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THE ECTON COPPER MINES IN THE SEVENTEENTH CENTURY

by

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Introduction

Ecton Mine, Staffordshire, (SK 097583) is known to have been one of the very few British copper mines worked during the mid 17th century and is reputed to have been the place where gunpowder was first used for mining in Britain (Kirkham 1947). Important new documentary evidence has recently been discovered which confirms some of the previous knowledge on the early working of Ecton, adds a great deal of fresh information, and shatters some of the most often quoted statements on the mine.

Previous knowledge on the early working of Ecton

All previously published information comes from three sources, and has been quoted without question many times since. Dr Robert Plot writing in 1686 gives us the only published contemporary account of the mines. Plot reported that the copper ores in Staffordshire were not thought worth digging "but at Ecton Hill, where the Mine was worked several years by my Lord of Devon himself, Sir Richard Fleetwood, and some Dutchmen", and "the veins lay from eight to fifty yards deep, but all dipt North Easterly: that they broke the rocks with Gunpowder and got 3 sorts of Ore: 1. a black sort which was the best; 2. a yellow sort, the worst; and 3. a mixt sort of both; which they Smelted at Ellastone not far off, where they had mills &c. for the purpose; but all was out of order before I came thither, and the famous wooden bellows that had no leather about them carried away to Snelston in Darby-shire." His drawing of the bellows is entitled "Designe of a foraigne Engine". These wooden bellows were also described by Nehemiah Grew in 1681, and it is recorded that this type of bellows were first used at Nuremburg as early as 1550 (Tomlinson 1866). When Plot visited the mine, about 1680, mining operations had ceased "as not worth their while; Copper comeing cheaper from Sweden than they could make it here." He also discussed the lead ore mined at Ecton.

Hooson (1747) reported that Ecton had been re-opened "About forty Years ago", and after draining the mine they found that "Blast-Holes had been bored, most a Yard or four Foot long, and two Inches or more Diameter, so that in those Days they used not such small Holes as we do in these". He also stated that the workmen had been Dutch or German miners. The

Dutchman Mine is traditionally where these early operations took place, although it must be noted that the mine known today mistakenly as the Dutchman Mine and Level is in fact the Goodhope Mine and Level; the entrance to the old Dutchman Mine is now flooded.

The story that the Dutchman who used gunpowder at Ecton were brought over by Prince Rupert seems to have been originated by Bishop Watson (1781), writing over 100 years after the event. Watson's information came, as he admits himself, from local people living about the mine. At the period under discussion the privilege of mining copper in Staffordshire, in theory at least, was granted to the Company of Mineral and Battery works under the governorship of Prince Rupert. Since Rupert was an expert in the use of gunpowder for military use and had invented a stronger powder then, the conclusions were obvious to Watson and since that time Rupert has become linked with the introduction of powder for mining at Ecton and this has been repeated by nearly every mining historian since.

All subsequent writers have relied on these three accounts of Plot, Hooson and Watson. Plot's account can now be substantiated, but the connection between Prince Rupert and Ecton cannot.

The Copper and Brass Monopolies in the 17th Century

In order to understand fully the operations at Ecton in the 17th Century it is necessary to review the state of the British copper and brass trade at that time.

During the 16th and 17th centuries the copper and brass industries were under the monopolistic control of the Company of Mines Royal, and the Company of Mineral and Battery Works, originally set up by Elizabeth I in 1568 to encourage the home production of these metals. The Company of Mines Royal held the privilege of mining copper in the counties of Westmoreland, Cumberland, Lancaster, Cornwall, Devon, Gloucester, Worcester and York and in the Principality of Wales, while these rights in the remaining counties of England as well as for the manufacture of brass and other privileges had been granted to the Company of Mineral and Battery Works, (Hamilton 1926, Donald 1955, 1961). Since the monopoly of working copper in Staffordshire had been granted to the Mineral and Battery Works it has been assumed by several authors that Ecton was under their control (Hamilton 1926, Harris 1968).

During the 16th century these privileged companies imported many German workers to mine copper in the Lake District and to make iron and brass wire at Tintern Abbey, Isleworth and elsewhere. By the early 17th century these privileges came under attack with the setting up of brass and copper works in competition to the Mines Royal and Mineral and Battery Works. Also there was fierce foreign competition, mainly from Sweden, with the result that the importation of brass wire was prohibited in 1638. At this time English copper mining was at a near standstill, so that much Swedish copper had to be imported while Dutch and German merchants who had set up in England were attempting to corner the supplies. There was an increasing opposition to monopolies of all kinds and the

powers of the two companies was waning. Although the answer to the increased importation was to impose heavy duties on foreign copper the two companies did little to encourage the production of copper and brass themselves. It has been stated that during the Civil War and Protectorate (1642-1660) practically all the operations of the companies were suspended, no Governors were chosen and no meetings were held (Hamilton 1926). This has been shown not to be the case (Davies 1935, Rees 1968), and a perusal through the Court Minute Books of the companies shows that their meetings and elections were carried on throughout this period, even though most of the shareholders were Royalists (B.M.). Both before and after the Restoration in 1660 they were concerned solely with the leasing of their rights to those wishing to mine copper and make brass. Not surprisingly, the monopolies were openly violated.

In 1668 there was an attempt to unite the two Companies, but despite what has been previously written on the subject this did not occur until the early 18th century, and the formation of a United Society under the Governorship of Prince Rupert cannot be substantiated. Certainly in 1668 Prince Rupert was elected as a Governor of the Mineral and Battery Works and discussions were held between the two companies, but they held separate meetings until about 1709. Prince Rupert played a very minor role in the running of the Mineral and Battery Works, attending very few of the meetings. His election to Governor seems to have been solely to influence important persons to assist the companies retain their monopolies.

Eventually these monopolistic rights, which had only stifled the development of the industry during the 17th century were rescinded in two Acts of 1689 and 1694, which, together with the development of the reverberatory furnace using coal as a fuel for copper smelting, opened up the way for a major upsurge in copper mining and brass making (Jenkins 1944). Previously the vast quantities of wood required for smelting had severely limited the production of copper, particularly in Cornwall and the Lake District, the most abundant sources of the ore then known.

Early Mining at Ecton

Although mining is known to have taken place in the area very early in the 17th century, this cannot be proved to be at Ecton. The Wetton Parish Register records

"Baptisms, July 2nd 1600 - Margaratae f. Morgini and Agnatis Hartede Casteron, parochiae de Wetton - mynner," who was of the Hurt family of Castern. Nicholas Hurt was a lead merchant and was living in 1660 (Harwood 1820). In 1622 Garard Malynes reported that he had seen "excellent copper ore of some mines in Staffordshire, in the hands of Mr Stonewel, which absolutely is the best ore that ever was found in England". The differences in the mineral laws of Derbyshire and Staffordshire were noted in 1630 when we read - "in Staffordshire (where his Majesty hath noe lot nor Cope nor other jurisdiction in the Mynes or Oare) there is Sir Richard Fleetwood, one Mr Hurt, and others whoe have lead mynes They lett the workes to Myners and reserve a part, some tyme of the oare and some tymes of the

lead, to themselves, vizt., in some places a Seaventh dish, in some other a Sixth, and where the care is very plentifull a fifte or a foarth dish, but that is seldome", (France 1947). Sir Richard Fleetwood of Calwich, near Ellastone, had held a lease from the Mineral and Battery works for the mines in north Staffordshire since 1623, but shortly afterwards his operations were in difficulty and a renewal of the lease in 1640 was refused (Rees 1968).

The first dated reference to Ecton is in 1654 when Francis Berresford, Esquire, bought 2 loads, 4 dishes of ore (most probably lead ore) from Jeremiah Roades and Will. Foowe at Ecton at 18s.6d. per load. (Derbys. R.O.). A year earlier Roades had been a partner with Lional Tynly, a lead merchant from Holmesfield, and two others in the Hardyhead Sough at Taddington, Derbysire. He was one of five auditors of Tynley's estate after the latter's death in 1653, and was described as a Yeoman from Ecton (Lawrance, 1931).

The most important single document that has yet come to light is an account of the Copper Mines at Wetton from 1660 to 1668 (Dev. Coll.), which gives us such a vast amount of information on the Ecton mines at this period that it is transcribed in full in the appendix.

Firstly it is clear from this document that the mines had been in operation before the Civil War, when £200 had been spent on them, and they were also working continuously from 1660 to 1665. In the 1660's 4 tons 6 cwt. of copper metal (probably the total produced) was sent to London, thus disproving the theory of Hamilton (1926) that Ecton supplied copper to the large Nottinghamshire brass works owned by Lord Byron. 587 kibbles of copper ore (calculated from the wages at the stated rate of 10s. per kibble) were mined and 472 kibbles sent for smelting. Also there is the statement that 85 dishes of copper ore (approx. 17 cwt.) were bought at Tissington. This is rather unusual since there are no known records of copper being mined anywhere near Tissington. The quantity of ore produced at Ecton during this period shows a steady decrease -

1660	180 kibbles
1661	131
1662	129
1663	91
1664	56

Since $9\frac{1}{2}$ kibbles held about 10 cwt. (Donald 1955), this would make a total ore production of about 30 tons, (each of 21 cwt., the customary copper measure). The total copper metal production would be just under 5 tons, giving about 15% copper from the ore which is quite comparable with 18th century values.

Jeremy Rhodes was still in charge of the operations, for which he was paid £20 in 1660, and 1664, £30 in 1661 and 1662, and apparently nothing in 1663. Jeremiah Roades appears in the Hearth Tax returns for 1666 as paying for 3 hearths at Eeckton, (Wm. Salt Arch. Soc. 1925).

Apart from Plot's mention of the Ellastone smelting mill, here we have the only other reference to this mill, which appears to have been built

(or at least modified from an existing building) in 1660-1. Leather was used for the bellows, so presumably they were replaced later by the "foraigne Engine" when the Dutchmen took over. The rent for the copper mill was £25 per annum presumably paid to Sir Richard Fleetwood the owner of Ellastone at that time. It is clear from both this account and Plot's description that it was an ore hearth requiring a blast from water-wheel driven bellows, with a fuel of wood. Copper smelting by reverberatory furnace and coal was not developed until later in the century at Bristol (Jenkins 1944). The reason for the location of the smelting mill at Ellastone, some 10 miles from Ecton, is clear when it is realised that vast quantities of fuel are needed for smelting, copper being much more difficult to extract from the ore than lead. The smelt would be nearer the wood supplies, some of which at least came from Birchall Park; Birchwood Park is just $2\frac{1}{2}$ miles away. The river Dove would provide ample water power. The exact location of this mill is still uncertain, and although there are two mills in the area today, they are both old corn mills.

Other details of the accounts can be seen in the appendix, but it is clear that quite a large sum of £1263 was spent on the Ecton Mines and the Ellastone Mill in the early 1660's. With copper worth £235 a ton at that time, the income from the metal sold would amount to just over £1000. The lack of any mention of purchases of powder suggest that any blasting done at Ecton was after 1664.

Jacob Mumma and the Esher Brass Works

One of the most important parts of the Ecton account is the lease of the mill and mine to a Mr Mumma in August 1665. The duty payable in 1668 was 1/6th of the ore raised. No other Staffordshire references to Mr Mumma have yet been discovered.

In 1649 two Dutchmen, Jacob Momma and Daniel Demetrius set up a brass wire mill at Esher in Surrey, using Swedish copper (Hamilton 1926, Houghton 1697). Other spelling variations of these names are Mumma, Mummer, Mommer, Moma, Mummy, Muma, while Aitken (1866) refers to "Jacob Monimia and Daniel Diametrius, both Germans, who established brass works at Esher, near Surrey, on which they expended the sum of £6000; but which, after being in operation thirty four years, and making good profit, they were compelled to give up working, to their own ruin, and, as they expressed it, to the prejudice of the Kingdom, in losing so beneficial an art - having here, i.e. in England, the best copper and calamine of any part of Europe." There was a large influx of Dutch families into the Esher area at that time, most probably to work at the brass mills (Stevens, 1966, Anderson 1948).

James Mummy, gent., and Jacobus Mumer appear as constables at Esher for 1661 and 1663 respectively, while Jacobus Mumma, gent., was a juror in 1665. Jacobus was used in 17th century latin for both James and Jacob. The name does not appear for 1666-8 (Surrey Rec. Soc.). In 1664 Mr Mumma

was taxed on twenty hearths at the mills, while in 1670 two particulars of the manor of Esher read as follows - "The Mills (let) to Jacob Moma at £40 p.a. 16 yeares to come the Lease being expired worth £100 p.a." and "meadow and the mills for (?) wire built on the river which cost £3000 the building, worth the lease being expired £100 p.a. wherein about 16 years to come lett to Jacob Momma The Improvement of Mr Mommas Mills". (Surrey R.O.).

In 1656 Momma petitioned Parliament for the reduction of the duties on imported Swedish copper (Cal. S.P.D.). He was evidently still in possession of the mills in 1678, for in his will dated that year they were left to his wife. He died in 1681.

No positive confirmation that Jacob Mumma of Esher was the same person who took over the Ecton Mine and Ellastone Mill in 1665 has yet emerged, but with such an unusual foreign name and the same connection with the copper trade at about the same time, we can be fairly sure that they are one and the same person. This opinion is shared by Professor Donald, the authority on the 16th century copper and brass industry in England. It will be seen later that further circumstantial evidence supports this supposition.

The Introduction of Blasting to England at Ecton Mine

The story that Prince Rupert brought across Dutch or German miners to work at Ecton seems to depend upon whether Ecton was worked by the Mineral & Battery Works, and the role played by Rupert in the running of that Company. As we have seen, Rupert's role in the Mineral and Battery Works was negligible and any further possible connection with Ecton is severed when it is found that the mine was deliberately infringing the monopoly. In April 1663 the Company found that the 3rd Earl of Devonshire was working a "Copper Myne in Watton in Cou Staff. in the Earles own Lands" and attempted to get him to take out a lease from them. The Company graciously "ordered that no Lease thereof be made to any other without first acquainting the Earle therewith." In November of that year the matter was raised again - "The Company being informed that the Earle of Devon doth worke a Copper Myne in the Cou Stafford, and hath offered for sale 3000 weight of Copper, It is ordered that the Earle of Devon be waited on or some agent of his spoken with to know by what Authority the said Earle worketh the said Myne." Apparently the company received very little satisfaction from the Earl for the matter was not raised again (B.M.).

A similar situation arose with Mumma's brass works, originally set up in 1649. In 1655 the Company of Mineral and Battery Works found that "Jacob Mummer doth Worke att Ditton upon Thames upon Battery Plate and draweth Latten wyre." (Battery was sheet made from beaten brass, while latten was an early form of brass). His defence to this charge was "that he being a Stranger and an Alien borne knew nothing of the authority of this company," and he agreed to take a lease for 1 year at £10 per annum. A reminder in 1656 that they would "restrayne his working" prompted him to

agree to a 3 year lease at £10 per annum, but this had not been done two years later. In 1662 Mumma (described as a Dutchman) was summoned to the Court of the Mineral and Battery Works "to show wherefore they work upon the latten battery & deale in the said calamyne stone contrary to the priviledges and authority of this corporation." When Mumma did appear before the Court, together with his partners Daniel Demetrius and Peter Hoote, it was not to agree to a lease, but to request the assistance of the Company in presenting a petition to Parliament. Mumma said that "their manufacture is almost lost & that their fires are going out & showed some reasons & grounds for the decay of their said trade." The Company agreed to assist in presenting a petition giving "some reasons for the continuing of the brasse manufactory in this Kingdom," (B.M.). It is most probable that the high price of imported copper (due to high duty) was seriously affecting the Esher brass works, with the result that Mumma had to look elsewhere for his raw materials and he chose to take over the copper mine at Ecton.

The association of Mumma and his partners with Ecton also throws light on the introduction of blasting to Ecton. Since Surrey was one of the main centres of the gunpowder industry in England in the 17th century (Giuseppi 1905) it seems highly likely that Mumma would have connections with gunpowder experts, and so it is most probable that Plot's Dutchmen who "broke the rocks with Gunpowder" can be identified with Mumma, Demetrius, and Hoote.

Conclusions

The Ecton Copper Mine, was worked prior to the Civil War, during 1654, and from 1660 to 1668. A smelting mill was established at Ellastone in 1660 so as to be nearer to the wood supplies needed for fuel. It is likely that prior to 1660 Ecton was mined solely for lead.

In 1665 the mine and mill were let to a Mr Mumma, who was most probably the Dutchman who had a brass wire mill at Esher in Surrey. The close proximity of Esher to large gunpowder works suggests that it was Mumma who introduced blasting to Ecton, thus occasioning the first use of explosives in British mining. This must have been after 1665. For the five years beginning in 1660 about 30 tons of copper ore were raised, producing about $4\frac{1}{2}$ tons of copper metal. This copper was sent to London. These figures give about 15% copper in the ore and are comparable with the 18th century figures when production was at its peak.

The Company of Mineral and Battery Works played no part in the affairs at Ecton, nor did Prince Rupert, and there is no evidence to suggest that Rupert was responsible for introducing blasting into England.

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help given in the preparation of this paper. The Ecton Mine Accounts are reproduced by permission of the Trustees of the Chatsworth Settlement.

Appendix

An Abstract of the charge of the Copper Mill and mines at Wetton

		£	s	d
	ffor getting copper oar in Ecton Hill (rent in 27 pages) it seems there was 180 kibbles or horse loads got	096-19	-	7
	for getting stone & sand, & for lime, & carriage of all, for ye Mill & Mill dam at Eliston	20-11	-	10
	Timber, boards, hore & carriage	17-10	-	6
in 1660	Masons & Wallers 14-17-6 Carpenters 27-1-6	41-19	-	0
	Labourers 10-6-5 Thatch & thatchers 1-5-0 Nails 2-6-11	13-18	-	4
	Leather & hides for bellows 8-2-0, carriage of 100 ho. load of oar 5	13-	2	- 0
	Peats 5-11-9 Coles 1-7-0 Cordwood 15-10	07-14	-	7
	besides 22 yds of lead pipe & a pig of lead from Chatsworth			
		<hr/>		
		211-15	-	10
	ffor Stone, brick timber & Iron worke & c for ye Mill	39-	2	- 4
	Masons, wallers, carpenters, labourers & c	31-16	-	5
	Leather, oyle, tallow, tubbs, pailles & c	05-	7	- 10
	Cordwood, coles, rootes, poles, Coules & carriage	95-13	-	7
in 1661	85 dishes of Copper Ore bought at Tissington & c	04-	3	- 0
	Copper workers & their helpers wages	87-	5	- 1
	Getting copper oar, to groovers & miners	65-11	-	6
	Sopes, ? , candles & c	15-14	-	9
	rent of ye Copper mill	25-	0	- 0
		<hr/>		
		369-14	-	6

	carriage of 260 horse load to ye Mill	13 - 0 - 0
	" " 112 " " " " "	5 - 12 - 0
	Jeremy Rhodes wages in 1660 20-0-0)	
	in 1661 30-0-0)	80 - 0 - 0
	in 1662 30-0-0)	
	Smith & carpenter about ye Mill	3 - 0 - 4
in 1662	? & carriage & c	29 - 17 - 5
	necessaries as candles, leather, ashes & c	3 - 18 - 6
	Copper workers wages	62 - 6 - 6
	Miners getting oar	64 - 13 - 1
	necessaries for ye mines	12 - 6 - 8
	carriage of 2 tun & 4 ^c weight of copper to London	16 - 11 - 0
	ye accountants riding charges	2 - 16 - 0
	a yeares rent for ye Mill	25 - 0 - 0
		<hr/>
		319 - 1 - 6
	carriage of 2 tun & 2 C weight of copper to	10 - 10 - 0
	London at £5	
	for 40 cord of wood at 5s 6d	10 - 15 - 0
	Carriage of 30 cord from Birchall parke at 3s 4d	5 - 0 - 0
	cutting 36 cords $\frac{3}{4}$ at 22d	3 - 7 - 4
in 1663	repairs about ye mill dam	0 - 8 - 6
	piling up cordwood	0 - 7 - 6
	a yeares rent for ye mill	25 - 0 - 0
	miners getting oar	45 - 13 - 8
	candles, coles, leather for pumps, ropes, corves,	08 - 17 - 11
	nails & sharpening picks	
		<hr/>
		109 - 19 - 11
in 1664	for repairing ye Mill	04 - 9 - 0
	for getting copper oar	27 - 16 - 0
	Jeremy Rhodes wages	20 - 0 - 0
		<hr/>
		52 - 5 - 0
	Before ye Warr laid out about ye Copper mines	200 - 0 - 0
	the whole chargs is	<hr/>
		1262 - 16 - 9
	towards ye charges mentioned	
	sent to London (2 tun & 4 C weight of copper	
	(2 tun & 2 C weight of copper	

in August 1665, the mill & mine was let to Mr Mumma)	
who is to pay for the mill	150 - 0 - 0
for oar already gotten	110 - 2 - 6
for copper stone	22 - 10 - 0
for cord wood	24 - 6 - 10
for tooles	1 - 12 - 0
	<hr/>
	308 - 11 - 4

Copper Oar before ye war cost 10s a kibble getting, wh is a horse load

Copper Oar is worth about 12d a dish.

in 1668 there is a memdum, that my Lord was to have 1/6 part of the Oar measured out upon the spot before it does to ye mill for his duty.

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