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# The crown silver mines and the historic landscape in Devon (England): the work of the Bere Ferrers project

## *Les mines d'argent du roi anglais et le paysage historique du Devon : le Projet Bere Ferrers*

Peter CLAUGHTON\*

**Abstract:** The opening up of the silver mines at Bere Ferrers in 1292, under the direct management of the English Crown, marked a significant change in the organisation of mining in England. Until now the effect of those changes has not been examined in detail. The Bere Ferrers Project has used the available documentary evidence and historic mapping to inform its study on the impact of mining on the historic landscape.

**Résumé :** Les mines d'argent du comté de Devon, à Bere Ferrers et Combe Martin, au sud-ouest de l'Angleterre, étaient uniques au Moyen Âge. Elles étaient gérées directement par l'état, de 1292 jusqu'aux environs de 1350 ; elles furent, ensuite, données à bail dans un esprit d'entreprise. Durant la période de direction centralisée, il y eut des investissements de capitaux en prévision de la production future et l'introduction de nouvelles techniques. La structure d'emploi était différente des autres secteurs miniers en Angleterre. La main d'œuvre était salariée ou payée à la tâche, en fonction de la production.

À la fin du XIII<sup>e</sup> siècle, les mines de Bere Ferrers, au sud-ouest du Devon (traversé par les rivières Tamar et Tavy) constituaient le principal centre de production. Les mines de Combe Martin, dans le nord du Devon, étaient abandonnées dès avant 1296, alors que la production des Bere Ferrers était en pleine expansion, et le roi accorda les mines aux Frescobaldi, des banquiers. Malheureusement, les Frescobaldi dépouillèrent les mines sans se préoccuper du futur et les abandonnèrent au bout d'une année, à la fin de l'année 1300. Après les Frescobaldi, il fallut investir des capitaux (plus de £1 000 en cinq ans), pour les structures minières. C'est aussi à cette période qu'ont été menées des expérimentations dans le traitement de minerai, en particulier dans la forme des fourneaux.

Les mines ont continué à être administrées directement par la couronne, malgré une baisse de la production, jusqu'en 1349, et le « Black Death » ; mais l'approfondissement des travaux s'accompagnait de problèmes d'eau et le pompage mécanisé fut introduit en 1470-1480. Cependant, les mines étaient profondes et difficiles d'exploiter. C'est le XIX<sup>e</sup> siècle, avec l'introduction des pompes à vapeur et la hausse du prix du plomb, qui a permis d'exploiter en dessous des défilés médiévaux.

Le projet Bere Ferrers, organisé par l'Université d'Exeter, a évalué l'impact des mines médiévales sur le paysage historique. Ce projet pluridisciplinaire utilise différentes sources : les archives et sources documentaires, les cartes historiques du XVII<sup>e</sup> au XIX<sup>e</sup> siècle, les photographies aériennes et l'analyse des limites de parcellaires fossilisés. Ce qui a permis d'identifier la forme des mines médiévales, dont une des galeries d'exhaure, les petits puits d'exploitation à l'affleurement du gisement et l'infrastructure des pompes mécanisées avec le canal d'amenée d'eau.

Un système de champs, qui anticipe l'introduction de l'exploitation minière, a été identifié en plus de la colonie principale des mines. Le bourg de Bere Alston était le village principal, établi par le seigneur, en 1296, immédiatement après l'ouverture des mines. Il fut créé pour fournir des logements et des vivres (création d'un marché) pour les mineurs qui n'avaient pas la possibilité de mener une activité agricole en complément, ce qui se pratiquait dans d'autres régions de minières.

Bien qu'il ne soit pas possible de mesurer l'impact, sur le paysage, des fonderies sans l'utilisation des techniques géophysiques, on peut imaginer cette communauté minière à la fin du Moyen Âge. Notre conclusion a été publiée en 2009 *Mining in a Medieval Landscape: the Royal silver mines of the Tamar Valley* (University of Exeter Press).

**Key words:** Silver mines, landscape, Devon, Middle Ages.

**Mots clé :** Mines d'argent, paysage, Devon, Moyen Âge.

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## INTRODUCTION

At the close of the medieval period the vast majority of manufactured and primary output in England came from small producers integrated into rural society. Mining has, in the past, been excluded from such a model by historians holding a view, coloured by post-medieval developments in certain sectors like copper and coal production, that its demand on capital and techniques was beyond the reach of the small producer (Clarkson, 1985, 9). Burt and others (Burt 1995 and 1998; Gill, 1990; Hatcher, 1993, 11; Hatcher & Bailey, 2001, 134-7) have, however, argued convincingly for its inclusion; seeing the archetypal mine at the close of the medieval period as small scale, supporting increased production through a multiplicity of similar small operations. It created no great demand on either capital or technology and its workforce was integrated into its landscape, moving easily between agriculture and mining in tune with demands on production.

Such was case with silver production prior to the 13th century. For well over fifty years in the mid 12th century England enjoyed a rich source of silver derived from shallow argentiferous lead deposits in the north Pennines, sufficient to account for the significant increase in the volume of currency over the latter part of the century (Claughton, 2003b). These mines were either on the Crown demesne or on lands granted to the Bishop of Durham. Crown involvement was, however, confined to taking that portion of the produce due it by custom, leaving the working to individual or groups of miners. The Crown even chose to lease out its interest in the produce, the value of which was accounted for in the Pipe Rolls as the 'farm' of the mine of Carlisle. Although the evidence is not as strong, it is probable that the mines on the Bishop of Durham's estates were organised in a similar manner at that period.

However, in the 13th century following the decline in silver production from the north Pennine mines, the English Crown exercised a right of prerogative over silver-bearing ores and opened up mines in Devon (see Claughton, 2007 for the legal position). Mining in this and later silver mining fields was divorced from customary regulation. In doing so the Crown embarked on a course of action which was unprecedented in mining and not emulated in continental Europe until at least the 17th century. The direct management of the Devon mines meant that they developed on a large scale using capital intensive methods which were beyond the capacity of the small operator. They introduced the capital and techniques which were taken up by later mining for copper and coal, and were to influence the early economic view of mining as a large scale operation.

## 1. THE BERE FERRERS MINES

The principal silver producer opened up by the Crown in 1292 was at Bere Ferrers on the confluence of the rivers Tavy and Tamar in south Devon (fig. 1). Other mines at Combe Martin, on the north coast of Devon, were opened at the same time but the Crown had abandoned them by 1296. Those mines were subsequently worked by private individuals on lease from the Crown but suffered from problems of drainage and the discontinuous nature of the mineralisation there, and did not become significant producers until the 16th century (Claughton, 2004). The Bere Ferrers mines were, however, worked under the direct management of Crown officers from 1292 to 1349; a practice continued beyond that date by Crown lessees. Over 300 men were employed on wages and piecework, many being pressed into service and moved to Devon from other mining fields. By the early years of the 14th century a programme of capital expenditure on development was in place, taking the workings well below the water table with a requirement for well planned drainage. Over £1000 was spent between 1301 and 1305 on 'deadwork', ie. unproductive development work, before production could re-commence with free drainage to surface using adits with a consequent reduction in the use of manual water haulage. Processing of the ores mined was carried out at a number of sites around Bere Ferrers including a complex of smelting and refining furnaces at Calstock, on the Cornish bank of the Tamar (fig. 2 and 3). Subsequent developments in furnace technology led to a concentration of both smelting and refining in a water-powered 'fynnyng-myll', the exact site of which has yet to be determined. The demand for timber in the mines, and as fuel for the smelting/refining processes, meant that woodland was exploited in a wide area around Bere Ferrers. Water transport was used to supply the mines and smelting sites with necessary expenditure on boat repairs; and a rope-works was established to satisfy the requirements for haulage within the mines.

A continued demand for silver, particularly during the bullion crisis of the mid 15th century, encouraged deeper working of the Bere Ferrers mines. The attendant high costs in manual drainage stimulated the introduction of innovative mechanised pumping by 1480, along with the associated leat system to feed its water wheel (fig. 4 and 5). However, by 1500, the accessible silver-bearing deposits were worked out. The nature of the mineralisation, and the ability of the medieval miner to work at considerable depth, meant that it was not until the introduction of steam-powered pumps in the 19th century that modern miners could drain the old workings and exploit deeper deposits to the south under the River Tamar.

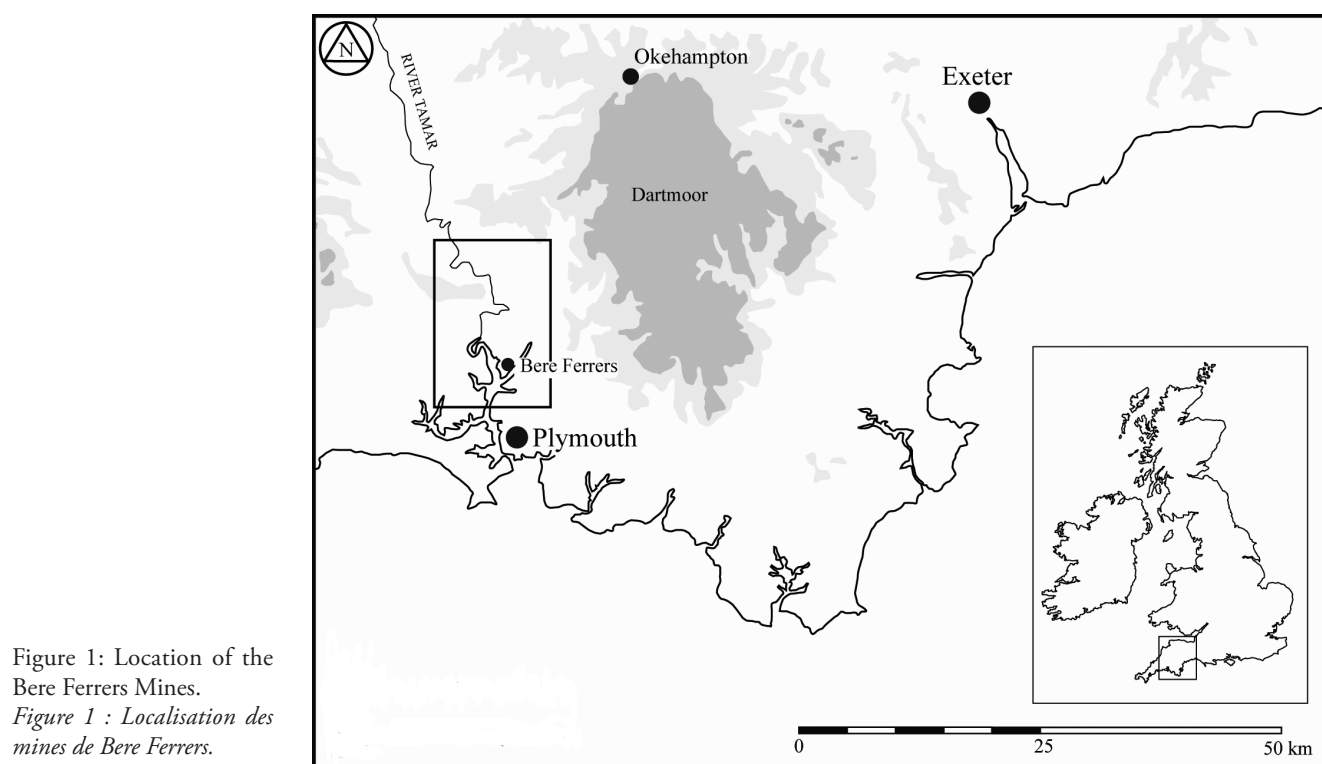


Figure 1: Location of the Bere Ferrers Mines.

Figure 1 : Localisation des mines de Bere Ferrers.

The survival of significant documentation for the operation of the Crown mines in Devon, primarily the Exchequer Accounts (TNA: PRO E101) has allowed for a comprehensive history of operations and has identified the organisational and technological changes affecting the Bere Ferrers mines (Claughton, 2003a). In the course of that work many aspects of mining were identified which could not be satisfactorily explained by the surviving documentation. In addition some physical features were noted which supported the documentary evidence but required further investigation.

## 2. THE BERE FERRERS PROJECT

Using landscape archaeology, informed using the documentation for silver mining and the rural economy of the area, the Bere Ferrers Project sought to determine the relationship between the industrial workforce, the settlement pattern and agricultural production; in particular its ability to support dual occupation. By using documentation from the post-medieval period the Project identified the mine workings named in earlier documents, relating them to known technological developments of the late medieval period, including those features already identified as providing the infrastructure for the mechanisation of pumping in the 15<sup>th</sup> century. It was hoped to identify other sites

associated with the mines, ore preparation, the smelting/refining complex and later mills, woodland and charcoal production areas, employing geophysical techniques where practical. Where possible, with the metallurgical sites, analysis of surviving residues would be used to determine the nature and efficiency of the processes used.

## 3. ASSESSING THE HISTORIC LANDSCAPE

Using some excellent historic mapping, particularly a detailed estate map of 1737 (Cornwall Record Office ME2424) and early ordnance mapping from the late 18<sup>th</sup> century, it has been possible to determine the pattern of cultivation around the mines. The fossilised boundaries of the cultivated strips can be seen to the north and west of Bere Alston on large scale mapping of the late 19<sup>th</sup>/early 20<sup>th</sup> century (fig. 6). It is also evident that the mines documented for the late medieval period, forming a linear feature south from Lockridge Mine through Furzehill Mine (erroneously described as a tin and copper mine) in Figure 6, sit uncomfortably within the surrounding field system. It is not surprising that the field system in evidence today would predate the documented commencement of mining in the late thirteenth century as it is probably based on the introduction of convertible husbandry in the 9<sup>th</sup>-10<sup>th</sup> centuries

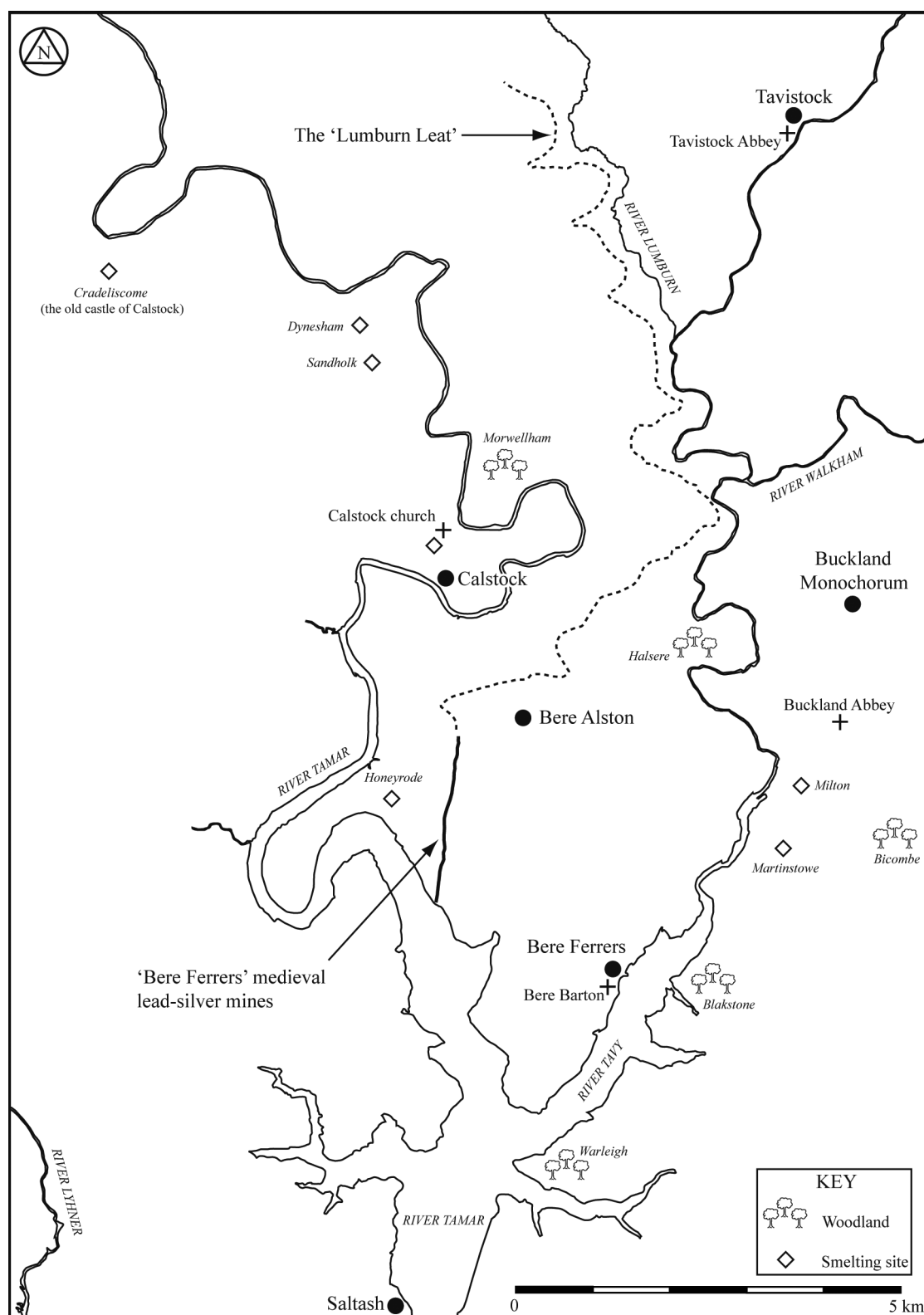
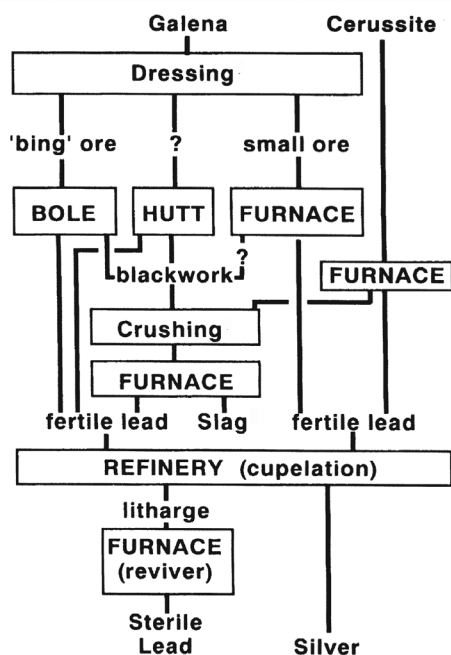


Figure 2: Sites and features associated with the Bere Ferrers Mines.

Figure 2 : Les chantiers et sites associés aux mines de Bere Ferrers.





The smelting and refining complex of the late 13th century

Note - feed lines marked thus -? - are implied but not specifically referred to in the accounts. Source - Exchequer Accounts

Figure 3: The smelting and refining complex was developed through experimentation. Various techniques were tried. These included the “hutt” which used a form of liquation or leading (plombage) involving the return of sterile lead into the process to extract the maximum amount of silver from the ores. A significant feature of the complex was the regular re-smelting of the residues. *Figure 3 : Le procédé de fonte et d'affinage a été reconstitué par expérimentation. Plusieurs techniques ont été utilisées. Elles incluent le « hutt » qui utilise une forme de liquation ou plombage impliquant le retour de plomb stérile dans le processus afin d'extraire le maximum d'argent à partir du minerai. Une caractéristique significative du procédé a été la refonte régulière des scories.*

(Fyfe *et al.*, 2004), but there are distinct differences between that adjoining the mines and that around the settlement of Bere Alston.

Bere Alston is the major settlement within the parish and manor of Bere Ferrers and is closely associated with the opening up of the mines in the late thirteenth century. Although not mentioned by name until the 1330s, it was probably the site of the Wednesday market granted by charter in 1295. As illustrated on the estate map of 1737 (fig. 7) the settlement has a borough structure, with narrow burgage tenements abutting the two main streets, and, by 1305, the lord of the manor Reginald de Ferrers had twenty burgesses paying annual rents. A key document in the limited evi-



Figure 4: The 15<sup>th</sup> century leat is clearly evident in woodland.  
*Figure 4 : Le canal du XV<sup>e</sup> siècle est clairement visible dans la forêt.*

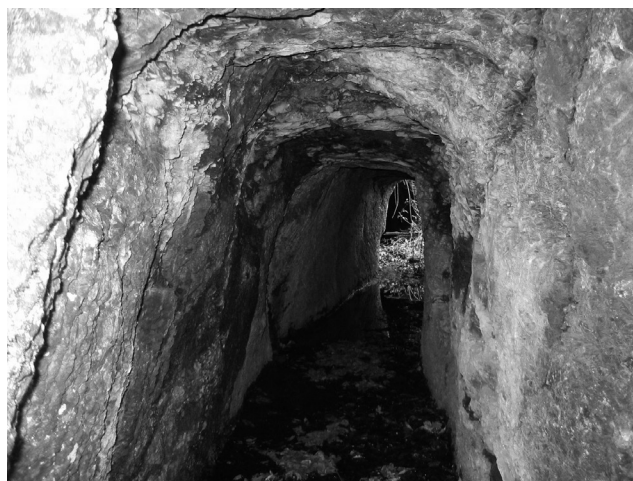


Figure 5: Where the terrain was difficult, tunnelling was used to bring the leat to the point where it could cross a saddle in the ridge between the Tavy and Tamar rivers.  
*Figure 5 : En terrain difficile, des tunnels ont été utilisés pour acheminer l'eau à travers la crête séparant les rivières Tavy et Tamar.*

dence available to us for the settlement pattern in the late medieval period is a list of settlements entered on the verso of the last leaf of Exeter Dean and Chapter MS 3522. The purpose of that list is dealt with elsewhere (Henry, 2001 and 2002; Orme, 2001) but analysis of the evidence presented does suggest that by the late 15<sup>th</sup> century Bere Alston was already by far the largest settlement and that there was a cluster of lesser, but still significant, settlements around the mines (fig. 8).

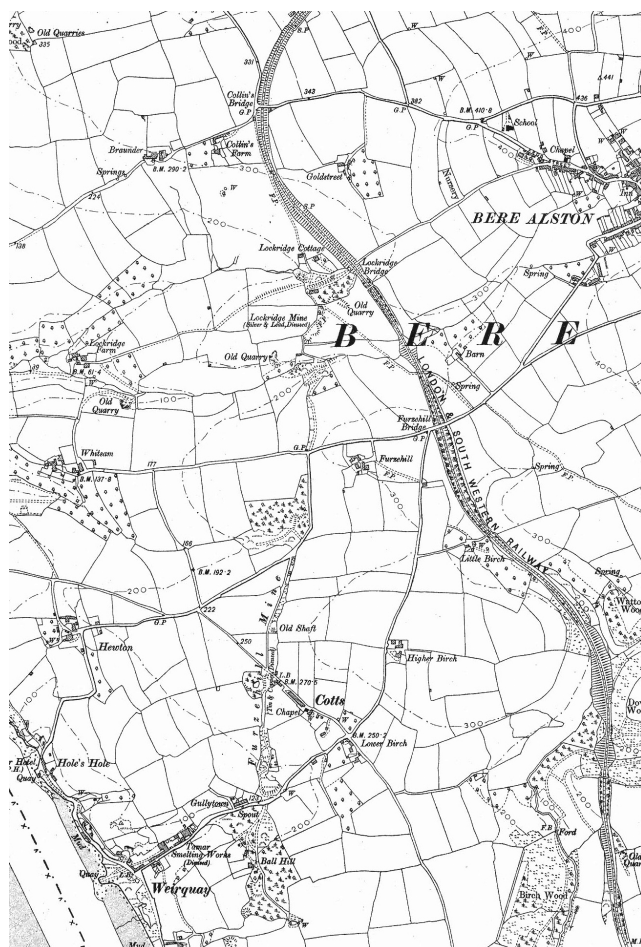


Figure 6: 2<sup>nd</sup> edition Ordnance Survey mapping at 1:10560 dated 1907. The curved field boundaries to the north and east of Bere Alston are the fossilised remnants of an open field system predating the establishment of the borough.

*Figure 6 : Cartographie, seconde édition à l'échelle 1/10560 de 1907. Les limites de champ courbes au nord et à l'est de Bere Alston sont les vestiges fossilisés d'un système de champs ouverts antérieurs à l'établissement du bourg.*

The settlement of Bere Alston was superimposed on an existing field pattern, apparently originally centred on the smaller settlement later known as Frogstreet and shown in Figure 7. Reference to the estate map of 1737 (CRO ME2424) and the mid nineteenth century tithe award assessment for Bere Ferrers (DRO 1237A/PB 1a-b) shows that, in contrast to the rest of the parish, there was fragmented ownership of enclosures in the field pattern around Bere Alston. A tentative conclusion is that this suggests an association of the land with burgage holdings in Bere Alston. On the other hand the evidence above shows that the fields associated with the settlements along the line of the medieval mine workings (fig. 9) had been consolidated into relatively



Figure 7: An extract from CRO ME2424 showing the borough structure at Bere Alston and the fragmented ownership of the surrounding fields.

*Figure 7 : Un extrait de CRO ME2424 qui montre la structure du bourg de Bere Alston et le parcellaire fragmenté environnant.*

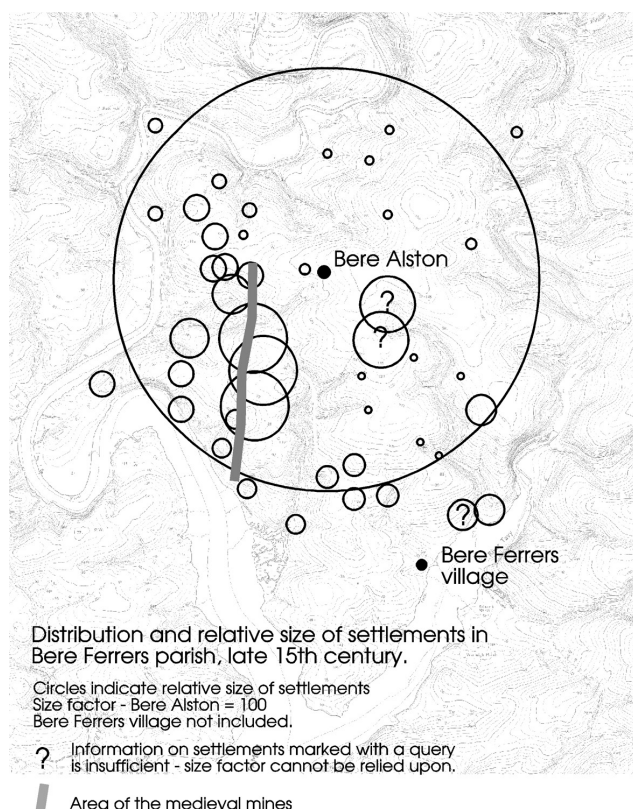


Figure 8: An interpretation of the evidence from Exeter Dean and Chapter MS3522.

*Figure 8 : Une interprétation du site d'Exeter Dean et Chapter MS3522 : distribution et dimension relative des établissements dans la paroisse de Bere Ferrers, fin XV<sup>e</sup> siècle.*





Figure 9: An extract from CRO ME2424 showing the consolidated occupation of land adjoining the southern end of the medieval mines.

Figure 9 : Un extrait de CRO ME2424 montrant l'occupation consolidée des terres voisines de l'extrémité sud des mines médiévales.

small blocks, each with a single occupier, perhaps reflecting a response to a well established tenancy with links to mining in place by the 15<sup>th</sup> century.

#### 4. SUMMARY

Building on the excellent documentary evidence for the mining of silver in Devon during the late medieval period and relating it to the historic landscape, we are beginning to construct an impression of mining development and its relationship with the settlement pattern. It is evident that mining by the Crown at Bere Ferrers was of historical importance beyond the value of silver produced. At their peak in the last years of the 13<sup>th</sup> century the mines produced over 20,000 ounces per annum but, whilst they provided a

welcome input into the exchange at a period of low minting levels (Crump & Johnson, 1913, 9), it did little more than compensate for losses to the currency due to wear and tear. The action of the Crown did, however, set the precedent for the future working of silver bearing ores beyond the abandonment of direct management in the mid 14<sup>th</sup> century, as Crown lessees continued to operate on the same scale.

When the Crown distanced itself from the custom which regulated other forms of metal mining it made no allowance for compensation to the lord of the soil. Reginald de Ferrers petitioned the Crown on two occasions complaining about damage to his land and requesting a portion of the produce (TNA: PRO SC8/111/5544 and 322/E550). Although his requests were passed to the Exchequer for action there is no evidence that he received any form of compensation. As lord of the manor, one course of action open to him was to establish a centre to service the demands of the large body of immigrant miners, including a market for provisions. By establishing the borough of Bere Alston, probably on the site of an existing settlement, he would have assigned the control of the market to the burgesses in return for an annual rent. Although the miners themselves were exempt from local taxes, including market tolls, suppliers of provisions from outside the borough would have provided the burgesses with a regular income. The burgesses would have also been in a position to sublet and provide some housing for immigrant miners but that was probably, initially at least, provide by the establishment of temporary accommodation close to the mines. The Crown played no part in that provision, leaving no documentation, and we must attempt to determine their location from the archaeological evidence which is so far elusive.

The large scale working of the mines through to the early years of the 16<sup>th</sup> century left its mark. When mining resumed in the late 18<sup>th</sup> century it required the use of steam powered pumps to get under the medieval workings. The infrastructure for the introduction of mechanised pumping in the 1470s, the 'Lumburn' leat, can be traced for over 16 kilometres and surveyed using GPS to confirm that it is a continuous feature. Evidence for an early crosscutting adit, providing free drainage to a shallow valley to the west of the Furzehill Mine and possibly dating from the 1320s, has been identified for further investigation.

Since this paper was presented at Florac in September 2006, and subsequently written up, the Bere Ferrers Project has reached its conclusion and a full account has been published (Rippon *et al.*, 2009). In that work the mining of silver has been placed in its context alongside the metal resources available in the late medieval period. It has also allowed us to explore the various aspects of the extractive processes, the demands on local resources and the rela-



tionship between the community, mining and their impact on the historic landscape. The smelting and refining of the silver bearing ores did, however, proved difficult to identify in the landscape. Despite documentary evidence providing clear indicators as to the general location of smelting and refining sites the ephemeral nature of some of the structures employed, the practice of reworking the residues and the intense nature of post-medieval agriculture means they are invisible in the landscape. Geophysical techniques were used to investigate one such site at Calstock Church (fig. 2) and led to the discovery of a late 1st century Roman fort along with a smelting furnace, possibly a copper smelting furnace, which was contemporary with the fort rather than the expected late medieval activity (Claughton & Smart, 2008). This dilemma highlights the need for a wider use of scientific techniques such as geophysics in the interpretation of the mining landscape and will provide a focus for further research in the Tamar valley.

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## *Planches couleur*

