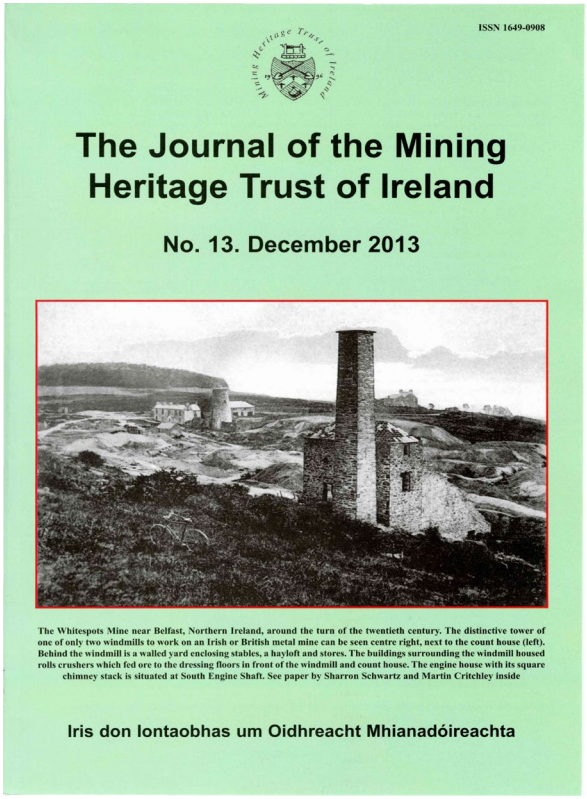

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EARLY SILVER MINING IN WESTERN EUROPE: AN IRISH PERSPECTIVE

Peter Claughton and Paul Rondelez

Abstract: In late medieval times in Europe, silver represented money itself and the mining of its ores was of great importance. In this paper, the evidence for the mining of that metal in late medieval Ireland is investigated. The known, and suspected, mines are identified, while some mis-interpretations in the current literature are rectified. The limited source material is then used to build a preliminary picture of the evolution of silver mining during the various stages of late medieval Ireland: the Anglo-Norman period (c. AD 1170 – 1350), the Gaelic revival (c. AD 1350 – 1550) and the early decades of the Plantation period (c. AD 1550 – 1600). This information is viewed against the background of the broader European silver mining industry, particularly that in England, which underwent significant changes during the later Middle Ages. *Journal of the Mining Heritage Trust of Ireland, 13, 2013, 1-8.*

INTRODUCTION

In a modern context Ireland, on the periphery of Europe, was never a major silver producer. A significant number of sites have been worked for silver-bearing ores, primarily lead based, but the precious metal has never been an important constituent in total production. Quantifying the position prior to 1913 is hampered by the lack of published overall mine by mine figures for Ireland and the fact that total production was generally aggregated along with that for Wales, England and Scotland.[1] It is, however, evident that Britain and Ireland in the latter part of the nineteenth century only accounted for around 1.8 percent of world production. From the seventeenth through to the early nineteenth century, even the central European 'German' states, the principal source of silver in the medieval period, were contributing only around 8 percent to the total and that neither Britain nor Ireland produced enough to warrant their inclusion in world figures - the vast majority of silver was coming from South and Central America (Schmitz 1979, 143-47). It should, however, be noted that, prior to the introduction of the Pattinson enrichment process in the 1830s (Burt 1984, 219-23), the majority of lead ores mined at depth in Britain and Ireland did not justify refining to recover their silver content. Today Ireland is one of the few countries in Western Europe producing silver, over 6 tons in 2011, as a by-product of large scale lead/zinc mining (Brown *et al.* 2013, 63).

Prior to 1600, not only were there shallow weathered deposits with an enhanced silver content available but that silver content was of greater importance in terms of its monetary value and economic potential. Although total early production figures are, with a few exceptions, difficult, if not impossible, to quantify, the suggestion is that silver mining had significant, sometimes realised, potential in the medieval period through to the turn of the seventeenth century. Ireland was amongst the earliest countries in Europe to establish and regulate silver mining activity but, as in England and Wales (Claughton 2009), little is known of the details for those early medieval operations. It is not until the thirteenth century, and the documentation linked to the intervention in Ireland by the English Crown, that we can provide some limited accounts and, by the end of the medieval period, the scale of prospecting and mining can be appreciated. Using that information, this paper seeks to put the history of medieval silver mining in Ireland in context against that in the rest of Western Europe, particularly for England and Wales

BACKGROUND

Whilst argentiferous galena (lead sulphide) was the primary source of silver in Britain and Ireland in the modern periods its weathering products, including secondary silver-rich minerals such as the tetrahedrites, and native silver, had a significant role in production prior to 1600. They were worked in the mines at Bere Ferrers and Combe Martin in south-west England and would have been found on many Irish silver production sites. Across Europe as a whole, other sources of silver were of greater importance. Poly-metallic ores, including bournonite, were mined in southern central France and silver-bearing copper ores (chalcopyrite and the copper carbonates) would become important to continued production in Central

1 Individual mine by mine production figures were published from 1845, initially on a voluntary basis, through to 1913 by the British Geological Survey, later by the Home Office Mining Records Office. The basic collated data for mines in Scotland and many counties in England and Wales have been published in a series of separate volumes (Burt *et al.* 1981 *et seq.*) but those for Ireland were not included in that series. The relevant data is now being processed by the MHTI with a view to eventual publication in an enhanced format.

Europe at the end of the medieval period. Silver-bearing zinc ores (sphalerite or blende) do not appear to have been exploited in their own right before the nineteenth century, as at Pont Pean (France: Ille et Vilaine) but may have been part of the mixed ores mined on some sites. Silver haloids, where silver was the prime component, are found in Central Europe, but relatively rare in Britain and Ireland. The only deposit of any significance in Britain, in East Cornwall, does not appear to have been worked until the seventeenth century.

Prior to the tenth century much of northern Europe's silver supply came from mines in Asia, east of the Aral Sea, north of Afghanistan. This was supplemented by European production from shallow lead deposits. For example the Frankish mine at Melle, near Poitiers, supplied mints in that area until at least the late ninth century. But it was central European mines which provided the bulk of silver produced during the late medieval period although there were significant producers elsewhere on the continent.

CONTINENTAL EUROPEAN SILVER

The discovery of rich silver-lead deposits in the Harz Mountains, at Rammelsberg near Goslar in Saxony in the late tenth century, when the mines of central Asia were in decline, established the German states as the major producer: a position maintained through much of the late medieval period. As mining in the Harz expanded, along with other lesser deposits opened up in the Black Forest, German silver reached every corner of the continent. Production there reached its peak in the second decade of the eleventh century but by 1040 was in rapid decline. For the next century European production relied on residual production from the Harz and that from lesser deposits, including those of northern England. The shortage of silver was demonstrated by a reduction in the weight and quality of coin across continental Europe (Spufford 1988, 74-105 and Map 9).

Relief came in the late 1160s with fresh rich deposits opened up near Freiberg, in Meissen, and, shortly afterwards, at Freisach in the eastern Alps augmented by an expansion in production from lesser deposits at Montieri, in Tuscany. These mines were to sustain production for nearly a century before the centres of production shifted south and east (Nef 1952, 435). By the late thirteenth century new silver was coming from mines at Iglesias, in southern Sardinia, Jihlava, south-east of Prague, and lesser deposits at Schemnitz and Göllnitz, in Zips; Rodna, in Transylvania (both areas now part of modern Hungary); Brskovo, in the Balkans; and Longobucco, in southern Italy (Spufford 1988, 109-31). Production cycles for the richer mines were short and by the early fourteenth century outputs were eclipsed by that from the Bohemian mine at Kutná Hora. However, many of the lesser mines continued in production. In Tuscany, Montieri was replaced by new, but short-lived, workings at the nearby Roccastrada mines. Balkan production reached its zenith in the mid-fifteenth century but was eventually lost to European markets by the advance of the Ottoman Empire (Cirkovic 1981, 52).

As central European output, based on argentiferous lead deposits, declined in the late fourteenth/early fifteenth century the shortages were again felt across the whole continent as many mints closed. Revival came in the latter part of the century as new drainage technology allowed deeper working of known deposits and, more important for future production, fresh sources derived from a new ore base were opened up. Then the old lead-based deposits took on a new role as key suppliers to the technology developed to extract silver from argentiferous copper deposits being exploited in central Europe. Lead was an essential element in the 'saigerprocess', required to draw out silver from copper. The use of argentiferous lead then had the added bonus of supplementing the silver recovered from copper (Blanchard 1995, 15-22).

Extraction of silver from copper ores was not new but was brought to effective, if ephemeral, commercial levels in Slovakia at the turn of the fourteenth century. As new deposits were opened up in central Europe (Bohemia and Saxony) in the mid-fifteenth century the process was to have a significant impact on European silver production. This initial central European boom could not be sustained and output quickly fell back to a base line supported by continued production from Slovakia and Thüringia (Meissen). The base line, with central European output (primarily from the mines of the Erzgebirge), rose steadily thereafter until, in the late 1520s, that from the Erzgebirge expanded rapidly to take silver production to new and unsurpassed heights (Cipolla 1993, 175). It was at this point that South and Central American silver began to enter the European economies, primarily through the colonial power, Spain, and by 1580 well over 2 million kilograms were travelling along that route alone every decade. The stimulus to the European economies and increased trade with the East was such that the demand for silver increased (Cipolla 1993, 211-27). This, in turn, led to renewed searches and further exploitation of silver resources across Western Europe including in Britain and Ireland.

ENGLISH SILVER

From the ninth century onwards England's strong export trade in wool and tin was drawing in European silver, allowing it to establish a centrally controlled coinage. There is, nevertheless, limited evidence to suggest that some newly mined silver came from English sources from the tenth century onwards but it was not until the early part of the twelfth century that firm evidence is available. Even then, with statistical evidence suggesting levels of production from mines in the North Pennines sufficient to sustain a commercialised economy, its full impact on the volume of coin in circulation is as yet unclear, as silver continued to be drawn into the country through a strong export trade (Claughton 2011, 62-65).

Once the rich shallow silver-bearing deposits in the North Pennines had been worked out in the late twelfth century, England had to rely on continental European resources until new mines were opened up in Devon at the end of the thirteenth century. Although the coinage in circulation increased substantially over the thirteenth century, driven by a healthy export trade, during that period the English Crown made a concerted effort to identify new silver-bearing resources within its domain, including the lands it controlled in Ireland. It also took action to consolidate its hold over such

resources by invoking a right of prerogative on ores which yielded gold, silver and copper. Whilst across continental Europe a legal framework had developed where all minerals were state property, in Britain and Ireland mineral rights were not clearly defined. The right to work minerals, including silver, had developed as a right in common even if the minerals themselves were the property of the freeholder. These were rights encoded in Irish law as early as the eighth century, with the working of silver mines clearly defined (Kelly 1997, 435), although the position in England and parts of Wales can only be extrapolated from later codification of customary rights (Claughton 2010).

In practice, in England by the twelfth century, silver was being mined on the Crown demesne or that of lesser lords, such as the Bishop of Durham and the Bishop of Wells, who had been granted land and the minerals in the North Pennines and on Mendip, respectively: with the miners having the right to work the silver on payment of a royalty to the mineral owner. The Crown itself had no direct involvement in mining and even leased out the right to collect royalty on its North Pennine mines (the 'Mine of Carlisle') to a third party. After 1260, however, the English Crown was not only exercising a right of prerogative over silver-bearing ores but had also taken action to prevent any new customary rights developing in respect of those ores. The mines in Devon were worked directly by the Crown, supervised by Crown officers, employing miners and other workers on contract or day wages (Rippon et al. 2009, 55-63).

ANGLO-NORMAN SILVER MINING IN IRELAND

Interest by the English Crown in identifying and directly exploiting silver resources in Ireland is evident by the early years of the thirteenth century and continued through into the fourteenth century. This could have built on earlier activity, perhaps revisiting sites worked in the early medieval period. In 1213, smelters (*ardores*) and miners were sent from England, probably from the North Pennines, to an un-named mine in Ireland although there is no record of production (CDRI 1171-1251, 75). It is not until the 1270s that there is clear evidence for further working of silver when, after employing miners from central Europe to investigate, unsuccessfully, mines of copper, gold and silver in Devon, and exercising a right of prerogative over those metals (Rippon et al. 2009, 53-54), the Crown again took an interest in Irish mines.

By the mid-1270s the English Crown was having some success with its search for silver in Ireland with John Bonaventure accounting for expenditure on 'mining works' (CDRI 1252-1284, 240). Payments continued into 1278 when John de Lydyard, the keeper of 'the king's mines in County Tipperary' is also accounting for the cost of rebuilding Roscrea Castle (ibid., 286; PRIE 1272-1284, 47, 310), but it is not until the following year that there is any record of silver which might have been the product of the mine, being received by the Dublin mint (ibid., 42). Work continued until at least 1290 but the available records (CDRI 1285-1292, 230-32, 238, 242, 322) are more of expenditure than production and, by 1280s, the merchants of Lucca were involved. Their role would probably be as bankers to the Crown, lending money against the prospect of a productive return from the mine, although they were evidently drawing on some Italian mining expertise with a view to assisting in production. John de Genoa was paid for mining work in Tipperary in 1290 (ibid.).

In only one instance is one of the Tipperary mines located, i.e., at Oola (today in County Limerick), when William de Berham was sent over in the mid-1290s with four miners to examine the potential for silver there (PRIE 1295-1304, 29). Gleeson (1937, 102-05) suggested that the workings were on Knockaunderrig, in the parish of Kilmore, the Silvermines district south of Nenagh, but that is no longer tenable. His attribution was based on an enquiry of the 'King's miners in Ireland' regarding an incident involving the chaplain of 'Byr', the name of whom he links to Kilmore. Close examination of a transcript of the document (originally in the Tower of London but now lost), in the Harris Papers in the National Library of Ireland (McNeill 1934, 328-29), reveals that the 'Byr' in question is Bere Ferrers in Devon. The miners there were deployed to Ireland possibly in 1300-01, when development work was underway to enable further production (Rippon *et al* 2009, 60), or earlier and the incident resulting in the enquiry had occurred before their departure from Bere Ferrers.

By the time that the King's miners in Devon were subject to the enquiry of 1303 the search appears to have widened, moving away from County Tipperary, when four miners and a smelter were working at Waterford in the following year (PRIE 1295-1304, 33). Despite this wider search nothing of value, in terms of continued production, appears to have been found. Prospecting continued into the 1370s and, on occasions, miners were sent out from England. Some sites, such as Oola, and possibly Waterford, were revisited and new ones, including Clonmines in County Wexford are identified (Connolly 1998, 519-20).

SILVER MINING AT THE END OF THE MEDIEVAL PERIOD IN IRELAND

Reliant as we are on the records of the English Crown for much of our information the question must be asked as to how much silver mining was going on in areas outside the influence of the Crown. Tellingly, in 1375, the semi-autonomous Earl of Ormonde was first granted permission to work a silver mine under favourable conditions, only to have this revoked a year later (COD 1350-1413, 140-41; CCR 1374-1377, 312, 355). In 1380, then, all Irish landowners were granted the right to mine for metals, including gold and silver, for six years while only paying a ninth part to the Crown, this in addition to the right of coinage (Berry 1907, 477). A licence to work Clonmines was granted in 1458 to a Dublin merchant (Berry 1910, 553-54), presumably for silver although this is not specified. This renewed interest, after nearly a century with little activity, was a late response to the bullion crisis which had developed across northern Europe. The prospects for working even shallow deposits on low-lying coastal land such as Clonmines on the Bannow estuary, with their associated

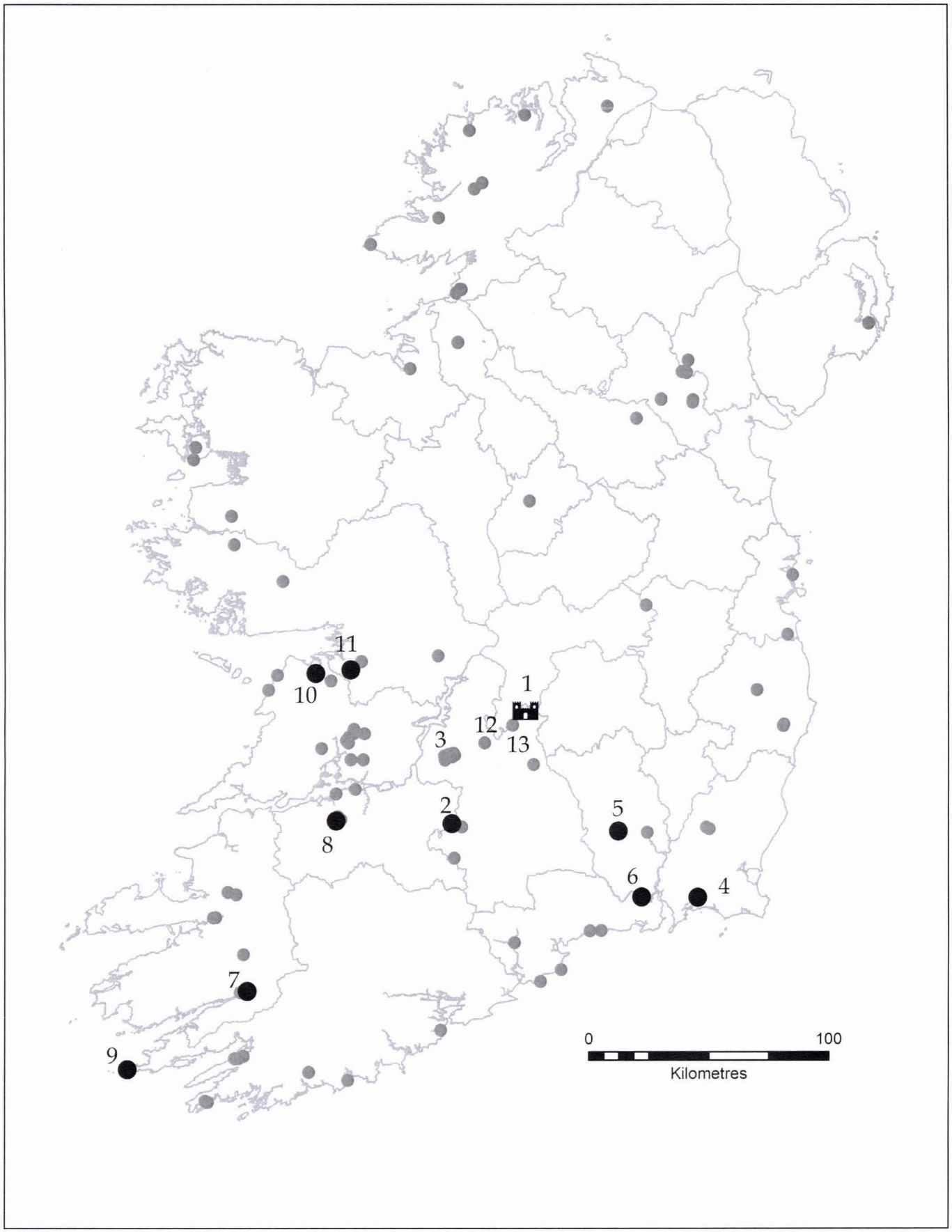

Figure 1: ***Irish silver mining. Sites referred to in the text - 1. Roscrea Castle; 2. Oola; 3. Silvermines; 4. Clonmines; 5. Knockadrina; 6. Kilculliheen; 7. Ardtully; 8. Cloghatrida; 9. Dursey Island; 10. Aillwee; 11. Caherglassaun; 12. Garrane; 13. Rathnaveogue; references to other known silver mines and occurrences (small dots) can be found in Griffith (1854), Kinahan (1887) and the GSI Datasets Public Viewer***

List of Mines in the Hamner Papers	Location
It. in the isle of Dorsay, a silver myne	Dursey Island, Co. Cork
It. at Glanneroghe w[it]hin the havon of ardeghe in mc Carty mores contrey, a sylver myne	Ardtully, Co. Kerry
It. in OLogl[a?]ins contrey by his castell in borrein, a silver myne xvi myles from Galwey	Ailwee, Co. Clare ?
[..] the countre of wexford at Clonemene	Clonmines, Co. Wexford
[..] the countie of kilkenny at killeghen against waterford at the [.]onry a myne of sylver	Kilculliheen parish, Co. Waterford (see Note 2 below)
It. a myne of sylver at [..]okdrin in do[.es] comitat	Knockadrina, Co. Kilkenny
At knockkylleny co[nn?]ogh [O?] Tirrelaghe obriens lan[.]s one myne of silver	Caherglassaun, Co. Galway

Table 1: ***References to silver in the List of Mines in the Hanmer Papers. Based on the manuscript in the Public Records Office (TNA: PRO SP 63/214 f.24). The transcription of this text (CSPI 1601-1603 Addenda, 670) has several errors which hinder the identification of some mines; a near identical List is preserved in the British Museum (Add. MSS., Annales Anonymi, 1390-1451, n260, p429) transcriptions of which were published by O'Conor (1819, 133) & Hardiman (1825, 63).***

drainage problems, were, however, limited. New pumping technology became available in the first half of the fifteenth century and was used at Bere Ferrers in Devon by the 1470s, as it was in Central Europe (Rippon et al 2009, 110-19), but there is no evidence for its diffusion to Ireland at this period.

From the late fifteenth century onwards the available evidence for mining in Ireland increases. A mine of silver, described as at Waterford, Knocktopher and in Ormond is recorded in the Red Book of Kildare circa 1503 (Flattisbury & Mac Niocaill 1964, 12) may refer to the mine at Knocknadrina (see Table 1). By mid-century a concerted effort is being made to work the mines at Clonmines. Workers from central Europe (Almains, ie., Germans, sometimes referred to as 'Dutchmen') were employed to mine and smelt the silver-bearing ores but failed to realise its full potential, a fact that was the subject of serious disagreements between Robert Recorde, tasked with supervising operations, Joachim Gundelfinger and the 'German' specialists. The story of their failure is recounted by Cowman (1986) and Williams (2011, 35-52) and some of the supporting documentation is available in print (Hore 1901, 233-62; Clarke 1926). Of interest is the reference in one of the unpublished Clonmines documents (TNA: PRO SP 61/4 f.53) to a rich silver mine at "Blak Rokke and at the Nunrye against Waterford". Together with the reference in the List of Mines (see below) this would imply that this mine was likely located near the Abbey of De Bello Portu in the parish of Kilculliheen.[2]

2 The silver mine at "the Blak Rokke and at the Nunrye against Waterford" and "in the countie of Kilkenny at Killeghen against Waterford at the [.]onry" is undoubtedly the same. Black Rock is then possibly an old name for Cromwell's Rock, which is close to the old nunnery of De Bello Portu and across from Waterford city in County Kilkenny. One of the authors (PR) has observed small veins of galena at Cromwell's Rock.

It is potentially the same mine as the earlier one mentioned at Waterford (see above). The introduction of the new ore-hearth smelting process, developed in England, to Combe Martin (North Devon) contributed to the successful working of new silver deposits there in the 1580s. Ore was sent to Combe Martin at that period from County Wexford (Atkinson 1825, 16) and, although we have no information on its success with those ores, the new smelting process would have made a significant contribution to the effective smelting of silver-bearing ores across Ireland.

Although improvements in smelting technology were introduced at and after the end of the medieval period, this does not seem to have led to increased activity in Ireland. The mineral resources of Ireland were in several cases explicitly named as one of the motives behind the Plantation efforts of the late sixteenth and early seventeenth century (SPHen. VIII, Vol. III, 343; CSPI 1596-1597, 499). At the same time, due to the renewed penetration of Crown influence in the west and north of Ireland, we get references to the mining of silver already being carried out in those areas. This is the case at Ardtully in County Kerry (Skempton 2002, 99), Cloghatrida, County Limerick (Purcell 2009) and mines in Counties Cork, Mayo and Galway, the locations of which are not specified (Horne 1808, 134; Ayscough 1782, 315; Dudley 1910, 420-21). The mines near Galway, several of which were owned by Teige Oderick who was selling "wedges of silver" in Galway around 1600, were to be investigated to see if the building of a mill and furnaces was justified (ibid.). A large number of the other mines detailed in the List of Mines (see Table 1), which is provisionally dated to the mid to late sixteenth century, were similarly located in Gaelic Irish and Old English territory. Few of these were exploited under Crown prerogative, as far as we

know, before 1600, but after that date several ventures are recorded, including at Silvermines, County Tipperary (Cowman 1988, 96-99) and Ardmore, County Waterford (Cowman 1993, 25; Grosart 1886, vol. III, 132). Ireland could then contribute, if only to a limited extent, to supplying an increased demand for silver in the rapidly growing economies of northern Europe.

IRISH SILVER BEFORE 1600: A SUMMARY

We should now take stock of what we know about Irish silver before 1600 and consider the work required to advance our knowledge on the subject. The documentary sources referred to above provide us with an insight into the development of silver mining in the late medieval period in those parts of Ireland controlled by, or under the influence of the English Crown and they were largely confined to the south of the country (see Figure 1). What we do not have is evidence for what was happening elsewhere in Ireland.

Searches and mining for silver in the south and west accords with what was happening in England from the early thirteenth century onwards and, initially at least, it had greater success. The mine or mines in County Tipperary, possibly administered from Roscrea, maintained some production over a period of around ten to fifteen years in the 1270s and 90s. How much, and at what level of expenditure, is as yet unknown but it was, in many respects, no different from the Crown silver mines in Devon: expenditure was met from local taxation and the produce directed to the Dublin mint, probably with little regard to 'balancing the books'. Thereafter the search widened but with no evidence for sustained production. Renewed interest in the fifteenth century was followed by a flurry of activity in the sixteenth century, the full extent of which remains unknown, as much of it was carried on outside, and very likely hidden from, the influence sphere of the Crown. The initial re-colonisation by the Crown started with an ambitious project at Clonmines in the 1550s and its expensive failure was undoubtedly part of the reason, together with the instability of the period, for the limited Royal interest in silver mining in the following decades. Only in the early seventeenth century do we hear of renewed attention to the Irish silver potential.

The archaeological evidence for silver mining is currently scant. No sites have been identified and dated to the medieval period. Paleoenvironmental evidence from the uplands west of Camaderry in the Wicklow Mountains (Mighall *et al.*, this volume) suggests a rise in lead and zinc levels in the late medieval period, accelerating after about 1400. The cause of that rise is, however, inconclusive. It could be the result of local soil disturbance or airborne emissions from mining and/or smelting of lead ores, perhaps for their silver content.

If the evidence for lead smelting can be found in the field then we perhaps have the best chance for dating from the wood and/or charcoal used as fuel and, where the recovery of silver was the primary objective, to help identify potential production sites. At Oola, in County. Limerick, what appears to be slag, possibly the residues from lead smelting, is present on one of the spoil heaps but it is out of context, probably re-deposited or disturbed by nineteenth century activity. This certainly deserves further investigation.

Refining, the recovery of silver from the lead metal after smelting, on a large scale was probably carried out in a secure environment and, in the 1270s and 80s, that may have been at Roscrea Castle. There is, however, circumstantial evidence to suggest that some refining was being carried out elsewhere. Sterile lead, free from impurities, was a by-product of the refining process which found a ready use in plumbing and roofing, and sufficient to roof the tower and houses of the King's castle at Occanagh (within the same cantred as the Oola mines) was ordered to be sent there in 1278 (CDRI 1252-1284, 297; CCR 1272-1279, 515). The order, directed to Robert Ufford, justicary in Ireland, does not specifically name the source of the lead, only that it should be delivered 'from the king's mine there'. Does that imply that the source was in the cantred of Occanagh? Field evidence for the refining process is seldom found but there is always the chance if the possibility is borne in mind during investigations on potential sites such as Roscrea or possibly close to Oola.

Where were the silver mines or mines in County Tipperary and were they all administered from Roscrea? Oola, for example, is some distance from Roscrea and it lay in the cantred of Occonagh which straddled the Tipperary/Limerick border. Although the site is not specifically named until the 1290s, it may have been worked in the 1270s (see above) and there is other circumstantial evidence to suggest it was being worked in the early years of that century as the cantred was held by Henry, archbishop of Dublin, to whom the miners from England were despatched in 1213. Was it included amongst 'the King's mines in Tipperary' or treated as a separate enterprise? We might draw parallels with silver workings on Crown demesne in the North Pennines during the twelfth century. Those workings, principally in and around the South Tyne valley south of Alston, were administered from Carlisle which is around 35 miles to the west. Although the main evidence used by Gleeson (see above) is now discredited, the Silvermines area as a source of silver-bearing ores in the thirteenth century cannot be totally discounted although field evidence has not yet come to light. There are, however other possible sites closer to Roscrea which warrant further investigation, sites such as that at Rathnaveogue, where nineteenth century investigations highlighted the presence of much earlier workings (Wynne 1860, 32), or the silver mines at Garrane near Killanafinch (ibid., Kinahan 1878, 347; 1887, 208).

It is evident that closer examination of Irish silver mining prior to 1600 raises more questions than it provides answers. A planned programme to investigate further is certainly warranted, with a view to examining the documentary evidence in greater detail and linking that, where feasible, to sites with archaeological field evidence for early working.

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