

ART. XV. – *Two Post-mills at Whitehaven in the 17th century.*

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IN his stimulating and informative article *Cumberland Windmills*<sup>1</sup>, J. Hughes described seven surviving windmills and noted twenty-five more which had been destroyed. All, except a demolished 17th century post-mill at Moorhouse (NY 327 572) four miles west of Carlisle, were described as tower mills built of local stone to withstand harsh northern winters. The tower mill at Arrowthwaite, a quarter of a mile southwest of Whitehaven's centre, had been converted into three flats before its demolition about 1893. Joseph Farrington's "North View of Whitehaven" in Lysons' *Magna Britannia*<sup>2</sup>, shows the tower carrying four sails and standing by a small group of houses on the open hillside. The Ordnance Survey plan (1 : 2500, 1st Ed., 1874) shows the buildings still amid fields, locates the mill at NX 968 178 and names the houses Nelson Terrace (Fig 1a). This suggests that the houses were built just before Farrington drew his view and other evidence shows that the tower mill was built next to an earlier post-mill.

In a volume of estate plans, drawn by Andrew Pellin for Sir John Lowther of Whitehaven,<sup>3</sup> folio 24 has a plan of "Harrathwaite" dated 1703. It has a neat drawing of a four-sailed, open post-and-trestle mill with quarter-bars supporting the main post, and a tail pole for turning the mill into the wind (Fig. 1b). Proof of when that post-mill was built is available in early letters between Sir John and his estate steward, Thomas Tickell.<sup>4</sup> Indeed the detail is sufficiently interesting to justify using their own words as often as possible to create a first-hand account. All dates are given in modern form.

They had differing opinions on the best site for a mill, Lowther thinking that Brackenthwaite would be more accessible for townsfolk. On Thursday 28 June 1666, soon after he became agent, Tickell pondered "upon what ground the windmill *shall be erected*" and reported: "The Millwright came heer last Satterday and fancys noe place so convenient to fix it as the hill at Arrithait; he objects much ag[ain]st Brackenthait as a place too low"<sup>5</sup> because it would catch only winds "downe the Vale & from the sea". The millwright had "brought 3 men and one boy; his owne wages 2s, one of his men 22d., and two other men each 20d. p. diem and his boy to have his diet for his labour". Tickell then advised: "I intend the Cariage of Wood upon Monday if your comands divert not".

From his home at Sockbridge Hall, Sir John replied the next day, "troubled that the Hill at Braconwt should not fall proper for the windmill, for the other at Arithwt, I conceive very inconvenient for the Town". He observed that if a horse mill was to be built later, it should be in or near town and that, if one man managed both mills, lack of wind would not stop production. He feared that the wind at Arrowthwaite might be so strong that the mill might "be overthrown by some extraordinary Gust . . . as was once the whole woodwork of the old Mill" and he noted that the project would depend on the "sufficiency of the Timber, principally the *main post* and those peices which must support it". A large, straight tree for the central post (perhaps 18 feet long and 2½ feet square) would not have been easy to find in a windswept coastal district.

On 6 July 1666, Tickell reported that the wright had "now resolved to erect it in the

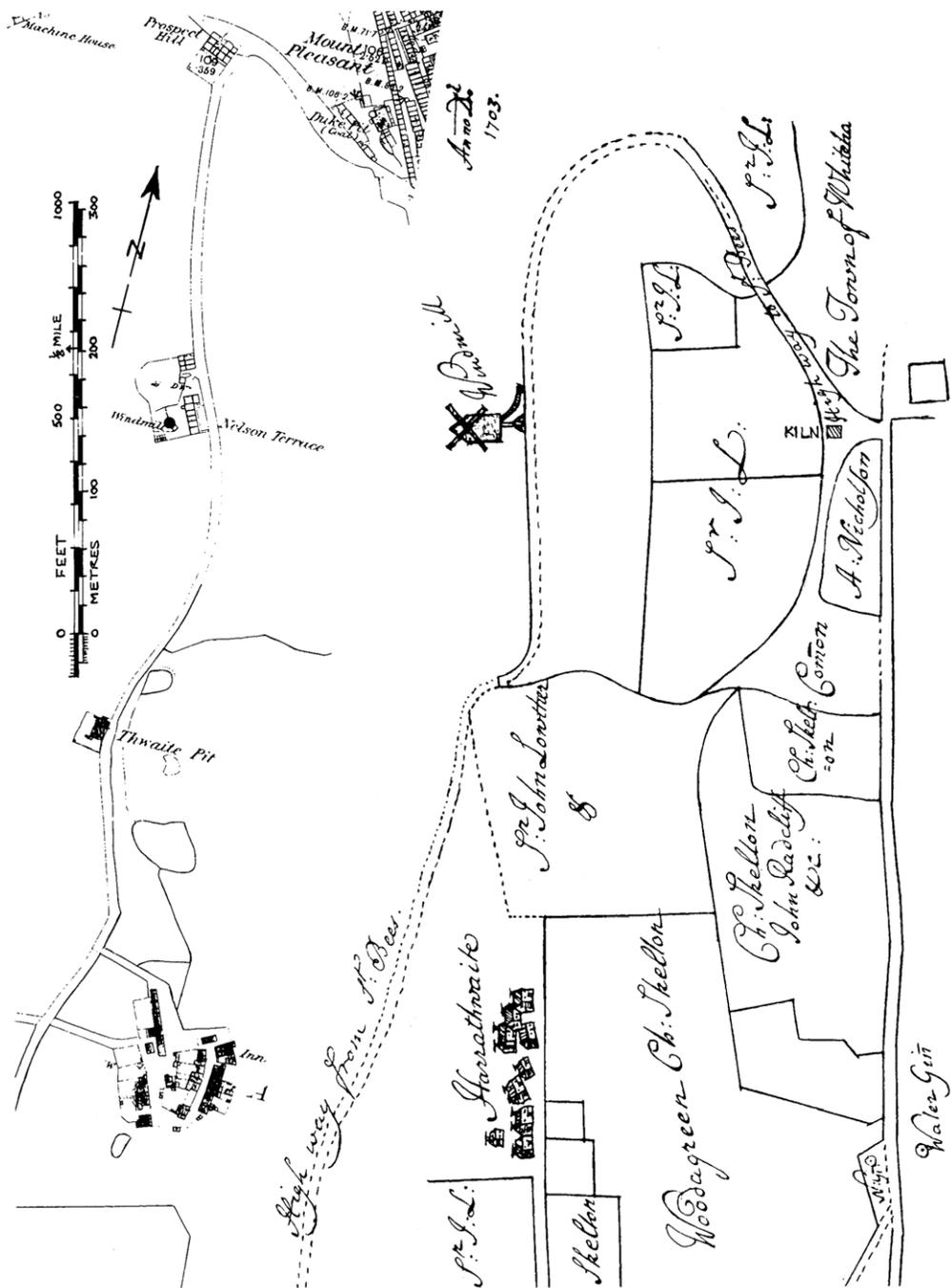


FIG. 1. — a, (left). Extract from the Ordnance Survey plan of 1874 showing the windmill's position north of Arrowthwaite (A). b, (right). Extract from Andrew Pellin's plan of the same part of Whitehaven, showing the post-mill, "Water Ginn" and "W Gn". The date has been moved to save space and the corn-drying kiln, built in 1672, has been added to show its position. Both plans have been reduced to achieve a similar scale for comparison.

place of the old windmill [at Arrowthwaite] and all the old Edifice to be laide aside. He doubts not to fix her to the generall good satisfaction of all and saith that we shall have wood sufficient to spare, excepting 2 peices for an horse miln if . . . we goe on with that also. When the other is finished he returns home and will procure us a good Miller from Newcastle if you approve". On 22 July, Lowther wondered if there was enough timber "for a House for the Horse Mill" and wanted a miller from Newcastle as "this Country does certainly afford none good".

By 3 August, Tickell had "people in Mr Gales Quarey for stones to the horse miln and the other [mill] is dayly laboured, another workman of 18d. p.day wages being come from Newc[astle] to assist them". Then, on 12 November, the agent reported "Our milnes are almost finished, the greatest wants are Milstones & Slates, both [of] which I expect dayly. Many would persuade me to build a Kiln which will cost about £10". It is worth noting that, even after five years delay, the agent remained uncertain over where a kiln should be sited. On 11 December 1671, he mentioned "a vacant parcel [of] ground called Hollinwell on the Backside of Will Nicolson's, in the way to the wind milne, which stands low and would be convenient for the towne who drie little, but at this place there are no matterials in readinesse tho' this might be straw thatched and litle charge . . . [At] the other place nigh the wind milne, on the low side of the way not obstructing the winde . . . there are as many stones remaining of the old milne as will make the Kilne and to me seemes rather to invite all your owne Country tenants and Sandwith also, but that must be slated . . . for about £15". The first location was adopted (Fig. 1b) for the Whitehaven Street Books, updated in 1743, show that, behind No. 9 Old Town (William Nicholson's) No. 8 "Was an old Killn . . . long since useless and demolished". The same source also proves the location of the horsemill. It described plot 2 in Old Town as "a Horse Mill [which] with the Cow Ho [use] No. 5 [was] sold to Math<sup>s</sup> Gale 20 Nov. 1742 for £50".<sup>6</sup> Andrew Pellin's plan of the town in 1699 shows No. 2 adjoining the south end of No. 1b "the old Tyth Barn of Whitehaven, Lett by Sr Jo L to Jno Gale for 1000 years" at 20s. per year. Both buildings occupied the space south of the Market Place, immediately east of the Old Hall. Hence the kiln stood conveniently between both mills, at the foot of the "High Way to St. Bees".

We return to 1667. Lowther wrote on 12 February: "I am glad the Mills are both at work, let me know how the Custome is like to keep them employed and if possible get a sufficient miller". Tickell's news was not good. He noted that "They finde a greater advantage by grindeing malt at the horse milne, which presents all Smitham [fine powder], than at the wind milne which, by Gusts of wind, either cutts too Round or too small and wastes the smitham. This will ingage us to keep an horse for that purpose, which may at some times assist the carriage". Two horses were in use, but he thought that one large, old coach horse might suffice.

By 15 May, Sir John had received his agent's accounts: "I see you make the charges of the Windmill £157 . . . [and] the Horse mill £69 and therein I find but two Milstones and not much Tymber". He asked for the whole cost, including wood supplied by William Atkinson, and also what rent the mills might yield. Atkinson was a ship-owning sea captain, engaged in the deal trade from Norway. On 27th, the agent explained that "For our milnes I made use of 2 milstones [that] were your owne and 2 I bought by reason the stones from Lancashire came not in time but, towards the latter end of my booke acco[unt], you will finde £24 charged for 4 paire stones . . . from Lancashire

which we have for store. I had them £11 cheaper than . . . if they had come in time". With respect to the value of timber used, he said Atkinson "could no way satisfie me, haveing used a great part thereof in the Coalegin and Coalepitts . . .". Only a few crooked and shaken pieces were left. He expected "the milner will make neare £30 per annum". It seems that both accounting and building management methods could have been improved. Both mills probably contained a lot of imported deal especially for framing and cladding.

The estate accounts show that both mills were let to Thomas Goscon [Gascoine?] for four years commencing 28 August 1667 and that they were "Turned over by him to Caesar Barnes".<sup>7</sup> Rent was paid at £22 per year until 28 February 1670 when it was reduced to £20, a clear sign of financial trouble. A marginal note in the accounts then states that "Here Sr Jn Lowth<sup>r</sup> took the Windmill to manage this last y[ea]re & abated 40s. rent for it by wch there was lost £4 10s. 9d. by that Acco besides 40s. rent that y[ea]re". The loss made on this venture shows why the rent had been reduced and the agent wrote on 14 November 1670 regretting that the windmill "to this time has only won three bushells [of] bigg since we entered – not enough to pay the Millers diet. She grindes well but hath no Custome. Other millers such as yours at Beck milne [St. Bees] keep carriers to seek and bring home the peoples graine". Despite this disappointment, the estate accounts show that, on 28 August 1671, the landlord "Entered upon *both* these Milnes & managed them till May the 1st 1672 and cleared by that Acco £2 4s. 11d." profit, perhaps through having the horsemill near the market-place. The income was "increased by suite at Law £1 19s. od.", so that £90 4s. 5d. had been received since the mills were built.<sup>8</sup> A separate account book was kept carefully by Thomas Tickell from 2 September 1671 to 2 May 1672. On the first page he listed expenditure totalling £18 17s. 4d.<sup>9</sup> and on the next four pages he listed milling done for several local customers including Mrs Britton and Mr Gale, but mainly "Home", a clear indication of poor support. During this period the number of bushels milled were; malt 189, bigg (barley) 34, wheat 1 $\frac{3}{4}$ , skilling (oatmeal) 1 $\frac{1}{2}$ , rye  $\frac{1}{2}$  bushel. This produced an income of £21 2s. 3d. and a profit of £2 4s. 11d. in eight months. After this brief venture into mill management, the remainder of the book was used for recording the leasing of numerous premises in Whitehaven until 1689.<sup>10</sup>

The estate accounts go on to record "Another Lease of the premises granted to Tho[mas] Ladyman & Ja[mes] Burnyeates for 7 years Comenc[ing] 2d May 1672 at £20 per annum if the 2 Milnes are profitable". However, "upon the Farmers compl[ain]t the rent [was] reduced to £16 per annum" from 2 November 1673. On 8 September 1673, the agent reported that the windmill "without additionall expence will be uselesse for the axletree, being not made of sound wood, is failed and without another new one made will be unserviceable. I have had a Milne wright allready from Newcastle to trie if it could be amended which he would not undertake without a new tree, nor am I so bold to buy one till I have your Answer . . . Mr Stanley told me that he would, to pleasure you, afford us the choice of his wood". In view of his earlier stance about its site, Sir John answered tolerantly, that the windmill "was unfortunately undertaken at first, not for any error in it . . . [but] that there wants sufficient Custome . . . Now it is up I think you had best be at this further charge tho you would have done well to have intimated what benefit we are likely to have by it, that we work not to loss as in some cases you know we have done already". On 12 November, the agent reported "Though

the windmill makes small rent yet the whole fabrick is lost without this reparation, for which reason I have procured a tree and will speedily reparaire it". Again he used a Newcastle man.<sup>11</sup>

By a new lease in 1675, Burnyeates and Ladyman continued as millers until 1682 paying £8 a half-year regularly. However, by 10 July 1677, more repairs were needed for Tickell wrote to Lowther thinking it "strange that you demur, since the sum of £30 added to the windmill materials, which would not raise £20 if it were pul'd downe and sold for any other use", might earn £4 a year rent. Again, on 13 January 1679, he wrote "I have a weeke ago repaired the windmill and put her into the farmers hands, but they have not as yet set her to worke". The tenants probably threatened to leave at the end of their term for Tickell wrote in his lease notes, on 24 February 1679, that Thomas Addison of the old Custom House in King Street was to take both mills for 21 years at £18 a year with effect from 1 May 1682. Lowther was not to erect other mills near Whitehaven and Addison was to give eighteen months notice to quit "or the windmill at any shorter time", which suggests that the latter was a less attractive proposition. Addison changed his mind, however, for he had a horsemill built by John Satterthwaite before February 1683.<sup>12</sup>

By the end of their lease on 1 May 1682, the tenants had paid £160 rent which was then "Increased by suites at Law, £9 10s." and they were penalized £3 "for the old Mill-horse being dead". After this the two mills were let separately, James Burnyeates retaining the horse-mill for £3 a year while Thomas Gillial, a carpenter, took the windmill for £4 a year. Tickell recorded in his lease notes on 1 May 1684, that Burnyeates was "to keep the . . . horse in good plight and all wearables" while the landlord was "to keep good stanch [waterproof] Roofes & walls" and supply millstones. The utensils comprised "one Winchester Bushell & a peck, one brass gallon and one brass pint measures, six [iron] pirls nine pounds six ounces<sup>13</sup>, one old axe, one Gavelick, [and] one bush chisell". On 24 April 1688, Tickell wrote to Lowther about the threat posed by Captain Richard Senhouse of Tangier House "getting stones . . . to build him selfe a Malt mill . . . wch will be another prejudice to your mill of which I can make nothing on by that idle Miller Burneyeats, who neither grinds nor keeps the horse well nor payes his rent". Not surprisingly, on 2 May 1688, Burnyeates was succeeded by a new tenant, William Thompson, paying £3 10s. a year. When he died, his widow Katherine continued the tenancy from 1 May 1696 until Thomas Jackson took over at Pentecost 1699 at £4 a year. On 24 February 1679 a Thomas Jackson, butcher, had been admitted to No. 3 Old Town, immediately south of the horsemill and, by 1701, his mill rent was in arrears. Thus, on 1 May 1701, the horsemill was "Lett to Mr John Gale for 31 years at £3 . . . . The Lessee is to take the Roof of[f] & Raise itt to the height of his own Buildings att the North end thereof", namely the old tithe barn which had been leased to Gale's father in 1664 for 1000 years. The Gale family continued to rent the horsemill until it was sold to Mathias Gale in 1742 for £50. We must return to the windmill, however.

The tenancy conditions for the windmill are given in Tickell's lease notes. Gillial was "to keep Coggs, Rungs and Sayles, Radling<sup>14</sup> & small wearables in good order". The landlord was "to repair the mill it selfe and find her with sufficient good millstones" while Gillial was to keep an exact account of all the mulctures he received and if he did not gain sufficiently from them he was to have ten shillings rent rebate.<sup>15</sup> A list of "Utensils belonging to this mill" followed. They comprised "one Gavelick [crowbar],

seaven pirls, one old peck, one old hoope, two new sailes, four indifferent good sailes and two with some holes in them". In 1686 Gillial paid only £1 rent for his mill and a marginal note in the estate accounts explains that "the windmill fell into decay". Another note on page 48 states "The windmill [was] wrought not, for want of Reparations, which Jo<sup>n</sup> Satterth[wai]t tooke into his hand to reparaire the 20 September 1686 & to have rent free for 2 years" in return for the repairs. Eventually, on 1 December 1689 the windmill and corn drying kiln were let to Satterthwaite and John Stoddart for seven years at £3 a year. Sir John Lowther was to have "her fitted with a new wheele and *one*<sup>16</sup> arme &c" and the tenants were to repair all other things and maintain the windmill in good order.

When William Gilpin succeeded Thomas Tickell as estate steward in January 1693, the same tenants were in occupation but John Satterthwaite died in September 1694. Gilpin's accounts mention repairs in 1697. On 1 April, he paid "John Knipe for 16 foot of Timber for a Swape to the Windmill 16s." and, on 28 July, he paid £2 14s. 8d. "for Timber, Carpenters work and Leading, for renewing 2 Supporters and the Groundsell of the Windmill". The mention of such items indicates the advantage of having had a carpenter as tenant of the windmill between 1682 and 1694. After Satterthwaite's death, John Stoddart paid the rent until August 1699 "At which time Sir Jo Lowther agreed to make a Lease to George Lancaster for 21 years . . . at 50s. per annum and to repair the Mill, and the Lessee to be at all future Repairs". One might question whether this was the same George Lancaster who undertook the carpentry repairs at Sockbridge Mill in 1708.<sup>17</sup> At Whitehaven, Thomas Benn's estate ledger<sup>18</sup> has a statement that the "Wind Mill & a New Mill to be built by Geo Lancaster in Mill holm [were] Lett to the sd Geo. from pent 1700 for 21 years at £4 10s." a year jointly. However, in 1701, "The Rent of those Mills was remitted upon Condison that the sd. Geo. Lancaster was to build Two water Corn Mills and a Corn Kill at Harras Park, till pent[ecost] 1704, the Lessees to find all repaires". Then we are told "Harras Mills and Kill was lett from the feast of pent. 1703 to John Peile & Dan Stephenson with one close of pasture ground for 25 years at £3" a year. Regular payments were made until Martinmas 1713 "At which time upon Application of the farmers setting forth their great Losses by the lease, Mr [James] Lowther was pleased to discharge them . . . & the said Mills & Kill tumbled down & lay in Ruins". So much for the windmill's competitors!

Perhaps the windmill also lay idle, for the next reference was made in the estate accounts for 1741 when the:

Wind Mill in Great Thwaite<sup>19</sup> with the Ground between the said Mill & the High Way [to St Bees] being 26 yds in Front & the same breadth backwards to the Centre of the Mill & thence further Backwards 13 yds in a Half Circle . . . [was] Lett to Carlisle Spedding<sup>20</sup> for 150 years from Mart. 1741 at £1 10s. p. Annum . . . Lessee to Build a Stone wall 5 [feet] High, or Sufficiently to Ditch & Rail-in the premises.

The tenant was to repair the mill, pay all taxes and was not to keep pigs or poultry. He was to give six months notice in writing and leave the mill and its utensils in the same condition as at his entry. By 1743, Spedding and his brother John had started a brewery company and might have used the windmill to grind malt for it. Certainly he paid rent for the mill until 1748 but, on 3 November, Sir James Lowther wrote to John "You may tell your Brother I have his letter . . . about the Windmill . . . he may be sure I

shal be glad he can secure his mony by parting with it [*sic*] for Millers are generally sorry folks". Then, on 22 December 1748, "As the Windmil is *blown down*, I am very glad your Brother gott it sold off[f] in time . . .".<sup>21</sup>

No details of rebuilding the mill have been found but, in 1749, Daniel Stephenson started to pay rent for at least the site. To provide a site to build another mill

[On] 13th October 1749 Sr James Lowther Granted *another* parcell of Ground in Thwaite 30 yds Fronting to the Highway & 40 yds Backwards . . . to Daniel Stephenson for 142 years from Mart. 1749 at £3 per annum . . . Lessee to enclose with a Wall on the North & South sides 7 ft High for 25 yds back and the rest of the Ground either with a like wall or with a wall 2 ft High & posts & rails . . . 5 ft more . . . .

The other conditions were like those of Spedding's lease. Clearly the new lease was intended to expire with that for the post-mill and both plots were in the same hands. This explains an entry for arrears of rent paid on 10 December 1751:

To one yrs Rent for the 1st Mill due Mart 1750	£1 10s.	} ..... pd by D <sup>l</sup> Steph <sup>n</sup> £9
To one yrs Rent for the 2nd Mill due Mart 1750	£3	
To one yrs Rent for both Mills due Mart 1751	£4 10s.	

Stephenson also paid for 1752 but, from 9 August 1753 a Richard Radcliffe paid the same rents for "Wind Mill in Thwaite No. 1" and "Wind Mill in Thwaite No. 2", both listed on a page headed "Arrathwaite". William and Edward Fletcher took over both mills from Radcliffe in 1766 and kept them until at least 1774. In 1791 both mills were tenanted by "Fletchers & Co." but, by 1800 John Ramsay was tenant and, in 1803, his widow paid £2 5s. per half year for "Two Windmills" in Arrowthwaite.

The boundaries of the windmill site on the 1874 Ordnance Survey plan (Fig. 1a) match the combined dimensions given in the two leases. The projection "Backwards 13 yds in a Half Circle", which allowed the tail-post to turn within the site, proves the old post-mill's position on the northern half of the site. If it was re-built in 1749, it was certainly demolished before 1816. The tower mill was built in 1749-50 and must have lost power from easterly winds once Nelson Terrace was built. We must return to earlier matters however.

From the comments made in 1666 and the "Prospect of Whitehaven in the Year 1642"<sup>22</sup> it is clear that a previous windmill stood on the same site. Additional proof is available in a deed, dated 20 November 1640, by which Robert Milholme sold part of his estate at Arrowthwaite known as "Munkeray" to (Sir) Christopher Lowther for £73. The property comprised half of a barn, part of a house, about eight acres of land "and allsoe foure acres . . . situate . . . in the Thwaite nexte to the wynde Mille".<sup>23</sup> It had been blown down, repaired and had fallen into decay again by 1666. Serviceable wood was re-used to save expence when its successor was built but, as its old stones were left until at least 1671, it probably had a 'round-house' of masonry to shelter the lower timbers from the elements and act as a grain store.

Major repairs were carried out on that old mill in May 1649 and included new sweeps, a new axletree and a considerable amount of new boarding and ironwork. It is interesting that some, if not all, of the iron came from Muncaster where a bloomery had been established in 1637.<sup>24</sup> Presumably there must have been a forge nearby. If the windmill repairs followed the accident mentioned by Lowther, he would have been about six at

TABLE I. – Extracts from Thomas Lamplugh's Accounts for Sir Christopher Lowther's Estate following the latter's death on 6 April 1644.

Source: C.R.O. (Carlisle), D/Lons/W/1/8, pp 129, 130.

Page 129, headed "the 25th March 1649"

May 10th	£	s	d	£	s	d
Paid for Coggs & rungs p: Windmill		2	2			
pd. for 6 trees p armes & stayes	1	4	0			
pd. for the Axletree & carrying up	5	10	0			
pd.p: leading wood from Hensingham		5	10	7	2	0
pd. for 2 Cwt of Iron at 22s p Cwt				[2	4	0]
pd. Bardy & his men p lying Mill irons one day		2	0			
for making 2 bolts & 16 Clasps p Axletree		0	8			
for 1 lb. of Steele to the Spindle		0	6			
for bringing Iron from <i>Muncaster</i>		3	6			
for making pullies & bolts		2	0			
for making 4 bands to the Wings		0	6			
for making 220 nailes & a bolt to the shooe		0	8			
for 3 dayes p: 3 men making plates		6	0			
given them to drinke	1	0		0	16	10
for bending Iron at the forge		0	6			
for tallow to the Mill		0	8			
for beare to workmen severall times		2	6			
for carrying up armes and swapes		0	10			
for 33 yards of Canvas 21s. 6[d.] charges 9d		22	3			
charges to Wirkinton for boards to cover the Mill 6d p: dressing the Mill 12d		1	6			
for Coardes to the Sailes		3	0	1	11	3
pd. Geo: Langmire p: 21 dayes worke at the Mill for himselfe 12d & his man 8d a day besides their diett	1	15	0			
for 4 dayes charges when he came to view the Mill		5	0			
for 4 days coming & going himselfe 2s & his man 20d. a day		14	8			
for his diett & his mans 23 dayes at 2s a day except Sundays at 16d	2	4	8			
for a meale the 1st night they came		0	8	4	19	4
September 29th [p.130]						
Paid for 12 boards p: Windmill		9	2			
pd. one going to Workinton for them		0	10			
for mosse 3d, soape & nailes 7d.		0	10			
for 1 lb. of twine & making sailes		2	8			
for one going to the Carpenter		0	6			
for 5 daies worke & his diett		6	6			
for 6 boards more		4	6			
for dressing 3 hogs heads & ½ pecke to put corne in 18 d; a bush 2d		1	8			
for nailes 2s 1d p: mending swapes 7d		2	8			
for drawing writings & charges at Sealing of them		2	0			
for leading 4 load of timber		0	7	1	11	11

[On page 132] "A true Coppy of Mr Tho Lamplughs first accounts examined by Thomas Busfield ?? Bainbrigge."

the time.<sup>25</sup> The cost was recorded in accounts kept by Thomas Lamplugh after Sir Christopher Lowther's death on 6 April 1644,<sup>26</sup> and the detail is sufficiently interesting to justify transcription. The entries appear to have been copied from six original bills which indicate that George Longmire was the chief carpenter and one Bardy did the ironwork (Table I). About 73.6% of the total was spent on carpentry and timber, 18.7% on iron and smithing and 7.7% on canvas and cordage. Other entries in 1649-51 are less clear, but suggest that George Wood, who rented the old salt pans for £17 10s. a quarter, withheld £5 which "he paid . . . for an Axletree for the windmilne". A legal case seems to have ensued for Lamplugh recorded the payment of £3 12s. 8d. to "Will Leech about

Jo. and Hen. Woods bond in suit concerning windmill". Perhaps the last two stood surety for a tenant (George Wood?) who failed to keep the mill in adequate repair and brought about the accident. Certainly, that would give grounds to sue them.

The detail in this account falls short of what one would expect of a new building,<sup>27</sup> so that one must ask when and by whom the first post-mill was built at Arrowthwaite and what changes it underwent during its early history? Answers have not yet been found.

A second post-mill at Whitehaven was intended to remove water from coal mines. Before 10 November 1681, Tickell haggled with a Mr Gee over whether to buy land with coal seams which "lay under water and [were] not likely to be drayned without [spending] a great sum of money, viz £100 at the least . . .". With a hint of disbelief, he reported that Gee "told me stories of windmills to draine water" and the agent decided to await Sir John's visit in Spring to tell "all that I can on this subject which is too tedious to be written". No doubt some useful facts went unrecorded, but later letters give an indication of pump and mill design. Referring to traditional methods for extracting coal at a new pit, the agent suggested, on 15 February 1683, that it could be:

wrought by a Gin which . . . [I] can order well enough by the handy worke of one Sattertht, a Carpenter in this towne which person is a good, ingenious artist in anything and made Mr Addison's [horse] mill . . . In order to this mans riper understanding in Gins I suppose, by sending him to Newcastle to inspect the Coalmills &c thereabouts and their workings, that he may in 10 dayes time return fully qualified to manage our Gins.

John Satterthwaite, who rented a house and workshop in Hodgson Croft for £1 a year, went to Newcastle before 19 March and one Henry Winship "showed him all that he desyred to his content".<sup>28</sup> This openness contrasts with accounts of the secrecy surrounding Carlisle Spedding's efforts to elicit mining information there early in the 18th century.<sup>29</sup>

On 27 March 1686, three years after Satterthwaite's visit, Lowther was "very solicitous for a Wind Gin, lest when we have much hollow work under [the drainage] Level we should at any time be mastered by Water. Let me know your opinion and whether our new [horse] Gin for Coals be better than Coggs and Rungs". Tickell replied on 5 April: "Your windemill to exhaust the colewater seems to me needfull because of the hopefull duration of that mine. I heare severall such [mills] are now in use about Newcastle with good effect and I like this Barrel wheele very well as it is expeditious and cheaper than the Cogg wheel . . ." for raising coal. Regarding the "Windmill to draw Water", Lowther had written to John Gale (his colliery manager) before 27 April, pointing out that "to raise Water by one Chain pump sixteen fathom [96 feet] it will not do; at two lifts it may, otherwise not". Figure 2 compares the two lifting systems and shows how a shaft rotated in only one direction by a windmill could drive a chain pump through cog and rung gearing, whereas a barrel wheel for hoisting water or coal would require a reversing mechanism unless powered by a reversible horse-gin.

Lowther wanted Tickell to indicate how they proposed to proceed before sending more instructions. The agent replied on 4 May: "Satterthwait sayes (having bin lately on your score at Newcastle) that he can make the wind mill draw our full depth of water with one chaine at one lift or at 2 or more as you please with the same mill but more

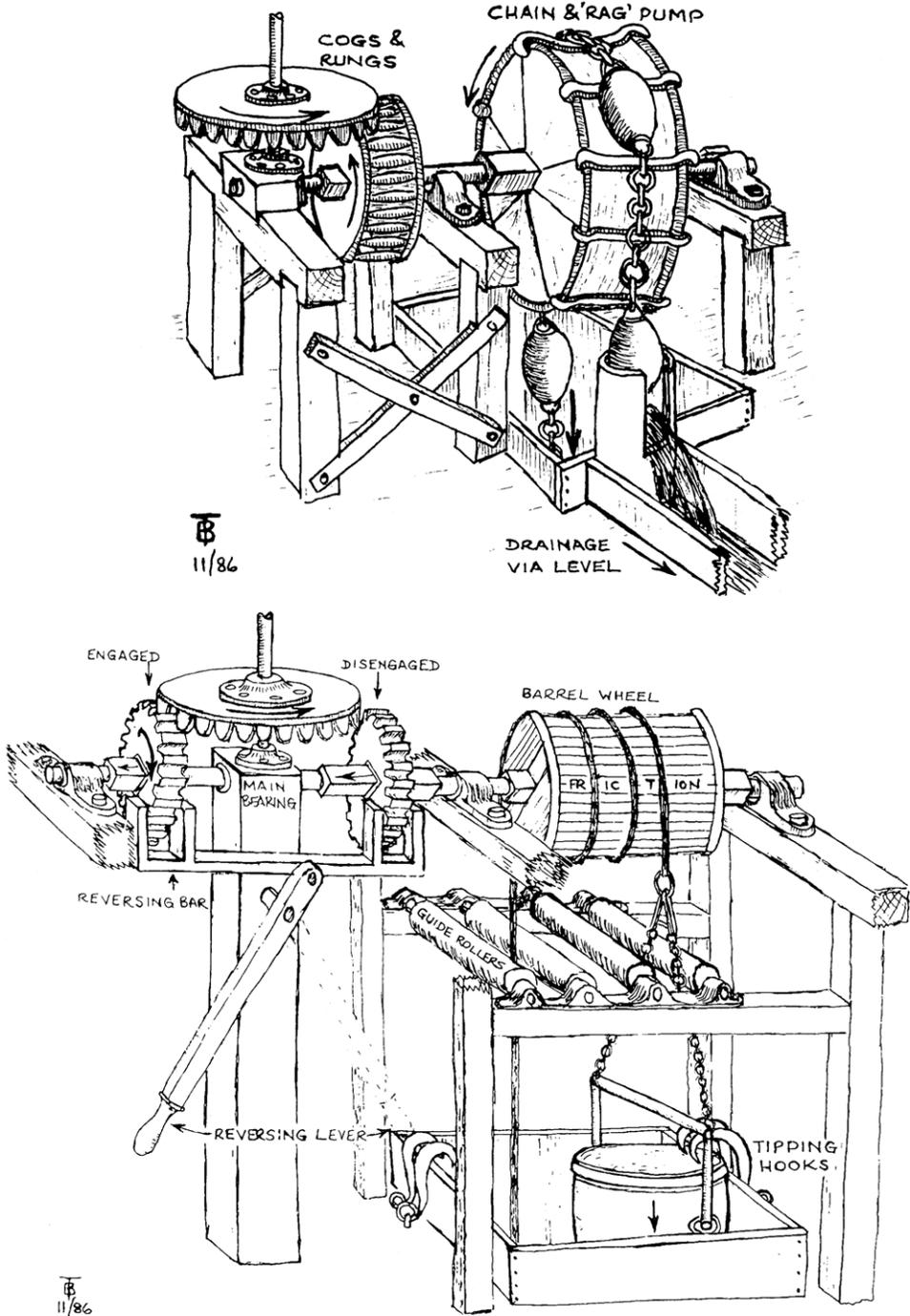


FIG. 2. - (Upper). Sketch to show how a rotating, vertical shaft could drive a chain-and-"rag" pump to raise water to a drainage level in a mine. (Developed from 16th-century German mining practices illustrated in Agricola's *De Re Metallica*). (Lower). Sketch of a barrel-wheel hoist in which the weight of the descending bucket helps to counter-balance the ascending full container. If the drive was uni-directional, a reversing mechanism was necessary. The self-tipping bucket follows a design by Andrew Pellin (for details see *Cumbria Industrial History Society, Bulletin*, Jan. 1987).

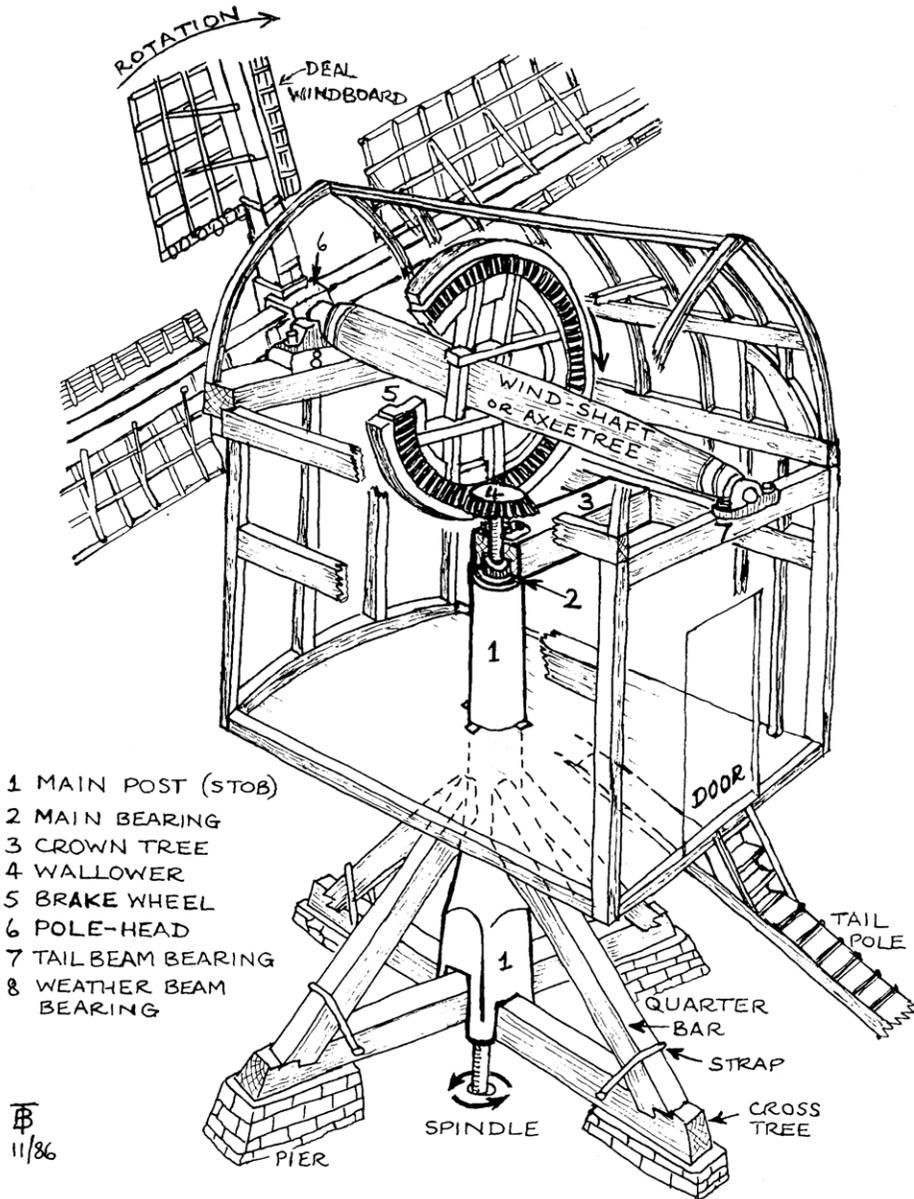


FIG. 3. - Reconstructed, cutaway outline of a four-sailed post-mill. It shows how a geared brake-wheel on the wind-shaft could rotate a wallower and a central, vertical spindle passing down the centre of the main post to drive machinery in a mine below.

chaines according to the number of the lifts". Then, on 18 May, he reported: "the wind Gin is preparing with all diligence to draw at one lift 13 fathoms into a levell, the manner how, Mr Gale sayes he has laid before you. I showed them yesterday . . . how to get the long Iron spindle made at a forge in Ireland by a very good hammerman goinge thither and to be brought by sea hither on less charges than otherwise". That same day, Lowther seemed satisfied that "As to the Wind Gin, Satterwhait seems to understand it aright.<sup>30</sup> I have since my last seen one of as great a draught as ours will be, of which I will shortly send a further acco. You may in the mean time proceed with the Pitt". More advice followed on 25 May:

As to the Wind Gin, the Workmen here doe usually make them carry two or 3 Chains but that may be too difficult for us and perhaps may require too large a Pit. If the Pumps be not exactly bor'd it will much hinder the motion. They usually make all the Work here and then goe into the Country to set it up. The lowest length of Pumps must be an Inch narrower than all the rest, where 4 or 5 of the Lenthers onely have Friction and not any other part. The thing is not difficult if the work man be good, but . . . the long Iron Spindle I understand not . . . Represent the Wind Gin as you understand it for by various discriptions I can best understand it. To have it right, there should be two Chains, a bigger and a less according as the Wind is strong or weak, for a chain pump must alwaies work smartly and a small bore will not bear a great wind, nor a little wind work a great Chain but the way you best understand is best.

Clearly, to overcome trade secrets, technical ignorance and his own doubts, Sir John gleaned advice from widespread contacts in London and the Provinces.

Tickell obtained help to satisfy Lowther's request and wrote, on 31 May: "the figure of the Wind Engine enclosed as Sattertht has drawne it (tho not by a Scale) will lett you see the manner of working with that long Iron spindle or Rod from the wheele above to those below downe that great stob or post on which the mill stands, which stob<sup>31</sup> is bored through as a pump for that Rod to work in". On 19 June, the drawing met with only partial approval:

As to the Wind Gin, Saterwhait has drawn it well but whether it ought to have six sails I doubt. That in Town here [London] has but 4 and the Arms not in the middle of the Sails as in your draught but Dutch fashion, a narrower slit deal on One side [of] the Arm, and on the other, the Sail so much larger. The Iron Spindle I wish may be well done. The mill here has onely a shaft of wood, but the spindle is cleverer work, but I apprehend not by the Draught whether the Spindle goe thorough a bored pump as yours implies or onely in the Middle of the 4 Posts that support the Mill . . .

On 29 June, Tickell explained: "The mill is to be supported with one great post well spurd on 4 sides as [is] the corne wind mill, through which single post that spindle is to play and is allready bored through like a pump for that purpose". Figure 3 shows how this arrangement would work. The comments seem to have satisfied Lowther and the correspondence passed to other matters, leaving an intriguingly incomplete impression of the total project.

The wind gin's location is shown on Pellin's plan (Fig. 1b) beside the Low Road to St. Bees, where a "Water Ginn" and a "W Gn" across the road lay in a part of Whitehaven which became known as The Ginns. One of these would have been horse powered. Both of them were mentioned in an agreement, dated 30 October 1700, for "Repairing water Tubbs at Ginns". For seven shillings a week, "Wm Walker, smith at the Ginns [agreed

to] make, Repair & keep in Repair 6 Water Tubbs at the Least & leave the same in as good Repair . . . To leave 3 New Tubbs and 3 more workable, and to continue so long as the Two Gins now working doth continue".<sup>32</sup> Richard Scott, a colliery overseer and A. Richardson<sup>33</sup> were the witnesses. It is likely that these tubs were of a self-tipping design, illustrated in a drawing in Andrew Pellin's volume of estate plans. The tubs were pivoted just above their centre of gravity and hung from a kilp (like a yoke) which, in turn, was suspended by two chains from an 'A' frame at the lower end of the haulage rope. As the 'A' passed upwards through a pair of guide rollers, the chains and kilp were turned so that the rim of the tub could be caught by two large hooks mounted beside the colliery shaft. Further hauling caused the tub to rotate about its pivot.<sup>34</sup> Thus water could be tipped into a drainage trough, or coal into containers. Such a water tub could be self-filling in a reservoir at the shaft bottom so that the only non-automatic feature was the reversing mechanism if the haulage cable was wound on a barrel-wheel. It is not clear whether Pellin invented this far-reaching device or copied it from observations made elsewhere. Certainly, on 19 September 1697, William Gilpin remarked that "Mr Peling has a Mechanical Head . . . and has made proof of himself in some Contrivances about our publick clock".<sup>35</sup> Had the windmill driven an endless bucket-chain, no reverse would have been needed and the only hindrance to full automation would have been repairs and a lack of wind in a position sheltered from the south west.

No other information about this windmill has been found. It probably failed to meet expectations for, on 19 November 1715, James Lowther agreed to lease one of the earliest Newcomen steam pumping engines for £182 a year. It was set up at Stone Pit in The Ginns.<sup>36</sup> Significantly, in 1708 a Scottish plan to use windmills to drain collieries relied on the expertise of "John Young, a millwright of Montrose, who had been sent to Holland at the expense of the town to inspect the machinery there". Although the windmills were sufficiently powerful, that scheme failed because the mines flooded during long calm spells, making the workmen idle.<sup>37</sup> Had Whitehaven's windmill been successful, surely Young would have studied it, or those at Newcastle, to save travelling abroad.

An interesting comment survives in a letter dated 14 December 1686. Tickell was discussing a scheme to start linen textile manufacture under the management of one Matthew Coulston and considered that sacking for coal sacks and windmill sails would be a suitable product. The plan failed because, shortly afterwards, Coulston was imprisoned at Carlisle for debts in the Newcastle area. However, if windmill sails offered a market outlet worthy of mention, one must wonder just how many other windmills worked or were planned in the district.

Despite many frustrating omissions of detail from the documents, this article extends our scanty knowledge of local windmills. There is a good deal of information about mill construction, maintenance, management and operating problems and even some rather unclear statements are enlightening. Lessons learned from working the Arrowthwaite post-mill might have influenced the wind gin design as much as ideas imported from the Northeast coalfield. Certainly, West Cumberland's reliance on that region for technical innovation and skilled workmen in the 17th century is well shown, but the influence of postal contact with specialist advice from London cannot be ignored. In view of the detail revealed by the owner's and agent's actual words, one might query how much

more information about Cumbria's windmills remains to be discovered in other local archives.

### Acknowledgements

For permission to reproduce Fig.1b, I wish to thank the Lonsdale Estate Trustees with whom the copyright resides. Mr Bruce Jones drew my attention to the 1649 building account and the Cumbria County archivists have always been most helpful during my researches. The Oxford Polytechnic Research Committee gave a grant toward the cost of publishing this article.

### Notes and References

- <sup>1</sup> CW2, lxxii, 112-141.
- <sup>2</sup> *Magna Britannia*, Vol. 4 (1816), facing p. 24.
- <sup>3</sup> Cumbria Record Office, (Carlisle), D/Lons/W, Surveys 15. See CW2, lxxxvi, 163-183, for details.
- <sup>4</sup> C.R.O. (Carlisle), D/Lons/W, Tickell correspondence in five boxes. Tickell died in December 1692.
- <sup>5</sup> This quotation was crossed out and substituted by a less informative version.
- <sup>6</sup> The cowhouse was "an Incroachment taken up by J. Gale". C.R.O. (Carlisle), D/Lons/W, Whitehaven Town 59 (Street Books) and 56 (Pellin's Town plans).
- <sup>7</sup> In 1665 Caesar Barnes's house was at Nos. 11 to 15 Roper Street. He was a rope maker and, by 9 January 1672, was seriously in debt so that Thomas Tickell had "all his Goods this weeke made over to me by Bil [of] sale" (letter 1;141). Barnes, his wife, two of his children and a servant were lost at sea near Dublin when the *Charity* (Capt. Will Woodall, master) sank in September 1672 (1;160).
- <sup>8</sup> C.R.O. (Carlisle), D/Lons/W, Estate Accounts 1666-1685. Two obvious date errors have been corrected in italics. Similar volumes of accounts continued until 1781.
- <sup>9</sup> See CW2, lxxii, 139 for details.
- <sup>10</sup> C.R.O. (Carlisle), D/ Lons/W, "Horse-milne Acco & Winde-milne Acco 1671".
- <sup>11</sup> Tickell to Lowther 18 January 1674. Similarly, on 25 December 1675, Lowther wanted workmen from Newcastle to make a horse pump for the coal mines. Within a month, Tickell "had a Newcastle Carpenter at the Drift who came . . . to make some water works for Sir Francis Salkeld" and would come again.
- <sup>12</sup> See Tickell's letter 15 Feb. 1682/3. William Gilpin mentioned this mill on 20 September 1693: "On Monday last another accident happened; A Boy was crushed in pieces by the wheel of Mr Addison's Horse Mill, and if the Jury find (as you cannot well avoid it) the Mill going [at the time] the Horse & wheel will be a Deodand" – the cause of death and therefore forfeit to the crown for pious purposes.
- <sup>13</sup> Presumably fine chains weighing 25 ounces each (see *O.E.D.*, pur1).
- <sup>14</sup> Was the windmill therefore painted red like so many Scandinavian timber buildings?
- <sup>15</sup> Gillial had the option to extend the lease on the same terms or give six months notice. On 22 March 1681 he had rented Sir John Lowther's "tith hay west of the [river] Pow" for 7 years at £1 a year.
- <sup>16</sup> This word was misread by J. Hughes as *six*, though "arme" is clearly singular. This does not invalidate his comments about six-armed mills, though they do not apply to the Arrowthwaite mill.
- <sup>17</sup> B. Tyson, "Building Work at Sockbridge Hall . . .", CW2, lxxxiii, 120.
- <sup>18</sup> C.R.O. (Carlisle), D/Lons/W, Estate Accounts, 1700-1706.
- <sup>19</sup> In the 1757-1781 Accounts (p. 106), Great Thwaite was described as lying "on the East side of Saltom Waggon Way, Barughdale & part of the Land purch<sup>d</sup> from Mrs Ribton all laid into one Enclosure, valued at £35 per year. Kept in Sir James Lowther's Hands for Hay &c". Similarly, Little Thwaite was "part of Davys, Sir J. Lrs and Radcliffes Thwaite Butts & Part of Rad[cliff]fs Gang, all laid into one Enclosure & Walled round, valued at £12 per year . . .". It was also kept in hand for hay. The 1738-57 volume says Great Thwaite contained 12 acres.
- <sup>20</sup> Sir James Lowther's esteemed colliery agent who died in 1755. For details see J. V. Beckett in CW2, lxxxiii, 131-140.
- <sup>21</sup> C.R.O. (Carlisle), D/Lons/W2/1/109.

- <sup>22</sup> Copies of this view are in J. V. Beckett, *Coal and Tobacco*, (1981), frontispiece; and D. Hay, *Whitehaven, an Illustrated History*, (1979), 16. As some of the buildings depicted were not developed until about 1650, the stated date might be a little early. B. Tyson, "Some Aspects of Whitehaven's Development Before 1700", Ancient Monuments Society, *Transactions*, Vol. 30 (1986), 149-185.
- <sup>23</sup> C.R.O. (Carlisle), D/Lons/W, Arrowthwaite deeds, bundle 10/5.
- <sup>24</sup> R. F. Tylecote and J. Cherry, "The 17th Century Bloomery at Muncaster Head", CW2, lxx, 71.
- <sup>25</sup> As a child he probably lived nearby for, on 10 September 1666, he asked Tickell to give 40 or 50s. a year to his old nurse ( Watson) as a pension. She lived at Brackenthwaite and her son Robert was admitted to land in Corkikle in April 1681. (D/Lons/W, Whitehaven Street Books, p. 106).
- <sup>26</sup> C.R.O. (Carlisle), D/Lons/W/1/8, pp. 129-30.
- <sup>27</sup> For cost comparisons, on 30 March 1685, Tickell reported that "The Seamill [at St. Bees] is in a very ruinous condition. I have treated with workmen who are to pull her downe and build her anew with your timber and slates &c for £22". Repairs early in 1671 had cost £70 12s. after an inspection in March revealed "the sieles and principall timbers of the house . . . shrunk & the spars decayed", the building likely to collapse and the miller proposing to leave (letters 4;270, 1;110 & 107). In September 1685, Tickell "bargained for Beck Mill & Kill at £42 to increase Rent 50s.", also at St. Bees (4;324). On 10 June 1692, Gilpin paid £17 10s. 8d. "for amendments at the Beck Mill viz a New Inn Wheele and casting & Walling the Mill dam". On 24 July 1692, he paid Robert Seed 19s. 6d. "for repairinge the Roof of Horse mill with Slate".
- <sup>28</sup> Henry Winship (Winshopp) was a cousin of Richard Pallister and was offered (but refused) the latter's job as colliery overseer at Whitehaven after Pallister was buried on 9 July 1682. Pallister came from Newcastle before 1678 and lived at Corkikle until 1680 when he moved to Brackenthwaite and occupied one third of the tenement later sold freehold to Captain Richard Senhouse. B. Tyson, "Some Aspects of Whitehaven's Development Before 1700", Ancient Monuments Society, *Transactions*, Vol. 30 (1986), 158 and footnote 25.
- <sup>29</sup> R. L. Galloway, *History of Coal Mining . . .* (1882), 93-4; C. F. Dendy Marshall, *A History of Railways . . .* (1938), 30; Daniel Hay, *Whitehaven; an Illustrated History* (1979), 43. J. V. Beckett, CW2, lxxxiii, 132 questions the truth of the tale.
- <sup>30</sup> Other millwright work by John Satterthwaite was referred to by Tickell. On 29 January 1690, the agent was tempted to allow him to build a new water mill on Howgill beck for £18 (including a pair of local millstones valued at £6) as it would "be a great assistant to the windmill which now goes very well". Satterthwaite and Thomas Gillial offered £2 a year rent for 7 years. Presumably the windmill had already benefitted from having the carpenter as tenant. Satterthwaite was the carpenter at St Bees School when the library and schoolmaster's house were built in 1687. B. Tyson, Ancient Monuments Society *Transactions*, 33 (1989), forthcoming.
- <sup>31</sup> A stump, stake or post etc (*O.E.D.*); *Stobum* (Latin); Stob-mill = a windmill pivoted on a central post; see *Newcastle Daily Chronicle*, 28 August 1884, p. 4.
- <sup>32</sup> C.R.O. (Carlisle), D/Lons/W/1/52, page 4.
- <sup>33</sup> Probably Anthony Richardson who, amongst other things, held a lease to operate the water gins at Howgill colliery. J. V. Beckett, *Coal & Tobacco*, (1981), 64.
- <sup>34</sup> B. Tyson, "A Design for a Self-tipping Tub for Draining Collieries", Cumbria Industrial History Society, *Bulletin*, Jan., 1987. Also D/Lons/W, Surveys 15.
- <sup>35</sup> B. Tyson, "Andrew Pellin's Surveying Career, 1688-1705", CW2, lxxxvi, 165.
- <sup>36</sup> Cited in a second agreement dated 22 February 1726. Chapter on Coal Mining by R. W. Moore, *VCH, Cumberland*, ii 354.
- <sup>37</sup> R. L. Galloway, *History of Coalmining in Great Britain* (1882), 77-8.

