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A SURVEY OF SURFACE FEATURES AT FOOL'S VENTURE MINE, BONSALL LEYS, DERBYSHIRE

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Abstract: Results of a surface survey of a small-scale lead-mining site at Bonsall Leys in Derbyshire are presented, with a brief outline of its history based on the survey and historical records.

INTRODUCTION

The survey of Fool's Venture mine site, a Scheduled Ancient Monument, at SK 2675.5714, was undertaken during the winter of 1993-4 and June 1995. The aim of the survey was to identify the various features which can be seen on the surface, evaluate their uses and importance, and attempt to phase and date the site.

The most notable feature of the Fool's Venture site is that several miners' coes, which were built around or near each shaft, are still, in part, standing. The site represents an important aspect of the Derbyshire lead mining industry in the post-Medieval period for which examination of small-scale mining industry is an under-represented aspect compared with larger company-based mining which played a predominant role especially during the later part of the period.

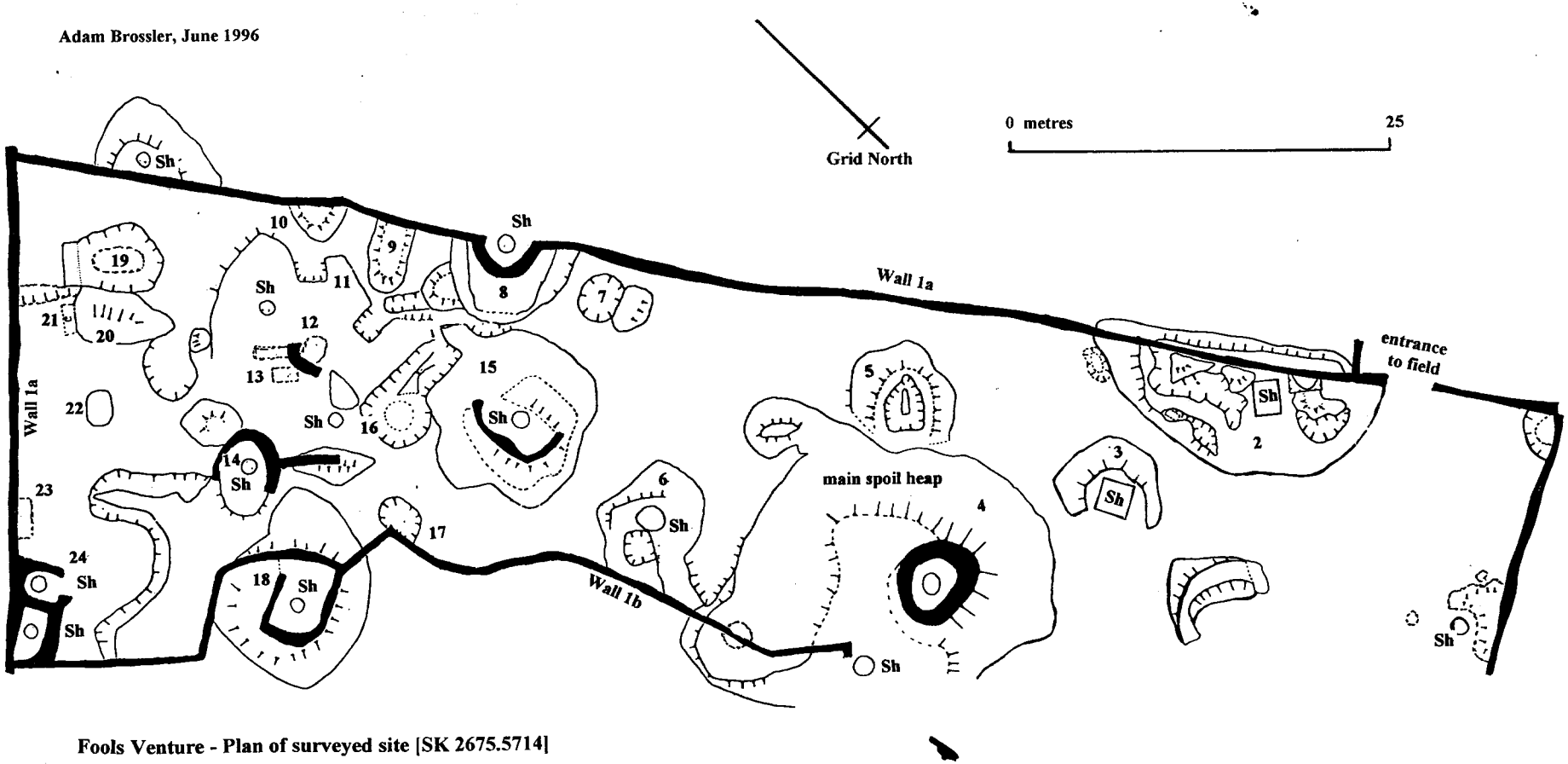
The mining in this area, as with the rest of Derbyshire, is not confined to one period of activity, but to many different phases of of exploitation. David Crossley points out the problems of identifying the age of a mining site: "Difficulties of interpretation occur in most lead mining areas, particularly because of the chronic instability of the lead trade in the 18th and 19th centuries: at times, boom conditions which favoured large scale investment in structures such as engine houses and other permanent surface buildings have given way to conditions when only small-scale part time mining has been worthwhile, using methods indistinguishable from those of earlier work". Some of the earlier phases can be distinguished in the post-medieval record, the most prominent being "open trenches up to 7 metres deep" (Crossley 1990 p.186-7). Small trenches of this type occur in the adjacent field.

In extant records the site is first recorded by the Barmaster as freed in 1782 by Wm. Woodiwiss (see Accounts, below) and is shown on the Barmasters Plans of c.1912 (on the OS 2nd edition it is field 1288). The field itself is fairly large but only a small section where the most obvious features are was surveyed because of time limitations. These are the bases of 'coes': small buildings which the miners used for shelter and storage, placed "near the shaft and sometimes sheltering it, there was often a small building, the coe, in which ore and tools were stored." (Crossley 1990. pp.186-7). The example Crossley uses is the area surveyed.

The main problem with identifying features on the site was the weather. When the measurements were taken the weather varied between snow, hail and rain, with only the occasional dry day. As well as making our work there difficult, this illustrated the sometimes difficult conditions in which the mine surface-workers worked, and the need for coes to protect them as well as their tools and ore. In the winter season when the original part of the survey was carried out, the vegetation offered few clues as to the

Plate 1. General View of the site facing north-west.

Adam Brossler, June 1996



Fools Venture - Plan of surveyed site [SK 2675.5714]

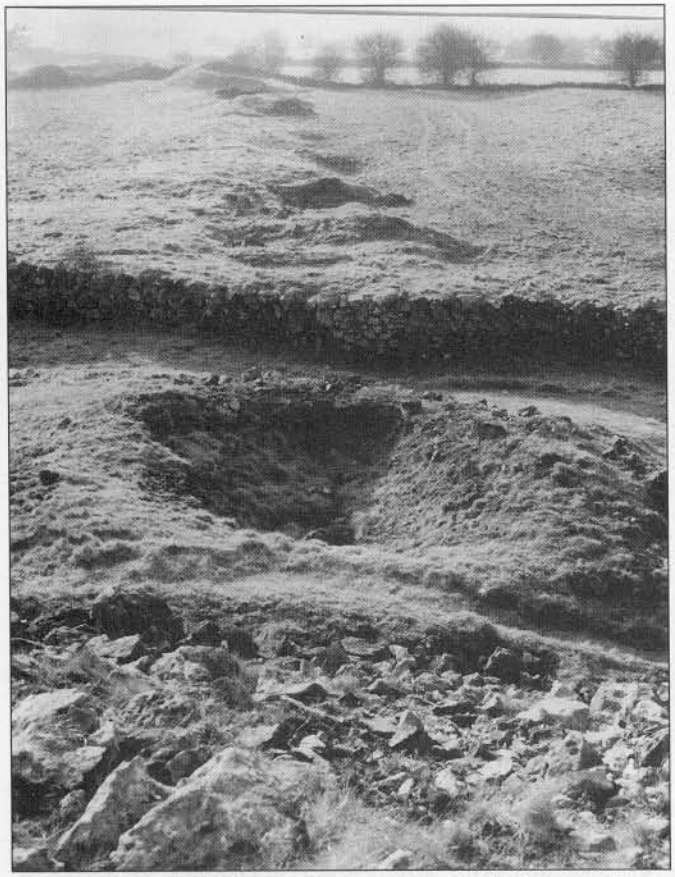


Plate 2. One of the Fool's Venture veins running in a southwest direction, seen from the main hillock [4]. Note fetaure [5] at centre which is partially overlain by [4].

whereabouts of hidden features. The return to the site in summer 1995 allowed additional information to be gathered based on vegetation and its growth, including known metallophytic plants such as leadwort (*Minuartia verna*).

GEOLOGY OF THE AREA

Bonsall Leys is situated on the Lower Carboniferous Matlock Group Limestones (Smith, Rhys and eden 1967). There are also a number of volcanic clay partings and at depth a thick volcanic lava. Metallic minerals, in addition to the lead ore, galena, included calamine (smithsonite) which was sometimes mined in this area and, probably, secondary oxidised lead minerals also.

The major gangue (waste) minerals found are calcite (found in abundance on the surface and often shows hematite staining), barite and fluorite. Many fossils, mainly crinoids and brachiopods, can be found on surface exposures and in the walls. Prominent veins run NE -SW through the site, their lines being more obvious from the shaft mounds in the adjacent field than on the site itself, of which Fool's Venture is the most conspicuous (Plate 2). Others, Terpin's and Hardy's are known to be present but are not obvious.

THE SITE AND ADJACENT AREA

The site (Fig. 1) is situated along the northern flank of the Via Gellia gorge. The nearest village to the site is Slaley which is about one mile away. The first mention of Slaley is in the Domesday book which describes it as a hamlet in the Manor of Mettesford, an area now known as Matlock Bridge, and it is shown on Burdett's 1767 survey of Derbyshire. Bagshaw (1846) described Slaley as a small hamlet containing seventeen houses "principally occupied by miners each of whom occupy a few acres of land". The site is only a very small part of the land which was mined in the Bonsall Liberty The entire area around is covered in shafts and other indications of mining activity.

The area was enclosed by Act of Parliament in 1774 (DRO). The two major walls alongside the site clearly belong to the enclosure period, and can be seen to have been built over at least some of the mine waste hillocks - thus presumably post-dating mining. A third wall, on the east side, also crosses a hillock, but is much less regular than usual for formal enclosure.

The importance of this particular site, which probably has several mines in different ownership on it, is that it represents the

Plate 3. Facing south east from the top of the main spoil heap.

primitiveness of the small scale mining industry, even after the introduction of gunpowder. The site has a pond, sorting areas, and one, or possibly two, buddles. This means that the miner was able to dress the material on the site, therefore avoiding the transport of gangue (waste) material, which was of no use to the miners.

The existence of a Medieval, possibly Romano-British or even earlier, track way close-by, between Winster and Wirksworth, and another passing down to Matlock and Cromford bridges means that transport of the lead ore from the site would not have proved difficult. There is evidence, in pottery sherds and orthostat walls, of a Romano-British settlement some 200 metres away (Willies pers. comm.), and the adjacent area has been partially terraced for agricultural use.

FEATURES ON THE SITE

[1] The walls (a) apparently aligned as on the enclosure. Nearly straight except for a semi-circular portion around a shaft (8). (b) a much less regular wall, crossing several features but without obvious relationships to them. Wall [1b] can be seen on Plates 1 (to the right) and 3 (left).
[2] Shaft mound with concrete sleeper capped shaft (not examined). The wall [1a] overlies the mound. A considerable portion of the original mound has been removed, some sorted material being placed in subsidiary heaps within the reworked area. A small stone-lined rectangular hollow appears to post-date the wall..
[3] Sleepered shaft with a crescent-shaped bank of mixed limestone and soil surrounding about two thirds of the shaft circumference.
[4] Prominent spoil heap or hillock, some three metres above general ground level, predominantly of limestone rubble. A low percentage of soil matrix is visible with some calcite. There are infrequent patches of grass. One piece of rubble had a drill hole in it (Plate 6). There is a ruined coe on top surrounding a stone-beehive covered shaft. Tipping has continued outside of the coe wall, so the coe is invisible from the ground level. The heap appears to overlie feature [5]. Plate 5 shows the heap from the north, Plate 1 has it in the background from the south.
[5] Small hillock, grassed over, with a characteristic flora including metallophytic species. It is part of a line of similar hillocks south-westwardly ranging across the adjacent field. It appears to have been reworked, leaving a hollow in the centre.
[6] Beehive-capped shaft on mound. Slightly overlapped by feature [4]. Edges of the hillock are distinct, and part is hollowed suggesting reworking. Overlain by wall [1b]. Plate 1 shows the beehived shaft site.
[7] Small excavated hollow and adjacent mound. Metallophytic flora.
[8] Shaft mound. Appears to have been cut on both north and south sides by reworking to leave hollows. Wall [1a] runs over but diverts around shaft.
[9] Hillock butting against the wall. Probably from reworking or processing.
[10] Small hillock. As [9].
[11] Wide raised area around two beehive capped shafts (Plate 1). Edges of the area have been "cog-reworked" (see below). Both [9] and [10] may result from this reworking.
[12] Small area of rubble limestone and calcite partially enclosed by a small wall (windbreak). Possibly a sorting area.
[13] Two small rectangular areas: one may be a collapsed extension to wall on [12], the other is sunken with unusually lush grass. Extent unclear, but may be buddle or small pond.
[14] Semi-circular remains of a coe with beehive-covered shaft inside.
[15] Shaft mound with remains of coe wall banked with spoil. Cut on western side by "cog working".

Plate 4. Remains of a running buddle [16]. Note step near scale rod.

[16] Rectangular pit cutting into [15] with oval SE end up to 1.1m deep. Appears to have two small steps under grass and declines at 25-30°. May be running buddle (similar to one in adjacent field) with storage and slime pond. Plate 4 shows step.
[17] Sub-rectangular pit about 1.3 m deep. Excavation close to wall [1b], but relationship not clear. Plate 3 shows (left-centre) against wall.
[18] Shaft mound. Bisected by wall [1b] and almost surrounded by a ruined coe. Shaft capped with beehive.
[19] Large sunken feature, possibly an excavation for mineral material, about 1.8m deep, or may be a pond. A flat area at the southern end may be a shovelling platform.
[20] Large area of fine calcite and soil, probably riddled or washed material (from excavation and pond [19]?).
[21] Rectangular. Possible buddle. Obscured by lush grass.
[22] Oval patch of large stones.
[23] Rectangular overgrown sunken feature. Buddle?
[24] Walls of two coes with beehived shafts. (These have been rebuilt in recent years). Walls are very thick. Mound extends north and west to a small area of what appears to be the original ground level. Most of the remainder has been built up with spoil.

PHASING OF THE SITE

At least three phases of working are visible.

1. The earliest observable phase consists of low heaps and hillocks which are related to the adjacent shafts and perhaps the coes around them (partial rebuilding of the latter is likely). The enclosure walls are built over the hillocks in several places, suggesting phase one is pre-1774. It may represent work over a very long period.

2. The large hillock Feature 4 has been superimposed on the phase one workings. It, perhaps, was sunk to the Slaley Sough. The absence of volcanic lava in its spoil shows it is unlikely it penetrated that horizon. It may represent only a few years activity.

3. A number of the phase one hillocks have been reworked,

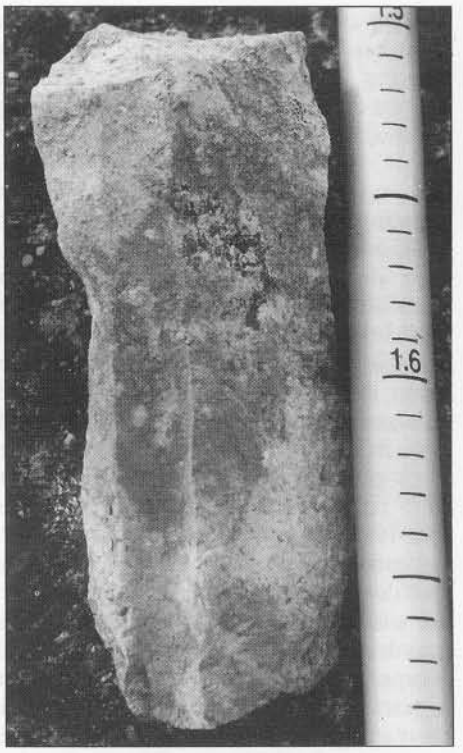


Plate 5 (above). The main spoil heap [4] taken facing northeast.
Plate 6 (right). Rock fragment with groove suggesting use of black powder. Found on [4].

probably to reprocess the material they contain by buddling. The hillock [20] has the wall standing proud on a small bank of otherwise reworked material, suggesting here at least is post enclosure, i.e. post 1774. Willies (pers. comm.) refers to some reworked hillocks as having been "cog-worked", from the cog - like appearance of diggings around the periphery. The site was in use long after the introduction of the cupola, circa 1737, which allowed the smelting of even the poorest quality lead ore (Willies 1971 p.385), and such activities were also very common after 1850 when the Spanish slag hearth was introduced.

There is no relationship between the large hillock and the walls, and any between it and reworking is not clear. We thus have no indication of its age exscept it post dates phase one.

ANALYSIS OF THE SITE

Two certain, with a third probable, areas seem to have been used for dressing the ore by means of buddling., associated with features, [16], [20] and [2] respectively. The buddle allowed the miner, or the family of the miner or miners both to work ore from the mine and to rework old surface deposits. The water used may have been brought up a shaft from underground perched on top of a lava flow at a reasonably shallow depth, or "lead in" by horse and cart and ponds may have been sited to retain water from rainfall. Clay from a volcanic horizon would have been used as a seal. Only fairly small quantities of water would have been required.

Buddling was used to extract inferior quality pieces of lead, known as belland, from the gangue material. The process involves "small quantities of fine material" being heaped "at the upper end of the buddle and by means of a piece of wood with a handle, were raked back and forth across a flow of water poured from a bucket". The heavier particles settled near the head of the buddle, the lighter being washed further down. The hollow at the bottom end would have caught water which could then be re-used. The division of the platforms is represented by a stone ledge or step (Gregory and Tune 1967 p.253: see also for an illustration of a buddle of this type).

The running buddle at the site [16] is an oval shaped area with an extended neck on the side, and a probable pond at the lowest point. The stone step or ledge can be seen on Plate 4 as a slight rise in the grass layer.

The nearby circular depression or excavation [19] in the southern-most corner of the field may also have been a pond. An obvious flat cut in the structure of a square area [21] is similar to the platforms seen on [16] and suggests it is another buddle. [20] is probably an associated sorting area. This is a quite-deep pit which could have served the two mines in the direct proximity. It may have been an area from which ore was extracted, or an area where the larger pieces of ore were stored before being dressed.

The surface workings at [2] have clearly been reworked, probably for buddling, but there is no sign of a surviving buddle there.

The surviving coes and associated mine shafts are mainly on the southern end of the field, though it seems likely all such shafts were originally covered this way (concrete railway sleeper-covered shafts were open or dangerous before being covered in the 1980s). In the far south eastern corner are two coes [24] which were built into the wall, though it is unclear as to whether the boundary wall existed before enclosure in 1774. Like the walls, the coes are built of unmortared stone. Although the coes are together they serve different shafts, as can be seen on the plan. The reason for this may be multiple shafts for ventilation and winding purposes, or that the shafts and coes were in different ownership. The coe walls are approximately one metre in height and probably once had a thatched roof which provided shelter. It is unclear as to how high a coe would have actually been as there do not appear to be any written records of them, but a height enough to stand, or at least stoop, in seems likely. These may have exploited the two veins which run in close proximity to them. The nearest vein known (from the Barmasters' records) to these coes, with the exclusion of Fool's Venture, is probably that of the Bonsall Leys Great Rake, but it is unlikely that they worked the Rake because of the distance from the site. It seems most likely that all the shafts in the southern sector of the field worked the veins in that sector.

Most other coes are far less distinct than the two above, most being roughly square in plan. That at [12] is built on a raised platform which was probably a hillock, so perhaps a substantial amount of mining took place before the feature was built. Once again this was most probably sunk to exploit the two southern veins, but could have also have possibly connected to the main shaft to work the northern veins and act as a ventilation shaft.

The shaft and hillock built into the west wall [8] is in virtually a central position to both southern and northern veins on the site.

The cap of this coe is broken making it possible to see that the shaft has been lined with stone, the structure being known as 'ginging' (Crossley 1990 p.187). The stone lining is there to prevent the loose soil at the surface eroding and collapsing into the shaft.

The most prominent spoil heap [4] (Photo 5) is the most imposing feature on the site, standing approximately three metres high, overlying earlier spoil heaps. This is probably the major shaft, which connects to Slaley Sough; which was driven in 1747 (Flindall 1984), and possibly penetrates the volcanic horizon at depth below. The coe on top of the shaft is one of only two on the site which is circular. Inside this coe a broken rock fragment was found (Photo 6) which suggests the use of black powder. It is limestone which has a semi-circular hand-drilled groove running down its length. The groove is smooth inside, suggesting that the black-powder (gunpowder) blasting was used here (Rieuwerts 1979 p.258). Although this find has no context, it suggests an 18th-19th working of the site by which time black powder was in common use even in small-scale Derbyshire mines. The shaft itself does not appear to be much wider than any of the others on the site. It is likely to be the major shaft worked for the time records exist, circa 1782 onwards. The spoil heap is very large in comparison with most of the other workings in the area and appears to be made up of reasonably large lumps of rock which cover a large, and wider, mound of earlier waste. It is not possible to estimate the thickness of the spoil underneath. A number of rocks with drill-hole marks also appear in the walls around the site, possibly also derived from workings in this shaft.

KNOWN HISTORY OF THE SITE

The only known history about the site has been taken from the Barmasters records. Roger Flindall's index to the *Derby Mercury* (in Derby Library) shows that the *Derby Mercury* gives four references to the working of calamine in the Bonsall Leas Liberty: three of these date to 1785 and one to 1788, but these are not specific to the Fool's Venture site.

The information in the Barmasters records does not give a date for the start of mining on the site. The first records for Fool's Venture are in 1782 when W. Woodiwiss freed the vein. The records are limited to who founded and freed veins and where the vein runs; the Barmasters record is not a true run of a vein, but a representation based on its rough course. Veins were freed for "old", indicating a previous exploitation.

ENTRIES FROM THE BARMASTERS RECORDS.

Book 12 p.9 1782 22 / 7 : W.Woodiwis freed Fool's Venture mine for old north - south.
p.34 1783 26 / 7 : Job Crichlow freed a first taker in an east - west vein
p.59 1784 22 / 4 : Job Crichlow freed an old founder at Fool's Venture mine north - south.
p.119 1786 5 / 7 : Job Crichlow freed old founder at Fool's Venture mine east -west Crichlow freed second taker from his old founder at Fool's Venture.

Book 17 p.107 1809 4 / 5 : John Bunting given Fool's Venture mine. Four meers in Parson's Rake from the wall adjoining the Open Leys ranging south east to the wall at the bottom of Mr. Flints most eastwardly close near Old Town Barn. Also three meers in north - south veins on the west side of Parson's Rake from the said wall to J. Bunting Title - Hardys Founder. Also five cross rakes from the wall on the west side the said close to the wall on the east side four meers eastwardly. Also eight or more north - south veins on the east side of Parson's Rake in the said close from the said wall by the Open Leys and ranging south four meers to the south wall of the said close. Also two cross veins three meers from the east side of the said close south to J. Buntings title called Hardys Founder.

Book 18 p.34 : 1823 9 / 10 : W. Bunting given Fool's Venture mine four meers in Parson's Rake from the wall by the Open Leys south - east to the wall at the bottom of the late Mr. Flint most eastwardly close. Also three meers in five or more east - south veins on the west side of Parson's Rake from the said wall south to Turpin Title. Also eight or more north - south veins in the east side of Parson's Rake from said wall four meers to the wall at bottom of said close. Also five cross veins from the wall on the west side of said close four meers to the east wall eastwardly. Also five cross veins from the wall on the west side of said close with two meers on each from the wall on the east side ranging west to late J. Bunting's Title called Terpin.
"This title is all within said Close."

Book 20 p.43 1813 24/12 J. Bunting freed for old Fool's Venture.

Fool's Venture ore accounts : (Accounts start 25 / 6 / 1782)

	Coper	Ore L -d	Lot L - d	Price (load)	Buyer
1782					
22 / 6	Job Crichlow	3 - 2	0-1	43/-	Bradley
22 / 6	W. Woodwiss	6 - 4	0-2	43/6	Bradley
22 / 6	W. Woodwiss	6 - 3	0-2	43/6	Simpson
12 / 9	W. Woodwiss	5 - 4	0-2	43/6	Bradley
12 / 9	W. Woodwiss	5-4	0-2	43/6	Simpson
23 / 9	J. Crichlow	3-2	0-1	38/-	Simpson
6 /11	J. Crichlow	1-1	--	--	Simpson
6 / 11	W. Woodwiss	5-3	0-2	43/6	Simpson
1783.					
9 / 1	W.Woodwiss	0-8	0-1	40/6	Simpson
5 / 4	W. Woodwiss	2-3	0-1	40/6	Simpson
26 / 7	J. Crichlow	2-6	0-2	31/6	Simpson
26 / 11	J. Crichlow	5-6	0-2	34/-	Simpson
1784.					
22 / 4	J. Crichlow	3-2	0-1	34/3	Simpson
3 / 6	J . Crichlow	2-2	0-1	35/6	Simpson
22 / 7	J. Crichlow	4-3	0-2	35/3	Simpson
14 / 9	Jos. Woodhouse	1-3	0-2	35/3	Simpson
28 / 9	J. Crichlow	3-7	0-1	35/3	Simpson
1785					
20 / 1	J. Crichlow	4-0	0-2	36/-	Simpson
21 / 5	J. Crichlow	6-3	0-2	36/-	Simpson
1786					
5 / 7	J. Crichlow	4-4	0-2	33/-	Simpson
12 / 7	J. Woodhouse	2-6	0-1	31/6	Evans
2 / 9	J. Woodhouse	2-0	0-1	34/6	Simpson
18 / 10	J. Crichlow	4-3	0-1	32/3	Simpson
1787					
9 / 1	J. Woodhouse	7-9	0-2	--	Simpson
27 / 1	J. Crichlow	23-4	4-3	32/-	Simpson
23 / 3	J. Crichlow	14-2	3-5	30/-	Longsdon
25 / 6	J. Woodhouse	2-2	0-1	41/3	Longsdon
20 / 7	J. Crichlow	3-0	0-2	36/-	Longsdon
23 / 7	J. Woodhouse	0-8	--	--	Longsdon
1788					
12 / 5	J. Crichlow	8-3	0-3	42/-	Simpson
14 / 7	J. Woodhouse	1-5	0-0	27/-	Longsdon
14 / 7	J. Crichlow	3-6	0-1	36/-	Evans
31 / 10	J. Crichlow	4-8	0-2	48/6	Hurt
1789					
7 / 3	Mary Crichlow	4-1	0-1	45/-	Hurt
13 / 5	Henry Bunting	3-0	0-1	44/3	Hurt
10 / 7	Rich. Henstock	2-6	0-2	39/-	Evans
1791					
4 / 1	W. Knowles	3-7	0-1	37/-	Evans
28 / 4	R. Henstock	2-0	0-1	37/-	Evans
1792					
18 / 1	R. Henstock	1-6	--	--	Evans
1800					
22 / 2	W. Knowles	5-2	0-2	42/-	Evans
21 / 7	W. Knowles	1-8	0-1	35/3	Evans
1802					
22/ 7	Joseph Sheldon	0-3	0	--	Evans
16 / 12	W. Knowles	1-6	0-1	80/-	J. Barker
1803					
18 / 3	W. Knowles	2-4	0-1	77/-	Barker
21 / 5	W. Knowles	1-7	--	--	Barker
21 / 7	W. Knowles	1-6	0-1	72/-	Barker
6 / 12	W. Knowles	1-0	--	--	Evans

1804 - 1812
The records which exist for 1804-12 have no accounts for Fool's Venture which may suggest nothing was extracted.

There are nine dishes in a load (L - d) of around 60lb weight, and every twenty fifth one of these had to be paid as a duty of a "lot". (The information from the Barmasters records and explanation are courtesy of Mr. R. Flindall).

In 1854 the Bonsall Leys Lead Mining Company attempted to start mining in Bonsall Leys, they produced a rough sketch map of the area and levels they intended to drive. The company actually achieved very little, if anything and very little is known about them.

CONCLUSION.

From the Barmasters' records alone Fool's Venture mines appear to have a limited history. However, by studying the features of the area in question a different pattern emerges which suggests that more than one period of exploitation and at least three, took place. The exploitation of mineral reserves in the general area may well date back as far as the Roman occupation of Britain, and the nearby Romano-British site evidence, and nearby road systems is suggestive. But though it is clear from many lead ingots found that lead from Derbyshire was used by the Romans, there is no direct evidence to suggest that the Fool's Venture mines were part of that trade network.

Without full excavation, the main problem faced is identifying the different periods of activity in the Fool's Venture mines. Mining in the post-Medieval period has been established. However mining activity from this period, due to technological advancement and the very nature of mining, often destroys much evidence of earlier working. The main evidence for more than one phase of activity, or rather just one period, is the superimposition of newer, very distinctive hillocks over older. This resulted from near surface deposits of galena becoming exhausted, so it was necessary to sink new shafts deeper into the ground. The hillocks may represent a stage of exploitation even prior to the 15th century, but as the smelting technology had not advanced enough to allow the smelting of inferior quality galena, such as belland, it appears most likely that buddling-related features of the site would have been much later. The reworking of hillocks also indicates more than one phase of mineral exploitation on the site.

ACKNOWLEDGEMENTS.

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