BP (Bolling) was real warming, fall in Sorrels, rise in Junipers, Ferns, Heather, Cowberry, Purple and Starry Saxifrage, Asters, Rock Roses, Meadow Rue.</p> <p>14,100BP, (Older Dryas), getting colder, lasted less than 200 years. Decline in Birch and Juniper. Rise in Sorrels, Docks and Grasses</p> <p>13,900BP, Allerod, rapid warming, light woodland of Birch, Juniper and decline of Willow</p> <p>The changes on land lag behind the Ice Core data.</p> <p>Animals: Start of the Interstadial the dominant animal was Horse alongside, Red</p>	<p>Warmer period. In the coldest periods Sea levels fall to -120 m, the warmer periods, Sea levels fall to -50 m. Rapid increases in temperature experienced interspersed with cooling. Harsh conditions in Britain. The Cannel River carrying much melt water from the Rhine and Thames.</p>

<p>Condoover, Norton Farm, Gravel Pits, Shrewsbury, Shropshire</p>	<p>Close to the Devensian Glaciation Boundary Radiocarbon dating of Mammoth bones: 14,500BP-14,000BP</p>	<p>Deer, Reindeer, Saiga Antelope and Aurochs. <u>But Woolly Rhinoceros had disappeared</u> Woolly Mammoths become rare Small mammals: Arctic Hare, Collared and Norway Lemming and Northern Vole, Arctic Fox, Red Fox, Eurasian Lynx, Humans, Brown Bear, Wolf. Later on, with the Birch Woodland advancing: More Red Deer, reduced Horse, Aurochs and Reindeer still present with Woodland animals Plants: Grasses, Sedges, occasional Willow, Birch, Pine. Beetles: Galeruca tanacetii (feeds on Tansy and Yarrow), Hypera elongata (feeds on Water chickweed, Willow, Dwarf birch, Alpine bearberry). Hippodamia arctica, Helophorus obscurus, found on the Tibetan Plateau, Helophorus splendidus found in arctic Siberia</p> <p>Mammals: Large Bull, 30 years old, similar in size to African elephant, at least 4 juveniles between 3-6 years of age. Possibly met their deaths at different times. Possibly trapped in the muddy waters. Adult male has a long standing pathology. Left scapula broken in 2. Vertebral injuries indicated. Possibly fighting another Bull.</p>	<p>Temperature estimations by using Beetle fauna: Average July temperatures: 15-17 degrees C January temperatures: -13 to 6 degrees C <u>The remains are the last records of Mammoths in Western Europe. Possible reasons could included advancing birch woodland and reduced grazing areas. But at Condoover Humans were not involved</u></p>
<p>Savory's Hole, Mendip, Somerset</p>		<p>Human and animal remains</p>	<p><i>The Magdalenians. The Cave of La Madeleine in South West France. Home to successful Reindeer and Horse hunters for 17,000 years. Distinctive points, scrapers and burins. Responsible for much of the later cave art at Lascaux in France and Altamira in Spain. Named Magdalenians after the Cave. They lived from Iberian peninsula to the South to the Paris Basin in the North. As climate warmed just after 15,000BP they ventured into Britain. The familiar sites are: Kent's Cavern, Devon and Creswell Crags, Derbyshire. Radiocarbon dating has indicated a more extensive range</i></p>
<p>Sun Hole, Cheddar Gorge, Somerset</p>	<p>Horse teeth dated to 14,800BP Human Left Ulna also dated to 14,800BP</p>	<p>Human: "Cheddarian" Flints</p>	<p>"Cresswell Points" discovered at Sun Hole, Cheddar. These have just 1 truncation and are characteristic of the late Magdalenians. Horse teeth smashed at the bone to reveal bone marrow.</p>
<p>Gough's Cave, Cheddar, Somerset</p>	<p>MIS 1, Human remains of 5+ individuals. 4 adults and 1 child. 12,570BP, 11,480BP, 11,820BP, 11,990BP, 11,700BP, 12,300BP, 12,380BP, 9,100BP, 9080bp, 2850BP (on Human bone) 11,600BP 11480 +/-90 – 12590+/- 50 BP Adult; Calotte, Mandible, Frontal, Calotte, Scapula Child; Calvarium,</p>	<p>Modern human, Mammoth, Reindeer, Auroch, Hare, Horse, Red Deer, Giant ox, Badger, Black grouse, Ptarmigan, Partridge, Whooper swan, Saiga antelope, 2 lemming species, "small wolves" evidence of domestication of animals, used for hunting wild horses ?, horse is the most abundant, Human skulls cut with flint tools and Cheddar and Creswell, held in the left hand and cut with the right hand Human modified tools, animal rib marked with notches and red ochre on the other side, Baltic amber, Cave art found at Church hole, Creswell Crags dated to 13,000BP Human: 2,200 artefacts. The largest number of any site of this age in Britain. End scrapers, burins and points (similar to Sun Hole). Some Points with a curved back, indicate the later "Federmesser" tools The first Magdalenian occupants were hunters. Using Gough's as a shelter and</p>	<p>Sea level lowered by 75 metres and a land bridge existed to Europe. Possible human scouting groups to Britain. Discovery of young adult male in 1903, Called "Cheddar Man" . "Cheddar points" discovered, identical to the Magdalenian culture of Central South West France. In particular at least 2 baton tools made from perforated reindeer antler. Termed Creswellian stone tools after Creswell Crags. "Cheddar Points" are primary flakes taken from flint cores, which have the bulb of percussion removed and have retouch along the edges. Approximately 3-6mm in length. Similar to those made by the people living in Holland, Belgium and France. The flint was obtained from Shrewton, close to Stonehenge. <i>Domestication of Wolves is already evident from other parts of mainland Europe prior to this date. Wolves would bring a ready supply of bones to the Cave. The Wolves provide protection and assistance whilst hunting. Wolves might have pulled or carried equipment as well.</i></p>

<p>Creswellian Stone Tools Similar tools found at: <i>Robin Hood's Cave, Creswell Crags, Derbyshire,</i></p> <p><i>Public Footpath, Newtown Linford, Leicestershire</i></p>	<p>Radiocarbon dating of Modified Human Bone at Gough's Cave is 14,700 BP, the same date as modified Red Deer and Modified Horse remains</p> <p>Open field site, Hunting Camp</p>	<p>processing carcasses. Careful removal of tendons from legs for bindings. Hoofs removed from the core to make glue. Mammals: Mammoth, Auroch, Reindeer, Arctic Hare, Steppe Pika, Collared lemming, Northern lemming, Brown bear, Lynx, Red fox, Arctic fox, Whooper Swan, Ptarmigan, Red Grouse, Peregrine falcon brought to the Cave by Humans for their meat and feathers. <u>Small bones of Grey Wolf unusual small bone size indicates signs of domestication.</u> Some bones and antlers were used as Tools. Tibia of an Arctic Hare was sharpened into an Awl. Possibly piercing a hide to enable stitching. From a Mammoth, 1 item, a sliver of Ivory fashioned into a point. Probably brought to Cheddar from a far distant location. A rib with criss-cross lines on one side and parallel lines on the other, that could indicate days / duration spent on a hunt. It was coloured by rubbing with Red Ochre. Sections of Reindeer antler with circular hole 25mm across. Similar items / batons often found at Magdalenian sites elsewhere in Europe. Symbols of command?. Hole as template for Spear thickness ?. Also, could be used as Spear-throwers ?. These extended the throwing distances. Human remains: At least 5 individuals, Child aged 3, 2 adolescents and 2 adults. With cut marks on the human bones. Intentional defleshing of bodies. Seemingly healthy individuals treated the same as the Red deer and other animals. Gnaw marks from Human teeth are also observed. Must have been cannibals. The abundance of Red deer indicates that the eating of humans was intentional. Heads were scalped, jaw removed, eye sockets removed and crania chipped to form a basin. Perhaps used as a cup ?. Could this be sacrificial ritual ?. This use of Crania as Cups was also known from Magdalenian sites in mainland Europe. The occupation of Gough's Cave by these cannibals was only a few generations. Analysis of the Human bones for stable isotopes indicates the diet of the Humans. This diet included: Horse, Red deer, Auroch, Reindeer. Auroch and Reindeer were rare at Gough's Cave <u>The Flint came from Chalk. This came from Salisbury Plain, 60 Km to the East. Brought to the Cave as finished products and blades ready for modification into points. A piece of Amber indicated that such a piece came from the shores of the North Sea. At least 300 Km away. Could be an heirloom or a journey of 1 person.</u></p> <p>Human: 450 blades, Burins, Piercers and a Cheddar Point. Scatter 5 metres across at the entrance to a narrow Gorge. Many were burnt. Temporary Camp whilst on a Hunt using the shelter and protection of the Gorge.</p> <p>Human: End scrapers, suggests a hide processing site. Flint was from chalk. The Trace element analysis suggests from Southern England. A regularly visited location. Could have been a landmark site, a Seasonal crossing point for Herds of Horse and Reindeer ?. It was a regular encounter</p>	
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<p><i>Farndon Fields, Confluence of Rivers Devon and Trent, Nottinghamshire</i></p>	<p>Flood plain sediments of both Rivers covering 15 Ha</p>	<p>point from people en route from South to the North Church Hole: Human: Late Magdalenian artefacts. Truncated points most frequent tool. Flint from Southern England indicates 300 Km Seasonal journeys. Smashing of lower cheek teeth of Horse, main hunted species. Use of Reindeer antler. Arctic hare trapped, hunted. Hare bones have cut marks and have occasionally been heated. Pelts were probably most valuable asset. 4 examples of Hare bones fashioned as Awls. 3 bone needles with perforated eyes. Suggests stitching together of hides. Arctic Hare fur was thickest in Autumn and this might have been the time they visited ? Some bones decorated. Head and front legs of a Horse engraved onto the Rib of the animal. Another rib carved image of a human. This strange figure is called the "Pin-Hole Man" Cave art: Church Hole Cave: Outlines of Deer, Bovids Horse, Birds and triangular Vulva. Style and subject matter similar to Magdalenian cultures of Caves in mainland Europe. Dated using Uranium Series dating (from stalactite film covering their surface)</p> <p>Human: Dates from cut marked bone are all within the same range from all these sites Indicates the extended range of peoples at the Bolling period</p>	<p>Later sites of the Bolling phase: At this time a slightly different projectile appears with a more pronounced shoulder at the base called "Hamburg Points". Possible links between Germany and Britain. This could be an incursion from Germany to Britain or could be simply a modification by indigenous people of Britain. Hamburg Points are found in Scotland and so indicates an extended territory</p>
<p><i>Creswell Crag, Derbyshire</i></p>	<p>Robin Hood Cave, Church Hole, Pin Hole, Mother Grundy's Parlour</p>	<p>Human: Dates from cut marked bone are all within the same range from all these sites Indicates the extended range of peoples at the Bolling period</p>	
<p><i>Robin Hood's Cave, Creswell, Derbyshire, Kendrick's Cave, Llandudno, North Wales, Victoria Cave, Settle, Yorkshire</i></p>	<p>Occupation of Creswell Crag is later than Gough's Cave but similar to Kent's Cavern 14,500BP-14,200BP</p>	<p>Adult calotte, Adult mandible, Frontal, Child calvarium, Scapula, Adult calotte Human presence: more than 300 years. Human tool: Thin bone needle with an eye, burins, flint point, end scrapers, curved antler harpoon with opposing barbs in series, attached to the end of a Spear and designed to break off inside the animal on the end of a line. Horses were the favoured prey. Bones from domestic wolf also show a growing relationship with animals.</p>	
<p><i>Kent's Cavern, Devon</i></p>	<p>Late Bolling phase 14,700BP - 14,100BP</p>	<p>Human: Over 600 artefacts. Included Hamburg Points. Probably ventured further North from England. The Flint from which the Tools are made is from the Yorkshire Wolds. Eastern England may have been only a stopping off point for many of these peoples</p>	
<p><i>Howburn Farm, Biggar, Borders of Scotland</i></p>	<p>Possibly starting at 14,500BP onwards with testing dates: 11480-12590BP, 6 human artefacts tested</p>	<p>Human: Eroding out of the Cliffs to the South are large stratified assemblages of flint artefacts of a range of ages. At least 13,000 assemblages date to the Bolling Era. Undisturbed knapping scatters with blades re-fitting onto their cores. Concentrations of burnt flints indicates that hearths were</p>	

<p><i>Hoyle's Mouth, Tenby, Wales</i> <i>King Arthur's Cave, Symon's Yat, Wye Valley</i> <i>Oare, North Kent</i> <i>Walton-on-the-Naze, Essex, Suffolk – Norfolk Borders have a cluster of sites</i></p> <p><i>Hutton Hill Hole, Hutton, Mendip, Somerset. ST 3424 5814</i></p>	<p>Also late Magdalenian sites</p>	<p>present. No floral or faunal remains. Use-wear on end-scrapers indicates that they were hafted and used for hide-working, hafted knives used for cutting and burins for engraving. Also were Hamburg Points. This indicated a possible occasional connection with people migrating from Germany or Continental Europe. This is a site of repeated visits. The site over looks the confluence of the Solent, Stour and Avon. Upstream was Central Southern England. Downstream was the Channel River and Europe</p> <p>A dig on Hutton Hill. Small muddy chamber with a phreatic tube leading off, some bones recovered. Mammals: Arctic Hare</p>	
<p>Older Dryas</p>	<p>14,100BP</p>	<p>Sudden, short, cooling, with a return to almost Arctic conditions. Lasted 200 years. People and animals retreated South</p>	
<p>Allerod oscillation</p> <p>Rookery Farm, Open-Air Site, Great Wilbraham, Cambridgeshire</p> <p><i>Seamer Carr, Vale of Pickering, Lake Flixton, North Yorkshire</i></p> <p><i>Kilmelfort Cave, SE side of An Sidhean, "Hill of the Fairies", Oban, Scotland</i></p> <p><i>Sproughton, Ipswich, Suffolk,</i></p>	<p>MIS 1, 11,130-12,600 BP</p> <p>13,000BP was a lake called Lake Flixton</p>	<p>Moose, Elk, Auroch, Roe deer, Reindeer Reindeer, Red deer, Giant Deer, (Brown bear, Wild boar?) less so, Horse Trees: Birch Woodland Humans: Humans that had links with Northern Europe predominate. Open-air sites. Very few faunal remains. Cannibalism is absent. Spears were tipped with curved-backed points and single-tanged points. These are called the "Federmesser technocomplex", after small blades mounted as cutting tools and German word for "Penknife". Sites extend from Poland, Germany, Denmark to Netherlands, Belgium and Northern France. In Britain, larger assemblages are East and South. Britain is on the periphery of their range. Perhaps only Seasonal, Summer visits</p> <p>Slight slope overlooking a flat landscape. Close to 2 Springs for fresh water. Human: 650 artefacts buried. Locally obtained Flint. Some were Federmesser Points. A single large portion was refitted, indicating a single-use site for a few days. A Dog incisor indicates a relationship with domesticating Dogs</p> <p>Human: North shore of the lake. Occasional occupation by Federmesser Groups. The Federmesser groups arrived with pre-finished tools. Probably with flint derived from Doggerland to the East, the glacial deposits. Re-tooling possible from Yorkshire Wolds.</p> <p>The entrance was blasted away leaving only the rear of the Cave, 3m high and 4m deep. Human: 750 artefacts, thought to be Federmesser age tools. Made of local Quartz and beach pebble flint. Tiny blades and re-touch tools. Mostly made of Flint, Scrapers and Burins. 2 curve-backed points.</p> <p>Human: Harpoons. Slender cross-section, single line of barbs down one side.</p>	<p>Warm and moist period. England and Wales were connected across the Bristol Channel by means of a Birch woodland</p>

<p><i>Devil's Wood Pit, Old Course of River Gipping, Heading SE towards Coast</i></p>		<p>Human: 2 harpoons found. One made from splinter of an Antler. The second made of Bone. 20 cm long. Broken at base. 17 cut barbs made by criss-cross sawing or cutting. Possibly using a sharp flint knife</p>	
<p><i>Doggerland, Under the North Sea</i></p>	<p>Radiocarbon dating: 13,800-13,500BP. Sailing trawler from Lowestoft, between lemon and Ower Banks, 40 Km off Norfolk Coast</p>	<p>Human: Harpoon, a lump of "Moorlog", black object, Harpoon made from antler in the centre of 4 ft x 3 ft lump of log. Harpoon was made of Antler, 21 cm long. Single line of 17 carefully carved barbs down 1 side.</p>	
<p><i>No 365 Old Blackpool Rd, High Furlong, Poulton-Le-Flyde, Lancashire</i></p>	<p>13,800BP</p>	<p>Once site of a Bungalow. Excavations for larger foundations for a larger construction. Antlers and Skull, 2 feet deep within the mud and clay at bottom of a trench. Mammal: Complete Skeleton of an Elk Human: 2 barbed points with the remains. Plants: Base- Grasses and Sedges, then Juniper and Birch, at top more open conditions. Elk associated with light Birch Woodlands, with Pollen from Willow and plants from a more open environment. Young Stage between 3 and a half to 6 years of Age. Just about to shed its Antlers. Therefore Season of death was late Autumn or Winter . One of the barbed points became lodged into left rear leg and over the following 2 weeks an infection had set in. Other barbed points had hit hind bones but had fallen out. Flint-tipped spears, around thoracic region, caused damage to the Ribs. It may have escaped since there are no butchery marks. Possibly falling into a lake.</p>	
<p><i>Porth-y-Waen, Shropshire</i></p>		<p>Human: Similar harpoons and points of a similar age</p>	
<p><i>Lynx Cave, Denbighshire, Wales</i></p>			
<p><i>Kendrick's Cave, Great Orme Head, Llandudno, Wales</i></p>	<p>Humans died between 13,800-13,400BP</p>	<p>200m high limestone Peninsula juts out into Irish Sea above Llandudno. Cave in the back garden of a rock / stone decorator. Discovered Human bones Human: Fragmentary remains of 4 humans. A few stone tools and decorated bone. Not Neolithic. Stable isotope analysis shows that their diet was animal protein. Significantly Marine animals. Mammals: Metapoda of Roe Deer with parallel lines crossing the bones, perhaps used as tallies. 2 Bear canines decorated with lines across them, one perforated as a pendant, Red deer teeth, several pierced. Horse mandible with a Chevron design. No purpose other than decoration.</p>	<p>The Federmesser people of the Allerod probably made only fleeting visits to Britain. Generally living in light Birch woodlands, Shrubs of Juniper and Willow. With open grassland and Heathland. Mammoths had disappeared Horse was rare . Reindeer, Red deer, Auroch, Giant deer and Elk had arrived in larger numbers. They had predominantly open-air sites, in the South and East. Using more localised sources of flint as they may not have moved as seasonally as the Magalenians. This may have been due to hunting Red deer and Elk rather than Reindeer and Horse. Using Harpoons to catch prey</p>
<p><i>Sun Hole, Sheep Hole, Cheddar, Mendip, Somerset</i></p>	<p>Remains of at least 4+ Humans (2 adults and 2 juveniles) 10,110BP, 10,280BP, 10,470BP (On animal bone and Animal Bone), 12,210BP (On Human Bone),</p>	<p>Human: "Cheddarian Flints"</p>	

<p><i>Gully Cave, Ebbor Gorge, Mendip, Somerset. ST 5255 4854</i></p>	<p>12,378BP (On bone from underlying levels)</p> <p>13,500-10,000 Radiocarbon dating</p>	<p>Palaeontological work conducted by Royal Holloway College, London.</p> <p>Mammals: Lemming, Arctic Fox, Reindeer.</p> <p>No human remains to date. Human: Auroch bones with a long bone displaying signs of burning and fractured in order to extract the marrow. These indicate human occupation.</p>	
<p><i>Younger Dryas, (named after Mountain Aven, Dryas octopetala) after Scandinavian Tundra.</i></p> <p>Three Ways Wharf, Uxbridge, Hillingdon, West London</p> <p>Holocene optimum</p>	<p>MIS 1, 11,500BP the glaciation finishes</p> <p>11,600BP</p> <p>11,500BP</p> <p>Radiocarbon dating: 12,000-11,300BP</p> <p>10,150-10,995BP Britain begins to warm again 9,000-5,000BP</p>	<p>Britain became a Human Desert with Ice forming on higher mountains and glaciers start to form in Northern Europe Humans retreated further South to warmer climates</p> <p>Temperatures start to rise again New Human groups start arriving from the Continent. Britain still part of the landmass of Europe. Treeless plains that cover the North Sea Basin connect Britain to Europe. It took a few hundred years for trees and woodlands to return to Britain. This would be necessary before Humans could flourish Humans: The hardened Ahrensburgian Hunters arrived first. Tools made from long blades. Characteristic tanged blades. For the first time small retouched blades called microliths. Used for barbing and tipping arrows.</p> <p>75m East of River Colne, rises from St Albans and is fed by tributaries from the Chiltern Hills. Joins the Thames at Staines. Melting Ice would have created a fast flowing River. Situated overlooking a flood plain and migrating herds</p> <p>Human: 2 distinctive scatters of flint, bone and antler only 10 metres apart. May be brief visits at different times by the same peoples. The same typical Tools as the Ahtensburgian. Site A has 900 flint artefacts, majority is waste from making only 19 tools. Bone was from 2 Reindeer. Only Reindeer legs brought to the site. Perhaps ambushed crossing the valley. Stripped of meat and tendons. Bones broken for marrow. Small number of tools, brief visit by a handful of people. Distinctive long blades present. The majority of tools were microliths for tipping arrows. Other items: Single scaper and "bruised blade". Long, thick blades have a distinctive battering along one edge. Caused by chopping bone / antler. Burnt flint and charcoal shows remains of a fire. Possibly stayed for the night to butcher Reindeer and maintain their Tools.</p> <p>Site C: much larger, intermixed with a much later Mesolithic occupation. Refitting flint artifacts helps to distinguish the Mesolithic from the other. The earliest occupation, to the East, surrounds a hearth. The visit here lasted only a few days. Possibly a larger group of people. Almost 6,000 artefacts, 140 tools. More scrapers, reflecting hide working. Microliths, burins, Awls and Bruised Blades. A wider range of tasks undertaken. Use-wear indicates cutting wood, Antler and fish. Main purpose of site is processing Reindeer. 3 Reindeer were brought to the site. In 2 cases, whole carcasses. Large, meat-bearing bones were close to the hearth. Horse seems to have been present.</p>	<p><i>A cool period in a warmer period. Sometimes called the Loch Lomond Stadial in Britain. Lasted just over 1,000 years</i></p> <p>Ahrensburg, small town, North east of Hamburg, Schleswig Holstein. In a glacially cut valley. Many Upper Palaeolithic sites such as : Stellmore, Autumn Reindeer Hunters, with Bows and Arrows. They ventured as far as Poland, Northern Scandinavia, Northern France and occasionally into Britain. One better-preserved site is Three Way Wharf in Uxbridge</p> <p>All Mesolithic sites indicate larger communities than before. More specialist tools for catching and processing specific prey at each site, such as shellfish or deer or birds. Hence, a change in technocomplex. People start to slash and burn the landscape</p>

<p>Other Ahrensburgian Sites: Mainly South East Britain, also: Yorkshire, Riverdale, Canterbury, Kent, Avington 6 near Newbury, Kennet Valley, Flixton 2 and Seamer Site L, Vale of</p> <p>Mesolithic (Meso), 10,000-4,000BC Early Mesolithic, 10,000-8,000BC</p> <p>Pickering and edge of Lake Flixton.</p> <p>“Chelm’s Hole”, Cheddar</p> <p>“Star Carr”, Scarborough, Vale of Pickering, Yorkshire</p> <p><i>Lake Flixton, formed at end of last Ice Age, 70 m deep at its maximum, 40 km along the Vale of pickering, Yorkshire sediments 8 m deep</i></p> <p>Savory’s Hole, Mendip, Somerset</p>	<p>10,500BP</p> <p>10,500BP</p> <p>Europe’s most famous Mesolithic Site</p> <p>Area of occupation 150m along lake shore</p> <p>10,700BP, people appear at Star Carr</p> <p>Human and animal including split long bones suggesting LUP or Mesolithic in date</p>	<p>Human: Riverdale, Kent, Blades 30 cm in length. Small populations who made little penetration into hinterland of Britain. Came to an abrupt end at 11,400BP. Thereafter, a short cold period lasting a few 100 years</p> <p>Largely destroyed by quarrying</p> <p>Microlith tools and Burins. Microliths are mounted onto sticks with animal tendons and tree resins</p> <p>Mesolithic tools and wooden implements preserved in the peat and silts. Barbed bones, points, antlers, stone, amber beads, pierced deer teeth, small flint tools, chisel-like burins, 6-metre long wooden platform manufactured by using stone tools, possibly used as mooring for boats and a wooden paddle, not known if used for fishing, 21 worked red deer skulls with pairs of holes at the back, headdresses, possible used as disguise or camouflage but debated</p> <p>Plants: 7 vegetation zones identified. Zones 1-3 show dominance of Grasses and Herbs. Together with Dwarf Birch, Downy Birch. This is colonised with Sea Buckthorn and Willow at the Lake edge. Jacob’s Ladder, Salad Burnet and Common Nettles are also present. In Zone 4 the climate warmed. Birch woodland dominated the valley slopes and dry ground. Sedges and Reed Swamp replaced what was once a Lake. White Water Lillies grow in the deeper parts of the lake. At the end of Zone 4 we see the appearance of Hazel and people</p> <p>The Lake recedes to 5Km long by 2 Km wide. Northwestern margins had Human settlements.</p> <p>Bones: Great Crested Grebe, Little Grebe, Red-Throated Diver, Red-Breasted Merganser, Common Crane, White Stork. Buzzards.</p> <p>Mammals: Red deer, Roe deer, Elk, Aurochs, Wild boar, European Beaver, Hare, Hedgehog, Pine marten, Fox, Badger. Bones of 2 Wolves were probably actually domesticated dogs, one as young as 6 months. Dogs now seem a regular companion, provide protection and help with hunting.</p> <p>Area contains a lot of flint. 17,000 artefacts were found at Star Carr. Mostly waste from</p>	<p><u>After the last cold period of 11,400BP, Britain had finally emerged from the last part of the “Ice Age”</u></p> <p>Humans return to Britain on a larger scale and much larger numbers. Britain is still attached to mainland Europe. The Channel River was flooding and created a more formidable barrier. The Climate was quickly warming but vegetation took longer to get a foothold. Within a few hundred years the Tundra is replaced by Dwarf Birch and Dwarf Willow and then onto substantial Birch woodlands by 11,000BP. Quickly after was Hazel, along the coastal areas of Irish Sea, by 10,000BP the Birch Woodland had reach most parts of Britain. Elm, Oak and Pine were slower to colonise. Starting in Southern Britain at 11,000BP. Oak reached Scotland at 9,000BP. Pine by 8,000BP. Alder and lime followed thereafter. The latecomer was Ash, rare until 7,000BP. Horse and Reindeer disappeared to the open grassy places or cooler climates. New herds of Deer and Woodland animals re-colonised Britain. Followed by the Humans that hunted them. In much larger numbers. This was easy at first, but as the North Sea basin flooded the migration became harder. This splits the period into an earlier and a later phase. The later phase being Island Britain. In the first phase the connections with Europe enabled the sharing of technology and new ways of hunting. Island status caused isolation. So later Mesolithic created regional development of tool manufacture. These technocomplex were different to the Continental Technocomplex</p> <p>Jacobi increased the number of Mesolithic find spots from 200 to 10,000 during his work. Each site often has tens of thousands of stone artefacts, often surface scatters. From Southern heathlands to the far North. Tiny blades and bladelets, sometimes modified into microliths. <u>Adzes also appear for felling Trees</u> <u>First stages of Woodland management in evidence</u></p> <p>Elk antlers were also used at Star Carr. Base of the antler, pedicel and frontal bones were sometimes used to make a working edge. Antler was worked to make a wide hole for a wooden handle. Possibly used as a <u>digging tool for grubbing out roots and tubers.</u></p> <p>Metacarpals of Elk also used to make fastening pins or bod kins. Long bones of Aurochs were used to make skin scraping tools, making a distinctive polish at both ends of the bones</p> <p>Wooden tools were less common. Handles for mattocks, manufacture of bows and shafts for arrows. Part appears to be a paddle. 42 cm in length. Made of Birch Tree. Most of the length fashioned into a flattened blade that narrowed into the broken handle. <u>if there was a paddle, there must have been a boat ?. Possibly a skin-lined boat.</u></p>
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<p>South Western Archaeological Research Framework, Early Mesolithic, 10,000-8,500BP</p> <p><i>Thatcham, Kennet Valley, Berkshire 1 mile before Newbury, Moor Brook, passes under Railway</i></p> <p><i>Worm's Head, Gower Peninsula, Glamorgan</i></p> <p><i>Aveline's Hole, Burrington Combe, Somerset, ST 4761 5867 North side of Mendip, looking West One of Europe's largest Mesolithic Cemeteries</i></p>	<p>9920 +/- 160 BP 9450 +/- 50 BP 9420 +/- 55 BP 9385 +/- 45 BP 9360 +/- 50 BP 9294 +/- 49 BP 9255 +/- 45 BP 9235 +/- 50 BP 9235 +/- 40 BP 9077 +/- 49 BP 8800 +/- 80 BP</p> <p>21+ individuals. At least 16 adults and 5 juveniles. 9114+/-110BP on one Human bone sample 8890-9210 BP date estimations from 17 Human Ulna, 3 Human humerus, 1 femur, bulked bone</p>	<p>making the Tools. Typical of other Mesolithic sites. Many Microliths, evidence of using Bow and Arrow by mounting carefully trimmed bladelets onto the end of arrow shafts. Burins for chiselling Antlers or Bones, Scrapers for processing hides and awls for piercing leather. A new tool. The Adzes or Axes with sharpened tips and hafted for felling trees. Industry of fashioning Red Deer Antlers into barbed points Long, thin splinters are prised out along Antlers making 191 points. Most are from under 15cm-30cm less than 2cm wide. 15 to 20 fine barbs down the side. Majority probably mounted onto Spears.</p> <p>Wide fringe of reed beds and scrub along Eastern edge of the brook. Behind which are the sprinkler beds of a Sewage Farm. 1920, flint blades were found Human: Flint blades, In 1960's further excavations, dense scatters of flint artefacts, occasion bones, charred Hazelnuts, possible former hearths, tools possibly made from locally sourced flint or flint from Hampshire Downs (10 km South). Tools similar to Star Carr: Blunted Microliths, Scrapers, Burins, several Axes. Occasional bone and Antler tools. Spear points, Pins or Bod kins. Several antlers have circular grooves around the beam to snap away from the pedicel. Naturally perforated flint pebbles. For beads and pendants. Possible Birch Bark Roll. Resin found on flakes (possibly from the Birch Bark Roll) Mammals: Red deer, Wild boar, Roe deer, Elk, Aurochs, Beaver, Fox, Dog, Wolf, Wild Cat. Birch woods were giving was to Hazel and Pine in the South with occasional Oak and Elm. 30 mesolithic sites in the Kennet valley alone. Hazel is a food for Wild Boar and deer as well as humans. Proteins, Sugar, Calcium, Phosphorus Vitamins B1 and C</p> <p>Human scapula Human ulna Human femur Human mandible (Mewslade Bay) Human cranium Human cranium Human ulna Human mandible (Mewslade Bay) Human mandible (Mewslade Bay) Human mandible (Mewslade Bay) Human ulna</p> <p>Creswellian phase occupation. Then used for multiple burials. Some bones embedded in stalagmites. Much material was lost in the Bristol Blitz alongside Uphill artefacts Local plants were Birch and Pine. More than 50 individuals were found. Minimum of 13 adults, 5 were males, 6 or 7 females. Small to light stature. Conforms to other Mesolithic sites. Females approximately 1.51m and Males 1.63m height. 2 adolescents and 4</p>	<p><u>Another use for Birch. Bark rolls 20 cm wide and 75 cm long. Cigar shaped. The Resin makes it water proof, possibly to make container or even canoes.</u> Can be used as Tinder for fires. <u>To extract Resin for Glue.</u> This resin can be mounted onto spear tips or arrow heads. Many microliths had resin still attached. Meat was largely Reindeer. To a lesser extent, Roe Deer, Wild Boar and Aurochs. Plant foods included: Nuts from Hazel, Lake-edge plants, Yellow Water Lilley, nutritious seeds, Chickweed has leaves and fine stems. Common hemp-nettle has cooked as greens. Rhizomes from Common Reed and Bog Beans. More than just functional tools from Star Carr. Amber was collected from the Coast to make a pendant. Local Shale worked to make Oval and Circular discs. Drilled with flint awls to form necklace beads. Red Deer items were very curious, 21 Stage frontlets. They also had the parietal bones of the skull attached. They had 2 perforations at the rear. Possibly to mount onto people's heads. Similar artefacts have been found at site in Germany. Such as Bedburg-Konigshoven. Also early Mesolithic site in age. These could aid hunting. They could have a ritual function. Horn Dance in modern day Abbots Bromley, Staffordshire is equivalent ? Seamer Carr also excavated. Very impressive timber platform of willow and aspen. Some over 30 cm wide. Possibly extended of 30m across the lake shore. Raised above the level of the water. Abundance of widespread burning but no hearths. The burning of young reeds. This may have been deliberate Spring time burning to enable better access to the Lake. Bulrush was also eaten, especially the tubers. <u>Possibly adapting the landscape to improve hunting</u> Star Carr sits on the Southern edge of a small peninsula. <u>With birch woodland providing shelter from winds that are from the North and West. A peninsula has a larger lake edge. Natural corral for deer who cannot escape and become trapped</u> A hut structure was found away from the lake edge. 4m across. 18 post holes. High density of Scrapers and Burins. Possibly a small hearth in the centre with burnt flint. The ring of posts had been replaced on several occasions. Settled for 300 years 10,700-10,400BP occupation during late Spring and Early summer.. Possibly just a few weeks. Based on unshed roe-deer antlers. These grow on April and are shed in late Autumn. Large numbers of juvenile deer indicates Spring. Possible aggregations of people in the Spring at Lake Flixton and then dispersal. Exchange of goods, re-affirm tribal cultures, inter-group marriages. These people had brought Amber from the Coast. Several sites in the North Yorkshire Moors could be dispersal sites. 2 sites at Pointed Stone, Bilsdale East Moor, Cleveland, have similar technocomplexes. Microliths made with flint from Yorkshire Wolds. Flints are scattered and surround small hearths. Limited to Bows and Arrows. No domestic hide and antler-working tools. Other sites: Pennines, Warnock Hill North, Warnock Hill South and Deepcar. After several hundreds of years Lake Flixton dried out <u>Doggerland was a site for rich hunting grounds in the Early Mesolithic. Climate warming caused Sea Levels to rise. by 10,500BP the Coastlines were receding and pressure was placed on finding new hunting grounds. New populations started arriving on the Coasts of North East England and Scotland. They brought with them distinctive Microliths. Made on Narrow Blades. Unlike the Broader Blades of the Early Mesolithic</u></p>
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	<p><i>fragmanets, and 1 Human cranium (9,210BP)</i> Human burials and animal. In 1805 50 perfect human skeletons were found laying parallel to each other.</p>	<p>young Children. Aged from 7 years. One year old or neonatal or perinatal. Well developed legs. Strong forearms. Possibly because they were mobile Hunter-gatherers. Stress on bones show strong downward pressure on feet. Possibly from repeated squatting. Squatting from scraping skins ?. Very little teeth wear. 80 Km from the Coast at that time. Periwinkle shells present show some contact with the Sea. <u>Strontium Isotope analysis indicates travel to the Chalklands 50 Km to the East.</u> "Harris Lines" on some bones and white banding on the roots of teeth indicate slow downs of growth during childhood. Probably every few months diets slowed down. Probably due to poor nutrition at some stages of the yearly cycle. Pitting in the Orbit of the Skull indicates anaemia. <u>Meat was the main source of diet at Aveline's Hole, Star Carr and Thatcham.</u> <u>Then Sea levels rose and the Coast became more accessible</u> Barbed Harpoon Head of Antler. Perforated Sea Shell and Incised teeth Flint assemblage. Scratched markings on walls interpreted as Cave Art. Grave goods were perforated Sea shells, some pig and deer incisors, some perforated also found, one horse incisor with a decorated root, parallel incisions. One skeleton had a child's head on its shoulder. 2 skeletons had slight red ochre. Barbed harpoon head of antler. Engraving found 30m into the Cave. Unused after the Mesolithic.</p>	
<p><i>Cramond, Firth of Forth, Scotland</i></p>	<p>10,500BP</p>	<p>New peoples with a new technocomplex. Microliths made on narrow blades</p>	
<p><i>Howick, Northumberland Coast, England 10 Km North East of Alnwick</i></p>	<p>9,850-9,650BP</p>	<p><u>Coastal sites indicates their dispersal was by the Sea, possibly in boats</u> Reliant on hunting fish and Sea Foods Disperal of these new peoples reaches the Western shores of Britain One characteristic is that these new peoples built more substantial homes. The earliest was at Howick, Northumberland. Could be called "Hunter-Fishers" Human: Flint artefacts eroding from the upper part of the Cliffs. Pits and hollows of 3 huts built in succession over 200 years Situating in a hollow, 6 m across and 20cm deep. Timbers of 15 cm diameter. Outer ring of holes for smaller, fire sharpened stakes, leaning at 65 degrees. These supported the upright timbers. Roof could be thatch of nearby reeds or cut turfs. Many hearths around the outside with Hazel Nut shells. Possibly "controlled roasting" of the nuts. Inside huts were 13,000 artefacts. Made from flint beach pebbles. Small microliths and scrapers, burins and awls. Possible 200 years accumulation of materials. Use-wear was hide processing, wood, bone and antlers. Axes are missing. But Axes must have been used. But axes were rare and retained. Hazelnuts a good source of proteins Mammals: Fox, Wild Boar, Dog / Wolf, Seal. No Deer. The sea at that time was 5 m lower</p>	<p>Travel by Sea is now well established Occupation of Mount Sidel was probably Summer, Autumn, Winter</p>

<p><i>Mount Sandel, River Bann, Coleraine, Escarpment on East side of River, Ireland</i></p>	<p>9,800BP</p>	<p>and several hunder meters away from the site. Some tools such as elongated bevelled pebbles from local sand stone 10-15 cm long. Show striations from use. Could be removing limpets from shells. Could also be processing Seal hides. Seal provided skins, fat and meat. Protection from the cold weather in the North</p> <p>Large flint scatters, bone and charred plant remains. Complex series of hearths, pits and post holes. 10 huts identified by the Hearths and Post Holes. 4 used at a different date, separate to the other 6. Posts 80 cm apart., angled at 60 degrees to the horizontal. Leaning towards the centre to support the opposing posts. Floors were 6m across. More substantial posts were on the North side. Possible because of prevailing weather. Microliths and blades lay inside the huts with most laying outside the huts. Each hut had a pit 50cm deep and 1m across. Pits were used to store foods such as nuts and smoked fish and meat. Posts outside the huts were from flims structures. Possibly to smoke meat. To the West of the huts were scatters of flint. On edge of the escarpment. This over looked the river and was probably a site for tool making.</p> <p>Mammals: Wild Boar- over 300 bones, Hare- 6 bones, Dog/Wolf-1 bone. <u>Limited fauna on Ireland possibly due to having land links with Britain at only the coldest periods of time.</u></p> <p><u>Young Boar had fusion of bones. Suggested that the hunting took place in the Winter months. Also, presence of foetal Boar bones suggests winter kills.</u></p> <p>Birds: Wider diversity, Waterfowl, Mallard, Widgeon, Coot. Woodland birds: Wood-pigeon, Woodcock, Goshawk, Capercaillie, Red-Throated Diver (Coastal Bird). The birds are Winter migrants and again suggest a Winter occupation of the site. <u>Fish: Next to the fires over 1,800 fish bones. Vertebrae from Salmon, Trout, Eel, European Sea Bass, the River Bann still famous for Salmon today. Eel migrate in the early Autumn. The Bass found in the Estuary over the Summer, Salmon also swim upstream in the Summer. Indicates Summer diets of fish, Winter diets of Mammals.</u></p> <p>Plants: Hazel Woodland, Charred Hazelnut Shells, Crab Apple, Wild Pear, White Water Lilly edible nuts.</p> <p>Occupation was Summer, Autumn and Winter</p> <p>The structures indicate a semi-permanent residence over that was visited several times a year over a few generations. Possibly managing Salmon and Eel traps in the Summer and Autumn. <u>Possible trips to the Coast in the Spring to bolster their diet when food was running short. Almost full-time residency</u></p>	
<p><i>Badger Hole, Wookey, Somerset</i></p>	<p>1 adult, 2 Children. 9360 +/- 100 Human mandible 9060 +/- 130 Human mandible. 1380 human bone</p>	<p>Main burial of human Flint scrapers, Awls, Saws and Leaf points</p>	

<p><i>Gough's Cave, Cheddar, Somerset, ST 4670 5391</i></p>	<p>9060-9360 BP "New Cave" 9080+/-150- 9100 BP, Cheddar Man 7,000BP the land bridge with Europe floods 8,700-7,750BC</p>	<p>Human clavicle, possibly one individual. Flint Tools and worked Amber Human Burial</p>	
<p><i>Foxhole Cave, Gower Peninsula, Glamorgan</i></p>	<p>8760 +/- 55 BP 8415 +/- 65 B 8655 +/- 60 BP 8615 +/- 75BP</p>	<p>Human tibia Human mandible Human mandible Human clavicle</p>	
<p><i>Totty Pot, Mendip, Somerset</i></p>	<p>Remains of at least 1+ human individuals 8180BP, 8245BP, (On Human Bone), 4008BP and 4706BP (On Human Bones)</p>	<p>Early Mesolithic remains and Neolithic remains</p>	
<p>South Western Archaeological Research Framework, Later Mesolithic, 8,500-5,500BP</p>			
<p><i>Doggerland</i></p>	<p>8000BP</p>	<p><u>By this time Doggerland was shrinking rapidly. By 7,000 BP they had shrank all together and Doggerland was lost. Along North Eastern Coasts strange Marine snads are found inland, at least 1m thick, dating to 8000BP, when the Sea level was 10m lower than today. Deposits stretch from Shetland to Berwick. This suggests evidence of an immense Tsunami. It is believe it was caused by a massive sub-marine landslide off Norway. Estimated that 2,400Km3 of sub ice silt had been dislodged by melting ice sheets. Called the Storegga Slide. Estimated to be 20m high waves on Shetland.</u></p>	
<p>Late Mesolithic, 8,000-4,000BC</p>			
<p><i>Inner Hebrides, Western Isles, Scotland, Kinloch, Isle of Rhum, Scotland, Mount Sandell, Coast of Northern Ireland, Cass Ny Hawin, Isle of Man, Prestatyn, North Wales, Cladey Island, Pembrokshire, Wales</i></p>	<p>8,500BP, people arrived by boat. Islay 40 Km across. Lower ground to the West, called the Rinns, was focus of archaeology. The Rinns was an Island in the Mesolithic times</p>	<p>Possibly arriving by boat. Islands of Jura and Islay with Colonsay and Oronsay. Mesolithic hunters and fishers arrive. Islay is one of the largest islands. Easy to get to from Jura in a small boat. Plants: Wetlands of Alder Carr, Stands of Willow. On dry ground was Birch, Hazel, occasional Elm, Oak and Pine. Mammals: Red Deer, Roe Deer, Hare, Otter, Stoats. Rabbits are more recent. Absences: Hedgehog, Mole, Red Squirrel, Fox, Weasel, Badger. Fish: Migratory Sea Fish. Salmon, Trout, Eel, Lamprey in Rivers. Cod, Saithe, Herring and Mackerel spawn in coastal waters. Marine mammals: Grey Seal, Common Seal, Porpoise, Dolphin, Minke Whale, Pilot Whale. Birdlife: 250 species. Many birds are migratory. Barnacle Geese, White-fronted Geese, Widgeon, Eider Duck, Scaup, Golden Eagle, Hen Harrier, Buzzard, Guillemot, Razorbill, Curlew, Sanderling, Turnstones Human: Occasional post-holes, hundreds of thousands of lithic artefacts. Found as</p>	

<p><i>Bolsay Farm, 70m above Sea Level, Southeastern part of Rinns, 1,500 m from the Coast, in the shadow of the tallest Hill, Beinn Tart a'Mhill, Islay, Inner Hebrides</i></p>		<p>surface scatters and excavated at sites. Flint pebble beaches on the Western shores. Small pebbles used to make narrow blades for microliths, sharp blades and scrapers. High concentrations of artefacts found at 11 locations. Largest number of artefacts was at Bolsay Farm. 250,000 artefacts. Further 75 smaller scatters whilst field walking on the islands.</p> <p>Human: 7,000 microliths found at Bolsay Farm. Small blades. Modified into small triangles or crescents. Mostly mounted as the points and tangs for arrows. Charred remains of Hazel also present. Also, charred remains of Pine, Oak and Elm shows that woodland was present. Lack of domestic huts indicates that it was used as a hunting base to make and amend hunting equipment. Frequently used over many generations. Nearby Spring may have been an attraction. The Mountain offered protection. No obvious base camps on Islay. Small bands of hunter-foragers using Seasonal camps that were less permanent. They moved as the resources changed during the year. Woodland deer and Fish, Shellfish and Marine mammals provide rich pickings. None of the original beaches survived. There are some elongated pebbles. These can knock limpets off rocks and cracking open nuts. Hazelnuts were an important source of food as their charred shells are found in many locations. Possible felling of trees disturbed the soil with increased sedimentation into the Lochs. This may indicate Woodland management to encourage Deer.</p>	
<p><i>Staonsnaig, 10m on an old raised beach, Eastern Coast, Colonsay, Inner Hebrides, Scotland 12 Km Sea crossing North from Islay, 13 Km long and 5 Km wide. At low tide it is connected to Oronsay to the South. Highest point Carn Owen, to the North, 143m</i></p>		<p>Mammals: Lacking Roe Deer and Red Deer. Human: Occupied for a very short period only. Staonsnaig is the only site on the Eastern Coast. 70,000 flint artefacts. Made from small local beach pebbles. These were a large number of small blades, blunted down one side for hafting. Mounted in series along a handle, making for an effective long knife for cutting light vegetable matter. Rather like sickles. Some charred remains of Crab apples have been found. Lesser celandine tubers. Roots of Western Buttercup are heated by hot rocks by the Indians of America. Lesser Celandine tubers have high vitamin C content. Large numbers of charred hazelnut shells. A 4m shallow basin contained over 3 Kg of Hazelnut Shells. Seemed to be industrial nut roasting. Hazel woodlands grew on sheltered East Coast. <u>Hazel Nut on this island dominates pollen record until 7,800BP</u> Were Hazel Nut Trees destroyed by people ?. By 7,600 BP people had left Colonsay. Jura, Islay and Colonsay were vacated for 2,000 years. Until Neolithic farmers arrived</p>	
<p><i>Oronsay, Tiny Island, Inner Hebrides, Scotland</i></p>	<p>7,000BP</p>	<p>Human: a regular port of call for Mesolithic fishermen. Large shell middens litter the coast, predominantly limpets, common periwinkle, Dog whelk, Oyster, Cockle and Scallop. Fish bones: Saithe. Mammal Bones: Grey Seal, Red Deer, Wild Boar. Deer and Boar are not native to the island. So were the bones brought along to make tools ?.</p>	

<p><i>The 5 main sites seem to have been used at different seasons, Inner Hebrides, Scotland</i></p>		<p>Human: Over 50 human bones found. Toes, Fingers, Ribs. May be further parts of skeletons buried intact under the ground. Nitrogen isotope analysis of 5 bones indicates dependence on Sea Food. Also some herbivore meat.</p> <p>Human: Saithe, fish ear bones, estimates age of fish and season of death. Midden, Caisteal nan Gillean was visited early Summer. Cnoc Coig was visited in the Autumn. Priory Midden was visited in Winter. The fishermen could have been seasonal visitors or permanent residents. Contact with the mainland or the other islands was necessary because of the Deer and Boar bones. There were double barbed antler harpoons. These harpoons were found at different locations around the Western Isles. Such as on Skye, Mull and Rhum</p>	
<p><i>Daylight Rock (Small Ord Point), Caldey Island, Pembrokeshire</i></p>	<p>8580 +/- 60 BP 7880 +/- 60 BP 1725 +/- 40 BP</p>	<p>Human ulna Human metacarpal Human radius</p>	
<p><i>Oreston Third Bone Cave (Oreston Breakwater Quarry/Oreston Cave), Devon</i></p>	<p>8545-8328 cal BC and 8237-7976 cal BC (both at 95.4% probability)</p>	<p>Human bones heavily calcified. Indicates bone having laid on ground of cave for a long period. One human maxilla had wear and attrition cogent with being used as a tool. Possible prehistoric cave burial</p>	
<p><i>Paviland Cave (Goat's Hole), Gower Peninsula, Glamorgan</i></p>	<p>8245 +/- 45BP 8180 +/- 70 BP</p>	<p>Human femur Human humerus</p>	
<p><i>Cannington Park Quarry Cave (also known as Boulder Cave or South Quarry Cave)</i></p>	<p>8415 +/- 65BP 8280 +/- 55BP 8210 +/- 55BP 7880 +/- 55BP 7020 +/- 100BP</p>	<p>Human mandible Human Innominate Human Innominate Human cranium Human mandible</p>	
<p><i>North Eastern Coasts and Doggerland</i></p> <p><i>Haywood Cave, Hutton, Hay Wood Rock Shelter, Mendip, Somerset. ST 3399 5822</i></p>		<p>Small cave in steep hillside facing north. Excavations from 1957-1962. Human: 560 fragments of identifiable human bone present. At least 8 skulls. One skull crushed beneath a large rock. Mammals: Several hundred bones. Sheep or Goat. A disturbed mound in centre of cave with microliths and other flint tools that could be meso or later. Sherds of Iron and and Roman pottery. Human bones could be Roman or Iron Age in date. At least 1 skull may predate the Iron Age. Also attribution of pot sherds questioned. Kept at Axbridge Museum.</p>	

<p>"Goldcliff", Newport, Wales . A river flowed through the forest connecting England to Wales</p>	8,000BP	<p>Footprints of Cranes, Deer, Aurochs and Humans can be seen. Prior to the flooding of the verdant woodland. Human footprints are both adults and children. Evidence of salt marshes at that time.</p> <p>Wild boar, Aurochs, Raspberry and Elderberry Seeds (Autumn occupation)</p>	<p>Prior to 7,000BP the forest-covered plain connecting England to Wales extended to Lundy Island</p>
<p><i>Kent's Cavern, Torquay, Devon</i></p>	8185+/-38BP 8070+/-90BP	<p>Ulna, Human Maxilla, Human</p>	
<p><i>Bower Farm, Staffordshire</i></p>	8170 +/- 45 BP	Human cranium	
<p>Formby Point, Mersey Estuary, Liverpool</p>	Late Devensian 7190 +/- 80 BP	<p>Crane, Auroch, Deer, Horse, Dog, Wolf, Wild boar, Sheep, Goat, Water rail and Oystercatcher. Human with long toenails, height estimation 5 feet 5 inches, some 4 feet 9 inches and some children. Possibly collecting Razor-shell and shrimps. Males seemed to be travelling faster and close to Roe deer and Red deer tracks</p>	
<p><i>Head at Holly Lane, Somerset, ST 417 726</i></p>	<i>Creswellian Horizon</i> 8100-9114 BP <i>Human</i>	Rich fauna from a nearby Cave	
<p><i>Brean Down, Somerset, ST 295 588</i></p>	7420 +/- 70 BP 7,000BP	Layer 8b, mammal bones that have been worked by humans	
<p><i>Totty Pot, Mendip, Somerset</i></p>	7,450-7,040BC	Human burials and animal remains, Microlithic Flints	
<p><i>Uphill Caves, Uphill Quarry, Weston-super-mare, ST 315 585</i></p>	7030+/-140BP 6785 +/- 50	<p>From a range of Ages or dates from MIS 3 onwards: Spotted hyaena Cave lion, Woolly Rhinoceros, Woolly mammoth, Cave bear, Wild horse, Arctic lemming, Reindeer, Steppe bison, Giant deer, Red deer (indicates temperate conditions with forest)</p> <p>There were 13 Caves in Uphill Quarry, bones of many Pleistocene mammals were found here. Caves were close together and might have been inter-connected. Cold climate fauna</p>	
<p><i>Soldier's Hole, Cheddar, Somerset, ST 4687 5400</i></p>	6785 +/- 35 BP 6720 +/- 35 BP	Human: Proto-Solutrean and Cheddarian Flints. Leaf Points. Bone implements	
<p><i>Badger Hole, Wookey Hole, Somerset, ST 4687 5400</i></p>	7,000BC 5740 +/- 65 BP 5615 +/- 45 BP 5495 +/- 55 BP	<p>Human burial</p> <p>Also: >18,000BP, bulked bone</p>	
<p><i>Flint Jack's Cave, Somerset, ST 4632 5381</i></p>	Remains of 4 humans. 4430BP on Human Bone 5480 +/- 55 BP 5485 +/- 75 BP 5185 +/- 60 BP	Creswellian flint implements, Human skulls possibly not contemporary with flint tools. Cheddarian flint Tools	

<i>Hutton Bone Caves, Somerset, ST 3610 5814</i>		Two bone caves close together. Discovered by Miners in 1756. Flints found in one Cave, Upper Palaeolithic, main fauna indicates cold climate. Flints	
<i>Soldier's Hole, Cheddar, Somerset, ST 4687 5400</i>		Upper levels, No C-14 dating possible, Flint is Creswellian	
<i>Gough's Cave, Cheddar, Somerset, ST 4670 5391</i>		Bones treated with preservative, no C-14 possible. Reindeer antler ? Flint is Creswellian	
<i>Hay Wood Cave, Mendip, Somerset</i>		Microliths and other flints	
The Severn Estuary			
<i>Pontnewydd Cave, Denbighshire, North Wales</i>		Human burial ?	
Severn Beach submerged forest, ST 518 834		Submerged forest visible at low tides, tree stumps at -5.5 m	
Somerset Levels Raised peat bogs		Neolithic trackways	
<i>Staythorpe, Nottinghamshire</i>	5150BP	Burial Staythorpe 1 Burial Staythorpe 1	
<i>Cnoc Coig (Oronsay), Argyllshire</i>		Human Burial ?	
<i>Hay Wood Rock Shelter, Mendip, Somerset</i>	Remains of 10+ Humans 5052-4674BP (Human bones)		
<i>Caisteal nan Gilleann Il (Oronsay), Argyllshire</i>		Human burial ?	
<i>Fox Hole Cave, Derbyshire</i>		Human tibia Human humerus	
Stolford submerged forest, Somerset, ST 2246		Forest visible at low tides in Bridgwater Bay	
<i>Kent's Cavern Torquay, Devon</i>	5020 +/-45BP 3560 +/-70BP 3460 BP +/-40BP 1520 +/-90BP 570 +/-24BP	Human Mandible Tooth Human calotte Human Mandible Tooth Human Ulna Human Mandible	
<i>Foxhole Cave, Gower Peninsula, Glamorgan</i>	4940 +/- BP 4840 +/-45 BP 4625 +/- 40 BP	Human phalanx Human phalanx Human tooth	
<i>Picken's Hole, Mendip, Somerset</i>	Remains of 1 Human 4800BP, Human Tooth	Neolithic . Flint flakes	

Bower Farm, Staffordshire	4725 +/- 35 BP 4724 +/- 33 BP	Human rib Human cranium	
Reindeer Cave (Creag nan Uamh/Inchnadamph), Sutherland	4720 +/- 50 BP 4520 +/- 50 BP 4515 +/- 60 BP 4470 +/- 50 BP	Human metatarsal Human immature femur Human immature humerus Human immature scapula	
Totty Pot, Cave, Somerset	4706 +/- 35BP 4498 +/- 35BP 4473 +/- 35BP 4442 +/-36BP 4008 +/-39 BP	Human femur Human Ulna Human femur Human femur Human femur	
Chelm's Combe Shelter, Mendip, Somerset. ST 4634 5447	Remains of 5 humans (3 adults and 2 Children) 4680BP (Human fan bone), 10,190BP, 10,220BP, 10,140BP, 10,910BP (On animal bones beneath the Holocene deposits)	A rock shelter and slitter, in a overhanging cliff now. Destroyed by quarrying. Late paleolithic to Romano-British remains. . Human: An engraved bone, bone whistle, ritualistic or bird decoy , Romano-British pottery, early 4 th Century coins, brooch, IA pottery, and smelter furnace traces, Neolithic and Beaker pottery, Pleistocene faunal remains. A stone cist found near the shelter lower down the combe contained several human individuals. Described as Neolithic. Wells and Mendip Museum and UBSS Museum . Includes a small late BA socketed spear headfound in the slitter. 25 Roman coins found while quarrying.	
Charterhouse Warren Farm, Swallet, Mendip, Somerset. ST 4936 5458	Remains of 30+ Humans. 3790BP, 3760BP, 2145BP (On Human bone), 3870BP, 3245BP, 4340BP, 4140BP, 3615BP, 3605BP(Animal Bones)	A large vertical shaft with a side passage at the top. On the West side of a dry valley. Stratified sequence of finds from Neo to the Roman periods. Human: An almost complete beaker, and sherds from another. Miniature pottery beaker from EBA. 2 Grooved Ware Sherds or BA barrel Urn. Sponge finger stones of slate. 2 large quartzite hammerstones or pounders. A bone pin. Antler spatula. Flints: dagger, scrapers, knives. Human bones are possibly Neo/ EBA, some have cut marks. IA and RB inhumations.. <u>Mammals: Aurochs. Last known survival of Aurochs in Britain</u>	
Halling, Kent	4180 +/- 190 BP 4100 +/- 180 BP	Halling 1, Human femur Halling 1, Human femur	
Neolithic (Neo) "Beaker", 4,000- 2,300BC Early Neolithic, 4,000-3,400BC			
Whaley 2, Derbyshire	3470 +/- 65 BP	Whaley 1 burial	
Little Shelter, Ebbor Gorge, Mendip, Somerset. ST 5246 4862		Small shelter with an attic. Human: Human bones and flints of neolithic age. Bronze age sandstone hammer or axe at 1 foot depth. Alongside fragments of human bone. . At 3ft 6 inches was a human skull and some flints. Possibly of middle aged woman and juvenile	
Late Neolithic, 3,400- 2,300BC			
Galley Hill, Kent	3310 +/- 150 BP	Human humerus	
Gough's Cave, Cheddar, Somerset, ST 4670 5391	2850 +/- 60BP	Human humerus	

<i>MacArthur Cave, Argyllshire</i>	2460 +/- 55 BP 2365 +/- 55 BP 2295 +/- 60 BP 2170 +/- 55 BP	Human talus Human femur Human patella Human humerus	
<i>Tynning's Great Swallet, Mendip, Somerset</i>	Remains of 3 human individuals 2254BP (On Human Bone)	Iron Age	
<i>Brimble Pit Swallet, Mendip, Somerset</i>	Human ?		
<i>Cockle's Wood, Upper Cave, Mendip, Somerset</i>	Remains of 2 humans, Neolithic		
<i>Cockle's Wood, Lower Cave, Mendip, Somerset</i>	Remains of 2+ humans, adults, Neolithic or Bronze Age		
<i>Flint Crevice, Axbridge, Mendip, Somerset. ST 4312 5502</i>		Narrow crevice excavated in 1954 by ACG. Human: 20 worked flints, neolithic	
<i>Outlook Cave, Mendip, Somerset</i>	Remains of 1+ Humans	Neolithic ?. Artificially widened entrance. Leads to small chamber with low level extension. Excavation, 1907, MNRC, Huan: At least 1 person Mammal: Late Pleistocene animal and human remains below a stalactite floor	
<i>Tom Tivey's Hole, Mendip, Somerset</i>	Remains of 1 adult Human	Neolithic or Bronze Age	
<i>Beaker Shelter, Mendip, Somerset</i>		Human and faunal with beaker pottery	
<i>Bone Hole, Cheddar Gorge, Mendip, Somerset. ST 4804 5470</i>	Undated	Human: Faunal, Beaker other. A miniature gorge formed by roof removal. Leads to a roomy entrance chamber. A scree slope with remains of Beaker to Iron Age . Leads to vertical rifts. Human and animal bones found by stalactite collectors in 1800's. Boyd Dawkins recovered: Human: 12 skulls, Mammals: Wolf, Boar, Deer and Oxen. Subsequent digs by Mendip Caving Group, awaiting Report. Also found human bones and animal bones. Wessex / Middle Rhine Beaker pottery. Mammals: Bear, Horse, Wolf, Boar, Auroch	
<i>Bos Swallet, Burrington, Mendip, Somerset. ST 4709 5837</i>		Large natural depression. Excavated by Sidcot School pupils in 1954. In 1956-58 Dr H Taylor of UBSS conducted archaeological assessments. Identified 2 phases. One was Beaker pottery. The other suggested Middle Bronze Age. Human: Burnt animal bones, beaker pottery, Leaf shaped arrow head (possible early neolithic). Beaker sherds were from 20 vessels, Flints: flakes, Cores, Scrapers, Knives etc. some flakes of Chert. Some burnt animal bones. Possibly a hearth. A trough / pit used for boiling things. <u>Burnt mounds appear to belong Middle Bronze Age period, hence date</u>	

<i>Bridged Pot Shelter, Ebbor Gorge, Mendip, Somerset. ST 5260 4866</i>		Roomy shelter. Perforated rock bridge spanning the entrance. Excavated by HE Balch in 1926 and 1929. Upper 120 cm are Neolithic Beaker remains. At 180 cm were 11 flints . Possibly Neolithic. Human: Beaker pottery, Flint knife, Hand-Axe green stone
<i>Bridged Pot Hole, Ebbor Gorge, Mendip, Somerset. ST 5258 4868</i>		A small rock shelter. Near head of Ebbor Gorge. Funnel-shaped dissolution hole of 2.5m-3m in diameter. Partially roofed and open on down Hill side facing West. Balch discovered and partly opened it in 1926. Human: Fragments of black pottery. Decorated fragment of beaker pottery. Polished green stone axe. A flint knife and flakes. In a rock niche was found 11 leaf-shaped spearheads and levelling flakes. Late Pleistocene bones also found.
<i>Brimble Pit Swallet, Westbury Hill, Westbury Hill Swallet, Frog Hole, Mendip, Somerset ST 5081 5075</i>		Swallet of 2 vertical shafts in limestone. North and South entrance shafts. More recent finds listed below. Human: Human bones, Adult male skull, several small rib and radius fragments, and Domestic animals, domestic dog, domestic sheep, or goat, cattle, Aurochs, Deer. Some showing signs of butchery and some were gnawed. Grooved Ware pottery, Barbed and Tanged and petit tranchet arrow heads, 4 retouched flakes of flint, Hand-Axe greenstone (10 m deep). Flint: 200 pieces, small animal bone. 42 sherds of Grooved ware pottery from 2 vessels. Possible deliberate deposition in LN, EBA
<i>Charterhouse Warren Farm, Swallet, Mendip, Somerset</i>	2100 +/- 140 BP	Human: Human bones and faunal bones, Antler and bone points, Grooved ware and beaker pottery, Flint dagger and "Sponge finger stones"
<i>Chelm's Combe, Mendip, Somerset</i>	1665 +/- 50 BP	Human: Human bones, faunal bone points (2), polished bone pin. Windmill Hill beaker pottery, Flint Scrapers
<i>Cockle's Wood, Mendip, Somerset</i>	1635 +/- 40BP	Human: Human and faunal bones. Grooved Ware Pottery and Beaker pottery, Flint scraper
<i>Hay Wood, Mendip, Somerset</i>	1380 +/- 70BP	Human: Human and faunal bones, Pottery sherds, Flints
<i>Little Shelter, Mendip, Somerset</i>	Remains of 4+ humans	Human: Human bones, flint tools
<i>Outlook Cave, Mendip, Somerset</i>	Remains of 9+ humans	Human: Human bones and faunal bones, Fingernail decorated pottery, black ware, Leaf-shaped flint arrow head, Hand-Axe of Millstone grit and polished (2)
<i>Rowberrow Cavern, Mendip, Somerset</i>	Remains of 1+ humans	Human: Faunal bones, partly polished bones. Beaker pottery and Ebbsfleet pottery, Knives, Lozenge arrow head, scrapers, borers, piercers, flakes of flint
<i>Soldier's Hole, Mendip, Somerset</i>	Remains of 9+ Humans. (& adults and 2 juveniles)	Human: Grooved ware pottery, Flint knives, scaper and saw, Hand-Axe made from polished flint

<i>Sun Hole, Mendip, Somerset</i>	Human remains	Human: Human bones, bone points and bone pin, Grooved ware pottery and Beaker pottery, Flint tools: Scrapers (3), Knives, Point, Borer, Barbed and tanged and leaf shaped arrow heads, hammerstone	
<i>Tom Tivey's Hole, Mendip, Somerset</i>	Human remains	Human: Human bones, domestic bones, bone points, Windmill Hill pottery, Barbed and tanged and leaf-shaped arrow heads,	
<i>Totty Pot, Mendip, Somerset</i>		Human: Windmill Hill pottery, Beaker pottery, Tanged and barbed arrow head	
<i>White Woman's Hole, Mendip, Somerset</i>		Human: Grooved pottery ware	
Bronze Age (BA) 2,300-700BC. Early Bronze Age (EBA) 2,300-1,200BC			
<i>Benter Cavelet, Ashwick, Somerset. ST 6454 4885</i>		Short but roomy shelter formed in Dolomite conglomerate. Excavated by the Abbot of Downside in 1920. Human: EBA remains found	
<i>Caerwys, Flintshire</i>	Human remains	Caerwys 1952, burial	
<i>Lloyd's Site (London Skull), City of London</i>	Human remains	Human Lloyd's Site 1, Skull Human mandible	
<i>Daylight Rock (Small Ord Point), Caldey Island, Pembrokeshire</i>		Human frontal bone	
<i>Badger Hole, Wookey, Somerset</i>			
<i>Beaker Shelter, Ebbor Gorge, Mendip, Somerset. ST 5262 4866</i>		Short Cave of 3 entrances. Formed alongside Calcite veins. A smaller passage excavated by Balch in 1931 and a smaller tunnel opened in 1951. A Beaker deposit was found. Possibly a ritual burial was performed on a perfect floor of small limestone flagstones. Finds recorded are a Skeleton and remains of 3 further individuals, Jackson. A tiny archway with room for 2 people to sit comfortably is close to the top cliff. Excavation of top 18 inches revealed 8 fint scrapers, deer bone fragments, the limestone floor flagstones covered a femur with associated foot and ankle bones. Also a Neolithic arrow head and 3 more scrapers.	
<i>Bracelet Cave, Mendip, Somerset</i>		Human: Gold bracelet	

<p><i>Bridged Pot Shelter, Mendip, Somerset</i></p> <p><i>Hope Wood Hole, Cook's Hill Hole, Mendip, Somerset</i></p> <p><i>Benter Cavelet, Mendip, Somerset</i></p> <p><i>Bone Hole, Mendip, Somerset</i></p> <p><i>Bos Swallet, Mendip, Somerset</i></p> <p><i>Bridged Pot, Late Neo, EBA</i></p> <p><i>Brimble Pit Swallet, Mendip, Somerset</i></p> <p><i>Charterhouse Warren Farm Swallet, Mendip, Somerset</i></p> <p><i>Chelm's Combe Shelter, Mendip, Somerset</i></p> <p><i>Cockle's Wood Shelter, Mendip, Somerset. ST 6461 4853</i></p> <p><i>Cross Spring, Cross Well, South Marsh Water Works, Cross, Mendip, Somerset. ST 4159 5469</i></p> <p><i>Ewe Cave, Little Stoke Wood, Rodney Stoke, Mendip, Somerset. ST 4886 5040</i></p> <p><i>Nettlebridge Cave, Mendip, Somerset</i></p> <p><i>Rowberrow Cavern, Rowberrow Mendip, Somerset. ST 4596 5802</i></p>	<p>Remains of 4 + humans. At least 3 adults and 1 child</p>	<p>Human: Human bones</p> <p>Human: Beaker pottery, Late Neo, EBA</p> <p>Human: Beaker pottery, Late Neo, EBA</p> <p>Human: Late Neo, EBA</p> <p>Human: Late Neo, EBA</p> <p>Human: Late Neo, EBA</p> <p>Human: Late Neo, EBA, LBA socketed spearhead</p> <p>Human: Late Neo, EBA Associated with Nettlebridge Cave. A rock shelter and cave at Cockle's Wood. The shelter yielded. Human: 2 Inhumations, decorated finger nail, Downside Abbey excavations recovered sherds of Grooved Ware and Beakers, 2 finger scrapers, scattered human bones and animal remains</p> <p>7m deep well in dolomitic conglomerate, sunk on site of a large natural Spring in 1898. Human: Gold bracelet dated to Bronze Age discovered. Ritual deposition, now in British Museum</p> <p>A small rock shelter in the Woodland. Some Bronze Age pottery has been found. Human: BA Human: Late Neo, EBA</p> <p>Human: Late Neo, EBA, flint tools</p> <p>Human: Gold bracelet, barbed and tanged arrow head made of flint</p> <p>Large dolomite conglomerate archway. Rapidly closes down with a passageway to the left. UBSS excavations between 1921-1926. Human: Neolithic, Bronze Age, Iron and Romano-British. Upper palaeolithic, flint implements, microliths and cores indicate Mesolithic. The Roman coins were counterfeit. Human skeletal remains possibly pre-Roman.</p>	
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<p>Tom Tivey's Hole, Mendip, Somerset</p> <p>Totty Pot, Mendip, Somerset</p> <p>Late Bronze Age (LBA), 1,200-700BC</p> <p>Iron Age (Lowland Britain), 700BC-43AD</p> <p>Early Iron Age (EIA), 700-400BC</p> <p>Read's Cavern, Keltic Cavern, Mendip, Somerset</p> <p>Middle Iron Age (MIA), 400-100BC</p> <p>Late Iron Age, 100BC-AD43</p> <p><i>Bone Hole, Mendip, Somerset. ST 4804 5470</i></p> <p><i>Browne's Hole, Mendip, Somerset. ST 6693 4757</i></p> <p><i>Charterhouse Warren Farm Swallet, Mendip, Somerset. ST 4936 5458</i></p> <p><i>Chelm's Combe Shelter, Mendip, Somerset. ST 4634 5447</i></p> <p><i>Chert Shelter, Ebbor Gorge, Mendip, Somerset. ST 5286 4901</i></p> <p><i>College Wood Rock Shelter, Mendip, Somerset. ST 6462 4950</i></p> <p><i>Cook's Hill Hole, Hope Wood Hole, Ebbor Gorge, Mendip, Somerset. ST 5216 4845</i></p> <p><i>Cooper's Hole, Cheddar, Mendip,</i></p>	<p>Remains of 1 human 2023BP</p>	<p>Human: EBA, MBA, barbed and tanged arrow head made of flint</p> <p>Iron Age ?</p> <p>Human: 12 skulls recorded. Iron age pottery</p> <p>Human: Iron age pottery, indeterminable flint material</p> <p>Human: Remains of 28 human individuals, of Iron Age and Roman-British date</p> <p>Human: Part of a furnace and associated slag, Hearth</p> <p>Undisturbed cave sediments, could be of archaeological interest</p> <p>A rock shelter on the steep hillside of college wood. Pottery described as Iron Age. "considerable signs of Romano-British occupation" and many flints. Human: Iron Age</p> <p>Narrow 4m shaft. Leading to a small chamber. Tight tube leads to a second entrance. Iron Age skeleton discovered by WSG in 1950. Human: Human bone</p> <p>Cheddar Gorge, East side of Road. 200m up from Gough's Cave. Low arch at road level.</p>	
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<p>Somerset. ST 4682 5402</p>		<p>Partly hardened and used as a Car Park. Front of Cave quarried back. Human: Iron Age: Parry, 1931-32, discovered Iron Age pottery and an area of the Car Park to the South. Bones from domesticated and wild animals. One sheep bone with a hole bored through described as a "bobbin". Female inhumation discovered in Car Park in 1966. Finds were on display at Gough's Cave Museum. Cave investigated by Channel 4 Time Team in 1998. A flint implement and animal bones discovered. The latter below a stalagmite layer. Possibly palaeolithic ? Prehistoric age sheep bones with cut marks on them.</p>	
<p>Fairy Cave, Stoke St Michael, Mendip, Somerset. ST 6565 4775</p>		<p>Located in a Cliff just outside of Fairy Quarry. Part of a complex system of passages in the quarry area which converge on St Dunstan's Well. The Well is situated a short distance to the North West. Human: Iron age pot sherds. On 2 occasions, now kept at Taunton Museum.</p>	
<p>Gough's Old Cave, Cheddar, Mendip, Somerset. ST 4668 5388</p>		<p>Opened in 1837, Abandoned in 1900 after the discovery of (new) Gough's Cave. Human: Iron age, UBSS excavations 1954-1961, IA and RB Hearths at entrance to cave.</p>	
<p>Gough's Cave, Cheddar, Mendip, Somerset. ST 4670 5391</p>		<p>Human: Pierced bone (Animal ?), Bronze Ring, Iron Age</p>	
<p>Great Oone's Hole, Cheddar Gorge, Mendip, Somerset. ST 4680 5392</p>		<p>Human: Iron age. Fake cave paintings in main gallery. Floor deposits removed by people in 1800's. Vandals removed stalagmites. UBSS dig in 1976. A few pottery sherds of Iron age. Home Guard used cave in WW2</p>	
<p>Ham Hole, Croscombe, (Ham Woods Cave, Badger Hole, Ham Wood Shelter), Mendip, Somerset. ST 60224503</p>		<p>Roomy phreatic tunnel in liassic conglomerate. Human: Iron age pottery discovered. Cave diggers have removed much of the interesting sediments. Ham Woods warrants more archaeological excavations</p>	
<p>Hay Wood Cave, Mendip, Somerset</p>		<p>Human: Human and animal bones, Iron age</p>	
<p>Pig's Hole, Sow's Hole, Mendip, Somerset</p>		<p>Human: Iron age</p>	
<p>Read's Cavern, Burrington Combe, Mendip, Somerset. ST 4682 5844</p>		<p>Discovered in 1919.. Main chamber excavated. Human: Human and animal bones. Late Iron Age. Fragments of Iron and Bronze. Clay craft objects and a hearth Late Iron Age. Antler-cheek pieces, bronze fittings for Chariot Wheels, Bronze Bracelet, Stone Spindle Whorls, Iron Shackles, Coin of Magnentius. Cave may have been used for ritual purposes in pre-roman age. Continental brooch found dating to the La Tene period (450-20 BC).</p>	

<p><i>Rowberrow Cavern, Mendip, Somerset</i></p>		<p>Human: Furnace and slag, fragments of metal work, evidence of Iron smelting, hearth, Iron age</p>	
<p><i>St Cuthbert's Swallet, Priddy, Mendip, Somerset</i></p>	<p>2023BP radiocarbon dated</p>	<p>One of the most complex caves on Mendip. Entrance to the left of the lead workings. Human: Glass beads and human remains. Female with tresses in her hair. The beads were Celtic form.</p>	
<p><i>Saye's Hole, Cheddar, Mendip, Somerset. ST 4663 5389</i></p>		<p>Large arched chamber at the bottom of the Gorge. Human: Fragments or broken pieces of Iron and bronze, Craft objects, Hearth, Late Iron Age</p>	
<p><i>Soldier's Hole, Cheddar Gorge, Mendip, Somerset. ST 4687 5400</i></p>		<p>Human: Early Iron Age, Neolithic and Romano-British. Cheddarian Flints, Pro-Solutrean Flints. Mammals: Lion, Hyaena, Wolf, Bear, Mammoth, Reindeer, Elk, Bison</p>	
<p><i>Tom Tivey's Hole, Mendip, Somerset</i></p>		<p>Human: Iron age</p>	
<p><i>Sun Hole, Mendip, Somerset</i></p>		<p>Human: Early Iron Age and Late Iron Age</p>	
<p><i>Whitcombe's Hole, Mendip, Somerset</i></p>		<p>Human: Animal bones, Early Iron Age</p>	
<p><i>Wookey Hole, Wookey, Somerset</i></p>		<p>Human: Human and animal bones, Extensive metal work assemblage including iron and bronze objects, craft objects, hearth, Iron Age</p>	
<p><i>Sow's Hole, Cheddar, Mendip, Somerset. ST 4784 5455</i></p>		<p>Roxk shelter, Cheddar Gorge. Human: Iron Age pot sherds. See Pig's Hole</p>	
<p>Roman Period (Rom), AD43-450</p>			
<p>Romano-British (RB), AD43-450</p>			
<p><i>Dinder Wood Shelter, Dinder, Mendip, Somerset. ST 5884 4541</i></p>		<p>In a cliff at the head of a ravine. A rock shelter partly filled in with 1.5m3 of concrete. Anti-tank lines from WW2. Balch in 1933 excavated to a black layer, thick with charcoal and ashes, containing Iron Age and Roman pottery sherds. Fragments of iron slag and animal bones. Neolithic flint Axe Head also found.</p>	
<p><i>Hope wood hole, Cook's Hill Hole, Ebbor Gorge, Mendip, Somerset. ST 5216 4844</i></p>		<p>Rock shelter excavated in 1950. Animal bones and iron axe of unknown date were found. In 1951, Human: Crouched human burial, and middle bronze age sherds of pottery. Middle bronze age cinerary urn. Late bronze age urn of Deverel Rimbury type. Above the burial level some romano-british pottery was found. The surrounding areas has flint flakes and scrapers.</p>	

<p><i>Scragg's Hole, Compton Bishop, Mendip, Somerset. ST 3964 5496</i></p>		<p>Short, roomy Cave. Human: Roman pottery and coins. Neolithic pottery and flints. Partly polished stone Axe. Palaeolithic flints and animal remains.</p>	
<p>Migration, Early Medieval, Early Christian (MEM), AD450- 1066</p>			
<p>Medieval (Med), AD 1066- 1547</p>			
<p>Post-Medieval, Modern, Industrial, Recent, AD 1547 Post-Medieval, 1547-Present</p>			
<p><i>Nancy Camel's Hole, Croscombe, Mendip, Somerset. ST 6015 4417</i></p>		<p>Cave entrance excavated post-medieval remains found. Possibly of a Nancy Camey in 1780, who may have lived there</p>	
<p>Industrial, AD1700-Present</p>			
<p>Modern, 1901-Present</p>			
<p><i>Denny's Hole, Compton Bishop, Mendip, Somerset. ST 3967 5497</i></p>		<p>Entrance located on South edge of Crook Peak. Overgrown Pit that leads down to a main chamber. 2 passages lead to a second chamber. Used by Home Guard in WW2. Cave possibly breached only recently. Lack of Archaeology</p>	
<p><i>Foxes Hole, Burrington Combe, Mendip, Somerset. ST 4823 5822</i></p>		<p>Small double entrance. Leads to 2 Phreatic chambers. Connected by a small passage. Second chamber used by Home Guard in WW2. May have been hiding place of Lord Plumley, Lord or Locking in 1686 after Monmouth Rebellion. Boyd-Dawkins found sparse Pleistocene remains in first chamber</p>	
<p>Not Dated:</p>	<p>Not Dated:</p>		
<p><i>Bleadon Cavern, Mendip, Somerset</i></p>	<p>Remains of at least 1+ human individuals. Not dated</p>		
<p><i>Bone Hole, Mendip, Somerset</i></p>	<p>Remains of at least 18+ human individuals (13 adults and 5 juveniles). Not dated</p>		
<p><i>Cooper's Hole, Mendip, Somerset</i></p>	<p>Remains of at least 1+ human individuals. Not dated</p>		

<i>Dinder Wood Shelter, Mendip, Somerset</i>	Remains of at least 1+ human individual, Juvenile. Not dated		
<i>Hutton Cave, Mendip, Somerset. ST 3609 5813</i>		A cave or 2 bone caves. Discovered by Ochre miners in 1756. Rev. David Williams discovered a large deposit of Pleistocene mammal bones 70 years later. Human: Flints of palaeolithic date, possibly Aurignacian ? but provenance is not secure. Several sites listed as: ST 3605 5816, ST 3604 5818, ST 3615 5813. Pleistocene remains were cleared at the West end of a series of caverns. The Cave was filled in and became the "lost cave of Hutton". Confused with Bleadon Cavern / Cave.	
<i>Ivy Cave, Ebbor Gorge, Mendip, Somerset. ST 526 487</i>		A wide, low arch, earth-filled on a ledge near the top of left bank cliff. 30 yards south of the narrows. Considerable depth of sediment in the entrance. The ledge is narrow but may contain archaeologically significant materials	
<i>Kid's Cave (Hole), Ebbor Gorge, Mendip, Somerset. ST 5259 4862</i>	1 infant burial, no date	Partially excavated by MNRC in 1907 and 1912 . Human: Infant burial Mammal: Goat bones	
<i>Ladies Cave, Ebbor Gorge, Mendip, Somerset. ST 524 486</i>	Undated	Situated on the right bank at the foot of a cliff near the north-west corner of a large scree slope. 7m south of Lords Cave. A small arch with an earth. Floor. The sediments are undisturbed and will therefore be of some archaeological value.	
<i>Lion Cave, Lion Shelter, Ebbor Gorge, Mendip, Somerset. ST 5258 4871</i>	Undated	A wide low shelter in solid rock. Partly excavated by MNRC in 1910. Mammals: One Cave lion bone found.	
<i>Long Hole, Cheddar Gorge, Roman Cave, Cheddar, Mendip, Somerset. ST 4668 5387</i>		An old upper level of Gough's Cave. Deposits at entrance floor ransacked in 1900's. Much Romano-British material vanished. Human: some human bones were recovered but undated	
<i>Lords Cave, Ebbor Gorge, Mendip, Somerset. ST 524 486</i>		Situated on right bank at foot of cliff at south-west corner of large scree slope. . 7m north of ladies cave. Short earth-choked tunnel. Sediments in the cave are unexplored and could be of archaeological value	
<i>Mells River Sink, Wadbury Valley, Mells, Mendip, Somerset. ST 7351 4878</i>		WCC excavated in 1975-1977. Mammals: Rhinoceros, Reindeer, Horse. 1 st Century AD broach	
<i>Nedge Hill Hole, Nedge Hole, Green Ore, Mendip, Somerset. ST 6430 4712</i>		MNRC excavated in 1912 and 1934. Human: Pottery and some bones. Farmer levelled the field and is now lost forever	
<i>Nettlebridge Cave, Nettlebridge, Mendip,</i>		A rock shelter and cave at Cockles Wood. South West of Nettlebridge. Associated with	

<p>Somerset. ST 6463 4852</p>		<p>Cockleswood Rock Shelter. Situated on different levels of the same slope. The rock shelter is the upper most. Human: 2 inhumations. Coarse potsherds. Fingernail decoration on the sherds. Given to Wells and Mendip Museum. Downside Archaeological Society in 1947 and 1950 found sherds of Grooved Ware and Beakers, 2 flint scrapers, scattered human bones and animal remains. These are in Taunton Museum.</p>	
<p><i>Nipper's Hole, Ebbor Gorge, Mendip, Somerset. ST 528 491</i></p>		<p>Ebbor Gorge, high right bank, of upper valley, splits into west and East tributaries. Small cliff in the wood. Shallow arch with low descending creep at the back. Dug by unknown. The entrance has undisturbed deposits that may be of archaeological value</p>	
<p><i>Peacock Tube, Ebbor Gorge, Mendip, Somerset. ST 524 484</i></p>		<p>In woodland 100 yards up the valley from Primrose Valley junction, 50 feet up right bank, in a cliff of dolomite and conglomerate. Small descending tube, earth choked with undisturbed floor deposits</p>	
<p><i>Pearl Mine, Sandford Hill, Mendip, Somerset. ST 4285 5916</i></p>		<p>A number of small bones were found in the Cave in 1968. Assumed to be skulls. But were ransacked</p>	
<p><i>Pig's Hole, Cheddar, Mendip, Somerset. ST 4770 5454</i></p>		<p>Rock shelter in Cheddar Gorge, foot of a cliff, south side of the gorge. One of 2, the other is Sow's Hole. ST4770 5454 is larger and therefore decided to call this Pig's Hole. Currently under excavation</p>	
<p><i>Priddy Circle, Number 1, Priddy, Mendip, Somerset. ST 5393 5252</i></p>		<p>Ac Archaeology, 2013-2014, 2 natural sinkholes were discovered. Southerly sink hole, ST 5393 5259, revealed when a trench was dug. Back filled after archaeological assessment. No report. The Western Sink Hole at ST 5386 5256 occurred naturally after rainfall in 2014</p>	
<p><i>Pride Evans Hole, Cheddar, Mendip, Somerset. ST 4681 5406</i></p>		<p>Recorded as having been lived in by the Pride Evans family. Pride Evans was the Welsh keeper of Cheddar Pond in 1810. A hoard of Roman coins was found there</p>	
<p><i>Rowberrow Cavern, Mendip, Somerset</i></p>	<p>Remains of at least 1+ human individuals. Not dated</p>		
<p><i>Savory's Hole, Ebbor Gorge, Mendip, Somerset. ST 5286 4881</i></p>	<p>Remains of at least 1+ human individuals. Not dated</p>	<p>Upper valley of Ebbor Gorge. 2m above valley floor. 56m below main plateau. Shelter 4m long, 5m wide. Roof 1.5m high and 2m high at back. Human: Bones, possibly burials. Mammals: Split long bones of possibly LUP or Mesolithic.</p>	
<p><i>Stoke Lane Slocker / Swallet, Mendip, Somerset</i></p>	<p>Remains of at least 3+ human individuals. Not dated</p>		
<p><i>Ubley Hill Pot, Mendip, Somerset</i></p>	<p>Remains of at least 4+ human individuals. Not dated</p>		

<i>White Cliff Cave, Mendip, Somerset ??</i>	Remains of at least 1+ human individuals. Not dated		
<i>Ebbor Gorge, Mendip, Somerset</i>	Many Pleistocene fauna including Dwarf Horse, Wild Cat. Ongoing excavation as of 2022. No Human remains at current time		
<i>Handsdowen Swallet, Maesbury, Shepton Mallet, Mendip, Somerset. ST 6003 4712</i>	Remains of 1 Human . Not dated	An active sink hole. A complex of tight rifts. Now filled in. Human: Human remains of unknown age found in 1954	
<i>Hawk's Nest Cave, Hawk's Eyrie Cave, Ebbor Gorge, Mendip, Somerset. ST 5287 4899</i>	Not dated	Short cave with 2 entrances. Partly excavated by Balch in 1900. Found a large number of small animal bones from Hawk's Eyrie (above) . Undisturbed sediments on the Cave floor could be of archaeological interest	
<i>Hidden Cave, Ebbor Gorge, Mendip, Somerset. ST 525 485</i>	Not dated	Short unremarkable hole. Found underneath brambles, at the foot of the lower cliff on the left bank. Opposite Tower Rock. 5m north of Step Hole. Undisturbed Cave sediments may have archaeological material	
<i>High rift cave, Ebbor Gorge, Mendip, Somerset. ST 525 486</i>	Not dated	Reached by a 30 feet rock climb up left bank. 30 yards up Ebbor Gorge from bottom of big rock scree slope. "A rift narrowing inwards with tuffa". Undisturbed cave sediments on the floor may be of archaeological significance	
<i>Rabbit Hole, Ebbor Gorge, Mendip, Somerset. ST 525 486</i>		Foot of a cliff, half-way up North edge of a great scree slope, in a woodland. A descending tube, earth choked. The cave remains are undisturbed and may have archaeological significance	
<i>St Dunstan's Well Cave, Stoke St Michael, Mendip, Somerset. ST 6588 4789</i>		Human: Clay pipe pieces, medieval pottery at entrance. Abandoned village close by indicates Black Death Burial Pit. But unlikely	
<i>Smoky Shelter, Ebbor Gorge, Mendip, Somerset. ST 525 484</i>		Situated under Tower Rock. Some potential for archaeological excavations	

Key to the Biostratification Table for Britain shown above

Features in the table	Significance	Notes
<i>Dimlington Stadial</i>	A period of the Pleistocene	A period of time that has previously been identified within the Pleistocene. Always <i>bold italics</i>
"Banwell Bone Cave", Somerset, ST 3822 5881	"Name of Mammal Assemblage-Zone" type locality site	This site is accepted as typical of its type in terms of assemblage and time period
<i>Rhinoceros Hole, Wookey, Somerset, ST 532 479</i>	A site identified as having a similar or identical Mammalian Assemblage to Banwell Bone Cave but is NOT the accepted representative site-type	<i>These minor sites are always written in italics</i>
	A glacial or cooler period	
	A warmer or interglacial period	
A cold phase in a warm zone	A brief cool period in a warm period	

The Mammal Assemblage-Zone concept:

Whilst researching the material in order to write this book, I came across several important anomalies with regards to the Mammal Assemblage-Zone concept. A key assumption is that during each glaciation the entire mammal fauna of Britain became extinct, at roughly the same date. This was not the case when considering sites south of Wales and the Midlands, which escaped full glaciation, but were nonetheless experiencing Arctic wasteland conditions. But the concept is excellent and has considerable merits. These are listed in specific order below:

1. The Mammal Assemblage-Zone concept is a standardised method of comparing a new site, such as Brownes' Hole, to previously, thoroughly excavated and dated sites. This could be used as a method of date estimation as opposed to precise measurement. For example, consider Pin Hole Cave in Derbyshire. In most ways these sites are similar in Mammal Assemblage-Zone, demography, geology and geography, except Pin Hole is some 150 miles or more to the North of Mendip and would have experienced far harsher glacial conditions than Mendip. Therefore, Brownes' Hole Mammal Assemblage-Zone is referred to as "Pin Hole Cave -type", but the precise dates of the two mammalian assemblages found at both sites may differ. Pin Hole Cave and Creswell Crags may have experienced complete glaciation at a time that Mendip was experiencing Tundra-type conditions. The extinction event at Mendip was probably delayed or more recent in time. Hence, the need for radiocarbon dating of both sites
2. The next significance is depth in the soil. A Mammal Assemblage-Zone could also be a reference to depth in the soil at a specific site. The deepest finds, it is fair to assume would be the oldest in date. This is helpful. Some Caves will have different Mammal Assemblage-Zones at different depths in the Cave sediment. In probability each Cave has more than one Mammalian Assemblage-Zone
3. We move onto proximity of sites. Brownes' Hole is close to the Wookey Hole "Hyaena Den" and the Mammal Assemblage-Zone of both sites is very similar. Perhaps, sometimes we should use adjacent sites, which are geographically more local to each other in order to gain a better understanding of the dates, geography, environmental features and involvement of human occupation at that time

Section 9

Appendix 1: Constructing the Mammalian-Assemblage Zone framework for Britain

(Currant, A. and Jacobi, R. 2001 and 2011)

Summary of the Mammal Assemblage-Zones for Britain largely based upon Currant, A. and Jacobi, R. 2001,2011, Chapter 10, page 165, without material from Chris Stringer's book "Homo Britannicus"

Name of MAZ principal find site	Approximate dates or MIS	Significant mammalian feature	Notes
Cromerian interglacial Westbury Sub-Mendip Quarry, Somerset	MIS 19, 787,000 BP Earth's Magnetic reversal:780,000 BP	Hippopotamus (Neil Adams), Primitive Cave bear, primitive Rhinoceros, Wild dog, Jaguar, Scimitar-toothed Cat, Miomys savini vole	Warmer. An anomaly discovered by Neil Adams in 2015, at Westbury Sub-Mendip Quarry, Somerset. A warm period immediately after the last magnetic polar reversal
	MIS 18, 760,000 BP		Cooler.
Cromerian interglacial Pakefield, Cromer, Suffolk	MIS 17, 712,000 BP	Human artefacts, Voles: <i>Mimosys pussilus (rare after 650,000 BP)</i> , <i>Mimosys savini</i> , Hippopotamus, Rhinoceros, straight-tusked elephant, 3 species giant deer, scimitar-toothed cat, lion, hyaena, wolf, bear	Warmer, evidence of human stone tools. Dating attempted by amino acid conversion from Laevo rotatory molecules to Dextro rotatory molecules after death of shellfish. The proportion of Dextro rotatory amino acid molecules increases with age after death of the shellfish
	MIS 16, 659,000 BP		Cooler.
	MIS 15, 621,000 BP		Cooler.
	MIS 14, 568,000 BP		Cooler.
Cromerian interglacial Boxgrove, Chichester, Sussex (Also at Westbury Sub-Mendip)	MIS 13, 528,000 BP	Homo Heidelbergensis, bison, horse, red deer, roe deer, elephant, rhinoceros, lion, hyaena, wolf, boar, 10 species of large and small carnivore, bat, mole, Arvicola terrestris cantiana vole	Warmer.
Anglian Ice Advance	MIS 12, 474,000 BP		Cooler. No site currently established
Hoxnian Interglacial Swanscombe Doggerland	MIS 11, 427,000 BP	Homo Neanderthalensis (female), rhinoceros, mussels, pike, eel, perch, salmon, dolphin, two types of beaver, cormorant, osprey, badger, marten, rabbit, hare, shrew, vole, red, roe, fallow deer, boar, wolf, horse, bison, giant ox, giant deer, straight-tusked elephant, two kinds of rhinoceros, lion, macaque monkey	Warmer. Evidence of Neanderthal tools found along Suffolk and Kent coastlines
	MIS 10, 364,000 BP		Cooler. No humans
	MIS 9, 334,000 BP		Warmer. No humans
	MIS 8, 301,000 BP		Cooler. No humans
Crayford, London	MIS 7, 244,000 BP	Corbicula fluminalis, Clam	Warmer. No humans
Bacon Hole, Gower, Wales	MIS 6, 190,000 BP	Small Horse	Cooler. Land bridge crossing to Europe possibly open. No humans
Bacon Hole, Gower, Wales and Banwell Bone Cave, Somerset, Joint Mitnor Cave, Devon	MIS 5e, 130,00 BP	Spotted Hyaena, Narrow-nose rhinoceros, Hippopotamus	Warmer. High sea level event Island Britain ?. No humans
	MIS 5d, 115,00 BP	Very little	Cooler. Possible extinction event. Island Britain ?. No humans
	MIS 5c, 106,000 BP		Warmer. Island Britain ?. No humans
	MIS 5b, 93,000 BP	Very little	Cooler. Possible extinction event. Island Britain ?. No humans
Banwell Bone Cave, Somerset	MIS 5a, 85,000 BP	Island fauna of Britain. Bear, Wolverine, Bison	Warmer. Closure or flooding of land bridge to Europe. Island Britain. No humans
Dating above is often achieved by Uranium series decay, dating below is achieved by radiocarbon dating			
Brean Down, North Somerset	MIS 4, 74,000BP	Woolly mammoth, Wild horse	Cooler. Land bridge to Europe probably opened once more to allow European animals to migrate back to Britain. No humans
Pin Hole Cave, Derbyshire	MIS 3, 60,000BP	Human artefacts, Woolly mammoth, Wild horse	Warmer. Possibly migrated from Europe to Britain after a cooler period
Dimlington Stadial	MIS 2, 24,000BP	Modern human, Woolly Mammoth, Musk Ox	Cooler. Musk Ox is a cooler period indicator species as they can survive extreme cold climates
Gough's Cave, Cheddar, Somerset	MIS 1, 11,600BP	Modern human, Mammoth, Reindeer, Auroch	Warmer period. Possible human scouting groups to Britain
Allerod oscillation	MIS 1, 11,130-12,600 BP	Moose, Elk, Auroch	Warm and moist period. England and Wales were connected across the Bristol Channel by means of a Birch woodland
Younger Dryas, Chelm's Hole, Cheddar	MIS 1, 10,150-10,995BP	Reindeer, Red deer	Incomplete mammalian assemblage due to Cave destruction by quarrying activities

The significant sites are listed below as a point of reference (Currant, A. and Jacobi, R. 2001,2011)

Each specific location or site listed below has a distinctive “Mammalian Assemblage-Zone”

Crayford, South London – MIS 7:

Corbicula fluminalis – Freshwater clam

Bacon Hole, Gower Coast, Swansea, Wales, Britain – MIS 6:

Small Horse, Fox, Large Northern Vole (*Microtus Oeconomus*)

Minchin Hole, Walton Bone Cave, Holly Lane, Clevedon – MIS 6:

As Bacon Hole, again with small horse, large Vole and a Human modified Bone. This Human modification indicates that Humans lived in Britain during the MIS-6 period. Humans were absent thereafter until MIS-3

Joint Mitnor Cave, Buckfastleigh, Devon, Britain “Mammal Assemblage-Zone”- MIS 5:

Common shrew, Arctic Hare, Bank vole, Water vole, Field vole, Wood mouse, Wolf, Red fox, Brown bear, Badger, Spotted hyaena, Wild cat, Lion, Straight-tusked elephant, Narrow-nosed rhinoceros, Wild boar, Hippopotamus, Red deer, Fallow deer, Giant deer, Bison

Common sites for the Joint Mitnor Cave “Mammalian Assemblage-Zone” are lowland areas including beneath Trafalgar Square, London (Currant, A. and Jacobi, R. 2001,2011, page 166)

The Hippopotamus and associated fauna has been assigned to a sub-stage called MIS-5e. There is no clear identification as to when Hippopotamus remained dominant (Currant, A. and Jacobi, R. 2001,2011, page 167). One observation is that mammalian assemblage sites indicate catastrophic events occurred and may have been responsible for the accumulations of the bones. In addition, Hippopotamus create a great deal of disturbance during their lives in both water and on land (Currant, A. and Jacobi, R. 2001,2011, page 167)

There is no evidence of human occupation of Britain during MIS-5e. This is thought to be attributed to the island status of Britain rather than a glacial period (Currant, A. and Jacobi, R. 2001,2011, page 167)

***Bacon Hole Mammal Assemblage-Zone and the Banwell Bone Cave Mammal Assemblage-Zone
MIS 5:***

The Marine Isotope Stage 5 seems to have seen considerable upheaval in terms of climate change. This includes Stages labelled 5d and 5b, which are major cold stages, in which there is little faunal evidence. In the warmer stages 5c and 5a we do have some mammalian faunal evidence (Currant, A. and Jacobi, R. 2001,2011, page 167).

Beneath the MIS 6 layer in Bacon Hole:

MIS 5e – High Sea level event dated to 122+/- 9,000 years (Carrant, A. and Jacobi, R. 2001,2011, page 167). Spotted Hyaena, Small form of northern vole (*Microtus oeconomus*), Narrow-nosed rhinoceros, straight-tusked elephant. Note: dating of a stalactite capping in Bacon Hole has recently suggested a new date of 86.97 +/- 0.73 Ka (Carrant, A. and Jacobi, R. 2001,2011, page 167). This would date the Cave as MIS 5c (96-103,000 years BP) . Hippopotamus may have been absent from this locality at that time meaning that the date of the deposits could still be MIS 5e

The complete Mammalian Assemblage-Zone, faunal lists for Bacon Hole and the Banwell Bone Cave, MIS 5

(Carrant, A. and Jacobi, R. 2001,2011, page 168):

Banwell Bone Cave Mammal Assemblage-Zone (Cemented breccias):

Brown bear, Wolverine, Reindeer, Bison

Bacon Hole Mammal Assemblage-Zone (Upper Cave earth and Upper Sands):

Water vole, Northern vole, Wolf, Spotted Hyaena, Straight-tusked elephant, Narrow-nosed rhinoceros, Red deer, Bison

Bacon Hole Mammal Assemblage-Zone (Grey clay, silts and sands):

Wood mouse, Field vole, Water vole, Bank vole, Straight-tusked elephant, Woolly mammoth, Narrow-nosed rhinoceros, Spotted hyaena, Wolf, Badger, Red deer, Roe deer, Bison, Common shrew

Joint Mitnor Cave, Mammal Assemblage-Zone (Sandy cave earth/shelly sand):

Pygmy shrew, Common shrew, Field vole, Water vole, Bank vole, Wood mouse, Hare, Straight-tusked elephant, Lion, Red fox, Fallow deer, Red deer

Joint Mitnor Cave, Mammal Assemblage-Zone (Sandy Breccio-conglomerate):

Wood mouse, Field vole, Red deer

Joint Mitnor Cave, Mammal Assemblage-Zone (Course sands MIS 6 fauna):

Northern vole (large form), Red fox, Horse (small form)

Joint Mitnor Cave, Mammal Assemblage-Zone (basal pebbles):

No fauna

Note: It is possible that Britain remained as an island for the entire period of 70-130,000 years ago (Currant, A. and Jacobi, R. 2001,2011, page 169)

Banwell Bone Cave, Banwell, North Somerset, Britain Mammal Assemblage-Zone MIS 5a, island fauna of Britain:

Arctic hare, Northern vole, Wolf, Red fox, Arctic fox, Brown bear, a very large Wolverine, Bison

Note: restricted range of fauna, possibly because Britain was isolated from the rest of Europe at this time. The specific presence of Woolly Mammoth, Wild Horse, Woolly Rhinoceros in the rest of Europe at that time supports this theory

The cold of MIS 5b seems to have resulted in an almost total loss of mammal fauna from Britain at this time (Currant, A. and Jacobi, R. 2001,2011, page 170). The fauna of Britain were trapped on our island at this time owing to higher Sea levels in MIS 5a (Currant, A. and Jacobi, R. 2001,2011, page 170)

The Brean Down, North Somerset, Britain, Mammal Assemblage-Zone (MIS 4 and MIS 3):

During the MIS 3 period there is the occurrence of mammals which had previously been living in abundance on mainland Europe in MIS 5, but were absent from Britain until now. Evidence of Woolly Mammoth, Woolly Rhinoceros, Wild Horse and Humans can be found living in Britain during MIS 3. It is assumed that spotted hyaena had accumulated the Mammalian Assemblages in their Dens and shelters. Measurements taken from beneath the sands at Brean Down have dated this Mammalian Assemblage-Zone to 64.87 +/- 4.26 Ka. This might place Brean Down in the MIS 4 era (Currant, A. and Jacobi, R. 2001,2011, page 170). The most significant difference in mammalian assemblage finds between Brean Down and the Banwell Bone Cave is the presence of Wild Horse at Brean Down

Brean Down Mammal Assemblage-Zone MIS 4-MIS 3:

Bed 11: Collard lemming, Hare, Fox, Wolf, Woolly mammoth, Wild horse, Giant deer, Reindeer, Bovine

Bed 12: Vole, Reindeer, Bovine

Bed 11: Narrow-skulled vole, Fox, Reindeer, Bovine

The Pin Hole Cave, Cresswell Crags, Derbyshire, Lower Cave Earth Mammal Assemblage-Zone MIS-3, 60-26,000 years BP (Currant, A. and Jacobi, R. 2001,2011, page 170):

The mammalian fauna of Pin Hole Cave is regarded as demonstrating a consistency of its type (Carrant, A. and Jacobi, R. 2001,2011, page 172):

Human artefacts, Arctic hare, Red-cheeked suslik, Wolf, Red fox, Brown bear, Stoat, Polecat, Spotted hyaena, Lion, Woolly mammoth, Wild horse, Woolly rhinoceros, Giant deer, Reindeer, Bison

Faunas identical to Pin Hole Cave have been found elsewhere in Britain such as Banwell Bone Cave and the Hyaena Den of Wookey Hole, Somerset, Picken's Hole at Crook Peak, Compton Bishop, North Somerset and Ash Tree Cave, Whitwell, Derbyshire (Carrant, A. and Jacobi, R. 2001,2011, page 172)

At this date of 60,000 years BP the material from the Pin Hole Mammalian Assemblage-Zone can be dated by means of radiocarbon dating. Whereas prior to this stage in history other dating methods were needed

Hyaena have been very active in Britain at this time and have been instrumental in gathering bones and depositing them in Caves. The dates for significant Hyaena occupation range from 52,000 – 27,000 BP. Hyaena and Woolly rhinoceros vanished at the same time. It is also believed that human activity in Britain at this time was very sparse (Carrant, A. and Jacobi, R. 2001,2011, page 173). It is thought possible that Britain was explored by only one visiting party and on only one occasion (Carrant, A. and Jacobi, R. 2001,2011, page 173)

The Dimlington Stadial:

"The term Dimlington Stadial is proposed as a climatostratigraphic name for the main glacial episode of the Late Devensian in Britain, in preference to stratigraphically unsatisfactory terms, such as Late Devensian Glaciation (which includes the Windermere Interstadial and the Loch Lomond Stadial), icesheet glaciation or maximum of ice expansion, that are currently in use. The name is selected from a site on the East Yorkshire coast and refers to the interval between 26,000 and 13,000 radiocarbon years B.P. Dimlington Chronozone is the formal chronostratigraphic term for the equivalent period of time, and comprises the main part of the Late Devensian Sub-stage"

James Rose, September 1985

During this period animals were probably sparse, however there are sites where dating has commenced on assemblages. For example Pontnewydd Cave near St Asaph, Denbighshire. Many pieces of assemblage have been obtained from other sites in Britain. The name offered is "Dimlington Stadial Mammal Assemblage-Zone" (Carrant, A. and Jacobi, R. 2001,2011, page 173). Mention is made of a partial human humerus having been found in a Cave in South Wales dating to the early Dimlington Stadial (Carrant, A. and Jacobi, R. 2001,2011, page 173)

The Dimlington Stadial Mammal Assemblage-Zone, 26,000 -13,000 BP:

Modern human, Arctic hare, Fox, Brown bear, Woolly mammoth, Reindeer, Musk ox, Large deer

The Musk Ox is regarded as the most significant cold-climate indicator (Currant, A. and Jacobi, R. 2001,2011, page 174)

The Gough's Cave Mammal Assemblage-Zone and late interglacial interstadial (Currant, A. and Jacobi, R. 2001,2011, page 174)

13,000-10,000 BP

Many bones recovered from Gough's cave have evidence of cut marks made by humans and some have been fashioned into sharp points. This is evidence of tool manufacture

Modern Human, Arctic hare, Collared lemming, Norway lemming, Water vole, Northern vole, Narrow-skulled vole, Wolf, Red fox, Brown bear, Lynx, Mammoth (Human artefact), Horse, Red deer, Reindeer (Human artefact), Aurochs, Saiga antelope, Wild dog ?

Most artefacts have been radiocarbon dated to 12,245- 12600 BP

The Allerød Mammal Assemblage-Zone, 11,130-11,795 BP

The Allerød oscillation was a warm and moist global interstadial that occurred c.13,900 to 12,900 BP, nearly at the end of the Last Glacial Period

At this time England and Wales were connected by a birch woodland. There are few find spots for this era. Possibly due to Sea level changes

Moose, Irish elk, Red deer, Roe deer, Reindeer, Auroch

Younger Dryas Stadial, 10,150 – 10,995 BP

The Younger Dryas (12,900 to 11,700 years) was a return to glacial conditions which temporarily reversed the gradual warming after the Last Glacial Maximum (27,000 to 20,000 years BP)

A period of extreme cold and tundra type conditions. The most significant site was Chelm's Combe Shelter, but this was sadly destroyed by quarrying (Currant, A. and Jacobi, R. 2001,2011, page 177). This is the last phase of the Pleistocene. Further research is required on the specimens which were from this site. Some of the radiocarbon dating of artefacts assumed from this era could be wrong.

Chelm's Combe Shelter, Cheddar, Somerset – assumed to be Younger Dryas, 10,150- 10,995 BP, Mammalian Assemblage-Zone (Currant, A. and Jacobi, R. 2001,2011, page 177) :

Reindeer, Red deer

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