

The Bere Ferrers Project and Discovery of a Roman Fort at Calstock

by Peter Claughton and Chris Smart

In January of this year (2008) we had the first clear evidence of a Roman military presence in the Tamar Valley. The evaluation trench which provided the evidence was a significant stage in an archaeological journey which started in the summer of 2006 and is not yet complete. Although the discovery of the fort came about by chance, it was nevertheless the product of a well planned and logical sequence of investigation which has its origins in a study of the medieval mining landscape.

Medieval mining in the Tamar Valley

Over the last two years the authors have been engaged in an interdisciplinary study of silver mining in Devon during the later Medieval period. Working in the Department of Archaeology at the University of Exeter with funding from the Leverhulme Trust, the Bere Ferrers Project employed two archaeologists (Stephen Rippon, who directed the project and Chris Smart) together with an economic historian (Peter Claughton) in assessing the impact of mining on the historic landscape, focussing on Bere Ferrers, or Birland as it was known and its environs in the Tamar Valley. For this the project had the benefit of a range of resources, including a large body of documentary evidence on the operation of the mines as well as historic mapping covering the late 17th Century through to the early 20th Century. These resources were complemented by carrying out a detailed survey of the mines and their infrastructure, including the use of geophysical techniques.

Mining of the silver-bearing lead deposits at Bere Ferrers was first documented in 1292 when the mines there and at Combe Martin on the north coast of the county, were opened up under the management of Crown officers with a directly employed workforce. In doing so, the Crown broke with the custom which had regulated mining prior to the 13th Century and continued to regulate the working of tin in Devon and Cornwall as well as the mining of non-argentiferous lead deposits on Mendip, in north-east Wales, in Derbyshire, Yorkshire and the uplands of the north Pennines, along with iron and later coal, in the Forest of Dean. Miners and other essential workers were recruited, some being pressed into service, from many of these established mining fields and moved to Devon.

The Combe Martin mines were abandoned in 1296 but were subsequently worked intermittently under lease (Claughton 2004), but the richness of the ores at Bere Ferrers ensuring that they remained under Crown control until the advent of the Black Death. After 1350 the mines in Devon, at Bere Ferrers and Combe Martin, were generally leased collectively to entrepreneurial interests. Production of silver from Bere Ferrers rose rapidly in the early years, reaching over 23,000 ounces in 1297. This made them attractive to Edward I as a means of clearing his excessive debts and in April 1299 his bankers, the Frescobaldi, took the mines on

lease. However, their tenure lasted less than a year, during which they worked the mines without regard for future production before giving them up on the grounds that they could not make a profit under the terms of the lease. The mines were then brought back under direct management and it took four years and an expenditure of over a thousand pounds to bring them back into production.

Damage to the Abbot of Buckland's woods at Biccombe south-east of the River Tavy, was excessive under the Frescobaldi and as a consequence the woods in the Crown manor of Calstock were allocated to the mines. The mines and the smelting and refining processes had a vast appetite for wood, particularly as fuel for the latter. It therefore made logistical sense to move the majority of the smelting, the refinery and the administrative centre, from Maristow to Calstock, where it remained until at least 1316 before being moved back to Maristow. The mines also drew on the woodland resources over a wider area; Blaxton, Warleigh, the woods on the de Ferrers' Estate adjoining the road to Denham Bridge and the Tavistock Abbey woodlands at Morwellham, all of which could be accessed by river.

Documentary sources can tell us a great deal about certain aspects of the operation of the mines but on others they are virtually silent. The bulk of the documents are found in the Exchequer Accounts which are primarily financial records, going into great detail where the Crown had a vested interest in recording the payments to workers employed on wages, carrying out activities such as smelting, refining and the cutting of wood, its carriage and the production of charcoal. They tell us something about the tasks of draining and developing the mines, the unproductive 'deadwork' but provide little more than a total annual sum for expenditure on ore production. The miners were allowed an element of self regulation in their working practices and were paid on results by the 'load' of ore prepared fit for smelting. There were also important areas in which the Crown took no role and which were therefore poorly documented; for example, it made no provision for housing or feeding the workforce. With some 400 miners employed in the late 1290s, a significant proportion of whom were immigrants with no access to agricultural holdings, the workforce was reliant to a large extent on imported foodstuffs and the local provision of accommodation.

The miners were drawn, initially at least, from established mining fields where many had practiced dual occupation, taking opportunities in the agricultural calendar to diversify into mining, although there is evidence to suggest that some in north-east Wales were already favouring mining as their prime occupation in the late 13th Century. In Devon the options for dual occupations were severely limited under direct management. They were expected to work full-time and for a full 12 months of the year. Investment by the Crown in adit drainage and development work to open up new deposits in the early 14th Century meant that the mines were soon operating through the winter months unimpeded by the problems of water entering the workings. Drainage was nevertheless to be a continuing problem for the mines.

The mines of the Medieval period were confined to the one mineralised north-south striking crosscourse, carrying deposits of silver rich galena (lead sulphide) and terahedrites in a fluorspar matrix. From Lockridge Hill southwards to the River Tamar south-east of Cleave, the mines form a near continuous linear feature as far as the southern edge of Cleave Wood. There is no evidence that a northern continuation of the crosscourse at Butspill was worked in the Medieval period. As these silver-bearing deposits were mined ever deeper, further adits were required. To achieve the required drainage it was necessary to drive longer, cross-cutting adits from the west, taking advantage of the shallow valleys which crossed the workings. By the mid 15th Century, as the mines responded to a pan-European bullion shortage, expenditure on manual drainage below adit became a major handicap. It was at this point that mechanised pumping was introduced. Water-wheel powered suction lift pumps were installed in a shaft at Lockridge Hill, fed by a 16 km leat drawing its water from tributaries of the River Lumburn to the west of Tavistock.



Tunnel on the 15th Century leat in Shillamill Wood (photo, Peter Cloughton)

Unlocking the landscape`

A leading objective of the project was to map the workings and their infrastructure, to identify those features which might date from the Medieval period and to assess the field and settlement pattern in order to characterise the associated historic landscape. Despite the overlying earthworks of late 18th and 19th Centuries mining, it was possible, using detailed topographical survey methods, to pick out the earlier features; for example, the shallow shaft mounds where the outcrop of the deposit had been worked in Cleave Wood and a link between the evidence on the early 18th Century mapping and the earthworks marking the line of an early cross-cutting drainage adit. It was also possible to trace the line of the 15th Century leat beyond the clearly visible features, the tunnels and cuttings, which mark sections of its route. Using the global positioning system the leat was confirmed as a single continuous feature with a steady gradient over its full length and traced to within sight of Lockridge Hill.

Analysis of the relationship between the borough settlement of Bere Alston and the surrounding field system, supports the limited documentary evidence suggesting that it was established by the Lord of the Manor, Reginald de Ferrers, at the turn of the 13th Century as a service centre for the mines. Although de Ferrers had no call on the produce of the Crown mines, he was in a position to profit from the demands on housing and food supply. The settlement was laid out, with narrow burgage plots, over part of an existing open field but aligned to a route towards the mines rather than to the pre-existing boundaries. There were evidently a number of uncultivated areas in the late Medieval period; areas such as Tuckermarsh, Berealston Down, Morwell Down, on the Tavistock Abbey Estate immediately to the north of Bere Ferrers and extensive woodland in the east of the parish. It is, however evident that surviving boundaries within the cultivated areas are fossilising a much earlier system of fields, an open field apparently centred on Frog Street and compact blocks of fields, or cropping units, surrounding the smaller settlements. It is clear that the mines, the largest settlement associated with them and their associated infrastructure, such as the leat, were imposed on and cut across that earlier landscape.

On the other hand, one important sector of the mining infrastructure appears to have had only a negligible impact on the landscape. The smelting and refining of the silver-bearing ores has left no visible evidence in the landscape, no disruption of the field boundaries, no surviving structures, earthworks or residues which might be linked to the processes. They were well documented and the approximate locations for sites are either named or can be computed but field walking failed to find any tangible evidence. There are, however, some reasons why they would prove so difficult to identify.

Two methods of smelting were in use prior to the 15th Century, the wind-blown 'bole' hearth and the charcoal-fired manual bellows-blown furnace(s). There were a number of experimental versions of the latter in the late 13th and early 14th Centuries but they were all located centrally close to the refinery either at or

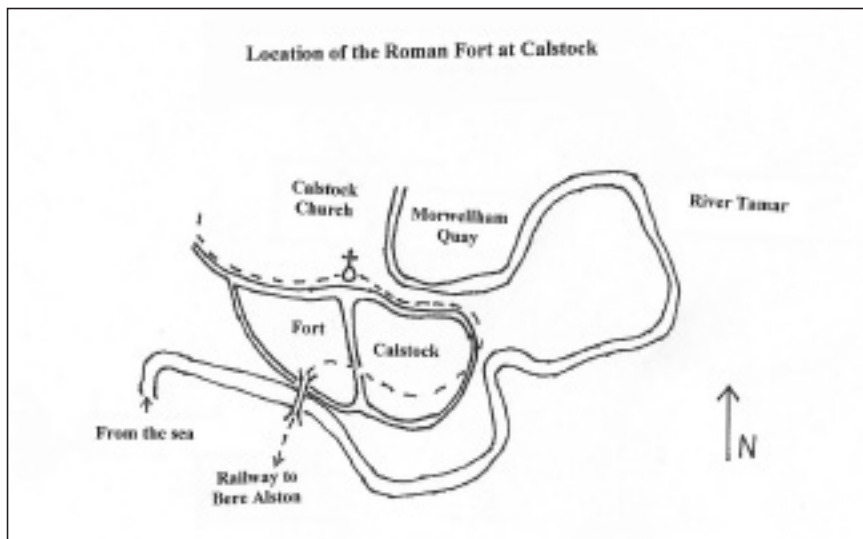
near Maristow or, from 1301 to *circa* 1316, at Calstock. The ‘bole’ hearths occupied more isolated locations on the higher ground of the Bere Ferrers peninsula between the Tavy and Milton Combe and on the Cornish bank of the Tamar at Calstock. Some of those sites utilised a version known as the ‘turnbole’ where the hearth was mounted on a timber platform capable of being turned to face the wind. Those moveable hearths could be dismantled and moved to new sites. Sites would also be cleared of smelting residues (slag) which was re-smelted to recover any remaining lead and silver. In doing so the hearths would be dismantled leaving no evidence in the form of earthworks. After 600 years of agricultural improvement there is therefore no visible trace in the landscape.

The lack of tangible evidence is particularly frustrating for a site such as that at or near Maristow which was used over a long period and was probably also the site of the 15th Century ‘fynynmyll’, a water powered smelter which superseded both the ‘bole’ and the manually blown furnaces. Whilst there was also no visible evidence for smelting at Calstock the sites there had only been used for less than two decades in the early Fourteenth Century, it benefited from some of the best documentary evidence. A detailed picture of the ‘curia’, the administrative enclosure containing the refinery, smelting furnaces, smithy, stables, various stores and a two storey hall accommodating the Crown officers, could be assembled from the documents even if its precise location could not be computed. The documents also regularly referred to smelting, particularly the use of ‘bole’ hearths, close to the church. There was also the single reference to constructing ‘bole’ hearths at the ‘old castle or fort’ – *vetus castrum de Calistock* – although that was presumed to be near Castle Wood in the north of the parish (Mayer 1990, 83). Overall the area around Calstock parish church presented the best chance for identifying a lead/silver smelting site. The topography south of the church is typical of a ‘bole’ site, i.e. a moderate slope facing the prevailing winds channelled up the valley, in addition there is supporting documentary evidence and there are reports of charcoal being discovered whilst cutting graves in the new burial ground south of the church.

Using geophysical survey techniques

Where field walking, assessment of the historic mapping and aerial photography had failed to find evidence for smelting, it was necessary to resort to other, science based, methods to reveal what could not be discerned by the naked eye. Geochemical analysis using soil sampling was one option but the demands on time and laboratory resources were beyond the scope of the project. Geophysical survey techniques provided the best prospects for success although their application to non-ferrous smelting sites had only been tested on a restricted number of sites - see Gaffney and Gator (2003) for the general application of geophysics and Vernon et al. (2002) for their application to non-ferrous sites. The amount of time we could spend on this aspect of the survey work was, however, limited and had to be set against the greater demands from the topographical survey, documentary research and landscape assessment.

In the summer of 2006 we selected Church Park, the field to the west of Church Hill and immediately south of the new burial ground, as the site for the first investigation and taking advantage of the available equipment, spent four days carrying out a 0.5 metre resolution resistivity survey over a 6000 square metre area. Such a survey would detect sub-surface changes caused by either the underlying geology or disturbance of the ground and the presence of buried structures. The results of the survey were inconclusive as far as smelting was concerned but it did show what appeared to be the south-western part of a large sub-circular earthwork bank or wall. This was perhaps too large to be an Iron Age hill-slope enclosure or the curia, the early 14th Century administrative enclosure but it and the field as a whole warranted further investigation.



The site was revisited in late September 2007 and the same area was surveyed at a one metre resolution using a magnetometer to detect changes in the sub-surface magnetic susceptibility. Disturbance of the ground or geological features would create detectable changes but the magnetic anomalies created by the heat associated with smelting and other burning events would also be detected. When one of the authors (Chris Smart) downloaded the survey data in Exeter, a strong anomaly suggesting smelting activity stood out quite clearly downslope from the top of the field, in an area where a 'bole' hearth might be expected. What was also evident was the greater clarity in the form of the earthwork seen in the earlier resistivity survey, to the north of that anomaly. The potential was recognised immediately; this was, in all probability, the south-west corner of a Roman fort. Once the data had been fully processed, the outline of the outer rampart, double ditches and the inner rampart, could be discerned and compared favourably with the recent magnetometer survey for one of the other two forts in Cornwall, that at Restormel.

A further magnetometer survey to the east of Church Hill confirmed the location of the south-eastern corner of the fort and allowed for a fuller assessment of its potential dimensions. If, as appeared likely, the northern boundary of the fort was defined by the edge of the churchyard, it measured *circa* 170 metres by 160 metres overall, which is significantly larger than the other forts in Cornwall. Also of significance is the inclusion of the parish church within the boundary and the possibility that its foundation could be very much earlier than previously thought.

For the Bere Ferrers Project the geophysical evidence for a Roman fort and at least two potential smelting sites (a second was identified in the further survey east of Church Hill) presented a dilemma. The project had only four months to run, there was some survey work yet to do and we were expected to complete writing up the results ready for publication by the end of that period; however the fort provided a new avenue of research which was detached from the project's Medieval focus. There were, fortunately, some funds still available for the project as a result of an under-spend on the travel budget. The Leverhulme Trust was approached with a view to using that money for a short extension to include an evaluation of the earthworks and the potential smelting site to the west of Church Hill. A training exercise was also funded by the Department of Archaeology which would allow for a full topographical survey and for the geophysical survey east of Church Hill, to be extended north and eastwards.

The archaeological evaluation

With the agreement of the Leverhulme Trust an archaeological evaluation led by Chris Smart, was carried out over two weeks in late January and early February 2008. This had two key aims: first to date the construction of the fort and second to examine the possible Medieval bole smelting hearth.

A single evaluation trench measuring 2 metres by 45 metres was positioned to expose a section across the fort's defensive earthworks as well as the potential smelting site. The field in which the excavation took place was under permanent pasture and had not been ploughed in the recent past. Therefore, it was expected that the preservation of *in situ* archaeology would be good. Overall, the fort measures *circa* 170 metres by 160 metres, with substantial defences leaving an internal area of *circa* 140 metres by 130 metres (1.82 hectares). Comparison with the internal areas of the two other Cornish forts, Nanstallon (0.72 hectares) and Restormel (0.42 hectares), demonstrates that the fort at Calstock was constructed on a much larger scale. The trench was cut a short distance into the interior of the fort, revealing a possible oven and stoking chamber. Its position against the inner rampart would have minimised the risk to the timber buildings and is a feature typical of Roman forts. Pottery of various types was recovered from the oven and overlaying deposits, which may give an indication of the length of use of the site.

Excavation revealed an inner rampart approximately 5 metres wide, constructed of clay and shillet cast from the digging of the first ditch, revetted with timbers on both faces. The outermost revetment was constructed of worked timbers 30 centimetres square, suggesting that they may have formed the basis of a timber superstructure or palisade. A band of blue-grey clay has been interpreted as the degraded remnants of a stack of turves which had been piled upon the natural geology abutting the timber revetment. The two ditches which sat between the inner and outer rampart both had a characteristic v-shaped military profile with a square-cut base. Each measured 2.8 metres deep from the present day land surface and was approximately 3.5 metres wide. The outer rampart was of a different construction to its inner counterpart. It too was about 5 metres wide and appears to have been constructed of the same intermixed deposit of clay and shillet but was capped with large, angular and sub-angular pieces of sandstone, the geology of which is unknown locally. Acid soil conditions will have limited the survival of animal bone but sherds of pottery, including Samian ware, were recovered. Significantly, the inclusions within the fills included geology associated with mineralised vein deposits, indicating that mined material had been deposited in the outer ditch. This material, which has yet to be examined in detail, is perhaps the first certain evidence of a Roman military interest in Cornwall's rich mineral resources.



A view from the outer rampart across the two v-shaped ditches and inner rampart to the interior of the fort (photo, the project archive)

Investigation of the geophysical anomaly to the south of the fort defences may corroborate this hypothesis. Prior to excavation it was conceived that this may be the location of the Medieval ‘bole’ smelting hearth referred to in 14th Century accounts. The feature presented itself as a square or rectangular (it was not fully revealed) stone-lined furnace. No slag was recovered from this feature but its fill has been sampled pending further analysis. The furnace sat within a deposit of intermixed heat-affected natural, charcoal and furnace-lining that extended for approximately 10m south of the outer rampart. Samian pottery was also found in this deposit. Furnace-lining and unabraded Roman pottery, including a sherd of stamped Samian ware, was also found in a shallow pit at the southern end of this ‘work area’. Radiocarbon dating will hopefully confirm whether the furnace is Roman or Medieval, however, at the outset it appears that it was a focus of Roman industrial activity.



The hearth/furnace found outside of the fort (*photo, the project archive*)

Discussion

Post-excavation analysis and preparation of the written report on the fort is now underway. It is anticipated that full details of the excavation will be published in the national journal of Roman archaeology, *Britannia*, as well as the county journal *Cornish Archaeology*. We are therefore not in a position to provide dates for the fort’s occupation or to state with certainty the purpose of the various features identified during the evaluation. One thing is, however, certain; the presence of the fort informs our view on the early history of Calstock and the Tamar Valley.

The indications for some form of Roman presence at Mount Batten, on Plymouth Sound, has been known for some time and it has been suggested that it might be related to an interest in mineral resources, particularly with tin deposits on the south-western parts of Dartmoor (Mattingly 2007, 407). Current archaeological evidence for the southern slopes of Dartmoor (Thorndycraft et al. 2004) does, however, suggest that the tin working there was late Roman to post Roman, 4th to 7th Centuries. If, as is possible, the smelting hearth/furnace is concurrent with the occupation of the fort, it will reinforce the view that the mineral resources of the Tamar Valley and its environs were a driving force for the establishment of the fort but the purpose of the hearth is currently unclear. No associated slag was found and its removal may have been a Medieval process, even if the hearth is of Roman date. There is ample documentary evidence for the removal of smelting residues in the early 14th Century, including copper bearing slag from 'old works at Calstock'.

The location for the discovery at Calstock is not in itself surprising - a fort on a prominent ridge close to the tidal limit - is not dissimilar to the location of those already known in Cornwall at Nanstallon and Restormel. Ptolemy's naming of the river Tamarus and two unidentified settlements of the Dumnonii, at Tamara and Uxella, had already provided grounds for speculation on possible fort sites in the Tamar Valley. There has also been speculation on the destination of the road westwards from the fort complex at North Tawton, with the Launceston area seen as a likely candidate (Griffith 1997; Mattingly 2007, 140). Once the results of the archaeological evaluation, including the post-excavation analyses, are processed and carefully assessed, they will provide a new and exciting chapter in the early history of the Tamar Valley.

The results of the Bere Ferrers Project will appear elsewhere - *Mining in a Medieval Landscape: the Royal Silver Mines of the Tamar Valley*, to be published by the University of Exeter Press but the discovery opens up a whole new line of research unconnected to Medieval silver mining. The fort may have come out of the project, *ex argentaria* (from the silver mines) but it goes forward as a subject for study in its own right.



A fragment of Samian ware recovered from the working area around the hearth/furnace (photo, Janis Heward)



Work in progress on the evaluation of the earthworks (*photo, Janis Heward*)

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