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Contents

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Field Notes

compiled by J. S. Hodgkinson

Further bloomeries at Peasmarsh, Sussex

Field-walking has revealed three further sites of early iron making in the Peasmarsh area.[1] Concentrations have been noted at TQ 8765 2220, and TQ 8748 2225, north of Morebread Wood, and in the grounds of Axletree Nursery, at TQ 8743 2134. Field-walking followed the outcrop of the Wadhurst Clay south of the village, each site occurring just below the boundary with the Ashdown Sand.

A second foray, in April 1998, to the south east of the outcrop, revealed no further evidence of ironworking.

Possible medieval iron working in Burstow, Surrey

Evidence suggesting medieval ironworking has been found in woodland just north of Cogman's Lane, at Outwood. Iron slag has been found at two locations; at TQ 3208 4470, where two sherds of late-Saxon/Norman pottery were found, one in contact with a burnt surface; and at TQ 3212 4463, where pottery dated from the late-13th/14th centuries has been found scattered on the surface.

Two bloomeries in Maresfield, Sussex

A concentration of bloomery slag has been found on the steep bank of the Misbourne valley at TQ 4575 2760, near the Airman's Grave, on Ashdown Forest. A further concentration has been noted at the head of the same valley, at TQ 4580 2845. The latter site was revealed after a fire in March 1998; slag was found about 15cm below the surface of an area of disturbed ground.

Two Romano-British bloomeries at Hadlow Down, Sussex

The existence of two bloomeries in Wilderness Wood, Hadlow Down, has already been noted.[2] Members of the Field Group excavated a trench in the slag heap of the site at TQ 5361 2366, and recovered one sherd of Romano-British East Sussex ware from within the slag.

Three trenches were dug through the slag heap of the bloomery at TQ 5373 2356, and four sherds of East Sussex ware were found within the slag. A considerable number of pieces of slag were recovered which appeared to bear the marks of wooden laths or wattles.

A late-Iron Age bloomery at Waldron, Sussex

The existence of a bloomery in Longreach Shaw has already been noted.[3] Members of the Field Group excavated two trenches in the slag heap of the site, close to the west side of the stream at TQ 5456 1780.

Two sherds of pale orange pottery were recovered from the south trench. Dr Sue Hamilton, to whom the sherds were shown, has described them both as of grog-tempered, coil-built, handmade fabric. One has a flat base and is pinch-splayed; the other is a rim, rounded and incurved, from a barrel-shaped or convex jar. On the basis of the grog-tempered fabric, both date from the late-Iron Age or early Romano-British period. However, their form is very generalised, and is present from the late Bronze Age to the late-Iron Age, being more typical of earlier in the 1st millennium BC.

Typical tap slag was not in evidence, although slag found during excavation bore the possible impressions of wood; the presence of a non-tapping furnace is suggested. It was also noted that waste material in both trenches indicated the cyclical deposition of material, with separate layers of slag and furnace debris.

A bloomery at Newenden, Kent

Members of the Hastings Area Archaeological Research Group have noted a concentration of bloomery slag close to a farm shed at Lossenham Farm, Newenden (TQ 8470 2775). About 750m to the north east lies Castle Toll (TQ 852285), which is noted on the OS map as a motte and bailey. We are grateful to Lesley Feakes for this information.

A bloomery at Sutton Valence, Kent

A concentration of bloomery slag has been noted at Rowan's Farm, Kingswood (TQ 828511). The area appears to have been occupied over a long period, as worked flints dating from the Mesolithic through to the Bronze Age have been found nearby. We are grateful to Lesley Feakes for this information. Other sites at Kingswood are at TQ 840513 and TQ 833513.

Medieval bloomery slag at Loxwood, Sussex

Excavations by Archaeology South-East, in advance of building development, at Loxwood Place Farm (TQ 0380 3141) have revealed small quantities of bloomery smelting and forging slag in a number of contexts. These were most notably in a linear feature from which 16 pieces were recovered, but which from associated pottery appeared to date from the 16th century. Other contexts suggested dates from the 13th to 15th centuries. No evidence of actual working was encountered so it must be assumed that working was either nearby, or the slag was brought in for use in making hard standings. Iron working from the late-medieval period has not been known in this area of Sussex hitherto.

Two medieval ironworking hearths at Crawley, Sussex

Excavations, by Wessex Archaeology, on the site of The Sun public house on the west side of London Road, Crawley, have revealed extensive ironworking debris, including slag-filled pits and areas of burning. Two concentrated areas of burning were sampled, by the Clark Laboratory, for archaeo-magnetic dating. One was the base of a hearth, some 2.8m by 1.4m, largely defined by an area of orange/red oxidised clay, but with evidence of grey, reduced clay at the northern end. This gave a date range of AD1390-1410 at the 68% confidence level.[4] The other area of burning gave a date range of AD1370-1390 at the 68% confidence level, and was part of a number of burnt areas and small pits, one of which contained a quantity of hammerscale. The dates from both features are consistent with the limited finds of pottery on the site, and also with ironworking areas elsewhere in the centre of Crawley.

Evaluation trenches dug by Archaeology South-East on Kiln Mead, on the east side of the London Road, opposite the Sun site, produced a number of pits with bloomery slag in them, but no dating material.

The Domesday *ferraria*

P. D. Wood suggests that the *ferraria* (iron mine?) mentioned for an un-named Domesday holding could be associated with the medieval 'Lavertye', now Ashdown House.[5] A dispute about an iron mine in 1263, on the lands of ReIf de la Haye, can also be associated with Lavertye at this time.[6]

Because of this evidence, two forays have been made to the Forest Row area to search for this Domesday *ferraria*. It may either be a mining area or a bloomery furnace site, but from a practical point of view it will probably be both. The geological map of the north bank of the Medway, where Ashdown House stands, shows that iron

ore will probably be found for many miles east and west of Forest Row. Evidence from the forays shows this to be true, with mine pits found at Spanden Wood at TQ 4295 3580, Mine Pit Wood at TQ 4340 3575, and Hazel Wood at TQ 4361 3604. The first two woods have both small and open-cast pits, whilst the latter wood is difficult to study, due to natural earth slumping because of proximity to a faulted junction.

Although pieces of bloomery slag have been found in all the fields to the north of Tablehurst Farm (TQ 4289 3530), a large amount of well-scattered slag has been discovered in Barn Field, centred on TQ 4308 3535. As there is a high lynchet, uphill to the north of this field, it is likely that it has been ploughed for many years. It would seem likely that this is a non-Roman site as there are no mounds of slag; it is thinly scattered over a wide area, and is not localised beside a stream.

As further forays are undertaken, the number of mine pits and bloomery furnace sites is expected to increase.

B. K. Herbert

Bloomery slag at Heathfield, Sussex

The dating of two Roman bloomery furnace sites near Heathfield, Sussex has already been reported.[7] Further forays have located another nearby, in Tilsmore Wood, at TQ 5755 2184. The site seems only to have slag in the stream, perhaps part of a trackway.

B. K. Herbert

Stumbleholm bloomery, Ifield, Sussex

In October 1997, WIRG paid its first visit to Stumbleholm bloomery near lfield in Sussex. The geological map shows that an area of iron ore, in the Wadhurst Clay, extends from Charlwood to the northern edge of the bloomery site at TQ 2304 3706. Mine pits abound in two woods called The Grove, at TQ 2320 3725 and TQ 2345 3740, and the field in between. Although bloomery slag was definitely found

at the above site, there is a great deal of forge cinder in the area, probably originating from Ifield Forge about a mile away; for this reason it is proposed to investigate and date the site next season. A possible new bloomery site was sectioned in Smugglers Lane, at TQ 2196 3691; although some bloomery-type slag was found, it was mostly forge cinder.

B. K. Herbert

Notes and references

1. WIRG, *Wealden Iron,* 2nd series **17** (1997), 2.
2. ibid, 4.
3. ibid, 3-4.
4. An alternative date range of AD 240-260 can also be arrived at owing to a crossover in the calibration curve, but the later date range corresponds with other features of the site.
5. P. D. Wood, 'East Grinstead in the Domesday survey', *Bulletin of the East Grinstead Society,* **58** (1996), 10-14.
6. L. F. Salzmann, 'Some Sussex Domesday tenants', *Sussex Archaeological Collections,* **57** (1915), 178-9.
7. WIRG, *Wealden Iron,* 2nd series **17** (1997), 3.

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The Tudeley Ironworks Accounts

J. S. Hodgkinson and C. H. C. Whittick[1]

Attention was first drawn to the accounts of the ironworks at Tudeley, near Tonbridge, in a paper by Michael Giuseppi.[2] The ironworks were part of the 'chace' or manor of Southfrith, which belonged to Elizabeth de Burgh, the founder of Clare College, Cambridge, and grand-daughter of Edward I, and the accounts form part of a larger collection of papers, now in the Public Record Office, relating to the manor. The detailed records of the ironworks

survive for two periods – from 1329 to 1334 and from 1350 to 1354 – when they were worked in hand by the manor. Between 1334 and 1350, and from 1354 to 1375, they were leased, and the manor accounts in those periods only record an annual rental payment. As well as describing in outline the working life of the ironworks, and commenting on some of the details of the accounts, Giuseppi provided a transcription of those parts which had been fully recorded. The accounts were written, for the most part, in Latin with some specialised terms in English, and their translation below is intended to make them more generally accessible. They are the only accounts known of any ironworks in the Weald in the Middle Ages, and provide us with a case study of the industry in the period, which the little detailed evidence from elsewhere in the region gives us no cause to regard as untypical.

By the 14th century ironworking was widespread in the Weald. There are documentary references to iron being made in Wartling manor and in the Withyham area, and to the manufacture of horseshoes for the Crown, at Roffey near Horsham.[3] In the 1379 poll-tax returns for Crawley, William Rockenham and William Danecombe, each described as a *factor ferri,* were among those assessed.[4] At both Roffey and Crawley dating evidence from finds of pottery associated with ironworking debris has supported the documentary sources. Demesne ironworks were in production in Chingley manor in the 1340s and 50s, although evidence of a direct connection with the forge excavated there is wanting, despite archaeological evidence of occupation in the same period.[5] Elsewhere there is indirect documentary evidence of iron production, either in the form of purchases of iron, such as at Penshurst, Petworth or Rotherfield, or in the mining of iron ore, as at Horley in 1372.[6] Further evidence is available through archaeology, most notably at Minepit Wood, Rotherfield, but also at Thundersfield Castle, Horley.[7] In other instances, pottery associated with iron slag has suggested 14th-century working at Parrock in Hartfield, and at sites

at Alfold, Outwood and Loxwood.[8]

Essential to the iron making process in any period is the acquisition of the raw materials of fuel and ore. Wood was required in two forms; as charcoal for smelting, and as *elyngwood* for roasting the ore before smelting. The wood for charcoal was obtained initially by the *decena* or ten, which contained 24 quarters (6 hundredweight), but later by the *duodena* or dozen. A recently-noted account concerning Pevensey in Sussex in the Middle Ages also refers to charcoal being sold by the *duodena,* suggesting that it too might have been sold for ironmaking, and the accounts of the fifteenth-century ironworks at Byrkeknott, in county Durham, make use of the same term.[9] There is no indication that wood was being coppiced, and there are occasional references to *olwood*, presumably old wood, or fallen branches, being used. A sub-division of a ten or a dozen is given as a seam, or pack-horse load, to which one assumes the ten or dozen therefore refer. Giuseppi calculated that a hundred blooms of iron required between 15 and 16 dozen of charcoal. Wood was obtained, in general, from the Southfrith manor although some was clearly purchased from outside. In the three-year lease granted in 1354 to Richard Colpeper, 50 dozen of charcoal was to be allowed to the lessee as well as an estimated 12 cartloads of *elyngwode.*[10] The medieval bloomery site which was excavated in Minepit Wood, Rotherfield, and which had been active at the same period, included a stone-lined hearth for *elyng.*[11]

Iron ore was referred to in the accounts either simply as stone for making blooms, or specifically as *orston,* an English word for which no Latin equivalent seems to have existed at the time. The ore was quantified in hundreds according to the number of blooms which could be made from it, and no indication is given of the weight of the blooms. So we have no means of assessing the ratio of ore to finished iron, except that the ratio is unlikely to have been markedly different from that found in the post-medieval period, namely about 3:1. Schubert has argued that the blooms at Tudeley weighed about

30lbs.[12] Assuming that, approximately 90 lb of ore would have been required for each bloom and more than 6¾ tons for a year's average annual production of 170 blooms, weighing 2¼ tons. Digging for ore was, like the cutting of wood, carried out on the manor, although no details are given of the methods used in digging, nor of the nature of the excavations involved. Apart from the costs, the only other reference to the digging of ore is the provision of a tunic for an ore-digger in 1350, which had been part of the digger's contract.

Frequent references are made in the accounts to repairs, to both equipment and buildings, and from the itemised records of this work, we can gain some idea of the technology being used, as well as being able to draw comparisons with the post-medieval period, for which inventories and accounts are more plentiful. No details are given of furnaces, but bellows and their maintenance, repair or replacement figure frequently. Maintenance usually involved the application of grease, presumably to keep the leather supple, although some sort of hinge may have been incorporated into the mechanism. In the eighteenth century, at Ashburnham Furnace, greasing the bellows leather was an annual debit on the accounts.[13] White leather, possibly deer hide, was used when the bellows needed more substantial repair, and in 1354 there was the expense of *brakyng,* or softening it. An ox hide had been purchased to cover the bellows during major refurbishment in 1350. Also used in bellows repair was hareskin, possibly for the valves. The tuyères, which directed the air from the bellows into the furnace, were made of iron and purchased from a smith; the great heat to which they were subjected making it necessary for them to be replaced quite often. The meaning of an *ege* or a number of *egyn* used in the repair of bellows is unclear. Possible suggestions include a protective plate through which the tuyère protruded into the hearth,[14] or a rod for maintaining a clear airway through the tuyère.[15] Other tools had to be purchased and maintained from time to time. Bellows grease was also used to lubricate and protect some metal tools, such as

the hammers, tongs and axes that were needed. Axes were used for splitting blooms, and Cleere and Crossley have suggested that this was to make the blooms into a more manageable size for smiths.[16] However, Schubert referred to the practice of cleaving blooms as a means of quality control;[17] a method which has been observed in the very recent past among bloomery ironmakers in Sri Lanka and southern India.[18] Splitting the bloom across half of its width, which took place while it was still hot, enabled the ironmaker to see a section of the iron, and ensure that the bloom had been properly consolidated. It also allowed the purchaser to see for himself that he was buying a sound bloom. Other pieces of equipment which required purchase and repair were the various containers used to carry material about the works. Troughs were used to carry ore, and a *scope,* or scoop, was employed, perhaps in measuring quantities of charcoal. Pairs of *coddes,* or bags, were also bought, although their purpose is unclear. In the eighteenth century John Fuller, at Heathfield Furnace, described the baskets, called boshes, which his fillers used for loading the charge of ore and charcoal into the furnace.[19] *Treys, or* troughs, at Tudeley may have had the same purpose.

The works underwent rebuilding in 1343, and substantial refurbishment in 1350, and there is sufficient detail to make it clear that the works included a building of about the size of a large shed; perhaps about 500 square feet ground area. It was timber framed and had lath-and-daub walls, and a roof covered in wooden boards, a practice not uncommon in that period.[20] The provision of a lock and key in the lease granted to Richard Colpeper in 1354 makes it clear that it would be unoccupied for lengthy periods, while expensive tools and equipment were stored inside. It is not clear, however, if the furnace was within the building as was suggested by the foundations of the building excavated at Minepit Wood, Rotherfield. In that example conjectural reconstruction envisaged a daub-and-wattle enclosure, with a thatched area at

one end covering the bellows, and a roof and chimney above the furnace.[21] At Tudeley the 1400 feet of board purchased for the roof suggests a structure which was altogether different.

Of the manpower at the ironworks, references to named individuals are few. Generally the only skilled personnel mentioned were the blowers who, from 1350, we know were four in number; a master blower, named in 1354 as John Tubbe, and three other blowers. Working two at a time would mean that there was just one furnace, which corresponds well with the production of a bloom a day accounted for in the payments to the blowers, allowing for Sundays and other holy days. The only other worker mentioned is a contract stone digger. The accounts mention several other individuals, apart from Elizabeth de Burgh herself. The first account, from 1329 to 1330 was kept by Richard of Grofhurst, who was keeper of Southfrith Chase, but from the following year it was Lady Elizabeth's chamberlain, John of Mesynglegh, who took over supervision of the works, although for the half year to Michaelmas 1334 the works were let to Sir Thomas of Gedeworth. The accounts resumed in 1350, by which date Thomas Springet, who had earlier been lessee of the works, was keeper. He was to hold that position, aside from a period of seven weeks between September and November 1353, until Michaelmas 1354. That brief hiatus in Thomas Springet's tenure is explained by his failure to pay the rent, for the works were taken in hand for the duration by John Parker, who was the then chamberlain and receiver of Southfrith, until Springet had paid up. Thomas Judde, Parker's predecessor as chamberlain, figures in the accounts for 1350-51, supervising the carpentry works when the building was being renovated. Finally, in September of 1354, Richard Colpeper, identified by Giuseppi as a member of a Pembury family that, in succeeding centuries, had other interests in the iron industry, obtained a three-year lease of the works, and the accounts mention the ironworks only briefly thereafter, until 1375 when references cease altogether.

Of particular interest are the costs incurred by the ironworks. Each year's accounts contain both income and expenditure of generally similar elements. The income largely arises from the sale of blooms, although there are occasional references to other sales, such as dead wood being sold to the charcoal burners, and ore being sold by the manor when the works were let in 1333. In most years the income exceeds the expenditure, although the low income in 1332-3 and the correspondingly high income in the following year resulted from sales in one year being carried over into the next. In 1350-1 high expenditure was due to renovation of the building. An unusual sale was of *graynes* of iron, although there is no indication as to the market for them. It is possible that the iron grains were droplets of carburised iron. The use of similar beads of cast iron, a by-product of the bloomery process, has been observed in steel making in eastern and southern India, but, whether or not this was the case with the *graynes* from Tudeley, the mere fact that they were being made use of points to the existence of a secondary process.[22] Apart from the *graynes* the bloom was the only product of the ironworks. Therefore the bulk of each season's accounts relate to expenditure, which fell into four main categories: the purchase of ore, the purchase of charcoal, the repair of tools and buildings, and the payment of the blowers.

Figure 1 shows the proportions of expenditure over the whole period of the accounts. With one season excepted, the highest proportion of expenditure was on the purchase and carriage of charcoal, which averaged 40% of the money paid. The sale of wood in 1329-30 implied that, unlike in the post-medieval period, when ironmasters often contracted for coppice wood and then simply paid charcoal burners to coal it, the charcoal costs at Tudeley included the cost of the green wood. An average of 23% of costs went on ore, which included the digging, carriage and *elyng,* or burning. Richard Colpeper's 1354 lease of the works, as well as allowing him 50 dozen of charcoal, also let him have enough ore for 300 blooms, that is to

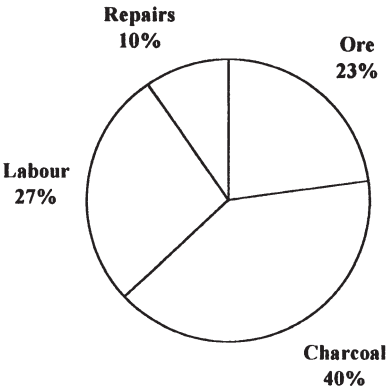

Figure 1. Expenditure 1329-34 & 1350-54

say 100 blooms a year for 3 years, and 12 cartloads of *elyngwode.*

There is no mention of workers at the works other than the blowers, and it is therefore possible that some or all of them were responsible for the payment of labourers who may have worked for them. Their payment accounted for an average of 27% of the expenditure, and included a piece-work payment for each bloom made, and drink money, which was, it states, according to the custom of the country, and is paralleled in the accounts, later in the century, at Byrkeknott in County Durham.[23] There was also a bonus paid according to status, the master blower receiving the largest amount, and his subordinates proportionately less. Between 1331 and 1333 the workmen also received a seventh part of the output of the works, in blooms, from which they could derive some income on the open market; a practice, however, which was short lived. In addition, included in the payments to the personnel at the works in the 1350s were the wages of the keeper, who at that time was Thomas Springet, and also the annual cost of a gown for him. While the proportions expended on ore, charcoal and labour charges remained fairly consistent throughout

the periods of the accounts, repair and maintenance costs fluctuated between a little over half of a percentage point in the early 1330s, and 10% of the out-goings in 1350, when the works were undergoing major repair and re-equipping.

The accounts survive from periods either side of the outbreak of the Black Death, and if one looks at individual amounts, shown in Figure 2, as opposed to proportions of the overall charges, there are clear differences. Firstly, there was the amount for which blooms were sold. In the 1330s these cost an average of 1s. 4d. each, rising to around 3s. 5d. in the 1350s; a rise of 256%. Charcoal prices are a little harder to compare as the quantities in which they were delivered changed during the period of the accounts. Presumably, though, there was a proportional relationship between the ten and the dozen, the two measurements used, which might account for a 20% increase in any case. In the 1330s the price of charcoal averaged at 3s. 7d a *decena,* which with a 20% increase, to bring it up to a *duodena,* would raise it to 4s. 1½d. Twenty years later, though, in the years immediately following the pestilence, it stood at around 8s. for each *duodena;* an increase of nearly 90%. Ore digging does not seem to have suffered such a high inflationary increase, rising from around 19s. for sufficient *oreston* to make a hundred blooms, to about 26s., but it is the wages paid to the blowers that account most significantly for the high increase in the sale price of iron. In the pre-plague years the blowers, or fore-blowers, were paid at a rate equivalent to about 5d. or 6d a bloom, because included in their payment was a seventh part of the production in blooms. Without this their pay came to about 2½d. a bloom. This payment practice had been discontinued by the second period of accounts, so a true comparison between wages before and after the pestilence can only be achieved if the payment-in-kind is compounded. By the 1350s the rate of pay per bloom had risen to an average of 8d., an increase of 320%. Carriage costs also increased, although comparisons are less easy because of inconsistencies in the methods used to itemise

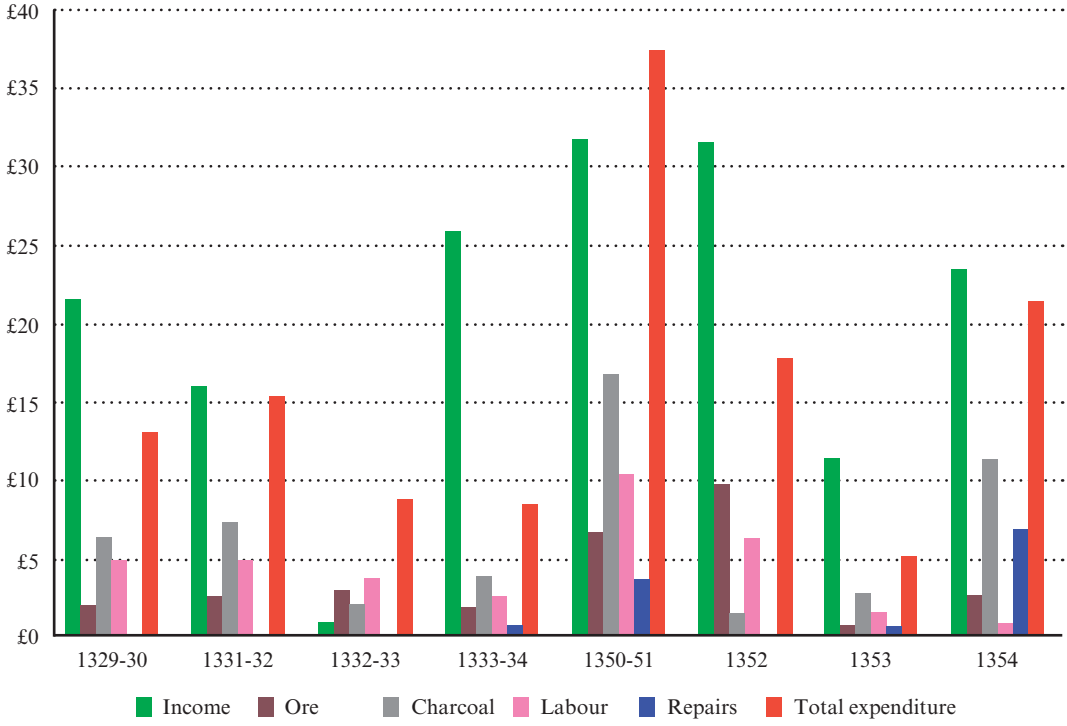

Figure 2. Income and expenditure 1329-34 and 1350-54

them in the accounts. Often the cost of ore and *elyng* wood were combined, and with the carriage of charcoal there is the disparity of the *decena* and the *duodena.* Nevertheless, where direct comparisons are possible the cost of carting ore can be seen to have increased by 150%, while for charcoal it rose by as much as 200%.

Certain problems exist in determining the location of the Tudeley ironworks. Southfrith Chase occupied an area south-east and south of Tonbridge, extending on the southern side of the Medway as far as Tunbridge Wells, and occupying land which later became associated with the Somerhill Estate. Ernest Straker identified several ironworking sites in the Tudeley area, including the water-powered forge site at Postern, and a bloomery site close to Devil's Ghyll, a short distance from Tudeley village.[24] This latter site he favoured as the location of the ironworks mentioned in the accounts. The production of upwards of 150 blooms a year would have resulted in the accumulation of a considerable quantity of slag; perhaps as much as 8 or 9 tons in a year, and the site at Devil's Ghyll does not have anything approaching that quantity. Nor does a site further up the ghyll, discovered a few years ago. It has been suggested that some medieval sites may have been re-occupied as forges in the post-medieval period, and that Postern Forge is therefore a candidate for the Tudeley works, but there is no suggestion of the use of water power in the accounts, and the regular payment to blowers, as well as the absence of secondary ironworking in the form of forging, makes the Postern site unlikely. A site known to Straker, but which he concluded had probably been a post-medieval, water-powered forge, lies at Rats' Castle, to the north east of Postern. Its location is unusual because it is on the edge of the Medway flood plain, but it is also unusual for two other reasons; firstly its configuration is far from the normal form for a forge, having no appreciable pond bay, and secondly because of the unfamiliar form of the slag at the site, of which, nevertheless, there is plenty.[25] Lately the site has become threatened by gravel working,

but archaeological investigation, before it is too late, might answer some questions.

There are indications in the accounts, as well as in the other papers in the Public Record Office which are associated with them, that other ironworking sites existed in Southfrith. The sale of ore, sufficient for 300 blooms, in 1333, suggests a nearby ironworks of similar output capacity to the Tudeley works. An ironworks at Newefrith juxta Bournemelne is mentioned in 1340, which may be the same works. Newefrith is also in Southfrith Chase; its name suggesting an addition to the chase at some date after its boundaries were originally drawn. It lies to the south of Tonbridge, and the Bournemill, to which it lay adjacent, became Vauxhall Furnace in the 16th century. The lessee of the Newefrith works was Robert Springet, who we must assume was a relative of the Thomas Springet who was leasing Tudeley in the same period. Finally there is mention of two other possible ironworks, leased to Thomas Harry, for which no other information is available.

Notes and references

1. Christopher Whittick would like to thank Anne Drewery for her help with the preparation of the translation of the accounts.
2. M. S. Giuseppi, 'Some Fourteenth-Century Accounts of Ironworks at Tudeley, Kent', *Archaeologia,* **64** (1913), 146-64.
3. J. S. Hodgkinson, 'Fourteenth century ironworking in Wartling Manor', WIRG, *Wealden Iron,* 2nd series **16** (1996), 7-9; H. F. Cleere & D. W. Crossley, *The Iron Industry of the Weald* (1985), 95; L. F. Salzmann, 'Industries: Iron', in W. Page (ed.), *Victoria County History of Sussex, Vol.* 2 (1907), 242.
4. ibid.
5. D. W. Crossley, *The Bewl Valley Ironworks,* Royal Archaeological Institute Monograph (1975), 2.
6. Cleere & Crossley, 89, 93-4.
7. J. H. Money, 'Medieval Iron-Workings in Minepit Wood, Rotherfield, Sussex', *Medieval Archaeology,* **15** (1971), 86-111; E. Hart & S. E. Winbolt, 'Thundersfield Castle, Horley: a medieval bloomery', *Surrey Archaeological Collections* **45** (1937), 147-8.8. C. F. Tebbutt, 'An abandoned medieval industrial site at Parrock, Hartfield', *Sussex Archaeological Collections* **113**

(1975), 146-51; WIRG, *Wealden Iron*, 2nd series **11** (1991), 6; 2nd series **18** (1998), 2, 3.

9. Public Record Office (hereafter PRO), JUST 1/941A m11; the document relates to the unlicensed sale of charcoal by John de Wroth (?Worge, in Brightling), with whom an ironworking connection has been suggested in note 3. G. T. Lapsley, 'The Account Roll of a Fifteenth-Century Iron Master', *English Historical Review,* **14** (1899), 511. Dr David Postles has suggested that the *duodena* may also have been used for cloth.
10. The quantity of *elyngwode* presumably had to be estimated because it could not be known precisely, when the lease was drawn up, how much would be required to burn the ore for 300 blooms.
11. Money, 88-90, 93-4.
12. H. R. Schubert, *History of the British Iron and Steel Industry* (1957), 140.
13. ESRO, ASH 1815.
14. From the Old English *eage,* meaning eye.
15. From the Scandinavian *eg,* meaning a wooden/oaken rod; I am grateful to Arne Solli for this suggestion.
16. Cleere & Crossley, 101.
17. Schubert, 131-3.
18. P. Craddock, pers. comm.
19. R. V. Saville, 'The operation of Charcoal Blast Furnaces in Sussex in the early Eighteenth Century', *Historical Metallurgy*, **14**, 1 (1980), 66-7.
20. M. Wood, *The English Medieval House* (1965), 292.
21. Money, 110.
22. J. Percy, *Metallurgy: Iron and Steel* (1864), 261-2; T. H. Holland, 'Preliminary Report on the Iron Ores and Iron Industries of the Salem District', *Records of the Geological Survey of India*, **25**, 3 (1892), 135-59; I am most grateful to Dr Paul Craddock for these references.
23. Lapsley, 512.
24. E. Straker, *Wealden Iron* (1931), 220-2.
25. WIRG, *Wealden Iron,* 2nd series **6** (1986), 53.

Accounts 1329-1330

Account of Richard de Grothurst, keeper of Lady Elizabeth de Burgh's chase of Southfrith, 1 Nov 1329 - 29 Sep 1330

He answers for £8 3s 8½d for the issues of the works as over

sum £8 3s 8½d

Account of the works of Tudeley for 1329-1330

He answers for £20 0s 11½d for the sale of 194 blooms of iron of the issues of the said works, at 15½ marks [£10 6s 8d] per hundred; and of 28s for dead wood in Southfrith sold for making charcoal for blowing the said blooms

sum £21 8s 11½d

In digging stones for 194 blooms with carriage of them to the hearth 40s;
in burning them *(elendis)* 3s 6d, at 2s per 100

In 36 tens of charcoal bought for making the said blooms £6 6s (at 3s 6d per ten);
in the salaries of the workmen for making 194 blooms £4 8s 11d (at 5½d a head);
in the workmen's drink-money 20d;
in their bonus (*gersuma*) 3s 6d; in repairing tools with grease bought for the bellows 20d

sum £13 5s 3d; and he owes £8 3s ½d and answers over

(PRO SC 6/890/22)

Accounts 1331-1332

Account of John de Me[synglegh], chamberlain of Lady Elizabeth de Burgh, Lady de Clare for Southfrith, 30 Sep 1331 - 30 Sep 1332

Account of the works of Tudeley for 1331-1332

He answers for 224 blooms made of the issues of the works this year; of which in the payment of the workmen for making them 32 blooms, taking for their work the seventh bloom; in sale 192 blooms

He answers for £16 for 192 blooms of iron sold at 20d each

In digging stones for 224 blooms of iron 40s 4d, at 18s the hundred;
in carriage of them to the hearth 12s 2¼d [?];
in blowing them 4s 6d, at 2s per 100;
paid to the fore-blowers for their work by custom 42s, at 2¼d for each bloom;
in [41 tens] of charcoals bought, each ten containing 24 quarters, for making the said blooms [and] burning them £6 13s 3d, at 3s 3d per ten;
in the carriage of them to the works 13s 8d, at 4d per ten;
in the workmen's drink-money 2s;
in the repair of various tools of the said works 2s;
in the wage of the workmen which is called bonus (*gersuma*) 3s

sum £12 12s 11¼d

sum total of expenses £12 12s 11¼d; and he owes 67s [¾d] whereof he answers as below; and thus he is quit here

(PRO SC 6/890/24)

Accounts 1332-1333

Account of John de Mesynglegh, chamberlain of Lady Elizabeth de Burgh, Lady de Clare for Southfrith, 30 Sep 1332 - 30 Sep 1333

He answers for…
And for 12s for stones sold for 300 blooms of iron, at 4s a hundred
sum 12s

In allowance made to the smiths for 198 blooms made at Tudeley which remain over to next year £7 10s 11¾d

Account of the works of Tudeley for 1332-1333

He answers for 231 blooms of iron of the issues of the works of Tudeley this year

sum 231 blooms

of which in the payment of the workmen for making them 33 blooms, taking for their work the seventh bloom

sum 33 blooms; and there remain 198 blooms

In digging stones for 231 blooms of iron 41s 6½d, at 18s the hundred;
in carriage of them to the hearth 11s 6d, at 5s the hundred;
in burning the stones 4s 7½d, at 2s the 100;
in the wage of the the fore-blowers by custom 43s 3½d, at 2¼d for each bloom;
in 7½ tens of charcoals bought for making the blooms and burning the stones, besides 34 tens made from the lady's wood, 30s, at 4s per ten; in the carriage of the said 34 tens of charcoal from the lady's wood to the works 11s 4d at 4d per ten;

in the workmen's drink-money 2s 1d;
in the repair of various tools of the said works 2s;
in grease bought for greasing the bellows 3d;
in the wage of the workmen which is called bonus (*gersuma*) 4s

sum £7 10s 11¾d

(PRO SC 6/890/25)

Accounts 1333-1334

Account of John de Mesynglegh, chamberlain of Lady Elizabeth de Burgh, Lady de Clare for Southfrith, 29 Sep 1333 - 29 Sep 1334

He answers for ..; and for £24 10s for 294 blooms sold as over, at 20d a bloom; and of 6s 8d of the farm of the works of Tudeley from Easter to Michaelmas for half a year this year, let in the month of March by Sir Thomas de Gedewerth

sum £24 16s 8d

and for 20s for stones sold for 400 blooms this year, at 5s a hundred

sum 20s

He accounts for the making and expenses concerning 112 blooms made at the works of Tudeley before Easter as is more fully contained on the back £6 13s 0½d

He accounts for 198 blooms remaining in the said works upon last year's accounts; and for 112 blooms made there this year before

Easter; and then the said works was let to farm by Sir Thomas de Gedewerth

sum 310 blooms

of which in the payment of the workmen for making them 16 blooms, taking for their work the seventh bloom; in sales as below 294 blooms

and nothing remains

He accounts in digging stones for making 112 blooms as above 22s 6d, at 20s the hundred;
in carriage of them to the hearth 5s 7½d, at 5s the hundred;
in burning the stones for the blooms 2s 3d, at 2s the 100;
in the custom of the fore-blowers for the said blooms 21s, at 2¼d for each bloom;
in mending the tuyere 8d;
in the workmen's drink-money 16d;
in 20 dozens of charcoals for the said blooms, with carriage to the works 76s 8d, at 3s 10d a dozen;
in the wage of the above workmen 3s for the half-year

sum £6 13s 0½d as is accounted below

(PRO SC 6/890/26)

Accounts 1350-1351

Account of Thomas Springet, keeper of the works of Tudeley ~~from 25 October 1350 to 30 July 1351 for 38 weeks~~ from 16 October 1350 to 30 July 1351 for 41 weeks

He answers for £4 8s 10d received from 26 blooms sold, at 3s 5d a bloom;
and for £8 16s 3d received from 47 blooms sold, at 3s 9d a bloom;
and for ~~£18 11s~~ £19 8s 6d received from 111 blooms sold, at 3s 6d a bloom;
and for 6d received from *graynes* sold

sum £32 14s 1d <checked>

He accounts for carpentry of the said works by the view of Thomas Judde 6s;
800 nails bought for the same 4s;
2000 prigs bought for the same 2s 2d;
in daubing the works 18d;
in making the hearth of the said works 16d;
in a pair of bellows bought 12s, by the view of Thomas Judde;
in an axe bought for splitting iron 12d;
in mending the axe with steel 3d;
in two tuyeres of iron bought 2s 8d;
in a hammer bought to break stones 1d;
in an *egyson* bought 1d;
in two sieves bought 5d;
in a *scope* bought 1¼d;
in a clay pot bought to carry water 1d;
in a pair of bannasters bought 12d;
in two troughs bought to carry stones 5d;
in a hand-cart bought 7d;
in a lock and key bought 3d;
in grease bought for the said bellows 15d;
in white leather and 3 hareskins bought for the bellows 3d;
in a new ox-hide bought for covering the bellows 5s;
in making 26 *egyn* for the tuyeres 6s 6d, at 3d an *ege*;
in making the bellows 6d

sum 47s 5¼d <checked>

He accounts for payments for digging stones for the said ~~247~~ 252 blooms ~~66s 2½d~~ 68s, at 27s for 100;
for digging stones for the 158 blooms which remain in stock to next year 41s, at 27s for 100;
to the stone-digger by contract made by Thomas Judde for a tunic 5s;
in the carriage of 250 stones and *olwode* 20s, at 8s for 100;
in burning the said stones 5s, at 2s for 100;
in 16 dozen of charcoal bought 116s 8d, at 6s 8d the dozen;
in 24 dozen of charcoal bought £9 12s, at 8s the dozen, bought from the lady's wood with Thomas Judde by the view of John Parker;
in carriage of the said 40 dozen of charcoal 23s 4d, at 7d the dozen;
in blowing 158 blooms £4 18s 9½d, at 7½d a bloom;
in blowing ~~89~~ 94 blooms ~~57s 5½d~~ 60s 8½d, at 7¾d a bloom;
in the drink-money of 4 blowers for 36 weeks 3s, at 1d a week;
for the bonus (*gersuma*) of the master-blower for three quarters 6s, at 2s a quarter;
in the bonus of the second blower for the same time 2s 9d, at 11d a quarter;
in the bonus of the third blower for the same time 2s 3d;
in the bonus of the fourth blower 2s for the same time, at 8d a quarter

sum £31 16s 6d <checked>

He accounts in the wages of the said keeper for the time of the account, by contract of Robert Marchal and Walter Colpepyr 20s;
for a gown for the said keeper 10s a year by the same contract

sum 30s <checked>

sum of all expenses and liveries £35 13s 11¾d

and thus is the said Thomas in excess 59s 10¼d

profit this year with the newly-constructed building and the iron remaining valued as over at £11 5s 7d

He answers for 247 blooms of iron received from the issue of works; from the same issue as is checked upon account 5 blooms

sum 252 <checked>

of which he accounts in sale ~~179~~ 184 blooms as below

sum ~~179~~ 184; and there remain 68 blooms <checked>

He answers for 40 dozen of charcoal received from purchase as appears by a tally against John Parker the forester

sum 40 dozen <checked>

of which he accounts in the making of the said ~~247~~ 252 blooms 39½ dozen, by the view of the said John Parker

sum 39½ dozen; and there remains half a dozen

He accounts for stones called *orston* received from digging in the forest for 405 blooms as below

the sum is clear

of which he accounts in the making of ~~247~~ 252 blooms of iron as above; and there remain stones called *orston* [sufficient] for 158 blooms in stock upon next year's account as below

(PRO E101/485/11)

Accounts 1352

Account of Thomas Springet, keeper of the works of Tudeley from 14 January 1352 to 31 July 1352 for 28 weeks and 2 days

He answers for £13 3s 2¼d from the arrears of his last account

sum £13 3s 2¼d <checked>

Of 53 blooms of iron of the issue of the lady's works sold during the time of the account £8 3s 5d, at 3s 1d a bloom;
of 24 blooms sold 76s, at 3s 2d a bloom;
of 26 blooms of iron of the issue of the said works sold £4 6s 8d, at 3s 4d a bloom;
of 27 blooms sold £4 10s, at 3s 4d a bloom;
of 13 blooms of iron sold 42s 4d, price of a bloom as above; for *graynes* of iron sold 3d

sum £22 19s 8d <checked>

sum total of receipts with the arrears £36 2s 10¼d <checked>

In making 9 tuyeres of iron 2s 3d;
in trimming the works axe with steel to split iron 6d;
in grease bought to grease the bellows 6d;
in leather bought for the said bellows 1½d;
in mending a works sieve 1d

sum 3s 5½d <checked>

In 22 dozen and 11 seams of charcoal bought in the lady's chase £9 2s 3d, at 8s a dozen;
in digging stones for making 87 blooms of iron 21s 9d;

for the carriage of the said stones 6s 8d, at 8s for 100;
in burning 143 blooms 2s 9d;
in carrying 22 dozen and 11 seams of charcoal to the works 13s 3¼d, at 7d the dozen;
in blowing the said 143 blooms of iron £4 12s 4¼d, at 7¾d a bloom;
in the drink-money of 4 blowers for 21 weeks 21d, at 1d a week among themselves according to the custom of the country;
for the bonus *(gersuma)* of the master-blower for one quarter of a year 2s;
in the bonus of the second blower for half a year 2s;
in the bonus of the third blower for the same time 2s;
in the bonus of the fourth blower for the same time 16d;
in the wages of Thomas Springet the keeper of the lady's works for the time of the account 15s;
for a gown bought for the said keeper annually 10s by a contract made by R[obert] Mareschal and W[alter] Colpeper

sum £17 13s 1½d <checked>

delivered to Thomas Judde, the chamberlain of Southfrith, £13 3s 2¼d

sum £13 3s 2¼d <checked>

sum of all expenses and liveries £30 19s 9¼d

and the said Thomas Springet owes 103s 1d

memorandum that Thomas Springet delivered of the above arrears the following year to Sir W Mant by a tally 60s; and 43s 1d were assigned to be delivered to John Parker, the chamberlain of Southfrith, in the said following year

Profit of the works this year £6 8s 3¼d as appears by this account and the last account before

of the issue of the works during the time of the account 143 blooms of iron

sum 143 <checked>

of which he accounts in sales as below; and it balances <checked>

of purchases for making iron in the lady's forest 22 dozen 11 seams of charcoal

sum 22 dozen 11 seams <checked>

of which in the cost of making 143 blooms 20 dozen and 11 seams

sum 20 dozen and 11 seams <checked>

and there remain 2 dozen of charcoal <checked>

of the remaining *orston* for making 68 blooms; of the digging of stones of *orston* for making 87 blooms

sum – o*rston* for 155 blooms <checked>

of which in costs for the 143 blooms made above

and there remains *orston* for making 12 blooms of iron <checked>

(PRO E1O1/485/11)

Accounts 1353

Account of John Parker, keeper of the works there [Tudeley] for seven weeks of the months of September, October and November 1353

He is charged with 103s 1d from the arrears of Thomas Springet the late keeper of the works there

sum 103s 1d <checked>

Of 26 blooms of iron of the issue of the said works sold during the time of the account £4 2s 10d, at 3s 2d a bloom;
of 13 blooms of iron afterwards sold by John Parker 41s 2d, at 3s 2d a bloom

sum £6 4s <checked>

sum total of receipts with the arrears £11 7s 1d <checked>

in digging stones of *orston* for making 33 blooms of iron 8s 11¼d, at 3¼d for each bloom

sum 8s 11¼d <checked>

in 5 dozen [and] 8 seams of charcoal bought for the work of the works 44s 7¾d, at 8s the dozen

sum 44s 7¾d <checked>

in blowing 26 blooms of iron before 29 Sep 1353 20s 7d, at 9½d each bloom;
in making the hearth anew for the said works 9½d;
in piercing and mending two tuyeres 10d;
in blowing 13 blooms of iron after 29 Sep 1353 8s 1½d, at 7½d each bloom;
in the carriage of *orston* and *olewod* for making 33 blooms of iron 3s;

in the carriage of 5 dozen [and] 8 seams of charcoal to the works 6s 1d;
in burning ~~33~~ 39 blooms of iron 9d;
in the drink-money of 4 blowers for 7 weeks 7d;
for the bonus (*gersuma*) of the said blowers for ~~26~~ 39 blooms of iron 18d;
in the new purchase of a pair of bellows from Henry Jon 9s;
in grease bought to grease the bellows 3d

sum 51s 6d <checked>

delivered to the receiver of Southfrith of the arrears of Thomas Springet the late keeper of the works there 103s 1d

sum 103s 1d <checked>

sum of all expenses and liveries £10 8s 2d; and the said John Parker owes 18s 11d which he delivered to the receiver of Southfrith, of which he answers at the foot of his account there; and so the said John is quit here

[stock]

of the issue of the works during the time of this account 26 blooms of iron; for the issue after 29 Sep 1353 13 blooms of iron

sum ~~26~~ 39 blooms of iron; sold as over; and it balances; <checked>

of remains 2 dozen of charcoal; of purchase for making iron in the lady's wood 5 dozen and 8 seams of charcoal

sum 7 dozen and 8 seams <checked>

of which in the costs of making ~~26~~ 39 blooms of iron during the time of this account ~~4½ dozen~~ 6 dozen and 13 seams

sum 6 dozen and 13 seams; and there remain 9 seams of charcoal for next year <checked>

of the remains *orston* for making 12 blooms of iron;
of digging stone of *orston* in the lady's forest during the said time for making ~~52~~ 33 blooms of iron

of which in the costs of making the above 39 blooms of iron 39 blooms of *orston*

sum 39; and there remains *orston* for making 6 blooms of iron <checked>

there remain in the said works two pairs of bellows

(PRO E101/485/11)

Accounts 1354

Account of Thomas Springet, keeper of the works there [Tudeley] for 25 weeks in 1354

in arrears nothing because he was quit in the last account

sum nothing

Of 74 blooms of iron of the issue of the works sold £12 19s, at 3s 6d a bloom;
of 3 other blooms of iron of the issue of the said works sold 10s, at 3s 4d a bloom;
of 61 blooms of iron of the issue of the said works sold £10 3s 4d, at 3s 4d a bloom;

of the leather of an old pair of bellows sold 6d

sum total of receipts £23 12s 10d <checked>

in digging stones of *orston* for making 122 blooms of iron 32s 10½d, at 3¼d for each bloom;
in digging stones of *orston* for making 16 blooms of iron 4s 4d, at 3¼d for each bloom

sum 37s 2½d <checked>

in 14½ dozen and 5 seams of charcoal bought in the lady's forest 118s 10d, at 8s the dozen;
in 8½ dozen of charcoal bought in the neighbourhood 68s, at 8s the dozen;
in 2 dozen and 5 seams of charcoal bought in the neighbourhood at various prices 17s 3d

sum £10 4s 1d <checked>

in blowing 138 blooms of iron during the time of this account 103s 6d, at 9d a bloom;
in mending 4 tuyeres during the same time 12d;
in mending an *augisen* 2d;
in a pair of iron tongs called *loves* bought 2s 6d;
in a pair of *coddes* bought 12d;
in leather bellows bought 12d; in nails bought for them 8d;
in making the said bellows ~~8d~~ 6d;
in grease bought for them 3d;
in the carriage of *orston* and *olwode* for making 138 blooms of iron 10s 6d;
in the carriage of 8½ dozen of charcoal bought in the neighbourhood to the works 9s 11d, at 14d a dozen;

in the carriage of 14½ dozen and 5 seams of charcoal bought in the forest to the works 8s 8d, at 7d a dozen;
in burning (*elyng*) 138 blooms of iron 2s 8d, at 2s for 100;
in one white hide bought for making bellows 3s 6d;
in *brakyng* it 6d;
in a pair of *codd* bought 12d;
in a sieve bought ~~3d~~ 2½d;
in mending 4 tuyeres 12d;
in mending an axe on [several] occasions ~~4d~~ 2d;
in the drink-money of 4 blowers for 25 weeks 2s 1d;
for the bonus *(gersuma)* of John Tubbe the master-blower for three quarters of a year 8s;
in the bonus of the second blower for half a year 4s;
in the bonus of the third blower for three quarters of a year 5s;
in the bonus of the fourth blower for the same time 4s;
in a *trey* for bringing in stones 1½d;
for the carriage of 2 dozen and 5 seams of charcoal bought in the neighbourhood to the works 22½d

sum £ 8 13s 9½d <checked>

in the wages of Thomas Springet the keeper of the said works during the time of the account, together with the share of his gown 15s

sum 15s <checked>

sum of all expenses £21 10s 1d; and the said Thomas owes 42s 9d which he has delivered to John Parker the receiver of Southfrith, of which he answers in his account there; and so the said Thomas is quit here

Profit of the works during the time of the account 53s 8d

[stock]

iron of the issue of the works during the time of the account 138 blooms

sum 138 blooms; sold as over; and it balances; <checked>

charcoal of remains 9 seams;
of purchase in the lady's wood during the time of this account 14½ dozen and 5 seams;
of purchase in the neighbourhood 8½ dozen before the view of the account and 2 dozen and 5 seams after

sum 26 dozen and 5 seams <checked>

of which in the costs of making 138 blooms of iron during the time of this account 24 dozen and 5 seams

sum 24 dozen and 5 seams; and there remain 2 dozen of charcoal <checked>; which remains are delivered to Richard Colpeper in part of the contract of 50 dozen annually

orston and there remains *orston* for making 6 blooms of iron;
of digging stone of *orston* in the lady's forest during the time of this account for making 138 blooms

sum 124 blooms of iron

of which in the costs of making the above 138 blooms of iron 138 blooms of *orston*

sum 138 blooms; and there remains *orston* for making 6 blooms of iron <checked>

which remains are delivered to Richard Colpeper in part of the contract of 300 of *oreston* annually

there remain in the works two pairs of bellows, an axe for splitting iron, an andiron, a pair of tuyeres, a hammer for breaking stones, a sieve, a *scope*, a clay pot for carrying water, a pair of bannasters, two trays for carrying stones, a hand-barrow, a lock and key.

(PRO E101/485/11)

Rebuilding 1343

In two carpenters hired for 22 days for doing the carpentry of the works at Tudeley, taking 7d a day	12s 10d
In making 1400 feet of board for the roofing of the said works, at 5d a hundred	5s 10d
In two men making laths and stanchions for the same, one day	5d
In 3800 nails for the same at 2½d a hundred	7s 11d
In 1500 prignails for the walls of the said works	10½d
In carrying the timber for the same	8d
In [under]pinning and plastering the walls, in all	1s 6d
In hooks and rings [for gates/door-hangings] for the said works	4d

(PRO SC 6/891/7)

Lease, 1354

Lease for three years from 29 Sep 1354 at £13 6s 8d, 20 Oct 1354

Elizabeth de Bourg, Lady de Clare, to Richard Colpeper

the works *(fabrica) of* Tudeley in Southfrith

RC to have sufficient wood for making 50 dozen of charcoal *(carbona),* and that by the view and livery of the chamberlain of Southfrith for the time being, by a tally to be made between them

RC to have *orston* for 300 blooms which he will dig at his own cost and shall be the subject of a tally by the chamberlain as for the wood

RC to have by estimation 12 cartloads of burning-wood *(elyngwode)*
by the livery of the said chamberlain

EB will maintain and make the building of the works at her own costs during the term

there are delivered to RC at the works, at his taking of it,
two pairs of bellows (13s 4d),
an axe for splitting *(scindendo)* iron (3d),
an andiron *(angire)* (8d);
two tuyeres (12d),
a hammer (1d),
a sieve (1d),
a pair of tonges *(loves)* (2s 6d),
two troughs *(alvei,* in 1354 Englished as *trey)* for bringing in stones (1d),
a lock with a key (3d),
all of which RC will return at the end of the term or satisfy EB for their price at her choice

given at Bardfield [in Essex].

Hawksden Forge, Mayfield, and the Sands Family

Anne Dalton

The gazetteer entry for Hawksden Forge in *The Iron Industry of the Weald*[1] refers to a Thomas Sands obtaining pig iron from Waldron Furnace from 1699 and being tenant of the forge between 1702 and 1719. There appear to have been, in fact, three Thomas Sands in that period, and a John Sands was tenant of Hawksden Forge between 1702 and 1727.

The first Thomas Sands in Mayfield, in the seventeenth century, was Thomas, 'son of William',[2] son of William Sands and his wife, Anne Fryday, both of Salehurst, the latter baptised in Lamberhurst on 29th June, 1606.[3] His grandmother, Martha Fryday of Salehurst, left her grandson, Thomas, and his sisters, bequests in her will, made in 1621.[4] He was buried in the nave of the parish church of St. Dunstan in Mayfield, on 20th July, 1668, under a cast-iron grave slab, described as 'a crude and poorly executed slab with neither lines nor letters straight and several letters and numbers reversed'.[5] This gave his age as 72 (the 7 was reversed on the slab) instead of his correct age of 62.

Thomas 1, in his will, made in February, 1665, and proved on 10th November, 1668, which he did not sign, but on which he made his mark, called himself 'Thomas Sands, the Elder, hammerman'.[6] In December, 1665, he became the tenant of Hawksden Forge, Mayfield, property of the Moneys of Glynde, who were to rebuild the forge.[7] He had been farming some of the Morley farms for some years[8] and in February 1667, there is a reference to him being in occupation of the farms of Gillhope, Carleham and Winters, some 200 acres in all.[9] In the Glynde archives there is also a lease, not dated but of the same

period and marked 'not executed', of these farms to Thomas Sands, the younger, for 20 years at a rent of £60 a year.[10] There is also a reference of this period to the repair of the 'fludgates and the gutte' of the forge, during which work Thomas' son, William, was employed carrying timber and clay.[11]

Thomas Sands 1 appointed his son, Thomas 2, to be his executor. The first bequest was of £5 to his apprentice, Mary Russell, when she reached the age of 21. He then left 20 shillings each to two nieces, daughters of one of his two sisters, and the same amount to the two sisters. He then remembered his wife, Margaret, who was to receive 10 shillings. His daughter, Anne Peckham, was to get £5 within two years of his death and he made bequests to his grandsons, Thomas, son of Thomas Sands, £10, Thomas, son of John Sands, £6, and Thomas Peckham, son of his daughter Anne, £4, when they reached the age of 21. He then left his son, Thomas, and his two other sons, John and William, shares in the money to be raised by selling his goods and chattels. There were lengthy instructions to the three sons as to how the stock and chattels should be divided, so that, finally, Thomas should have £20 more than John, and John £20 more than William. All his leases were left to Thomas, who thus inherited the leases to all the farm buildings and land and also that of Hawksden Forge.

The will of Thomas Sands I shows him to have been a wealthy yeoman farmer and hammerman. This is shown particularly well in his request to Thomas 2 that £10 should be spent on his funeral, of which £2 should be on bread for the poor on the day. I suggest that the remaining £8 was used in acquiring space in the nave of St. Dunstan's Church and having the iron grave slab cast. This could, perhaps, have been cast at Hawksden Furnace, reported as working in 1667, with members of the family trying their hands at moulding and casting, for I doubt that a good founder, anxious for his reputation, would have allowed such a slab to leave his furnace for all to see when they went to church.[12]

Thomas 2, who had married Ann Springett of Benenden at

Ticehurst on 25th May, l658,[13] had a son, Thomas, baptised on 11th September, 1659, and a daughter, Anne, baptised in July, 1661,[14] and a son, William, baptised in March, 1666. It seems from the parish register that the young Thomas was buried on 24th November, 1667, following which another child, baptised in March, 1668, was also called Thomas. He was buried in March 1669. Twins, John and Elizabeth, were baptised on 21st January, 1673, and a third Thomas, to whom I will return, on 22nd August, 1676.

There are no papers in the Glynde archives to throw light on the forge after the death of Thomas 1 in 1668, until July 1699, when John Durrant, carpenter, of Withyham, contracted to repair the forge for the estate, for £11.[15] During the summer and autumn of 1701, Thomas 2 was writing to Richard Barnard, the Glynde agent, about the problems he was having in selling cattle in Tonbridge, in order to be able to pay his rent, and the difficulties he had with a carpenter for the repairs needed to Winters Barn (occupied by hop-pickers at night and empty during the day) and the repairs needed to the coal-wain of the forge and also to the anvil.[16] On 7th November, 1701, William Sands wrote to Barnard to say that his father had died, following a fall from his horse, while returning at night from Mayfield Fair.[17] On behalf of his mother, William invited Barnard and his son to attend the funeral on 10th November, 1701 (Thomas was buried as 'Thomas Sands Senior'). There is nothing in the archives after 1701 about William. John, the second son, would appear to have inherited his father's leases.

John Sands was soon in trouble with the Glynde agent about non-payment of rent, writing to say, on 28th December 1701, that he had not any money since his father's death but hoped to be able to send some soon.[18] According to the rent-book of the Glynde Estate,[19] which contains the accounts of John Sands from 1702 to 1719, John was farming Little Bainden and Parkelands in 1702. In March Parkelands went to Stephen Jones for nine years[20] and in June 1714 John signed a lease for eleven years at a rent of £22, a year for Hawksden Park.[21] As

to the rent of the forge, the rent-book shows that John began paying £10 a year at Christmas 1703, the rent remaining the same until the account book ends at Michaelmas 1719.

Now the third Thomas Sands comes into the history of Hawksden Forge, with the accounts of Heathfield Furnace covering the period 2nd November, 1721, to 3rd May, 1726.[22] John Sands' account opens with a debit of £41 0s. 6d. and the total cost of iron brought from Heathfield, until the account was closed, was £413 5s. 4d. He paid his debt 'at the furnace' in instalments until May 1724. The next payment, on 13th August 1724, was by 'his son' and then the rest was paid off by 'Thomas Sands'. A 'Mr. John Sands' was buried on 13th August 1724.[23]

There is, however, a fourth Thomas Sands, owner of Spratsreed Farm in Mayfield, whose burial as 'Thomas Sands at the Forge' was recorded to have taken place on 6th April 1704.[24] In his will, dated 18th March, 1703, Thomas called himself 'forgeman'.[25] He left his son, Nicholas, as executor, with power to dispose of Spratsreed in order to pay the legacies of £20 to his wife, Hannah, within a month of his death and £20 to his children, Thomas, Mary and Hannah, to be paid three years after his death, each receiving 20 shillings a year in interest until then. The youngest child, William, was to receive £20 to be paid to his mother within one year of his father's death. The rest of his goods and chattels, and Spratsreed, were left to Nicholas. This Thomas, 4, is, I suggest, the Thomas, son of John, referred to in the will of Thomas 1.

From the above it is clear that Thomas Sands 2 was tenant of Hawksden Forge from the summer of 1668 until his death in November 1701, and that the purchase of pig-iron from Waldron thereafter could have been made by Thomas 4, until his death in April 1704, and then by Thomas 3, acting for his father, John, who paid the rent for the forge.[26] What is certain is that the formal connection of the Sands family with Hawksden Forge, a period of some 62 years, came to an end with a new lease of the forge, in May 1727, to Thomas

Hussey and John Legas, at £20 a year, instead of the £10 a year paid by the Sands family from 1665.[27]

There was one more Thomas Sands in Mayfield during the latter part of the seventeenth century and the early years of the eighteenth, and that is the Thomas 'citizen and wine-cooper of London' who died in 1708 aged 32, according to the fine cast-iron memorial slab in the nave of St. Dunstan's Church in Mayfield. While research into the history, in London, of this Thomas Sands is continuing, I suggest that he was the youngest son of Thomas 2 and Ann Sands, who was baptised on 22nd August 1676, to whom I have referred above, and that his memorial was deliberately placed at the foot of his grandfather, Thomas Sands 1, yeoman and hammerman, who died in 1668.

I attach a tentative genealogical tree (Figs. 1-3) for the Sands I have mentioned in this article, but there were many more Sands in the eastern Weald during the 17th and 18th centuries, many connected with the iron industry. There was Laurence Sands, collier, baptised in Frant, whose daughter, Katherine, was baptised in Mayfield in December 1622; Robert Sandes, forgeman, of Frant who gave 6d. to the relief of Irish Protestants in 1642;[28] and John Sands, forgeman, who with his wife and family, returned from Burwash to Hawkhurst in 1675.[29] The Wadhurst register records many Sands in the 1700s, including a 'Thomas Sands, the Elder of Hook Green, forgeman', who left a will made on 4th May 1756.[30] In Mayfield a William Sands, ironmonger, left a will, dated 27th August, 1745, proved on 31st May 1748.[31]

I am most grateful to Brian Awty for his very generous help with the family tree, the wills of Thomas 1 and of his grandmother and the extended Sands family. My thanks also to Christopher Whittick for his advice in the Record Office, and to Jeremy Hodgkinson for his constant encouragement and help.

Notes and References

1. H. F. Cleere and D. W. Crossley, *The Iron Industry of the Weald*, 2nd. edition (1995), 335.
2. Mayfield Parish Register, East Sussex Record Office (hereafter ESRO), PAR422/1/1/1.
3. Centre for Kentish Studies, Maidstone, P 216/1/1.
4. ESRO, A18 p.103.
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6. Public Record Office (hereafter PRO), PROB11/328 f.51, 51 v, 52.
7. ESRO, GLY 1230.
8. ESRO, GLY 1242.
9. ESRO, GLY 175 & 176.
10. ESRO, GLY 1628 & 1629.
11. ESRO, GLY 2954.
12. Cleere & Crossley, 335.
13. ESRO, PAR 492/1/1/1 (I owe this reference to Brian Awty).
14. ESRO, PAR 422/1/1/1.
15. ESRO, GLY 3214.
16. ESRO, GLY 2756, 2757, 2758, 2759, 2760, 2761.
17. ESRO, GLY 2750.
18. ESRO, GLY 2755.
19. ESRO, GLY 2784.
20. ESRO, GLY 1232.
21. ESRO, GLY 1233.
22. ESRO, SAS/RF 15/27, folios 238, 309.
23. ESRO, PAR 422/1/1/2.
24. ESRO, PAR 422/1/1.
25. ESRO, SM/D4 XA26/11.
26. Cleere & Crossley, 335.
27. ESRO, GLY 1234.
28. M. J. Burchall, East *Sussex contributors to the relief of Irish Protestants 1642*, Sussex Genealogical Centre Occasional Paper **10** (1984).
29. M. J. Burchall, *Eastern Sussex settlement certificates 1670-1832*, Sussex. Genealogical Centre Occasional Paper **1** (1979).
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31. ESRO, SM/D7 pp.290-1.

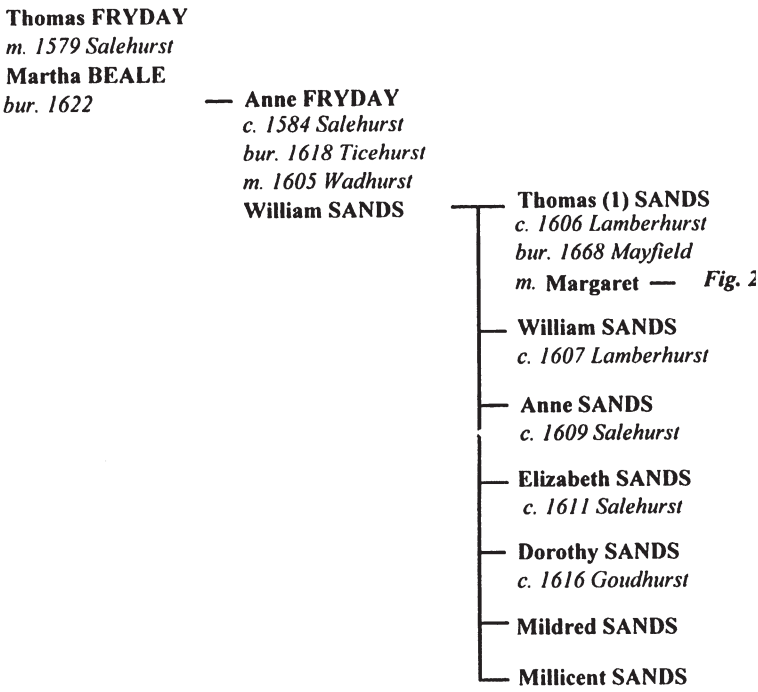

Fig 1: The Sands family of Mayfield, part I
(with acknowledgement to Brian Awty)

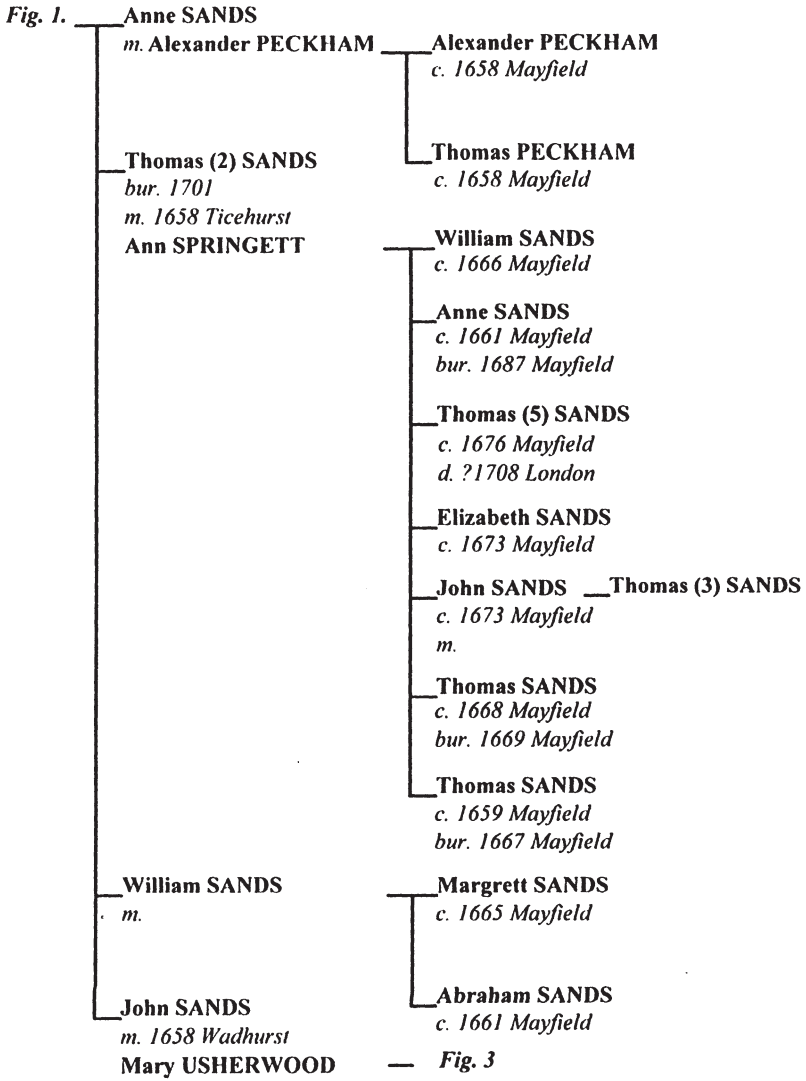

Fig 2: The Sands family of Mayfield, part II
(with acknowledgement to Brian Awty)

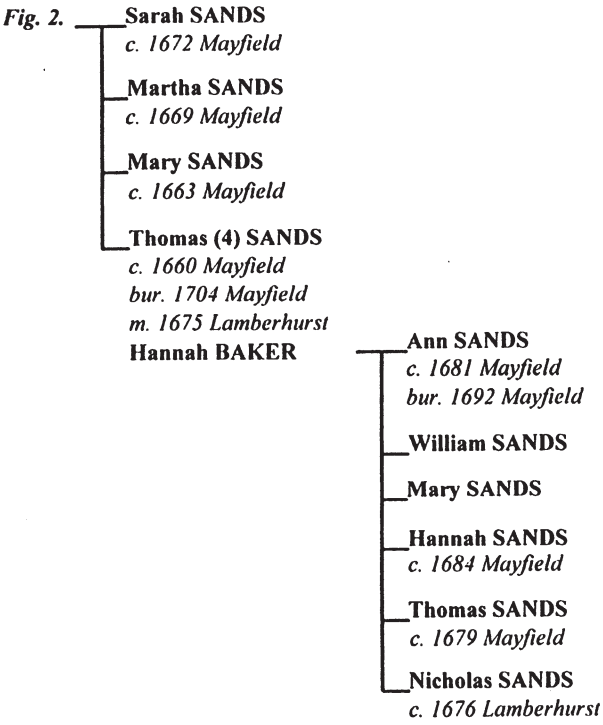

Fig 1: The Sands family of Mayfield, part III
(with acknowledgement to Brian Awty)

‘Brass’ Casting at a Kent Furnace

J. S. Hodgkinson

Evidence that brass (i.e. bronze) cannon were being cast at a Kent iron furnace in the mid-18th century has survived in the form of a copy of an unprovenanced letter. The letter was one of a collection of copies and originals that were found in a flooded kitchen, in 1995, by Mr Christopher Taylor, of Bourton-on-the-Hill, Gloucestershire.[1] Unfortunately the originals were ruined, and it was not possible to discover the source of the letters. In spite of the obvious questions that surround its provenance, the information contained within the letter is of sufficient interest to make it worth publishing. The letter is from a mother to her son, who was undertaking a tour of the continent.

Tonbridge, 28 June, 1758

My Dear Ned,

I have the happiness today of receiving yours from Achen and that of 10 from Basle; l am rejoiced to hear you are well and safe from all the dangers my own imagination, and Sir Thomas’s confusion, created for me to brood over.

I pity you for the tediousness of your journey, and the passing by so many places, that must have raised your curiosity without a power to satisfy it; the heat I shou‘d have thought very terrible, but you never object to that, I hope it has not wasted the little flesh you carried from home.

I suffered from heat excessively yesterday, ‘tis the only hot day we have had since I have been here, and I went with the Bishop of Worcester to see a brass cannon cast, about 7 miles from here [ ] hours too early in the heat of the day,

and spent [ ] in sauntering about the furnaces, but, however 'twas new to me and curious, for we not only saw the casting of a cannon, but the finishing of others, and one part is surprising, they turn the head of the cannon off in a lave, just as they turn a Tonbridge ware tooth-pick case; the master of these works has invented some mixture with the brass which prevents its heating beyond a certain degree, they have fired one 300 times in three hours, and it was no hotter the last hundred than the second.

We had a faint attempt towards a ball last night, but cou'd compass but four minuets and no Country dances, tho' the youngest Donellan came from London, on purpose to exhibit his pretty person.

Mrs Furnese's sister, Mrs Pearse is dead, and has made so odd a will, that Lady [ ] has expectations of getting Gunnersbury and the land [ ].

I need not tell you of Prince Ferdinand's victory, as to be sure you hear the truth better than we do, who call it an absolute one.[2]

I have no more news and am forced to write just after dinner, which does not agree with the waters, so my dear, adieu,

Yours entirely

K Southwell

The only gunfounder who had a furnace in the Weald in 1758, and who was casting bronze guns, was William Bowen. Bowen had been active since the 1720s, and John Fuller sold sows to him in 1729, possibly for the forge at Barden, which lies about four miles southwest of Tonbridge.[3] Bowen also leased a foundry in Upper Ground, Southwark, from the Edward Edwardes Charity, in 1722.[4] He supplied iron and bronze guns, and round shot, to the Board of Ordnance, purchasing old iron metal to remelt into shot, and

implying the use of an air furnace, presumably at his Southwark yard. In 1742 he purchased the freehold of Cowden Furnace, which lies about ten miles WSW of Tonbridge.[5]

The letter states that the furnace that the correspondent visited, in the company of the Bishop of Worcester, lay about seven miles from Tonbridge and, depending on precisely where in Tonbridge they travelled from, either Barden or Cowden could have been referred to. Where this letter adds to our present knowledge is that bronze guns were being cast at one of Bowen's iron furnaces, and that from the mention of 'furnaces' it seems that there were separate smelting areas for each metal. Bronze founding had been carried out in the Weald rarely; in 1567 a Thomas Maye, who may have had Pashley Furnace, was paid for three 'brass' guns;[6] in 1634, John Browne began to cast in bronze, probably at Horsmonden Furnace;[7] and in the late-1760s Edward Raby cast in bronze at The Warren Furnace.[8] Examples of bronze mortars cast by Bowen can be seen at the Royal Artillery Museum, at the Rotunda, Woolwich, and at The Royal Armouries' Artillery Museum at Fort Nelson, near Fareham, Hampshire.

The use of a 'lave' or lathe for removing the feeder head of the gun is at variance with the method used at the Royal Arsenal at about the same time.[9] There the 'head' was sawn off. Presumably the lathe made use of water power, possibly as an alternative operation at the boring mill. A mechanism whereby a saw blade, suitably lubricated, was held in place against a gun would considerably mitigate what must have been a very demanding labour.

The claim, apparently made by the 'master' of the works – and it is not clear whether this refers to the founder or to the ironmaster – that the bronze guns made there could be fired 300 times in three hours, without overheating (a fault to which bronze guns were prone), seems to have been hyperbole. Sustaining such a rate of fire would have been nigh on impossible, allowing little more than half a minute to reload. Furthermore there is no metallurgical modification which would significantly alter the thermal properties of bronze, or

its resistance to high-temperature corrosion or erosion.[10]

Notes and references

1. I am particularly grateful to Mr Taylor, who is editing the series of letters that he found, for permission to print the above letter, which he included in an inquiry he sent to WIRG about the probable location of the furnace described.
2. Prince Ferdinand of Brunswick's defeat of the French at Crefeld, on 23 June 1758.
3. East Sussex Record Office, Lewes, SAS RF 15/27 p.354.
4. Southwark Local Studies Library, 8287.
5. Centre for Kentish Studies, Maidstone, U1280 T2.
6. A. N. Kennard, *Gunfounding & Gunfounders* (1986), 111.
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9. M. H. Jackson & C. de Beer, *Eighteenth Century Gunfounding* (1974), 131.
10. 1 am most grateful to Dr Peter Northover and Dr Henry Cleere for their helpful comments on these aspects of the letter.