

THE TUDOR MINERS OF COLEORTON, LEICESTERSHIRE

Robert F. Hartley

Abstract: Over a period of eight years amateur and professional archaeological work on an opencast coal mine site at Coleorton in Leicestershire has been carried out at a gradually increasing extent, culminating in 1992-3. At this time archaeological features likely to be found underground in an extension to the site were made the subject of a planning condition, requiring the developer to fund a programme of monitoring, and to contribute towards the cost of conservation of finds by the local Museums Service. Accurate dating evidence from many parts of the site has made it possible to gain a new understanding of the nature and technological ability of the 15th and 16th century mining industry in this area.

INTRODUCTION

Between 1985 and 1993 the "Lounge" opencast coal mine removed parts of ten seams of coal from an area of over half a square mile (1.5km²) in the parish of Coleorton, Leicestershire. Over an area of 0.5km² of the Main Coal seams the modern excavators uncovered a continuous series of pillar-and-stall workings, as far as 100 ft. (30m.) below the surface, and originally reached by timber-lined vertical shafts. It has been possible to date this industry by tree-ring dating of timbers, and stylistic study of other artefacts, to the period 1450-1600 AD.

For probably the first time it has been possible to study a Medieval coal mining industry in detail, rather than relying on fragmentary and unreliable historical information. It has also been possible - again perhaps for the first time - to have historic underground coal mining features accepted as "a material consideration" in the determining of a planning application. This is a precedent of great importance for the future of research into this important aspect of our national heritage.

Historic mine workings have frequently been observed on opencast sites before, but several factors have combined to make the "Lounge" site uniquely productive of usable archaeological information.

Firstly, there has been the co-operation and interest shown at all stages of the operation by the site operator, British Coal Opencast. From the commencement of coaling, they allowed access to the site for recording purposes at all practicable times. They also took the decision - wisely as events have proved - to donate historic

artefacts from the site to the County Museums Service, rather than to the National Mining Collection, as precedent would have dictated. Subsequently, British Coal Opencast has funded aspects of the research project, both voluntarily, and also under the terms of a planning agreement.

Secondly, there was an amateur research input by a gentleman who has spent much of his life working in the mining industry, up to senior managerial level, and who still had access to the large collection of mining records then maintained at Coleorton Hall, the Regional Headquarters for deep mining, close to the opencast site. It was also important that John Crocker's research interests extended to all aspects of the history and ecology of the parish of Coleorton, and not just the mines.

Thirdly, there has been the existence of the Leicestershire Museums Service, with its wide remit of activities and specialities. Staff from Archaeology, Industrial History and Conservation sections have been involved, with the active support of the Director of Museums and County Councillors, including the former Chairman of the County Council.

Despite this, it is likely that interest in the site would have been limited without the remarkable dating evidence which has allowed the finds to be placed in a historical context. There is now an accumulation of artefactual evidence - especially shoes and clothing, which can be dated stylistically, but the initial breakthrough came from tree-ring dating of pit-props, done by Nottingham University Tree-Ring Dating Laboratory, and fortunately the first samples taken were also the earliest and statistically the most important.

Let us now take a closer look at the world of the Tudor coalminers, as revealed by the discoveries on the opencast site.

THE COAL SEAMS AND THE WORKINGS

The pillar-and-stall mines extended for a distance of 1¼ miles (2km.) along the outcrop of the Main Coal seams, having removed over 1 million tons of coal. There are three seams, which in this area are interspersed only by very thin "dirt bands". Superficially, the coal generally looked like one layer, about 9 ft. (3m.) thick, but the quality of the coal in each seam is different, and the dirt bands formed horizontal divisions which were important in actually mining the coal.

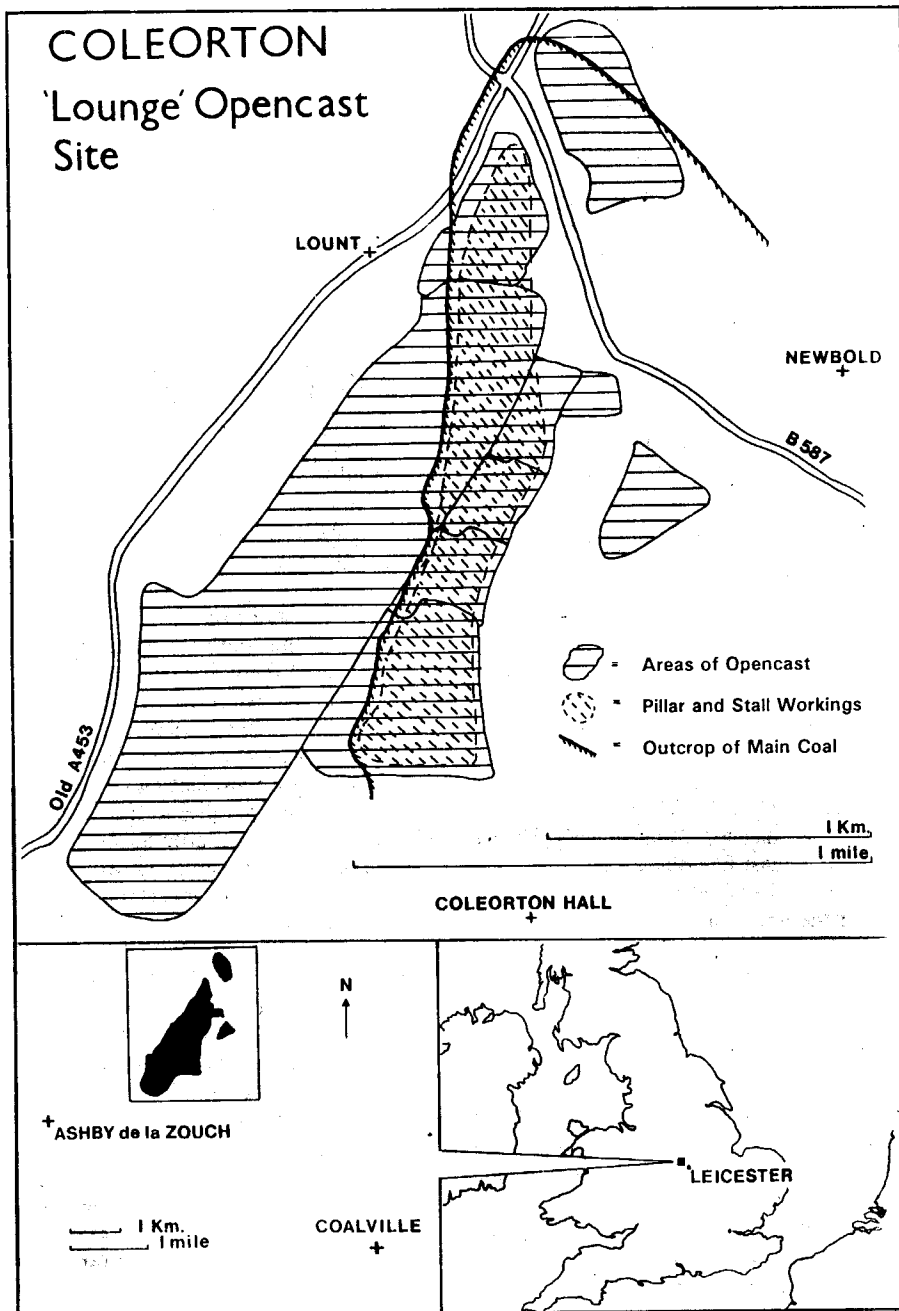
The earliest tree-ring date of 1450 was recorded at the southern extremity of the opencast and there are late 16th century dates from the centre of the site. In most areas between, there seems to have been a steady northwards progress of about 20 ft. (6m.) each year, with faces totalling about 800 ft. (250m.) parallel to the dip of the coal, from near the outcrop to about 100ft. (30m.) below ground level. However there is also evidence of reworking in some areas, with removal of pillars left by a previous phase of working. This would have been both difficult and dangerous, but seems to have been done successfully.

There was no evidence that these mines had been reached by levels driven into the outcrop. All access was presumably by the numerous shafts which descended vertically to the coal seam. For ease of working and transporting the coal underground, it is likely that the coal was usually cut in a westerly direction, up the 1 in 15 to 1 in 20 dip of seam towards the surface, but not actually breaking through at the outcrop.

Within the workings, the High Main Top seam was left to form the roof of the galleries. The High Main Bottom seam was mined, and much of the Upper Main, leaving some to form a floor. The Upper Main was the best and most sought after coal, with a high calorific value and a low ash content (8%). It also contained less sulphur than the High Main, which was known as the "Stinking Coal".

THE MINESHAFTS

Approximately 300 shafts gave access to the area of workings from the surface. These followed a fairly consistent pattern, with internal timber framing retaining the sides to leave a rectangular open shaft 4ft. to 5ft. (approx. 1.5m.) square in cross-section. The main frames, with carpentered mortice-and-tenon joints,



THE MINE GALLERIES

In pillar and stall mining, a portion of the coal is removed, leaving solid pillars untouched to continue supporting the roof. The main direction of working throughout the site is parallel with the dip of the coal. Linking passages run through at right angles, about 100ft. (30m.) apart. Whilst the separation of the cross-passages is fairly consistent throughout the site, the width of the stalls changes, widening from about 10ft. (3m.) in the mid 15th century workings, to about 20ft. (6m.) in the late 16th century. Generally the wider the galleries, the more timber would have been needed in addition in the form of pit-props, but the solidity of the coal also varied from place to place. The most spectacular remains are those in the most solid coal, but they are not necessarily the most interesting in terms of coal mining technology.

Unfortunately the site has not produced any recognisable evidence for the drainage and ventilation of these mines. There is documentary evidence (Owen 1984 p31) that in the 1550s quite a long sough was being constructed, probably to the valley below Newbold, a mile (1.5 km.) to the East. The one detailed document to survive, the Coalpit Sinking Book entry for November 1572 (Owen 1984, pp54-55), mentions work in a sough pit. This may have been a shaft into a sump, containing a bucket pump or rag-and-chain pump, but exactly what, and exactly where, will never be known.

The same document records the removal of timbers from a pit, but it would seem that most timbers could not be salvaged in this way. It is noticeable that the number and quality of timbers used in the 15th century mines exceed that of the ones used in the 16th century.

were inserted at 3ft. (1m.) vertical intervals during shaft sinking and smaller branches and brushwood pushed behind. Some shafts, apparently late in the period under consideration, made use of planking instead of brushwood. The frame timbers were mainly split oak, and some were of use for tree-ring dating.

On reaching the coal, a final shaft frame rested on top of the High Main Top seam, which was itself supported by props, and/or pillars of coal. Such documentary sources as exist for 16th century mining often identify shaft sinking as a specialist activity, and probably a full-time job. If the rate of sinking is estimated at 3ft (1m.) per working day, and the average shaft depth as 50ft.(15m.), each shaft might on average represent 15 days work for a team of at least four men sinking and winding. Allowing for the collecting, splitting, jointing, and construction of the shaft

timbers we can at least double both the time and the manpower requirements, and suggest that one shaft could be sunk each month. Making further allowance for weather conditions, holidays, difficulties with supply of materials, and other contingencies, it seems likely that the shaft-sinking team of eight or so would have been quite busy sinking six shafts a year. Since the area of the "Lounge" site alone would have seen, on average, the construction of at least two shafts a year, the parish as a whole would easily provide full-time work for the shaft sinkers.

Another specialist group identified in documents were the "headers", who presumably took over when the shaft reached the coal seam, and prepared the pit bottom area, probably they also established the direction and extent of the galleries, leaving the coal cutting team to concentrate solely on coal production.

BASKETS AND CORVES

Remains of about ten pairs of sledge-type runners have been found. These can now be shown to have been attached to wooden bottom-boards, with some evidence for a container of basketwork built on top. Some of the runners still have iron strips attached to the bottom. These containers would have had internal dimensions of 20ins by 20ins by at least 12ins high (50cm. x 50cm. x 30cm.) The contemporary name for containers of this size was the "corl" of 1/8 of a cubic yard, or 18ins x 18ins. x 18ins. They were clearly used for dragging the lumps of coal from the working face to the foot of a convenient shaft. The tracks of the sledge runners were observed worn into the floor of the workings in some places by site workers. The corl would have contained about 138lbs weight, and coal was sold by the



View of 15th Century pillar and stall workings.

"rook" of 18 corves or 22½ hundredweights. The corves may also suggest a purpose for another type of artefact found in the workings. This is the wooden hook, of which at least six have been found. Each has a handle at right-angles to the shaft. The shafts are carved from wood chosen specially, with a branch at the right point to form the hook. They may have been used to pull the corves out of awkward locations or away from the shaft bottom.

It is possible that the corves may also have been wound up and down the shafts, to take coal to the surface. The disadvantage of the extra weight might well have been offset by benefit of not loading into another container, which would have involved both work and breakage of the coal.

Parts of three baskets without sledge runners have been found. Again, the main surviving components are the oak bottom boards, but a superstructure of basketwork seems likely to have existed originally. Presumably they were hauled to the surface by hand-operated winches, similar to those used in contemporary metal mines.

MINERS TOOLS

The main working tools of the Tudor miner were the single-ended pick and the

one-piece wooden shovel. The picks are of iron, with wooden handles, and the shovels carved from a single piece of oak, probably originally tipped with a strip of iron across the end of the blade.

Several of the pick heads have marks incised in them, presumably identifying either the maker or the owner. Since picks were frequently sent to the smith for sharpening, a mark of ownership would have been useful.

The miners had tallow candies to light their work, of which several have been found, including an unused early 16th century example in perfect condition. The coal is not particularly gassy, and the workings showed no evidence of fires, although it is recorded that at least some of the Coleorton mines were on fire for many years in the reign of King Henry VIII (Owen 1984 p23).

In one area of the workings, incomplete remnants of several three-legged stools were found, and it is conjectured that these were used by the miners to lean on while working in galleries of an awkward height. The seats are crudely shaped pieces of oak. One of them has remains of a cloth pad on it.

MINERS' CLOTHING

Parts of about 25 leather shoes have been found in the workings, and many can be dated on stylistic grounds with reasonable accuracy. As we might expect, they are mainly very worn out. Several have evidence of patching, including one repair made with part of a leather jerkin. It is also possible to identify deformities in the feet of the last wearer in one or two cases. One child's boot has been found, clearly cut down from an old full-size one. The possibility of ritual deposition of old shoes has been considered, but no evidence was recorded to support this.

The most unusual discoveries are two garments, which I have called the Coleorton Tunic and the Coleorton Coat. The Coleorton Tunic is a find of national importance. It was discovered on May 26th 1988 by Neil Davenhill, an excavator driver, when clearing out slack and old pitprops from a mine gallery. It was quickly taken to the site offices, thence to the Leicestershire Museums Service for conservation. It is now identified as one of the oldest pieces of working clothing ever found in Britain, and probably dates from the mid-late 16th century, based on the nearest tree-ring dating samples. The closest parallels for it in illustrations are appropriately in Agricola's *De Re Metallica* Book 2 (Agricola 1556 p41). The garment is made of tabby woven



16th Century pillar and stall workings.

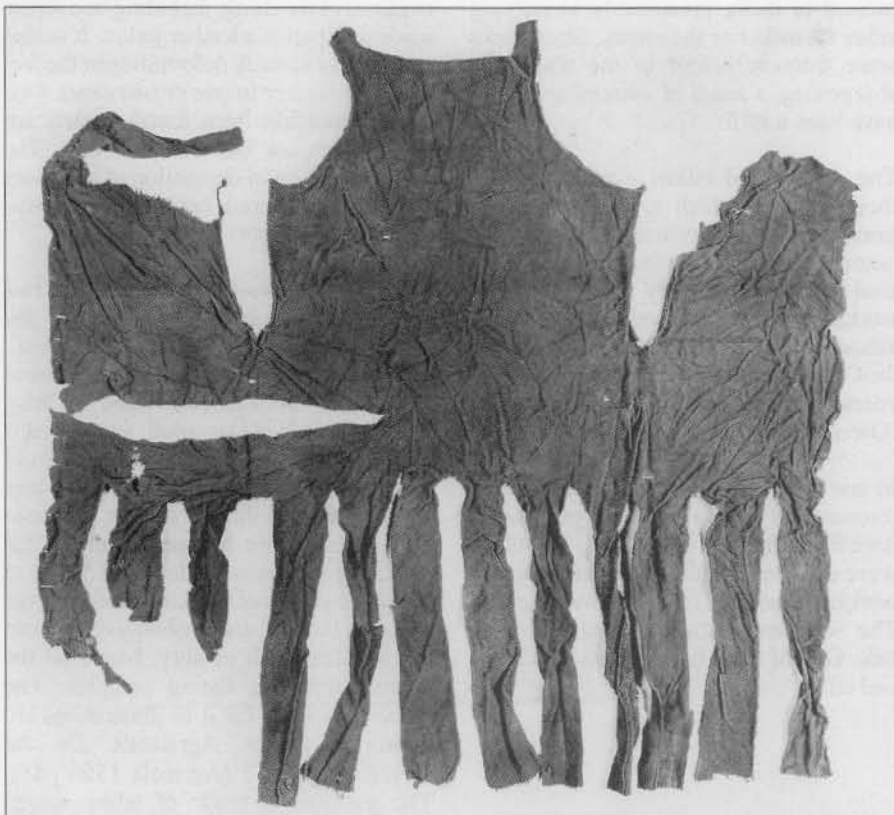
wool. It probably also had sleeves and inset lower strip panels, which may have been made of linen or similar vegetable fibre which has not survived. Traces of a possible yellow dye were found on

protected areas of the wool, and blue dye on some surviving fibres of the linen. To conserve this fragile and highly interesting artefact, and the other small finds, a special low-light display area has been

built at the Jewry Wall Museum in Leicester, aided by funding from British Coal Opencast.

The Coleorton Coat is one of three long waistcoats of late 17th century type found in Western Europe. It came from longwall workings and makes the point that very important finds on the site are not confined to the Tudor period.

The Cole Orton Tunic.



THE INTRODUCTION OF LONGWALL MINING

Alongside the area of pillar-and-stall workings, to the east and at a slightly greater depth, were bands of longwall working of two different periods. The conventional historical view is that longwall was devised in Staffordshire in the late 17th century, but tree-ring analysis of a timber lined roadway within an area of longwall on the "Lounge" site gave a reliable date in the 1620s. Perhaps the origins of longwall working can be traced to the late Elizabethan period. Perhaps it was among the new inventions, such as railways and boring-rods (Smith 1957), introduced to the Northumberland coalfield by Huntingdon Beaumont, that famous, if wayward, younger son of the Lord of the Manor of Coleorton.

CONCLUSION

Production probably increased in the later part of the 16th century, but the technological level of the industry was already established in 1450 in the earliest dated mines found on the site. Neither the Wars of the Roses, which led to the temporary confiscation of the manor, nor the supposed "Elizabethan Revolution" changed the essential nature of the job, although the latter probably saw higher production levels and growing shortage of really suitable timber. Whereas the 15th century oak seems to have been growing in mature stands in local woods, the late 16th century wood may have been coming from further afield, and from any available source. It is not surprising that the earliest reference to mining in Coleorton concerns the unlawful felling of trees and underwood in 1498 by two "collyers" (Owen 1984 p22). Even in 1450, mining in Coleorton must have been a full-time employment for a substantial group, probably a majority of the adult males of the parish, with some lighter jobs for children. Neither history nor archaeology suggest the active participation of women in the industry. Although the productive capacity of the mines is greater than previously envisaged by historians, there is probably no need to postulate new industrial users for it. The area over which coal from Coleorton was marketed included some 200 villages, 10 market towns and the county town of Leicester. Even a fairly low level of domestic consumption would add up to a substantial business over the area as a whole. In the 16th century the major environmental concern about this industry was the damage done to local roads by the numerous coal carts. It is interesting in this matter to note that several of the known historic bridges in Leicestershire are on routes leading from the coalfield. In a world where villages were self-sufficient in most bulk commodities, the coal industry was already a rather disturbing intruder.

Because many artefacts from the site are still undergoing conservation treatment, it is not yet possible to produce a final report on the site. It is hoped that this will be published in a forthcoming volume of the *Archaeological Journal*.

REFERENCES

Agricola, G. 1556 *De Re Metallica*. Translated by H.C. Hoover and L.H. Hoover, 1986. Dover Publications, New York.

Owen, C. 1984 *The Leicestershire and South Derbyshire Coalfield*. Moorland Publishing and Leicestershire Museums.

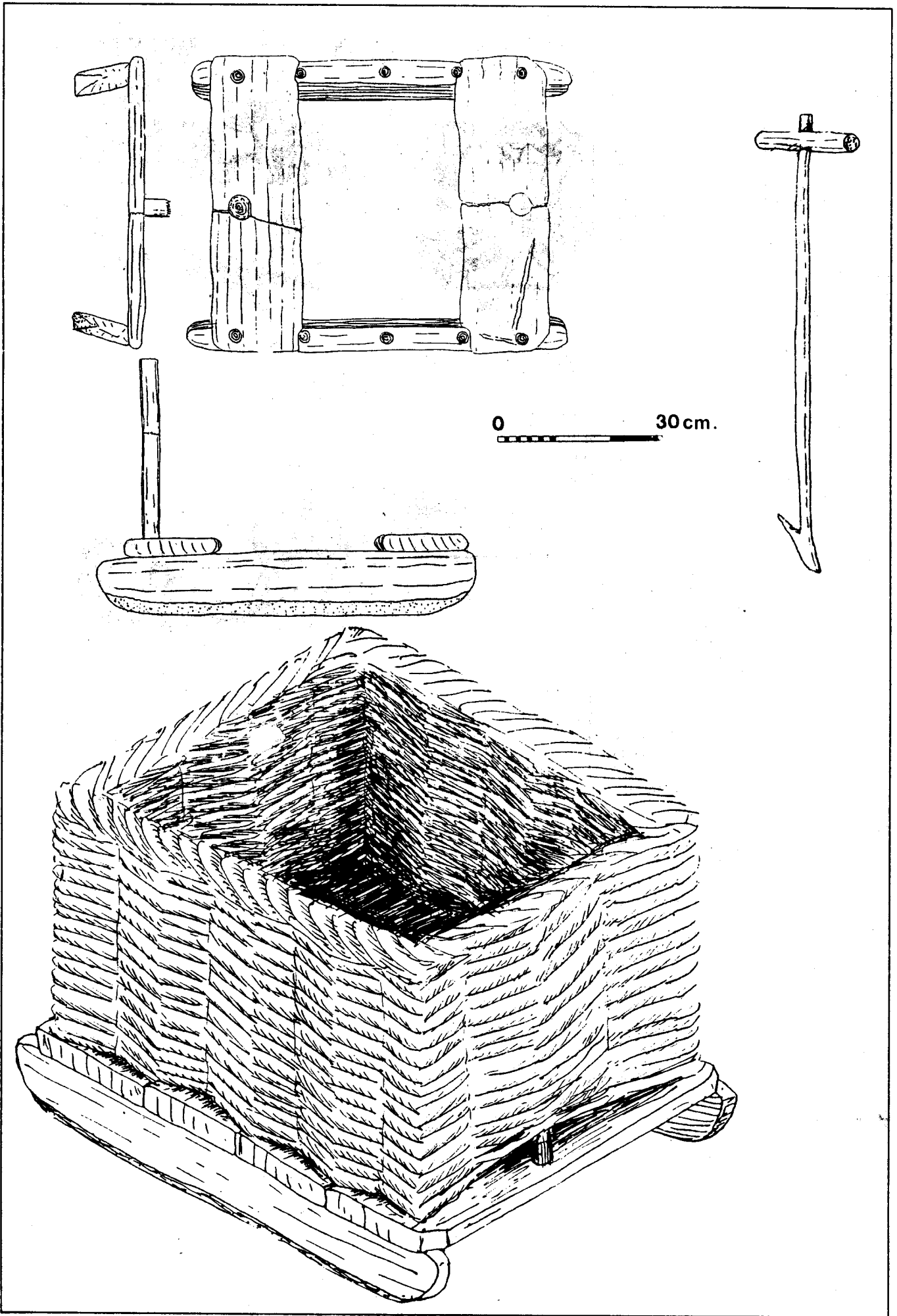
Smith, R.S. 1957 *Huntingdon Beaumont, Adventurer in Coal Mines*. *Renaissance & Modern Studies* Vol 1, Nottingham.



Robert F. Hartley.

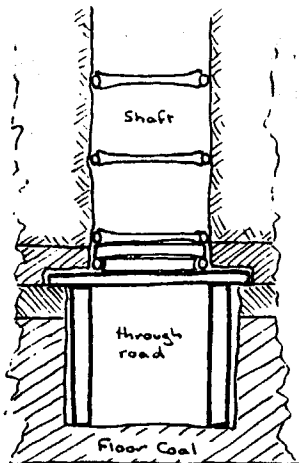
APPENDIX

The following six pages of drawings illustrate the wide range of artefacts recovered from the Lounge site.

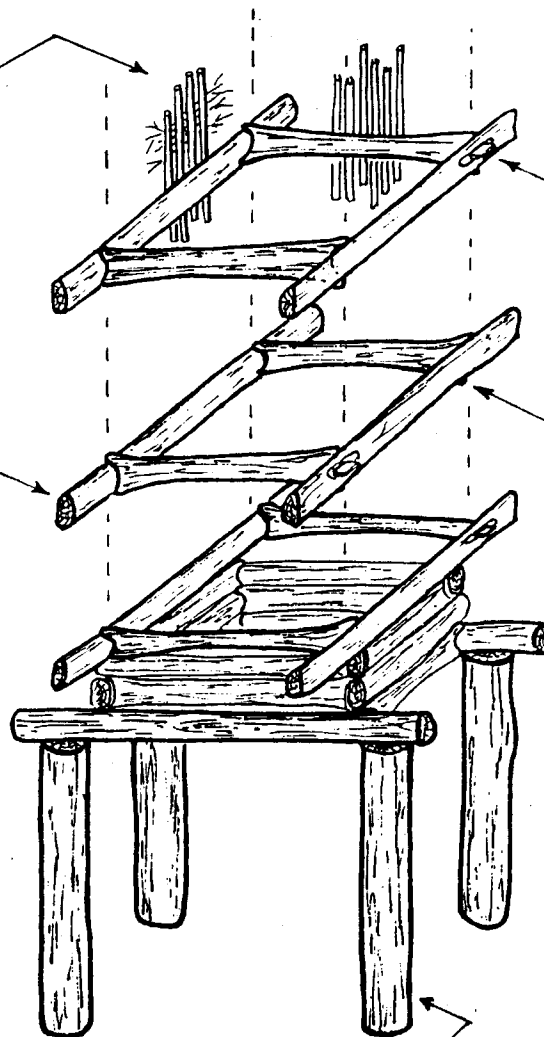


VERTICAL 'BRATTICE' MEMBERS (2" dia birch branches close packed, with horizontal brushwood) USED ONLY WHERE STRATA HAD BEEN SHATTERED OR WAS LIKELY TO BREAK UP.

'MANUFACTURED' OAK SHAFT FRAMES SET VERTICALLY AT APPROX 2'-9" CENTRES.



VIEW IN DIRECTION OF ARROW 'A'

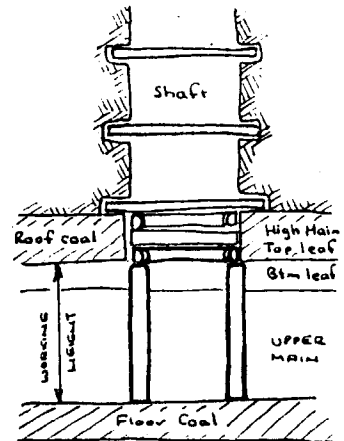


APPROX 1 CWT OF LUMP COAL WOUND THROUGH SHAFT IN SINGLE BASKET WITH ONE-MAN SIMPLE WINCH AT SURFACE.

TENON & MORTISE ENDS AT DIAGONAL CORNERS

WEDGED & PEGGED ENDS AT DIAGONAL CORNERS.

B



VIEW IN DIRECTION OF ARROW 'B' LOOKING DOWN DIP

OAK PROPS COMPLETE TRUNK SECTIONS WITH BARK, NOMINALLY 6" DIA.

GENERAL INTERPRETATION OF MID-15TH CENTURY SHAFT CONSTRUCTION AT COLEORTON COAL MINES (c.1450). NOMINAL 4ft SQUARE EXCAVATION, MAXIMUM DEPTH 100ft. SOME SHAFTS OBLONG (5'x4'), WIDEST LOOKING DOWN DIP.

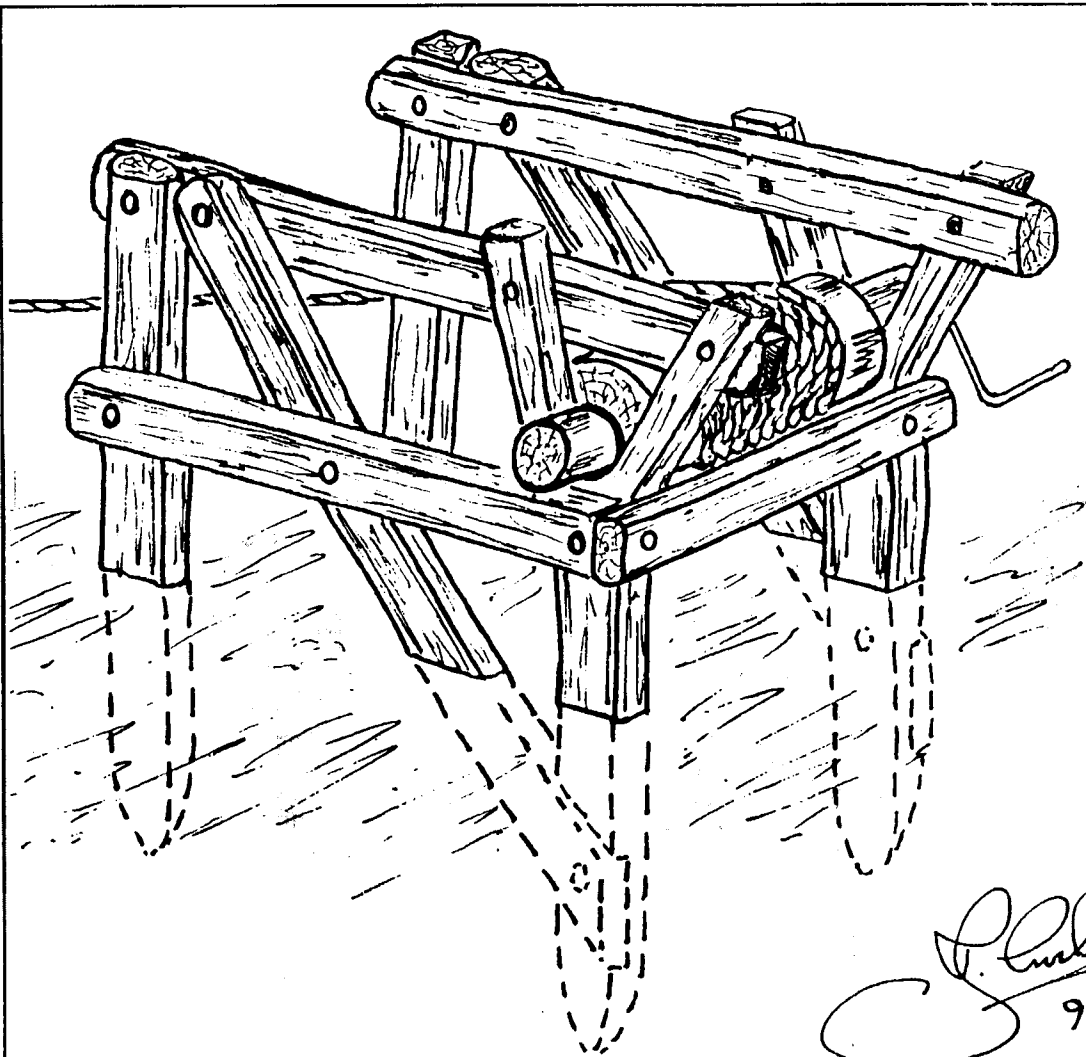
LOUNGE OPENCAST SITE EXTENSION 'C'

OCCASIONALLY THE LOWER FRAME IS OMITTED AND THE SUPPORTING PROPS ARE STRAIGHT ON TO THE ROOF COAL. TIMBER 'TUBBING' AT PIT BOTTOM NOT ALWAYS PRESENT, IT WOULD SEEM THIS ONLY USED WHERE THE HIGH MAIN TOP COAL WAS FRIABLE AND LIKELY TO BREAK UP, JEOPARDISING THE SHAFT.

SOUGH PITS OR PUMPING SHAFTS WERE SUNK THROUGH THE FLOOR COAL TO PROVIDE A SUMP FOR DRAINAGE WATER. THESE SHAFTS WERE OCCASIONALLY IN THE MIDDLE OF A GALLERY, AND SOMETIMES AT THE END OF A BLIND ROADWAY.

ALL DIMENSIONS TAKEN IN FEET & INCHES, SINCE MANUFACTURE & INSTALLATION WERE DONE IN IMPERIAL MEASUREMENTS.

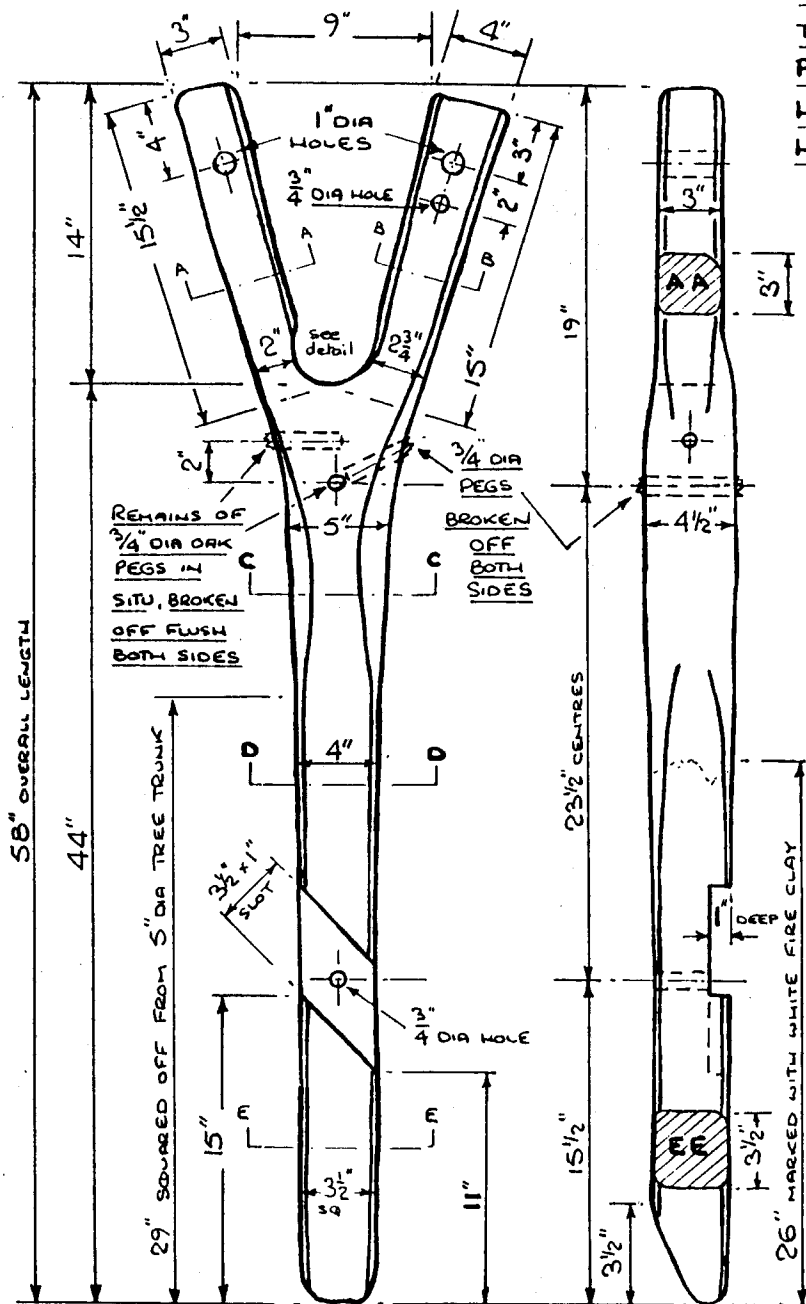
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20/5/91



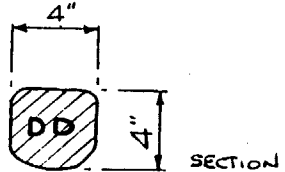
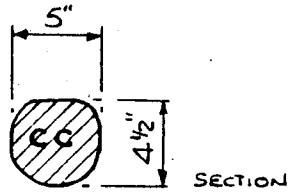
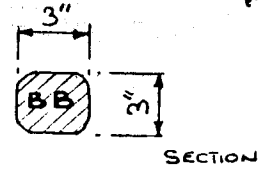
J. Cook
9-8-1991

SUGGESTION OF POSSIBLE USE FOR OAK SADDLE
 FOUND IN MEDIEVAL COAL MINE AT COLEORTON
 LOUNGE OPENCAST, AREA 'D', 439050 318550, 10-7-1991.
 UPPER MAIN SEAM, WORKING HEIGHT ABOUT 6'-0"
 TOTAL SEAM THICKNESS (HM + UM) OVER 9'-0", 70ft DEEP.

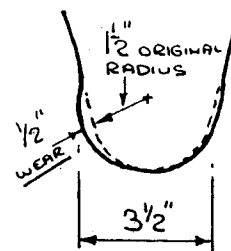
SUCH A WINCH WOULD ALLOW A 40YARD HAUL WITH 1/2" DIA ROPE.
 THE CENTRE LINE OF THE WOODEN DRUM IS 20" ABOVE FLOOR LEVEL
 AND A KNEELING MINER WOULD HAVE ADEQUATE MECHANICAL
 ADVANTAGE FOR HAULING LOADED SLEDGES OR SAWAGING PIT PROPS.
 THE INSTALLATION WOULD, HOWEVER, BE PERMANENT. IT IS NOT
 KNOWN HOW THIS ARTEFACT WAS POSITIONED IN RELATION TO
 THE MINE ROADWAYS OR GALERIES.



MADE FROM FORK OF
TREE. POSSIBLE USE:
PART OF UNDERGROUND
HAND WINCH FOR
HAULING LOADED SLEDGES.



THIS POST STOOD
VERTICAL WITH
LOWER 26" EMBEDDED
IN ROADWAY FLOOR



DETAIL OF WORN
GROOVE IN SADDLE

OAK ARTEFACT FROM OLD ROADWAY IN
UPPER MAIN SEAM COAL WORKINGS
LOUNGE OPENCAST SITE AREA 'D'
439050 318550.

RECOVERED AMONGST OTHER TIMBERS (not salvaged)
by BUDGE CLEANER CYRIL, 10th JULY 1991.

REMOVED TO SNIIBSTON HERITAGE MUSEUM WITH
THE PERMISSION OF MR P. BLOOD, BRITISH COAL SITE OFFICER.
SNIIBSTON ACCESSION NUMBER

[Signature]
9th AUG. 1991

J. Crocker

LOUNGE EXTENSION

30/10/90

DETAIL OF SHAFT BOTTOM

LOCATION 'C'

(see plan)

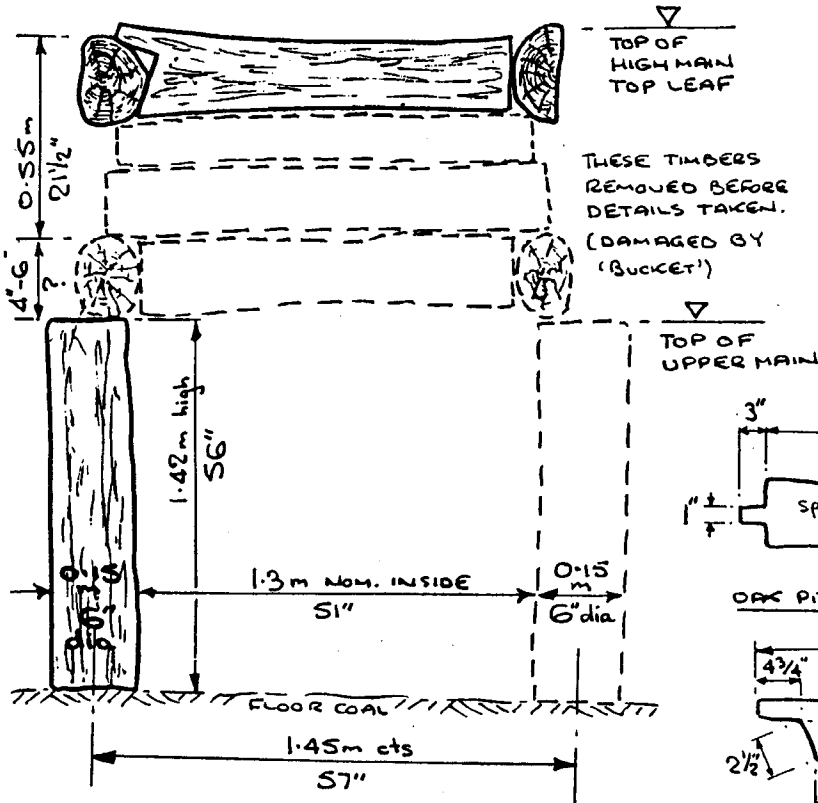
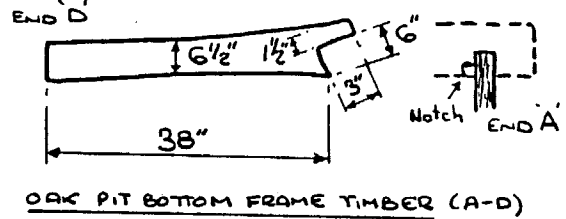
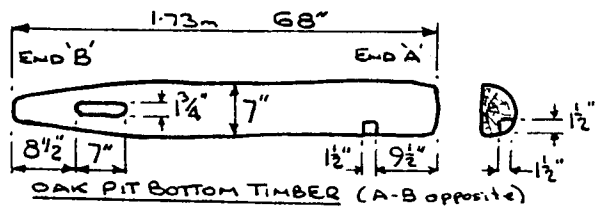
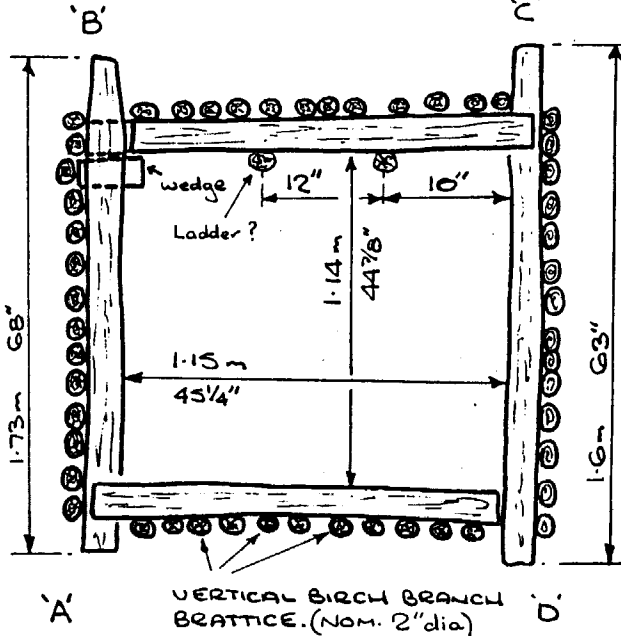
IN HIGH MAIN/UPPER MAIN SEAMS

APPROX POSITION

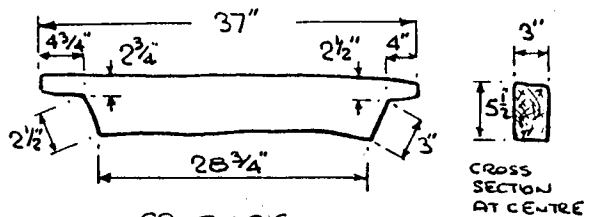
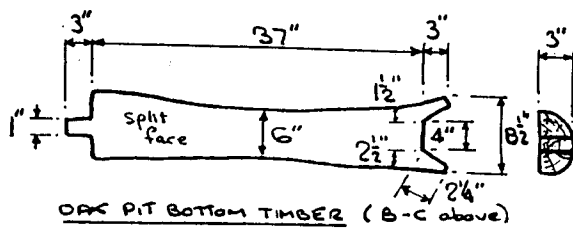
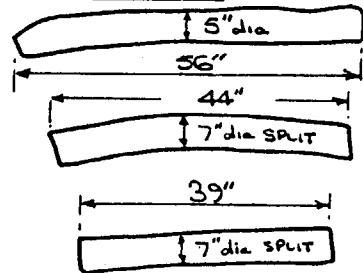
438876 317889



SPLIT TIMBERS
FLAT EDGE
OUTWARDS



VARIOUS OTHER PIT BOTTOM TIMBERS FROM THIS SHAFT



END ELEVATION - TOP SECTION ONLY EXPOSED

PIT BOTTOM DESTROYED BEFORE EXAMINATION COMPLETED

John Crocker
34 Bramcote Rd,
Loughborough,
Leics. LE11 2SA

MID 15TH CENTURY COAL WINDING BASKET
LOUNGE OPENCAST SITE
COLEORTON

UPPER MAIN SEAM
43887 31812
12/9/1990

SPREADER BAR?
STAY ROPES?
WICKER WORK?

POSSIBLY ANOTHER BATTEN UNDERNEATH (note peg lengths)

INTERFACES SHOW SIGNS OF LONGTERM CONTACT UNDER PRESSURE

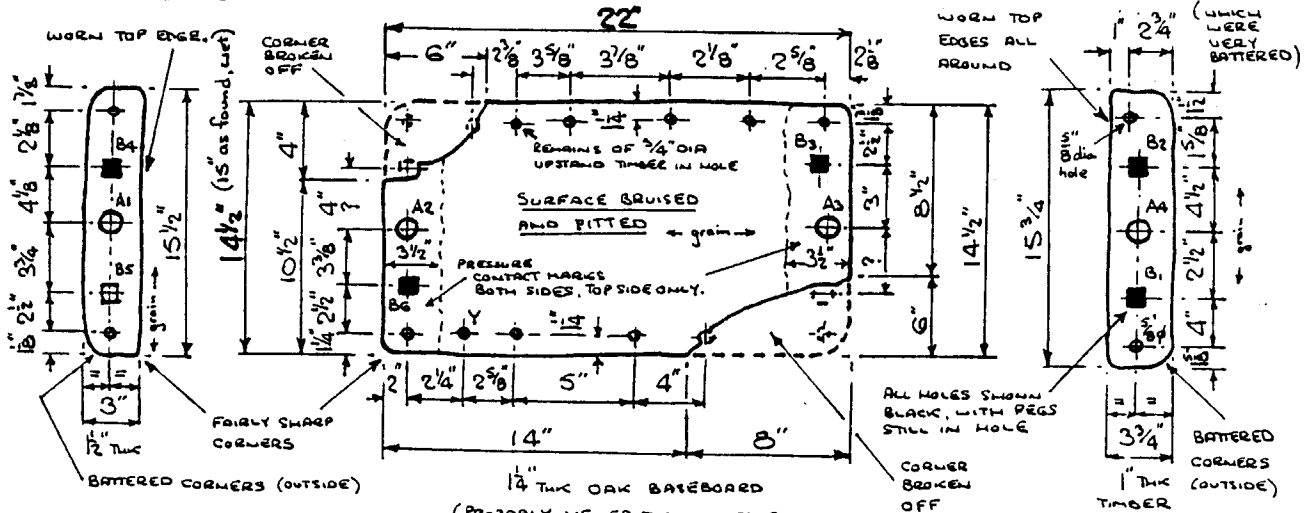
VERY BATTERED CORNERS

ONLY PARTS OF BASEBOARD FOUND, AS DETAILED BELOW. BASKET & SUSPENSION ARE GUESSWORK CAPACITY 1 CWT LUMP COAL

THREE TIMBERS BELOW, EACH FROM DIFFERENT BASKETS. BASE PROBABLY NEWER THAN BATTENS WHICH WERE VERY BATTERED

POSSIBLE ALTERNATIVE SUSPENSION

CONJECTURED MOCK-UP



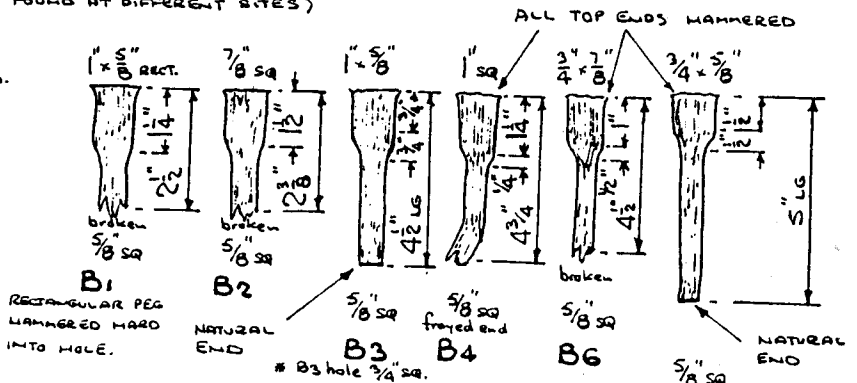
HOLES (DISTORTED WITH SHRINKAGE)

- A1 & A4 1/4" dia, rubbed edges above clean edges below.
- A2 & A3 1/4" dia, clean edges above & below.
- B1, B2, B3, B4 & B6 1/16" dia, probably started off as 5/8" dia.
- B5, no peg: 1" x 5/16" sq hole forced from 3/4" dia hole

UNLESS OTHERWISE STATED, ALL HOLES ALONG EDGES OF BASE 3/4" DIA.

[Signature]
20/5/91

MEASUREMENTS TAKEN IN DRIED OUT CONDITION 11/5/91.



SHAPED OAK PEGS IN HOLES IN ABOVE TIMBERS, LOOSE (SHRINKAGE) BUT CAPTIVATED.

Y (what could this be for?)