

Heavy Metal Mines in the Ochil Hills: Chronology and Context

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INTRODUCTION

In recent decades the mines of the Ochil Hills, in east central Scotland, have attracted the interest of speleologists, mineralogists, ceramists, and botanists¹. In the past they attracted the notice of an industrial spy, of speculators and landowners and of the British government, represented by Sir Isaac Newton in his capacity of Master of the Mint². For a time, in the eighteenth century, the mines seemed to offer almost unlimited riches. But gains were fleeting and often dissipated in endeavours to find further metal³. Ironically, in spite of the investments of skill and money, the deployment of new technologies and attempts to exploit new metals and new seams, the only sustained mineral wealth to flow from the hills was not derived from ‘noble’ metals but from mineral water, the basis of the foundation of the spa at Bridge of Allan⁴.

Historical studies of the silver and cobalt mines at Alva, and of the copper mine at Loss in Menstrie Glen have been published⁵. The Loss mine was the property of the Wrights, lairds of Loss, and the papers of James Wright (1730–1769) revealed a rich cache of papers about his family’s mines and those of his neighbours and show something of his approach to exploiting what clearly seemed a promising resource. Further search has located more documents and this paper begins with an overview of the local mines in the main period of operation in the eighteenth century. The people involved are then considered. The Discussion turns to wider links and contexts.

LOCATIONS AND SITE NAMES

This Report is based on documentary study. No new field-work has been undertaken. The major documented sites can be roughly identified with sites described by Francis and Read *et al* and by Dickie and Forster (1974, inset map)⁶. Many documents refer to the mines of ‘Airthrey’, potentially including all or any of the two Bridge of Allan mines and the Logie mine. The documents rarely locate mine sites precisely and are not consistent in naming them, most often identifying them only by the estate name. As property boundaries changed, a single site could be in different estates at different times. Further confusion has crept in since the eighteenth century. So far as possible this paper adopts a uniform nomenclature employing the eighteenth century names and ignoring later accretions; see Table 1: footnotes 7 8 9 10 & 11 refer to information in the Table.

Table 1: Mine Site Names in the Ochils.

Site	Dickie & Forster name & number	Francis & Read name & OS Ref	Notes
Bridge of Allan	Airthrey Hill mine (2) and probably east bank of Allan Water (1).	Allan Water (NS787983) and Airthrey Hill Mine (NS795978).	The probable source of the ‘Airthrey silver mine’ story.
Logie	Airthrey Silver Mine (3).	Airthrey Silver Mine (NS 81529720).	‘Old’ mine on record in 1715. Sketch of site in Wright of Loss papers. No evidence of silver production here.
Blairlogie	Blairlogie (4).	Blairlogie Trials; Fig 31 shows extensive trials.	Only passing references found.
Loss	Jerah (5).	Jerah Mine (NS83239949 and NS83009982).	This mine is on Loss rather than Jerah which south and east of the Crunie Burn.
Menstrie	Balquharn Mines (7).	Balquharn Burn Trials, various sites	Probable site of Earl of Stirling’s

		noted around NS86539782	mines of c.1607 also worked in mid 18 th century.
Carnaughton	Carnaughton (8).	Carnaughton Glen Silver Mine (NS 87819754)	'airshaft' in 1762; said to be barren in 1771
Alva	Alva Silver Mines (9).	Alva Silver Mine, Fig 32 shows the extensive workings.	Many sites identifiable from Alva papers.
Tillicoultry	Sites 10 and 11 cannot be distinguished in the sources.	Tillicoultry (NS91249780) Kirk (NS92349812) & Daiglen Burns (NS91069834).	Only passing references found.
Dollar	Dollar (12)	Dollar Burn (NN94550021)	Only one passing reference found.
Pendreich		Pendreich (NS80659922)	Only passing references found.
Keir/ Wood of Keir might include Knockhill		Western bank of Allan Water (NS787983).	Records cannot distinguish these sites.

CHRONOLOGY OF THE OCHILS MINES

There is no confirmation of the tradition that copper from Mine Wood, Bridge of Allan, was used for 'bawbees' in the late sixteenth century¹². However, a note written by James Wright of Loss in 1763 refers to 'the Earl of Stirling's copper mines near Menstry'. William Alexander, Earl of Stirling, died in 1640; he had been granted the rights to the minerals of 'Menstry' in 1607 and was later involved with the silver mines near Linlithgow; the grant of the monopoly of refining silver in 1611 does not necessarily refer to silver from Menstrie¹³. Notes, seemingly written in the mid seventeenth century, mention a copper 'mine' at 'Airthrey' where the ore also contained silver and gold and another site 'Eastward of Aithree, amongst the Ochels

upon the water of Alquharey, within two miles of the head of the water' where there was copper ore ¹⁴. However, the word 'mine' at this time might only imply the presence of ore rather than actual workings. The only other documentary evidence of working mines in the Ochils potentially before 1714 comes from April 1715 when Dundas of Manor agreed to 'red and let off the water where the mines were formerlie wrought' before new work began on his lands of 'Airthrey' ¹⁵.

The circumstances surrounding the discovery of a major silver deposit at Alva in about 1714 are cloaked in mystery, not least because of the political circumstances. For the discovery corresponded with the outbreak of the 1715 Jacobite rising. Sir John Erskine of Alva was an enthusiastic supporter of his close relative, John, Earl of Mar, leader of the rising. Both fled into exile and the news of the discovery was leaked to government, apparently by one of the miners. Sir John's promise to develop the mines at a time when supplies of silver from other sources were curtailed by war seems to have secured his permission to return to Scotland ¹⁶.

Sir John Erskine followed up the discovery at Alva with widespread interests in mineral extraction. He was a partner in a potash works in Guernsey and in Scots metal mines near Linlithgow and at Leadhills, as well as at Blairlogie and elsewhere; his correspondence even covered copper and lead mining in the Isle of Man ¹⁷. This interest was continued by other members of his family (see below). A key figure in this early phase was Daniel Peck. Henry Kalmeter, a Swedish mining expert who visited Alva in 1719 states that Peck was involved with Sir Charles Erskine at Linlithgow. He expands on this:

An Englishman called Peck, who came to Scotland to look for metals in several places, had in 1714 taken the opportunity of a narrow strip of white sparr, or rock, running up right across a high mountain, to go in there

prospecting, and when he had hardly come one yard, a gland of silver was discovered which was not only rich in itself but also contained pieces or lumps of solid silver which I have seen myself ...¹⁸

Peck seems to have originated in Cheshire but by 1715 Mr Daniel Peck 'of London' was involved with the local laird Dundas of Manor and John Adair, the geographer in the mines at 'Airthrey'. After this partnership was dissolved, Peck entered into another agreement with Dundas and two other local lairds to develop the 'Airthrey' mines. These contracts could refer to either or both of Bridge of Allan or Logie and it is interesting that the Airthrey estate had belonged to the Hopes of Hopetoun, Scotland's most famous lead mining family, between about 1678 and 1706 when it was sold to Dundas of Manor. Peck was a technical innovator in the salt industry and later had interests in the Scots salt industry and in 1727, in a series of contracts involving salt, coal and the harbour at Saltcoats (Ayrshire), he is described as a Daniel Peck, Esquire, of Linlithgow¹⁹.

Kalmeter, an intelligent, well-informed observer, is unequivocal that it was the discovery at Alva which stimulated a burst of prospecting – and equally clear that by 1719, though work continued at Alva, nothing was being produced²⁰. By this time, however, there were mines and investigations at or close to Menstrie, on the laird of Manor's lands (ie 'Airthrey') and at Blairlogie²¹. Sir Charles Erskine was the dominant partner in the Blairlogie mines by this time and remained so until he sold or assigned his interest in 1729 (note 17 above). Evidently one of the mines which Kalmeter saw was a preliminary investigation at Loss where a draft agreement for exploration had been drawn up in 1717 between James Wright, then of Loss and Hope of Rankeillor, Ayton of Inchdornie, Bethune of Blebo, John Hewingson, miner and others²². Negotiations about this contract continued intermittently for over six years,

the named partners and scope varying in different drafts²³. One of Wright's advisers (James Thomson) writes to him on 1st March 1723 admitting his lack of experience of mining arrangements and so he was at pains 'to get a sight of Hopetoun's contracts and several others of that kind'. On that basis a new contract had been drawn up and he now thought that the potential partners should be encouraged to sign 'by all dispatch imaginable'. There should be no delay on account of the agricultural land 'altho it were the best ground in Christendom because you are to have gold for it to the valow besides the shair that you are to draw'. The prospectors had agreed with an adjacent proprietor, Stirling of Keir to prospect in his grounds and Thomson urgently pressed Wright to concur; 'they are gentlemen of honour, honesty and probity, nowayes litigious nor inclined to law suits'²⁴.

At about the same period, Patrick Linton had become a partner in mining operations on his own lands of Pendreich, in those of Loss and of Tillicoultry as well as of Cauldhame, Glentye and elsewhere on the Stirling of Keir estate, adjacent to his own lands. The Keir mines had been let to the Hope of Rankeillor, Ayton and Bethune partnership. In 1724, Linton assigned half his interest in his own mines and all his interest in the others to Robert Bailie, an Edinburgh merchant²⁵.

By 1726 Stewart of Tillicoultry had joined the partnership in the Loss mines. John Hewetson, on behalf of the partners, granted a receipt to James Wright for 11 score and six stone of ore, removed 'to Holland and London for tryal'²⁶; years later Wright's grandson (also James Wright of Loss) would claim that several tons of ore had been removed during his grandfather's time²⁷. But during the following year the work at Loss lapsed and in 1729 Wright claimed for the damage to his croft ground after all²⁸. Interest in the Loss mines revived in 1730 and 1731 and some work was done, this time involving a Mr Baden as a technical advisor²⁹. But the episode

appears fleeting and no serious work is then recorded in the Ochils until in 1745 a Mr Thomas Jones inspected the mines of Pendreich, Loss, Tillicoultry and Logie and entered into draft agreements with at least some of the proprietors³⁰. Work at Tillicoultry may have continued for some time as in 1748 when Robert McKay died, he was described as ‘miner at Tillicoultry’, his brother Alexander was also a miner and the dead man was owed £7 19s 6 by ‘Mr John Heughs, Agent for and overseer of the mines’ for his services and work there³¹. It is tempting to identify this Mr Heughs with the earlier John Hewingson and John Hewetson. In 1772 John Drysdale recalled that some English miners had lived in Tillicoultry but had gone away about 20 years before and the Old Statistical Account for the parish puts the Tillicoultry copper mines ‘near 50 years’ before 1792 when a ‘company of gentlemen at London’ were the tacksmen, and for several years employed about 50 men.³² A draft tack of the Pendreich mines to Thomas Vangen and Company is dated 1749³³.

A Memorandum of Facts Concerning the Mines of Alva dated 1753 notes 15 sites on or close to the Alva estate where work had been carried out in the past or where ore was thought to exist³⁴. And, in November 1753, John Sickler, former agent to the Tillicoultry copper mines, proposed to the young James Wright, current laird of Loss, that if he was allowed six months to find suitable partners to provide finance, he was willing to take a 31 year lease of the Loss mines. A provisional agreement resulted in some work within days of the original proposal and by early December Wright had got a copy of Mr Jones’s tack of the Blairlogie mines from his neighbour, the laird of Manor³⁵. Between January and May 1754 more contracts were drafted between Wright and Sickler and his partners, now revealed as the original ‘partners and adventurers’ in the former Tillicoultry company and who included a Robert Wilson³⁶.

But again work seems to have lapsed quite quickly. By August 1756, Wright had made out a draft advertisement for his mines ³⁷.

Wright's excitement presaged a more widespread resumption of activity. By May 1757 the Alva mines had been inspected by John Williamson who, by March 1758 had been taken on to supervise resumed work at Alva; the old workings were cleared out and work continued through all or much of 1758. In early 1759 the chemist Joseph Black confirmed the presence of cobalt in the Alva ore ³⁸. Despite an approach from Dr Roebuck of the Carron Company, Erskine of Alva himself formed a company with wide contacts and employing considerable expertise to work the eastern side of Alva. That company was to continue seriously at Alva till about 1766, cobalt probably being the main product ³⁹. However, other minerals were found and, though less important, were exploited. In 1759 the Company for Smelting Lead from Coal had inspected the Alva sites but noted that the rock was hard, there were problems with water and, in spite of numerous trials, the appearance was not good and they saw no encouragement in view of the current low price of lead. In spite of that the 'lead vein' was explored and is occasionally mentioned over the next few years ⁴⁰.

Nor was work confined to the old (Silver Glen) site. In 1762, Erskine of Alva entered into a lease with Messrs Patten and Richardson to exploit the western side of Alva; this firm will be discussed below as they were extensively involved in other mines in the Ochils and elsewhere ⁴¹. In September 1762 John Williamson reported that there were 4 veins working at Alva, as well as the air shaft at 'Carnachan' ie at the Carnaughton Burn, west of Alva. Carnaughton is mentioned intermittently thereafter. In 1768 John Seyfert was badgering Lord Erskine; work on his (Seyfert's) own plan could not fail. On 16 October Seyfert made a very firm proposal for more work both at Carnaughton and at Mill Burn of Alva and he was still trying to persuade

various people to join him in exploiting the mines at Blairlogie in 1770. In 1770 the Carron company expressed some mild interest in Carnaughton but in 1771 they regretted to hear that Carnaughton had been abandoned due to barrenness ⁴².

The late 1750s and early 1760s saw several other sites either worked or prospected. Some, such as at Keir, Knockhill (part of the Keir estate) and Blairlogie are little more than passing mentions ⁴³. At Loss, there were two 'false starts', one involving Robert Wilson and John Sickler, and an abortive contract with a Mr Weston of Lambeth, whose local agent was again Wilson ⁴⁴. But by late 1761 Wright, using Wilson, Sickler and a Mr Stephens as his agents and technical advisers, entered into an agreement with Messrs Patten and Richardson. This resulted in a final, short burst of serious work; but the efforts were no more availing than others and probably in late 1763 work at Loss was abandoned ⁴⁵.

However, by that time, two further local ventures were being planned. James Wright had formed a partnership with Mr Charles Freebairn, architect in Edinburgh, to exploit the Logie mines. And Haldane of Airthrey had embarked on a further attempt to exploit the mines at the western end of the Airthrey estate, modern Bridge of Allan.

The Logie mines had been included in Mr Jones's contract of 1745 when the site belonged to Dundas of Manor. By the 1760s, however, the site seems to have belonged to the Maynes of Powhouse and Logie. The site is marked on a sketch plan concerning a contemporary agreement between Wright and Mayne about other matters ⁴⁶. It appears that about 1762 James Wright of Loss and Charles Freebairn formed a company and rented the Logie mine from Mayne, who is often mentioned in Freebairn's letters ⁴⁷. In an enthusiastic letter dated 1 February 1762 Freebairn tells Wright that he has already 'engaged Wilson to procure miners and oversee them work

not according to his own opinion but expressly by mine’⁴⁸. Work began in February and was to continue, at least intermittently, until February 1765 though by that time the correspondence was a great deal colder and more formal. Work resumed in April 1766 but now with only two miners and continued intermittently through 1766 and 1767 in spite of a Report by Mr Williamson in 1766 that the prospects for Logie were ‘not propitious’⁴⁹. Probably work stopped after November 1767.

At Bridge of Allan the story is more complex – and a good deal longer. Haldane of Airthrey, the proprietor, was in contact with the Erskines of Alva and in one of his first letters to Erskine, Nicholas Crisp – a partner and a technical adviser to the Alva cobalt mine - says that the delay in hearing from Haldane has left him no choice but to write into Cornwall. By November he can report that he has found a man in Cornwall who will examine the veins and on 12 December 1761, George Cockburn in Edinburgh tells James Wright (of Loss) that ‘Mr William Philips, a miner from Cornwall, sent down by Mr Crisp’ was now ready to inspect Haldane’s mines. As Haldane was not available, he asks Wright (as someone in Haldane’s trust) to assist⁵⁰. An undated draft letter in James Wright’s hand clearly follows this visit of inspection⁵¹; he and Philips, and a man called Russell who had previously been one of the miners, had found the site full of rubbish. But Philips seemed ‘exceedingly pleased with them and expects they will turn out well’. Samples were to be sent to Crisp and ‘Williamson’ had suggested that miners could be diverted from Alva to Airthrey. Philips soon came to be involved with both sites and it is not always clear which site is being discussed – especially in regard to samples submitted for analysis. On 19 February 1762 James Erskine (of Alva) wrote to Crisp congratulating him on the appearance at Airthrey ‘I think there is appearance of very good copper to be easily got. The people who formerly wrought there seem to have been very ignorant

believing nothing was copper but the purple, red and green ores whereas the white, gray and black horny ores are frequent in these hills’⁵².

By May 1762 Crisp reported a small quantity of silver present in the copper at Logie⁵³. And in August Haldane writes to Erskine that ‘Ten Great Lairds’ were involved in discussions of metallurgy ‘in hopes of extracting riches from the hidden recesses of the hills,’ adding, with a wise caution he was later to lose, that ‘it will be well if eight of the ten are not disappointed’. By the following spring a hopeful report claimed that there would be 50 to 60 tons of Airthrey ore ready by the summer. The writer would rather sell at the mine though it was actually being taken to Leith in barrels⁵⁴. In late July 1763 Crisp reports on an analysis of the Airthrey ore – and his letter was copied both to Erskine and to Wright of Loss. During August he reports excitedly to Haldane that he is achieving significant silver yields from the Airthrey ore and on 24th August ‘here is treasure almost beyond belief if you can get it out in a large way’⁵⁵. The story of a local silver mine clearly originated at this time; later reports are based on a comment in the Old Statistical Account for Logie parish that between 1761 and 1764 ‘a company of gentlemen from England, along with the proprietor got about 50 barrels of silver ore’. The venture is said to have collapsed when the consignee in London went bankrupt. The putative silver mine has been identified as either Logie or Bridge of Allan⁵⁶. The OSA can only refer to Bridge of Allan as the proprietor is named as Haldane of Airthrey whilst the Logie proprietor was Mayne; the writer is not likely to have confused them as he was a cousin and the eventual heir of James Wright of Loss, exploiter of the Logie mine, and they were frequent correspondents during the period and the identification is supported by, Stobie’s map of 1783 (which also shows the drainage level, marked as ‘mine’. But

there seems little doubt that, in spite of high hopes, copper was the only commercial product of either mine.

For a time, the two ventures, Airthrey and Alva, are scarcely distinguishable from the documents and some of the Erskines seem to have become partners in the Airthrey mine. In July 1764 Haldane of Airthrey obtained a charter under the Great Seal of all the gold, silver, lead and copper ores and other metals in the barony of Haldane, lands of Airthrey and all his other lands⁵⁷. Almost immediately, if the reduction in documentation is to be trusted (and consistent with the OSA story) the veins began to yield less. But some sort of work continued and 1770 provides a key document, the Report on the Mines of the Wester Airthrey Company, made by John Williamson and dated 26 September⁵⁸. This Report describes the New Level or Cross Cut, driven from the level of the carse, six feet high and four wide ‘being two hundred and twenty seven fathoms three feet [416 metres], so straight that one may stand at the entrance of it, and see a candle burning at the place where the Cross-cut flanks the east and west vein’. This description leaves no doubt that this is the drainage level at Bridge of Allan. Other circumstances of the Report and personnel leave no doubt that this was the mine which Philips had inspected and Crisp had so excitedly discussed⁵⁹.

Williamson concludes ambiguously:

it is difficult, nay Impossible for any man to give an opinion with regard to success or otherwise in any mining tryal. How often have we seen the most flattering appearances proves nothing, and those of a less promising aspect turn to good account? But ...there is now all the reason the nature of these adventures will admit of, to hope the best...

Later that year, Alexander Sheriff noted that the accounts of the undertaking are very clear and ‘satisfactory in everything except the success of the undertaking, which

no man can help'. Work seemingly continued and some copper was still being removed and sold⁶⁰. In February 1773 Haldane was hoping to keep the venture going, to interest new partners or to assign the lease as the only hope of retrieving the partners' losses⁶¹ and he so far succeeded that in 1775 some work continued⁶². On 12 March 1779 Haldane wrote, sadly, from the Airthrey Mine House (at Bridge of Allan) that 'all here is in great confusion. There is a large bing lying on the floor, twice the quantity that is in the casks'. He sends a sample for Dr Black to examine, adding, desperately that at least something should be done to sell off what was there⁶³. Work was resumed at Bridge of Allan in 1800 but was again abandoned in 1807⁶⁴.

THE PERSONNEL

Smout identifies four groups of investors in Scots lead mining between 1650 and 1850; Scots lairds, Scots merchants, Englishmen already involved in the English lead industry and Englishmen with spare capital to invest⁶⁵. Groups analogous to all of these were also involved with the Ochils mines between 1714 and 1780. Indeed, many men who were involved in the Ochils mines were also interested in Scots lead mines and with other mines elsewhere in Scotland. A fifth group was also involved in the Ochils, men like Charles Freebairn with a knowledge of technical aspects of the industry, who invested their own capital whilst being practically involved.

Some of the English investors appear as opportunists. John Stephenson, merchant in Hull, had an active involvement in other forms of Scots trade, became a partner in the Alva Cobalt mines, but failed in his efforts to use his Continental contacts to gain information about the technology of cobalt working⁶⁶. He does not appear to have visited Alva and clearly knew little of the practical issues but freely blamed the other partners for the company's failure and remained confident that the work could be

revived in 1768⁶⁷. Fordyce, Grant and Company of London also invested in the Alva Cobalt works; their use of John Fordyce, Edinburgh, as their agent, suggests that they, too, had prior Scots contacts⁶⁸. The more interesting of the English investors were Patten and Richardson, two men from Cheshire. They were involved with lead mines both at Tyndrum and Minigaff⁶⁹. In a letter in which he boasts of the great progress at Islay in 1765 Charles Freebairn says to James Wright ‘How lucky it was your English friends did not accept my proposal at Glasgow’⁷⁰ apparently referring to Patten and Richardson – and meaning, of course, that the remaining slices of the Islay cake were so much the larger. But Patten and Richardson were briefly amongst the most enthusiastic investors in the Ochils and clearly had some technical expertise; both visited Scotland to inspect their mines. Crucial to their involvement was John Sickler, who had been overseer of the mines at Tillicoultry and had worked at Loss in the 1750s⁷¹. In 1761 James Wright of Loss was approached by James Stephens, writing from Caernarvonshire, stating that some six years before he had inspected the Loss mines with Mr Sickler; he recalled Wright telling him then that six tones of ore had been removed in the past and asking for all available information⁷². In June Patten himself wrote, noting that his old agent, Mr Stephen, had recommended Wright to him and expressing interest in a contract; meanwhile he wanted information about transport costs, the proximity of a harbour etc. Wright’s draft reply, enclosed in this letter, puts a very favourable light on the prospects⁷³. After a good deal of correspondence⁷⁴ Patten visited Loss in June 1762, writing his ‘thank you’ letter for Wright’s hospitality from Newton Stewart where he was inspecting other mines; he had evidently used the trip to visit Tyndrum too. At this stage Stephens was expected at Loss shortly after 18th June; contracts were still being negotiated, though a good deal of prospecting had already been done and Patten suggests that a gift of £10 or

£20 to Stephens would be appropriate ⁷⁵. During the course of 1762 Patten and Richardson entered into agreements for the west side of Alva, for Loss and Lipney and for part of Keir and at least negotiated for Blairlogie and other local mines in addition to involving themselves in the lead mines referred to above. Stephens was left behind as the technical overseer (see below). Wright himself entered into several of these other ventures. Patten and Richardson probably lost direct interest in the Ochils during 1763.

Scots partners in the Alva Cobalt venture included George Muir, WS, Andrew Crosbie, advocate and John Campbell, cashier of the Royal Bank of Scotland, perhaps acting for the bank itself. Alexander Sheriff, a Leith merchant, is the best known Scots example, being deeply involved, also, in the Scots lead industry ⁷⁶. He was evidently one of the first people consulted by Erskine of Alva in 1759, partly on account of his technical expertise. It was he who first drew a comparison with the ores of the Hartz mountains. He was involved with Bridge of Allan from 1762 until 1775 ⁷⁷. It seems to have been Sheriff who involved Crisp and he did a good deal of the business administration for Bridge of Allan and Alva. There are hints of other Scots merchants involved though the role of Provost Jaffray of Stirling, for example, is not clear: he seems to have been involved with the Tyndrum company as well, perhaps, as with the later phases of Loss. As already noted, Linton of Pendreich assigned some of his mining assets to an Edinburgh merchant called Bailie ⁷⁸. But when William Ferguson, an Ayr merchant, was invited to become a partner in the Alva cobalt venture, he said that the business was well conceived and the proposed partners well chosen – except for himself as he had no knowledge of mines or metals and his only possible role would be ‘promoting the sales at London, after the cobalt or other metals were found’ ⁷⁹.

Local lairds were the most consistent investors in these mines. Mining prospects were investigated – if not exploited – on the lands of Tillicoultry, Alva, Blairlogie, Manor, Logie, Loss and Lipney, Pendreich, Keir and Airthrey on one or more occasions. Adam Spittal of Leuchat, laird of Blairlogie, may not have invested in his own mines and nor did Mayne of Logie but all the others certainly did, on at least one occasion. On the other hand, in every case where details are available, they went in as partners rather than as sole proprietors. Some partnerships involved other local mine owners. For example in the 1720s the lairds of Loss, Pendreich and Keir all invested in each others' mines and in the 1760s Erskine of Alva was involved in the Airthrey mines. In 1763, James Wright of Loss had shares in the mines of (amongst others) Loss, the west side of Alva, Keir and Blairlogie⁸⁰. The 1715 contract involving Dundas of Manor, Daniel Peck and John Adair was unusual in not involving other lairds. In 1718, Peck and Dundas took two local lairds (Stirling of Herbertshire and Craigenfelt of Gogar) into their new partnership, neither seeming to have other interests in heavy metals. The meeting of 'ten great lairds' discussing metallurgy⁸¹ was clearly only one of many such excited gatherings.

Another group of lairds, particularly important in the early phases, were - like Ayton of Blebo and the Hopes of Rankeillor – men from quite distant parts of Scotland. Henry Kalmeter visited Rankeillor several times and comments wryly on Hope's vain excitement at the potential mineral wealth of his own estate⁸². The Erskines of Alva were a prime example of this group, exploiting their own mines but investing widely and over two generations in mines elsewhere. James Wright of Loss had at least a transient interest in the Tyndrum lead mines as well as in iron mines at Tillicoultry⁸³. His correspondence suggests interest in coal mines in the Forth valley and shows a wide awareness of other areas of mineral exploitation in Scotland. In

many cases the mine-owners involved their own wider families. The Partners of the Alva Cobalt mines included Charles Erskine of Alva, James Erskine (lord Barjarg, Baron of Exchequer) and Sir Harry Erskine⁸⁴. The Bethunes, Hopes and Haldanes also drew in their extended kin.

Some landowners and investors developed a degree of technical knowledge and the stages by which James Wright of Loss educated and informed himself about the industry will be discussed below. Other people involved in the Ochils mines were primarily technicians (or even scientists) though this did not necessarily prevent them investing capital in mining ventures. Nicholas Crisp is the best example and his contribution has been fully considered by Turnbull⁸⁵. Daniel Peck played a crucial role in the early stages of the industry – he may well have been the discoverer of the Alva vein – and would certainly repay further research. He clearly had both technical skills and capital to invest and, uniquely amongst this group, came to settle in Scotland (note 19 above). John Adair, the geographer, is a surprising find in this connection; he is not otherwise known to have been involved in mining and, given his long and often despairing efforts to gain recognition and payment for his cartographic work it is surprising that he had any spare capital to invest⁸⁶. Louis Baden, who was probably one of the partners in the Loss mines in 1730-1, was another who appears to have had technical knowledge; when he wrote, from Alloa in March 1731, he said that his wife was ill and that he was himself busy at the coal works⁸⁷; clearly his mining knowledge was not confined to metals. John Sickler is another man who was both technically informed and had some capital to invest as a partner; his origins and fate are unknown.

Charles Freebairn, Wright's partner in the Logie mine between 1763 and 1766, described himself as 'architect in Edinburgh'. He was the son of James Freebairn, a

teacher of French in Edinburgh. His only recorded architectural work (at Abercairny House, Perthshire between 1755-9 and at Innerpeffray Library, Muthill, Perthshire 1758-1762) put him both geographically and socially close to Wright of Loss, who had family ties with southern Perthshire⁸⁸. They were in contact by January 1761 when Freebairn carried a letter to Edinburgh for Wright⁸⁹. By February 1762 Wright and Freebairn were hatching their Logie scheme and Freebairn was engaging miners. He encouraged Wright to ‘Mark everything Mr Stephens says with respect to Logie, Menstrie and Tillicoultry as his hints may be useful. When you have been at Logie write to me what Wilson has to say. Persuade Stephens to come this way.’⁹⁰ Mr Stephens, of course, was Patten and Richardson’s agent, expected shortly from Wales and Freebairn was anxious to learn from him whilst telling him as little as possible.

Wright and Freebairn were ‘equally concerned’ in the Logie mine⁹¹. From the outset they employed Robert Wilson (see below) as overseer and Freebairn was only intermittently present. Indeed, a letter dated 4th May 1763 shows that by that time Freebairn was also involved with mines on Islay and was actively engaged in visiting other mining sites⁹². He seems to have been involved with the Tillicoultry Iron scheme also⁹³. In July 1763, in another letter written from Islay, he claims to be involved in ‘Silver Craigs and Inverneel both on Loch Feen’ and talks of letting Richardson have shares there on the same terms as himself; again he invites Stephens to inspect and is certain that they are copper veins⁹⁴. By September 1764 he boasts that the Islay mines ‘go better than any other in Scotland except Leadhills’⁹⁵. And in February 1766 (by which time work had lapsed at Logie and both men were trying to extricate themselves from the situation) Freebairn writes gloatingly from Islay ... ‘The furnace is going here and the bairs mounting in piles like the piramids in the plain of Mummies.’⁹⁶ Much of his correspondence with Wright is concerned with the details

of financial arrangements. But he clearly sees himself as directing the practical mining operation over the head of Wilson, the day-to-day supervisor.

Robert Wilson seems to have been one of the partners at Tillicoultry (note 36 above) and in the early 1750s carried out a survey at Loss and was again Sickler's partner in a brief effort at exploitation (note 44 above). In 1758 he was working at Alva and resentful of being told what to do by the supervisor there, John Williamson⁹⁷. He was Weston's local supervisor for his short-lived venture at Loss in 1760-1⁹⁸ and one of the intermediaries introducing Patten and Richardson to the area (above). Freebairn was always anxious to have his view but was disparaging of his capabilities. Writing in February 1762, for example, he says

I have engaged Wilson to procure miners and oversee them work not according to his own opinion but expressly by mine ... Wilson is at the rate of 10s 6d per week but only for so many weeks as I chuse which Captain Barclay and you are to determine. He is a great fool but may be useful ... write to me what Wilson has to say'⁹⁹.

He was apparently authorised to incur expenses at Logie¹⁰⁰ and continued as supervisor there until shortly before the work lapsed. In a badly-written letter dated from Otterburn in May 1765 he endeavoured to interest Wright in further prospecting and partnerships for a suitable remuneration; he then fades from the records¹⁰¹.

John Williamson 'oversman at Alva' is mentioned in a letter dated July 1758 written by another John Williamson¹⁰². One of these men had been working at Alva so early as 1739,¹⁰³ and the 'oversman' was there in 1759 along with his brother, William¹⁰⁴; he was evidently responsible for reporting on the work to Erskine and the partners and a number of his reports survive. He could give instructions to the miners but was responsive to orders from the partners themselves.¹⁰⁵ He supplied spare

miners from Alva to work at Bridge of Allan, following the visit by Mr Philips. In 1766 he inspected the work at Logie and was evidently angry that some of the workmen had not been properly paid ¹⁰⁶. He does not then appear in the records again until 1770 when it is reported that he has gone to Islay but will return to Airthrey and in late 1770 he is supervising work at Bridge of Allan, has visited mines at Banton and is about to travel to the Highlands ¹⁰⁷. He is the writer of the long Report on the Mines of the Wester Airthrey Company dated 26 September 1770 ¹⁰⁸ and he was clearly a man who the partners felt they could trust. He was permitted, by this stage, to draw considerable sums for the work ¹⁰⁹. He was still engaged in 1775 when Haldane thought him too little there but that he was a man who could be confided in and who understood the mine as he had been a workman himself ¹¹⁰.

Finding labour clearly presented problems for an industry which had short and long term fluctuations. In late 1758, John Williamson wrote to Closeburn for two miners to be sent as work accelerated at Alva. Their travel costs would have to be paid and their wages would be one shilling per day. There was some movement of miners between different sites in the Ochils and some, at least, may have come from Islay. In 1758 there were two 'teams' working at Alva and they appear to have been set up as rivals to encourage greater effort ¹¹¹. Miners in the Ochils in the 1760s were more usually paid 'by bargain', that is, a team contracted to cut a specified length for an agreed fee. It was an English system increasingly used in the Scots lead mines during the later eighteenth century and its use at Loss in 1731 is surprising ¹¹². Alva quickly reverted to the more usual 'bargain' which was evidently also used at Bridge of Allan. At Logie, Wright and Freebairn seem to alternate between the two systems and it is not clear on what basis the decision was made. Wages of 1s 2d per day were being paid to the Logie miners in September 1763 but deductions for 'defective work'

are recorded twice at Logie and wages were not always promptly paid¹¹³. In 1762 Erskine told Nicholas Crisp that the previous year's expenses 'did not go much above two hundred pounds and we have about fourteen hands at work'.¹¹⁴ It is doubtful if any site in the Ochils exceeded (or even equalled) this figure in spite of the claim, many years afterwards, that up to 50 men had worked at Tillicoultry. At Logie the maximum was six; some worked only for a short period and no miner seems to have worked through the entire period of operation at Logie. James Gilchrist was injured at work at harvest time 1763, his injuries were treated but he did not return to the payroll¹¹⁵. The miners were recognised to be skilled employees and when Mr Philips came from Cornwall to inspect the old workings it was a former miner who showed him around. John Williamson, overseer, had evidently been a miner himself so there was a degree of social mobility.

DISCUSSION

Henry Kalmeter identified the main difficulties facing mineral mining in Scotland in spite of the presence of ores. There was widespread ignorance of the whole subject whilst a lack of capital was compounded by governmental indifference to the Scottish economy. Supplies were readily available from Sweden, the Baltic and from England, whilst 'consumption within the country is nothing, and manufactories are unknown.'¹¹⁶ The more specific local difficulty of the inaccessibility of the Ochils mines was only partly offset by the abundance of water power 'to drive a wheel for a smelting house' and by the availability of coal and water transport via the Forth¹¹⁷. By the time of Kalmeter's visit Erskine had begun to build a smelting and refining house at Alva – which might, of course, have been used to process ore from other sites had the Alva mine itself been still working¹¹⁸. Two documents of the 1760s refer

to the 'old smelt house' at Alva, one placing it in the Silver Glen the other beside the Dove Coat Burn, presumably the older name for the Silver Glen Burn ¹¹⁹. Most mining contracts for the Ochils allowed for building and processing on-site but there is no evidence, either documentary or archaeological, that it was ever done elsewhere or that smelting was resumed at Alva in the 1760s. Nicholas Crisp was against processing the cobalt on site at Alva until it was certain that there was sufficient ore to justify the cost ¹²⁰. Here was a key paradox for the Ochils mines; the potential advantage of local refining could only be justified if the supply of ore was going to be maintained. Even in 1800, ore from Bridge of Allan was carried to Alloa to be processed ¹²¹.

But the excitement of the early 1760s did introduce a potential local advantage which Kalmeter could not have envisaged: George Cockburn, in the letter requesting him to help Philips pointed out that clusters of mines were an advantage as they tended to attract 'adventurers' to a neighbourhood ¹²². In that sense, all the proprietors had an interest in encouraging the local industry. Briefly, at least, Patten and Richardson were able to move miners from site to site within the area according to the promise of the veins or the exigencies of water or other problems ¹²³.

The biggest ventures were the Alva Silver Mine, the Alva Cobalt Mine, the Tillicoultry Copper Mine and the Bridge of Allan episode from 1762 until the early 1770s. Whilst the evidence is fragmentary it seems that all involved significant finance and expertise from outside the immediate locality. Alva Cobalt Mine was a fully-fledged joint-stock company. Even the smaller ventures were never totally reliant on local finance. But total capital committed was rarely huge. Patten and Richardson could move in quite quickly as interest grew but could detach themselves equally quickly as prospects faded. Individual lairds spread their risks across several

mines and, whilst most probably lost money, none appear to have gone in so deeply as to bankrupt themselves.

Transport and access were prime concerns of Patten and Richardson – and Wright’s reply to their initial enquiry shows that he was also acutely aware of the issues, quickly correcting Patten’s (surely rather extraordinary) impression that ore would have to be carried to Glasgow for shipment; Alloa, only ‘three miles’ away, was the port of choice ¹²⁴. In 1763, ore from Bridge of Allan was barrelled and then shipped to Leith and that was probably the procedure for the other local mines though Alexander Sheriff thought it would be better to sell at the mine itself ¹²⁵. It is not clear how he anticipated that potential purchasers would view and select their wares if that were done. Nicholas Crisp urged that ores should be properly sorted before transport and his letters show the very considerable technical problems to be overcome in separating the various metals one from another ¹²⁶.

The Alva mine, which has attracted the greatest attention, was a highly unusual undertaking as the richest silver mine and the only cobalt mine to be exploited in Scotland. It could be argued, however, that historically the other mines, whilst of less economic importance at the time, are historically more significant because they illustrate something more typical. We are, therefore, particularly fortunate that this small group of mines provides particularly rich documentation. Some of the documents have been gleaned from public records – the Clackmannanshire Sheriff Register of Deeds for the Adair/Peck partnership at Airthrey, for example. But the richest haul came from the papers of James Wright, laird of Loss between his father’s death in 1745 and his own death in 1769. Presumably Wright inherited the papers concerning his grandfather and father’s workings at Loss – and the story that six tons of ore had been sent off in his grandfather’s day. His own mining exploits generated

another considerable tranche of records. But he collected a great many more as part of his own strategy for developing the potential of his own mines. And, of course, he kept them¹²⁷. In effect, Wright created an archive about mines and mining in eighteenth century Scotland because he recognised that informing himself about the procedure and the history of mines was likely to be a useful and profitable exercise.

He collected papers relating to Alva, Blairlogie, Logie (even prior to his own involvement there), Bridge of Allan (contemporaneously with the work there in the 1760s) Pendreich and Keir. His ability to do that is not surprising; Wright was a popular and genial man and would have known the proprietors of all these estates. Indeed, many of them were his partners and co-adventurers in the mining business; he and Lord Barjarg were partners in sheep farming, Haldane of Airthrey was his trusted friend whose land was integral to Wright's plans to transform Menstrie Glen from small farms into a sheep walk¹²⁸. When he wanted a copy of Mr Jones's contract for Blairlogie, he sent a letter to Dundas of Manor who quickly replied, enclosing the document – which Wright duly returned after copying it. At the same time, he kept a copy of his own request and of his own reply –something he only did with 'important' letters. So Wright used an extensive local network of contacts both to forge business links and to glean information.

Further afield he had documents relating to Strontian, Tyndrum and Wanlockhead¹²⁹ - though, recalling that in 1723, James Thomson had managed 'to get a sight of Hopetoun's contracts and several others of that kind' it must be recognised that Wright might have inherited some of these older papers¹³⁰. He was able to keep in touch, either by word of mouth or by letter, with events at all these places and also with Freebairn in Islay. And via Sickler, he was able to locate Stephens (who had previously visited Loss) and to set up the links with Patten and Richardson in

Cheshire as they tried to expand their operations to Scotland. Both of these partners visited Loss and Wright established friendly relations with them – they must have exchanged technical information. And via the Erskines and Haldane he had at least indirect contact with Nicholas Crisp with his wide connections and high expertise. James Fergus, Wright's cousin and legal adviser, wrote to Wright when he met a gentleman 'considerably concerned in mines', knowing that he might be a useful contact¹³¹. So, Wright went out looking for information and information was brought, almost spontaneously, to his door by people who knew he might be interested – and who probably hoped that his gratitude might take tangible form.

Perhaps the most remarkable find is a 'reading list' dated 1763 and in Wright's own writing¹³². There is no direct information about the circumstances of the list being made but it is one of many jottings, on a wide range of topics, which survive amongst his papers. There are four 'names' on his list which is headed by Georgius Agricola, the sixteenth century writer on mines; Wright notes that he writes in Latin and is 'the best writer upon Mines'. He also notes 'Helvas, a German & a physician & a director of the Emperor of Germany's mines'. Very curiously, the next reference is to 'a Swed (sic) that writes on the Mines in Scotland. He takes notice of the Earl of Stirling's copper mines near Menstry and this place and the Lead Hills mines...'. This, surely, can only refer to Henry Kalmeter, whose account of his journey was not to be available in published form until 1978. And finally, he lists 'Mr Place an English gentleman who was concerned in Mines in Scotland and who is a very sensible, clever man ...' going on to outline Place's reported views on Highland mineral veins. Place does not appear to have published anything but Abraham Place at Strontian, agent and manager for the partners in the Clifton Mines is on record in 1734¹³³.

Wright thus had links - some close, some tenuous - with local, national and international networks which he used to inform himself about mining in general and about the potential for exploiting his own mines in particular. He, in turn, informed others. It is unusual for this process to be so well documented but there is no reason to believe that the process was unique to Wright and he certainly used some of these links in his other business dealings as well. Mining was not a closed world. Indeed, the very excitement of exploration and the hope of riches, fostered new links and connections both within the world of mining and around it.

The links were not without problems, however. Nicholas Crisp, the most 'scientific' of those with a direct interest in the mines, wrote in September 1761, enclosing a copy of his thesis on the refining of cobalt ores, stating that he was anxious to further knowledge 'so as to steer between the common attention of miners to one ore only and the visionary pursuits of Alchemists.' But a few weeks later, more commercially, he advised that the presence of silver should not be made public if it was not already generally known¹³⁴. The following year, 'since the affair of Airthrey has made some talk' Haldane was approached by a David Main who assured him he knew something nobody else did about Airthrey and tried to get a half share in the mine and full control of the management. Main also spoke to Crisp. He did not know the extent of Crisp's existing involvement and told him that he was certain that there was great wealth in the hills, suggesting they might buy shares cheaply 'and get immense profit'. Crisp, whilst concealing his own prior involvement, assured him of a reward for useful information but blocked Main's further involvement. Crisp described him as speculative and ingenious but not experienced¹³⁵ - of course, we have only Crisp's account of these dealings.

But these events highlight a fundamental problem for this sort of network. Who was to be trusted when all had their own interest to consult? Were the supposed experts expert? Were they honest? Men like Wilson and Stephens, who were paid to find minerals and supervise their extraction, can hardly be blamed if they tended to see rosy prospects if just a little more work, a little more money, were expended. And men like Haldane, who had sunk considerable sums in the mines, can hardly be blamed if they were tempted to believe them.

At least some of the analyses of the 1760s and 1770s were being carried out in Scotland by Black and others though Crisp, based in London, was more important. And even Newton had recognised that his knowledge of the pure sciences was of limited use in deciding on practical mining issues. Perhaps the new generation of prospectors in the 1760s were more skilful than those who had gone before. In 1762 James Erskine wrote to Crisp of the Airthrey prospects:

I think there is appearance of very good copper to be easily got. The people who formerly wrought there seem to have been very ignorant believing nothing was copper but the purple red and green ores whereas the white gray and black horny ores are frequent in these hills¹³⁶.

But nothing could get round the problem of assessing what was behind the rock face. In 1762, as the prospects at Loss began to fade, Richardson wrote to Wright that he would try to see further into the rock than Stephens¹³⁷. In 1761 Crisp was certain that the hills which contained silver must contain other higher metals but in the same letter recognises that a smelter should not be built until supplies were certain¹³⁸. Crisp wondered aloud if a German miner might be useful. They were skilful but would be expensive and their knowledge of manufacture was poor – evidently it was decided that even the cobalt did not justify the expense or the risk. William Fergusson, the

merchant from Ayr, expressed similar worries. The miners of Scotland were ignorant of cobalt and the Alva venturers would need German expertise, he wrote. But a proper person would be difficult to find and expensive to retain, the Saxon proprietors would endeavour to frustrate their efforts and a bad choice could betray their trust¹³⁹. Mr Seyfert ‘the Saxon gentleman’ assured Lord Barjarg that his own system ‘cannot fail’; it was, surely, wise to ignore such approaches¹⁴⁰!

In the end, much came down to the old fashioned idea of reputation. Thomson had assured Wright in the 1730s that the potential partners were ‘gentlemen of honour, honesty and probity, noways litigious nor inclined to law suits’. Mr Stephens assured Wright that Patten and Richardson were ‘two of as worthy gentlemen as is in England. I have served Mr Patten this sixteen years or more.’¹⁴¹ Wright, meanwhile, assured Patten that Mr Sickler had a good reputation in Scotland and that Squire Shuttleworth’s steward could inform Patten about Wright himself¹⁴².

For the miners, it was dangerous and transient work. They appear to have been quite mobile, both locally and nationally; perhaps some were English. And the case of John Williamson suggests that there was at least a potential for social mobility. The supervisors and technical experts were very mobile. Seyfert was from Saxony and Sickler and Vangen are not likely to have been Scots. Philips came from Cornwall. And so on. They had extensive links and contacts and used them. Crisp, in particular, was in touch with other experts across Europe. Again, the Ochils mines were but an episode for most of them; when they failed to generate the expected profits they pulled out and moved their attention elsewhere. For the local lairds the situation was somewhat different. Their attention was primarily on their own land. They hoped that mines would make them rich. But they knew that rashness would make them poor.

They tempered their excitement with caution and they seem, all, to have avoided heavy losses.

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² T. C. Smout, 'Journal of Henry Kalmeter's Travels in Scotland' *Scottish Industrial History; a Miscellany*, Scottish History Society, 1978, 35-39. Athol L Murray, 'The Scottish Mint after the recoinage, 1709-1836', *Proceedings of the Society of Antiquaries of Scotland*, 129 (1999) 867 and notes.

³ Sir Charles Erskine's reported remark (quoted, Smout, 1967 111) that 'out of that hole I took fifty thousand pounds and I put it all into *that* hole', is a simplification as Erskine found a good many holes into which to pour money – but he does not appear to have died in poverty!

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⁵ Dickie and Forster, 1974, 7-13. RCAHMS, '*Well Shelterd & Watered*': *Menstrie Glen, a farming landscape near Stirling*, 2001, 60-61.

⁶ Francis and Read, 1970, 293-301.

⁷ FCA, GD171/3771, Report on the Mines of the Wester Airthrey Company by John Williamson 26 Sept 1770. This Report is wrongly described in the catalogue as referring to a coal mine.

⁸ NAS, RH15/115/1/1 Bundle G, Sketch of Logie, included in Agreement with John Henderson, tacksman of Logie, 1763: Note 13 below.

⁹ RCAHMS, 2001, 16.

¹⁰ NLS, MS5098 f 18r-19r, 1753; *ibid*, f 84 r-v, 14 Jan 1760.

¹¹ NAS, RH15/115/1 bundle F, Logie Mines April 1765, 'Cash received by Mr Freebairn for Tools sold to the Dolar (sic) mining Company £2 10s'.

¹² Rogers, 1851,5.

¹³ Thomas H McGrail, *Sir William Alexander, First Earl of Stirling, a Biographical Study*, Edinburgh, 1940, 22, 62, 64. *Register of the Privy Council of Scotland, Addenda 1545-1625*, vol 14, p 622, Edinburgh, 1898.

¹⁴ Cited in Arthur Mitchell and J S Clark (eds) MacFarlane's Geographical Collection, Scottish History Society, vol 53, 1908 16-17. 'Alquharey' seems to refer to the Auld Wharry Burn, a tributary of the Allan rising in the Ochils above the Sheriffmuir.

¹⁵ NAS, Clackmannanshire Sheriff Court Vouchers of Deeds, SC64/55/1 bundle for 1716 for Articles of Agriement betwixt Ralph Dundass of Maner and Mr Daniel Peck of London and Mr John Adair, geographer, dated 20 April 1715.

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¹⁸ Smout, 1978, 20 and Note; *ibid* 38.

¹⁹ Chester City Record Office CR 352, Letter Book of Daniel Peck, merchant, Chester, 1703-4: NAS, SC64/55/1, bundle 1716, Articles of Agriement betwixt Ralph Dundass of Maner and Mr Daniel Peck of London and Mr John Adair, geographer, dated 20 April 1715. FCA, Forbes of Callander Papers, GD171/3928 Contract between Ralph Dundass of Maner, proprietor of the lands and barony of Airthrey and William Stirling of Herbertshire, Mr Charles Craingingelt of Gogar and Daniell Peck

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²⁴ NAS RH15/115/1/1 bundle F, note Mr Thomson de Mines, 1 March 1723.

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²⁶ NAS, RH15/115/1/1 bundle F, obligation by John Hewetson to James Wright of Loss, 13 July 1726.

²⁷ NAS, RH15/115/2 Bundle D, documents endorsed ‘Manner’s letter’ with Wright’s draft reply enclosed, 1753.

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years but says terms are not so generous as those he has allowed Sir Robert Stewart [at Tillicoultry] and Mr Dundas of Manor [at Logie].

³¹ NAS, Dunblane Register Testaments CC6/5/25, Testament Robert McKay, miner at Tillicoultry Mines, registered 14 July 1748.

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³⁶ NAS, RH15/115/1/1 bundle F, Double of the lease of the mines of Loss to be sett 1753 to John Sickler and company for 30 years: *ibid*, Memorandum Nov 6 1753: Mr John Sickler who was once agent to the proprietor of Tillicoultry copper mines proposes to have liberty to dig and search at Loss for 31 years; *ibid*, copy draft contract of the Mines of Loss and Lipney between James Wright of Loss on the one part and Mr John Sincler for the space of 31 years from 15th May 1754: *ibid* Double of the lease of the mines of Loss to be sett 1753 to John Sickler and company for 30 years.

³⁷ NAS, RH15/115/3/2 bundle C, 1756, draft advert for Loss Mines, enclosed in letter to James Fergus dated 25 Aug 1756.

³⁸ NLS MS5098 f 22r – 23r, 1757, 7 May, Memorial by John Williamson; the work at Alva has been done badly before and he advises on resumption: NLS, MS 5098 f 42r-43r, 1758, 18 Dec, John Williamson reports progress. NLS MS5098, f 44r 1758, 22 Dec Williamson reports: NLS MS5098 f 45r, 1759, 3 Jan, Alex Shirreff, Leith, to Baron James Erskine: NLS MS5098 f 49r 1759, 17 Jan letter from Joseph Black, Glasgow confirming the presence of cobalt suitable for preparing pigment for painting porcelain; a fuller assay would be needed if quantities were found. There are further analyses on f f59r, 63r-64r, 66r & 67r, all referring to cobalt.

³⁹ NLS, MS 5098 f 84 r-v, 14 Jan 1760, Proposal by Dr Roebuck: See Turnbull, 1997 for a fuller account of the Alva works and company at this period and specifically for the role of Nicholas Crisp.

⁴⁰ NLS MS5098 f 103r 20 Dec 1759, Note from Messrs Tweedale and Harrup about Alva lead prospects: NLS, MS MS5099 f 31, 16 Jan 1764, John Williamson's report on lead and spar veins.

⁴¹ NAS, RH15/115/1/1 bundle F, 1762, lease by Sir Charles Erskine of Alva to Messrs Patten and Richardson of minerals on West Hill of Alva; this contract refers to the other contract for East Hill.

⁴² NLS, MS5098 f 174r, 28 Sept 1762, John Williamson to Erskine. NLS MS5098 f 64-5, 1768, 11 May, letter from John Seyfert: *ibid* f 94-5, 16 March 1770, Seyfert is at Traquair working lead; he will make out a lease for Abercrombie's ground soon: *ibid*, f 108r-109v, 15 Sept 1770, Seyfert's proposal for the Abercrombie and Leuchat of Blair[logie] Mines and he also wants a joint lease of Alva: *ibid* f. 117, 3 July 1770, enquiry per Robert Wilson on behalf of Carron Company about 'Carnachan': *ibid* f 131, 31 July 1771, Carron company sorry to hear Carnachan has been abandoned.

The ‘Abercrombie’ mines mentioned were probably coal mines on the carse in the Tullibody area.

⁴³ NAS, RH15/115/1/1 bundle F, 1762, Lease of a Mining Liberty within part of the lands of Keir, Knockhill and others by Mr Stirling of Keir to Messrs Patten and Richardson; there is another copy of the Keir contract with Patten and Richardson in Glasgow City Archives, Stirling of Keir and Cadder papers, T-SK9/7/35 Lease of Mines etc: NAS, RH15/115/1/1 bundle E, 4 May 1763, Charles Freebairn to James Wright ‘two of them [of the miners he had sent from Islay, apparently] are now in town and have agreed to cutt the remainder of Callandars Bargain at £3 3s per fathom’: NAS, RH15/115/3/2 bundle D, 9th May 1763, Mr Richardson at Chester to James Wright, He hopes Blair goes better than they are likely to do at Airthrey... I should be glad the affair was so settled about Blair before June that I may know whether we are to have it or not but we would not be at any great expense to get it for the metal is poor.

⁴⁴ NAS, RH15/115/1/1 bundle F 22 Jan 1758, Robert Wilson to James Wright and enclosure by Wright to Wilson: notes Wilson’s discovery of veins on Loss and Lipney and agrees to remunerate him from the profits and authorises the formation of a company and a tack similar to the one with Sickler in 1753; See RCAHMS 2001, 60-61 for a review of the Loss mines.

⁴⁵ RCAHMS 2001, 61: NAS, RH15/115/1/1 bundle F, Jan 1761, Copy letter to Mr Weston to be carried by Mr Freebairn; *ibid*, 18 March 1761, Mr Stephens to James Wright: *ibid*, 13 July 1761, Protest James Wright against Mr Weston: *ibid*, 12 Dec 1761, letter from Mr Patten, Bank: NAS, RH15/115/3/2 bundle A, 1762, draft lease of Mines of Loss and Lipney by James Wright to Patten and Richardson: NAS, Register of Deeds, RD2/191, Lease of mines of Loss and Lipney to Patten and Richardson,

dated 15th Feb, 24th Feb and 3 March 1762, registered 18 March 1762: NAS, RH15/115/4/1, Bundle B, 17 May 1762, James Stephens to James Wright ‘I hope they are sinking with all possible speed and hope we shall have a good concern. ... Be pleased to remember me to Mr Sickler and Mr Phillips.’: NAS, RH15/115/3/2 bundle D, October 1762, Thomas Patten to James Wright, ‘I conceive your mine upon the Hill to the North ... require respiting till the Spring’. NAS, RH5/115/5/ bundle G, 15 Jan 1762, Richard Richardson to James Wright, sorry to hear his mines do not ‘go well’: *ibid*, 9th May 1763, Richardson to James Wright, ‘I shall be very glad to find Mr Stephen mistaken in your ground. It would give me real pleasure to make a good discovery in your land.’

⁴⁶ RH15/115/4/2, bundle E, 1745 tack of Dundas of Manor’s Logie mines to Thomas Jones: NAS, RH15/115/1/1 bundle G, 27 Jan 1763, Agreement between John Henderson, tacksman of Logie, with special consent of Edward Main of Powis [ie Mayne of Powhouse] ... and James Wright of Loss, with attached Plan, showing Logie Mine.

⁴⁷ NAS, RH15/115/5/1 bundle E 17 Feb 1766, Freebairn to Wright, had written frequently to remind Fergus that the Logie mines stopped March last and Mr Main would take advantage of the forfeiture clause.

⁴⁸ NAS, RH15/115/4/2, 1 Feb 1762, Charles Freebairn to James Wright.

⁴⁹ NAS, RH15/115/1/1, bundle D, 5 Sept 172, Charles Freebairn to James Wright: NAS, RH15/115/1/1 bundle F, 1762-3, General Accompt of Expenses laid out in working Logie Mines: NAS, RH15/115/2 bundle G, 25 Feb to 1 May 1762, Copy Accounts of Logie Mines: NAS, RH15/115/1/1 bundle A, Charles Freebairn to James Wright, he will consider giving up the work when he is paid what Wright owes him: NAS, RH15/115/3/2 bundle D, Feb 18 1765, Charles Freebairn to James Wright

‘Forget not the draught you have of mine and all papers relative to Logie mines as I think there will not be much more used betwixt us on that account’: NAS, RH15/115/5/1, bundle E, Charles Freebairn to James Wright, ‘the Logie mines stopped March last’ and he warns that Mr Main may take advantage of the forfeiture clause: NAS, RH15/115/1/1 bundle F, various vouchers and accounts for payments to miners in 1766 and 1767: NAS, RH15/115/4/2, bundle C, 1766, Mr Williamson has examined the mine at Logie Burn and it is not propitious though he gives advice about continuing the drift further west.

⁵⁰ NLS, MS5098, f 129r-v, 26 Sept 1761, Nicholas Crisp to James Erskine: *ibid*, f 132, 1 Nov 1761, Nicholas Crisp: *ibid* f 139, 23 Nov 1761, a man has been sent from Cornwall to Captain Haldane: NAS, RH15/115/5/2, bundle J, 12 Dec 1761, George Cockburn to James Wright re Mr Philips.

⁵¹ NAS, RH15/115/5/2 bundle J nd, note in James Wright’s hand re visit with Philips to Airthrey mine.

⁵² NLS, MS 5098, f 151 r-v, 19 Feb 1762, James Erskine to Nicholas Crisp.

⁵³ NLS MS5098 f157-158r , 4 May 1762, Nicholas Crisp to Erskine. NLS MS5098, f150-151v 19 Feb 1762, James Erskine to Nicholas Crisp. There is appearance of very good copper to be easily got. ‘The people who formerly wrought there seem to have been very ignorant believing nothing was copper but the purple, red and green ores whereas the white, gray and black horny ores are frequent in these hills.’

⁵⁴ NLS MS5099 f5r-6v, 28 March 1763, Report on Airthrey Mines.

⁵⁵ NAS, RH15/115/1/1 bundle F, 29 July 1763, Nicholas Crisp to Lord Barjarg about Airthrey ore: NLS MS5099, f 21r-v, Nicholas Crisp to Haldane, copied to Erskine and to James Wright of Loss: Wright’s copy is NAS, RH15/115/1/1 bundle F endorsed

‘part of a letter from Mr Crisp to Lord Barjarg about the Airthrey Ore, London 29 July 1763; *ibid*, 24 Aug 1763, Nicholas Crisp to Haldane.

⁵⁶ OSA, Logie, page 561-2.

⁵⁷ NAS, GD198/189 and /190 Haldane of Gleneagles Papers, 15 July 1764, Great Seal Charter in favour of Robert Haldane of Airthrey of all gold, silver, lead and copper ores with other metals and minerals in the barony of Haldane, Airthrey and Gleneagles and lands of Fossaquhy etc.

⁵⁸ FCA, GD171/3771, Report of the Mines of the Wester Airthrey Company by John Williamson 26th September 1770.

⁵⁹ Roger, 1851, 4 -5: Dickie and Forster, 1974, 15 and Fig. 10.

⁶⁰ NLS MS5099, f 118-9, 11 Dec 1770 Alex Sheriff to Erskine: *ibid*, f 127 r-v, 20 March 1771, Sheriff sends Airthrey accounts, notes copper shipped to London and accounting details.

⁶¹ NLS 5099, f.145, 19 Feb 1773, letter from Haldane re Airthrey.

⁶² NLS 5099 f 124-5, 1775.

⁶³, NLS 5099 f. 148, 12 March 1779, letter from Geo Haldane, from Airthrey Mine House.

⁶⁴ Dickie and Forster, 1974, 15.

⁶⁵ Smout, 1967, 112.

⁶⁶ NLS, MS5098, f 124, Stephenson to Erskine, 30 August 1761: NLS, MS 5098, f. 144 r-v, 15 Jan 1762: *ibid* f 166r, 2 July 1762: *ibid* f 18-169, 16 July 1762: NLS MS5099 f 49-50 Articles of Agreement, 1765.

⁶⁷ NLS MS5099 f 56, 2 Dec 1766 and *ibid* f 71, 6 June 1768.

⁶⁸ NLS MS 5099, f 49-50 Articles of Agreement, 1765.

⁶⁹ Smout, 1967, 118 for Patten and Richardson at Tyndrum and Minigaff. NAS, GD18/1173 Clerk of Penicuik Papers, Patten and Richardson involved in lead mines in Dumfriesshire; this collection contains other relevant documents.

⁷⁰ NAS RH15115/1/1 bundle A, 6 Jan 1765, Charles Freebairn to James Wright of Loss.

⁷¹ RH15/115/1/1 bundle F, lease of Mines of Loss, 1753; *ibid*, letter John Sickler to James Wright of Loss 12 Nov 1753.

⁷² RH15/1151/1 bundle F, Mr Stephens to William [sic] Wright, 18 March 1761.

⁷³ *Ibid* letter endorsed 'Mr Patten 15 June 1761'.

⁷⁴ RH15/115/4/2 bundle F includes several of these letters.

⁷⁵ RH15/115/4/2 bundle F, Mr Patten, June 1762.

⁷⁶ Smout, 1967, 115.

⁷⁷ NLS, MS 5098 f 45r, 3 Jan 1759; 1762, 15 August f 171r-172r. Haldane to Erskine. Discusses Mr Sheriff's role and proportion. *Ibid* f 118-9, 11 Dec 1770: NLS 5099 f 127r-v, 20 March 1771, Sheriff sends Airthrey accounts, notes copper shipped to London and discusses accounts: NLS 5099, f 145, 19 Feb 1773, Haldane to Erskine, writes to him as a friend rather than to Sheriff as a managing partner.

⁷⁸ NAS, RH15/15/3/2 bundle D, Richardson to James Wright, 9 May 1763, refers to late payments by Ripon Company to Mr Provost Jaffray, 'If he is not content to wait till I come there is no doubt but he may get his money as soon as he will for as I remember he told me that he had the bond of Mr Pickering and Mr Hassell is certainly a man of fortune and therefore he need not fear being paid' NAS, RH15/115/31/ bundle D Account between Mr Freebairn, Architect, Edinburgh and Wright re Logie mines, 12th May 1763, refers to Provost Jaffray's interest. See Note 23 for Linton's assignation to Bailie.

⁷⁹ NLS MS5098 f 109r-v, 7 Jan 1761, William Ferguson to ‘Dear Sir’. See Note 129 for the Strontian company’s wish for partners of ‘skill and ability’.

⁸⁰ RH15/115/4/1 bundle B Account of the Cash Paid by Mr Wright... 1763; these investments were via the Patten and Richardson partnership.

⁸¹ Note 43 above

⁸² RH15/115/1/1 bundle F for Bethune of Blebo Contracts: Smout, 1978, 25 and 46 refers to Hope of Rankeillor’s vain attempts to ‘discover metals’ on his own lands.

⁸³ See Note 10 above for Erskine’s wide interests in the early part of the century.

RH15/115/4/1 bundle B, Account of the cash paid by Mr Wright, being his share of the purchase of the Clifton Mines, 1763: RH15/115/5/2 Bundle G ‘Charles Freebairn de Iron Scheme, 1763’; *ibid* Captain Barclay Maitland de iron Scheme, 1763.

⁸⁴ NLS ms 5099 f 49-50, 1765.

⁸⁵ Jill Turnbull, *Scottish Cobalt and Nicholas Crisp*.

⁸⁶ D G Moir (ed) *The Early Maps of Scotland to 1850, vol 1* Royal Scottish Geographical Society, 65-78 (1973).

⁸⁷ RH15/115/1/1 bundle F Memorandum, Loss to Mr Badden of measuring the level, 1730: *ibid* Note marked Louis Baden about Mines with some remarks which may be of use, dated Alloa March 25 1731.

⁸⁸ Howard Colvin, *A Biographical Dictionary of British Architects 1600-1840*, Yale University Press, 1995.

⁸⁹ NAS, RH15/115/1/1 bundle F copy letter to Mr Weston, January 1761.

⁹⁰ NAS, RH15/115/42 bundle F, 1 Feb 1762, Charles Freebairn to James Wright of Loss, he ‘likes the affair very well...’

⁹¹ NAS, RH15/115/ 3/1, bundle D Account between Mr Freebairn, Architect, Edinburgh and Wright re Logie mines, 12th May 1763, ‘with respect to Logie Mines

they being equally concerned therein' includes machinery, tools, candle, wages for miners and Freebairn's expenses.

⁹² NAS, RH15/115/1/1 bundle E, Charles Freebairn to James Wright of Loss, 4 May 1763, about Islay mine.

⁹³ NAS, RH15/115/5/2, 1 April 1763 Charles Freebairn to James Wright of Loss, As Wright has this day assigned his share in the company which was intended to be carried on on the estate of Tillicoultry he hereby grants him a discharge of all claims.

⁹⁴ NAS, RH15/115/4/1 bundle F, Charles Freebairn to James Wright of Loss, July 20 1763, from Islay.

⁹⁵ NAS RH15/115/4/2 bundle C, Charles Freebairn to James Wright, 3 Sept 1764.

⁹⁶ NAS RH15/115/5/1 bundle E Charles Freebairn to James Wright 17 Feb 1766.

⁹⁷ NLS MS5098 f 28r John Williamson, overseer, 1 Jan 1758.

⁹⁸ NAS, RH15/115/1/1 bundle F, Jan 1761 Copy letter to Mr Weston [to be carried] by Mr Freebairn.

⁹⁹ NAS, RH15/115/4/2 bundle F 1 Feb 1762, Charles Freebairn to James Wright.

¹⁰⁰ NAS, RH15/115/1/1 bundle F Paper endorsed Logie Mines, April 1765, Covers running expenses paid at various dates, 23 Sept 1763, 3 Dec 1764, 9 May to 28 Nov 1763, Nov 1764 etc.

¹⁰¹ NAS, RH15/115/4/2 bundle F Letter endorsed Mr Wilson 18 May 1765, from Otterburn.

¹⁰² NLS, MS 5098, f 35 r-v 8 July 1758, John Williamson mentions John Williamson, oversman at Alva.

¹⁰³ NLS MS5098 f 12 r 1739, 2 July, letter dated from Alva signed by John Williamson, 'the miners has now finished there bargain'.

¹⁰⁴ NLS MS5098 f 28r, 22 Jan 1757 discusses current work at Alva: *ibid*, 1 Jan 1758, f 28r, discusses current work at Alva. The miners are working by Bargain and Mr Wilson clearly resents being told what to do by Williamson: NLS, MS5098 f 313-v Journal of work at Alva, 1758, 28 March – 5 April.

¹⁰⁵ NLS MS5098 f 107-8. 1761, Jan 5, John Williamson to Erskine: NAS, RH15/115/5/2 bundle J, nd, draft letter from James Wright about visit to Airthrey mine with Mr Philips and Russell yesterday, samples to be sent to Mr Crisp etc. NLS, MS 5098 174r, 1762, John Williamson to Erskine: NLS MS5099 f 31, 16 Jan 1764, John Williamson Report from Alva;, 10 Feb 1764, 20 Feb 1764.

¹⁰⁶ NAS, RH15/115/4/2 bundle C 21 Aug 1766, letter signed Jno Williamson, from Alva.

¹⁰⁷ NLS, MS 5099, f 102r-v, 1770 1 July, Alex Sheriff has visited Airthrey on his way to Highlands and the men have done everything right. John Williamson goes to Isla with him and will return to Airthrey; *ibid*, f 114, 1770, 2 Nov, John Williamson still supervising Airthrey, has visited Banton and now going to Highlands.

¹⁰⁸ FCA, GD171/3771 Forbes of Callander Papers, Report of the Mines of the Wester Airthrey Company by John Williamson 26th September 1770.

¹⁰⁹ NLS, MS 5099 f 118-9, 1770 11 Dec, Alex Sheriff reports on financial matters.

¹¹⁰ NLS 5099 f 124-5, 1775, Alex Sheriff and John Williamson are to visit Airthrey and report on the prospects for continuing.

¹¹¹ NLS MS5098 f 75r-v, 1759, 18 June, report on work at Alva.

¹¹² NLS5098 f 42r-43r, 1758, 18 Dec, John Williamson reports progress: Smout, 1967, 122: NAS, RH15/115/1/1/ bundle F, 22 June 1731, Robert and Alexander Blackwoods ‘for and in name of the company’ to James Wright.

¹¹³ NAS, RH15/115/1 Bundle F, Account of Expenses laid out in working the Logie Mines: RH15/115/4/2 bundle C, 21 Aug 1766, John Williamson to James Wright, has inspected the Logie mine.

¹¹⁴ NLS, MS5098, f 150r-151v, 19 Feb 1762, James Erskine to Nicholas Crisp

¹¹⁵ NLS, RH15/115/1/1 bundle F General Accompt of the expenses laid out in working the Logie Mines.

¹¹⁶ Smout, 1978, 18.

¹¹⁷ Smout, 1978, 37.

¹¹⁸ Smout, 1978, 39.

¹¹⁹ NLS 5098 f 84r-v 14 Jan 1760, Proposal by Dr Roebuck to take a lease of the Alva mines on part of the ground of Alva on the Dove Coat Burn from the old smelt house on the south to a place to be marked etc: NLS MS 5099 f 49r-50r, 30 Sept 1765, Articles of Agreement, refers to land in the Silver Glen, 'from the old smelt house on the south to the source of the burn on the north'.

¹²⁰ NLS, MS5098 f 126r-127r 17 Sept 1761 Nicholas Crisp to Erskine.

¹²¹ Dickie and Forster, 1974, 15.

¹²² NAS, RH15/115/5/2 bundle J 12 Dec 1761 Cockburn to James Wright of Loss.

¹²³ NAS, RH15/115/5/2 bundle J, draft letter from James Wright of Loss; Williamson says there are 2 miners at Alva who could come to Airthrey with tools when needed: NAS RH15/115/3/2 bundle D, Oct 1762, Thomas Patten to James Wright of Loss, 'I conceive your mine upon the Hill to the North as well as Alva will require respiting till the Spring'. The miners might be employed preparing other sites.

¹²⁴ NAS, RH15/115/1/1 bundle F, 15 June 1671, Mr Patten to James Wright of Loss with Wright's draft reply enclosed.

¹²⁵ NLS MS 5099, f 5r – 6r, 28 March 1763, Alexander Sheriff.

¹²⁶ See, for example, NLS, 5099 f 21 r-v and f 27r Reports by Crisp on analyses etc; some of these issues are more fully discussed by Turnbull (1997) who also notes his concerns about the dangers of arsenic poisoning to workers and neighbours.

¹²⁷ RCAHMS 2001 64-6.

¹²⁸ RCAHMS 2001, 26-8.

¹²⁹ NAS, RH15/115/1/1 bundle F, 1734, Copy summons for William Drummond 1734 against York Building Company; Abraham Place at Strontian is the agent and manager for the partners, Clifton Mines: *ibid*, Copy Printed Contract between Duke of Queensberry and Alexander Telfer, miner at Wanlochhead, 1738. NAS, RH15/115/1/1 Bundle F, Copy Mr Lothian's letter, Feb 1766, asks recipient to tell Mr Stephens that the Strontian Company are looking for partners 'of skill and ability' and the Tyndrum company might be very suitable.

¹³⁰ NAS RH15/115/1/1 bundle F, note Mr Thomson de Mines, 1 March 1723.

¹³¹ NAS RH15/115/3/2 bundle A undated note 'copy paragraph from James Fergus's letter'.

¹³² NAS RH15/115/11/1 bundle F, memorandum about writers on mines, 1763.

¹³³ NAS, RH15/115/1/1 bundle K, 1734, Copy summons for William Drummond against York Building Company; Abraham Place at Strontian is the agent and manager for the partners of the Clifton Mines etc.

¹³⁴ NLS MS5098 f 126 – 7, 17 Sept, 1761 Nicholas Crisp to Erskine: NLS, MS 5098, f 132, 1 Nov 1761.

¹³⁵ NLS, MS5098 f 163r-164r, 25 May 1762, Crisp to Erskine.

¹³⁶ NLS MS 5098, f 151r-v 19 Feb 1762, copy letter to Crisp.

¹³⁷ NAS RH15/115/5/2 bundle G, 15 Jan 1762 Richardson to James Wright of Loss.

¹³⁸ NLS, MS 5098, f 126-7, 17 Sept 1761, Crisp to Erskine.

¹³⁹ NLS, MS 5098 f 160-161v 16 May 1762, Crisp says that a German miner would be useful but expensive and their knowledge of the manufacture [of cobalt] is very poor: NLS MS 5098, 109r-v, 7 Jan 1761, William Ferguson to ‘Dear Sir’.

¹⁴⁰ NLS MS5098 f 64-5, 11 May 1768, John Seyfert, says losses by leases are inevitable but work on his own plan ‘cannot fail’: *ibid*, f 78-9, 6 Sept 1768, John Stephenson still keen to go on, perhaps with ‘the Saxon gentleman’; NLS MS 5099, f 94-5, 16 March 1770, Seyfert is at Traquair working lead: *ibid*, f 108r-109r, 15 Sept 1770, Seyfert suggests a joint venture; *ibid* f 112-3, 22 Oct 1770, Seyfert furious that Dundas does not trust him but understands Erskine’s intention to confine his efforts to his own lands.

¹⁴¹ NAS, RH15/115/5/1 bundle E 3 July 1761, Stephens to James Wright of Loss.

¹⁴² NAS, RH15/115/1/1 bundle F, 15 June 1671, Mr Patten to James Wright of Loss with Wright’s draft reply enclosed.