

# A medieval fulling mill at Barrowburn on the River Coquet: evidence and context

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## SUMMARY

*A fulling mill on the River Coquet between the Rowhope Burn and the Hepden Burn is the subject of a single reference in the Newminster Chartulary, the only surviving document detailing the activities of the Cistercian abbey near Morpeth. This paper explores the implications of that reference, which can be dated to AD 1226 to 1245, discusses why a mill might have been built there, and suggests what may have happened to it in the context of other activities in the area.*

## INTRODUCTION

SINCE 2010, MEMBERS OF COQUETDALE COMMUNITY ARCHAEOLOGY (CCA) have been exploring a stretch of the River Coquet (figs. 1 and 2) referred to in the Newminster Chartulary as the site of a fulling mill (Fowler 1878, 78–9). The details of this reference are explored further below, as is an assertion of a more precise location for the mill made by a local antiquarian, David Dippie Dixon, who recorded that structural remains could be seen in the same stretch of river opposite Windyhaugh farm in the late nineteenth century (Dixon 1903, 21).

Although shown on modern Ordnance Survey maps as the Hepden Burn, the tributary of the Coquet that forms the eastern boundary of the stretch of river in question has had other names. On Armstrong's map of 1769 (fig. 3) it is called Barrough Burn, whilst on the 1st edition Ordnance Survey map of 1866 it is Barrow Burn. Barrowburn is also the name of the farm within which the location described by Dixon lies, and this name is therefore the one used to describe the mill site.

Initial inspection of the site by CCA members in 2010 revealed that in addition to masonry and timber remains in the bank and the river bed opposite Windyhaugh farm (NGR NT 8655 1097), further timber remains of a built structure existed in the river bed some 50 metres upstream (NGR NT 8652 1101). This site was fully excavated in 2011, revealing a well-preserved, substantial wooden structure comprising three timber baulks set across the stream, with close-set planks forming a level surface between them and posts set orthogonally to this surface. Work also began in the same year on the downstream site. Here, CCA has identified the remains of a high quality masonry wheel-pit in the river, along with elements of timber structures which dating evidence confirms are compatible with a thirteenth-century construction date, contemporary with the upstream site. Sections of wall have been excavated on the associated riverbank and medieval artefacts found there include coins, pottery and a key, as well as charcoal fragments that have been dated to the fourteenth century. Whilst it seems highly probable that these elements form the remains of the fulling mill referred to in the chartulary, work continues on this site in order to provide additional evidence relating to its form, function and date.

This paper represents the first part of a two-stage report. It reviews the background and evidence for early fulling mills in Britain, before examining the context of the specific site at

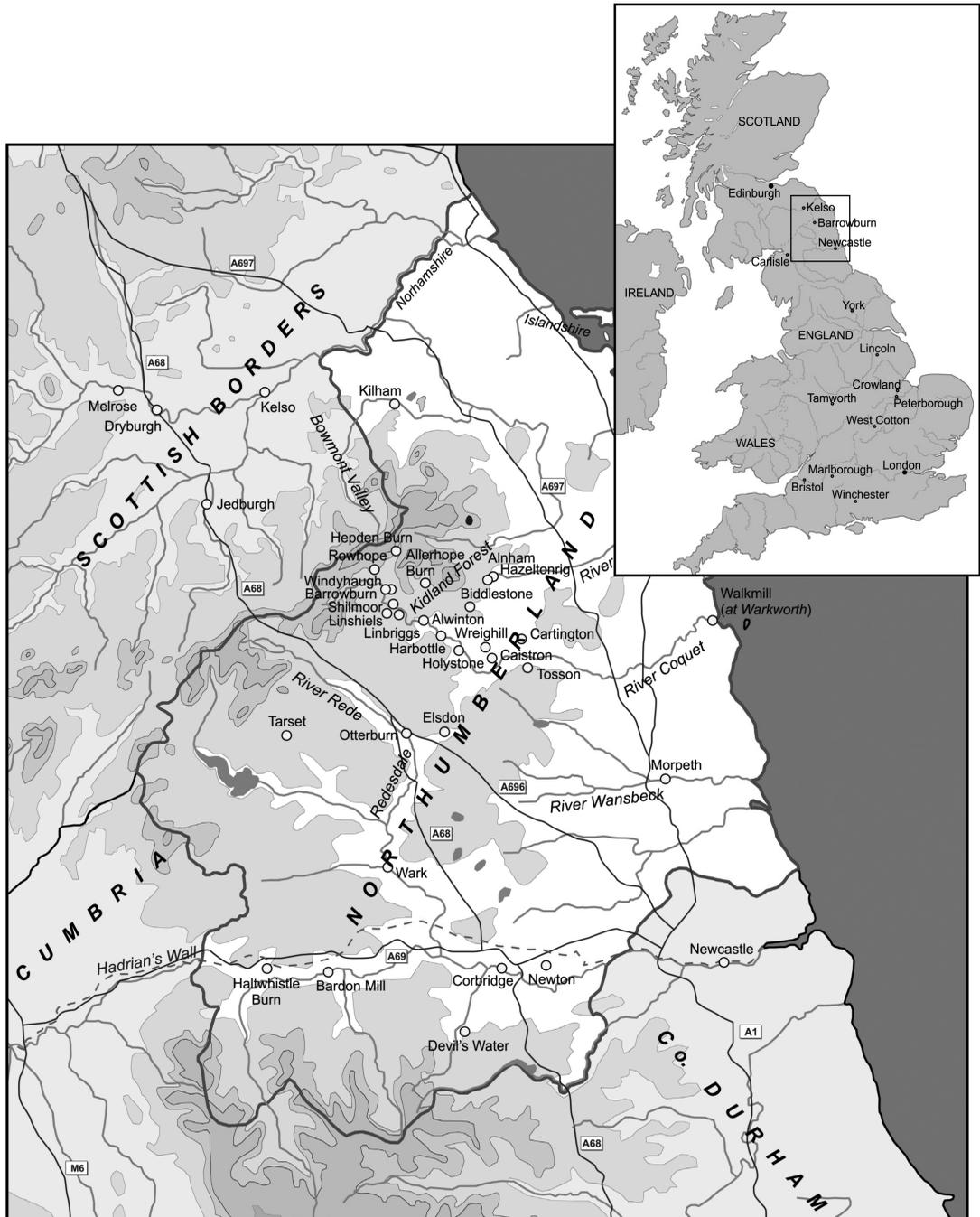


Fig. 1 Location map showing the position of the study area, including places mentioned in the text.

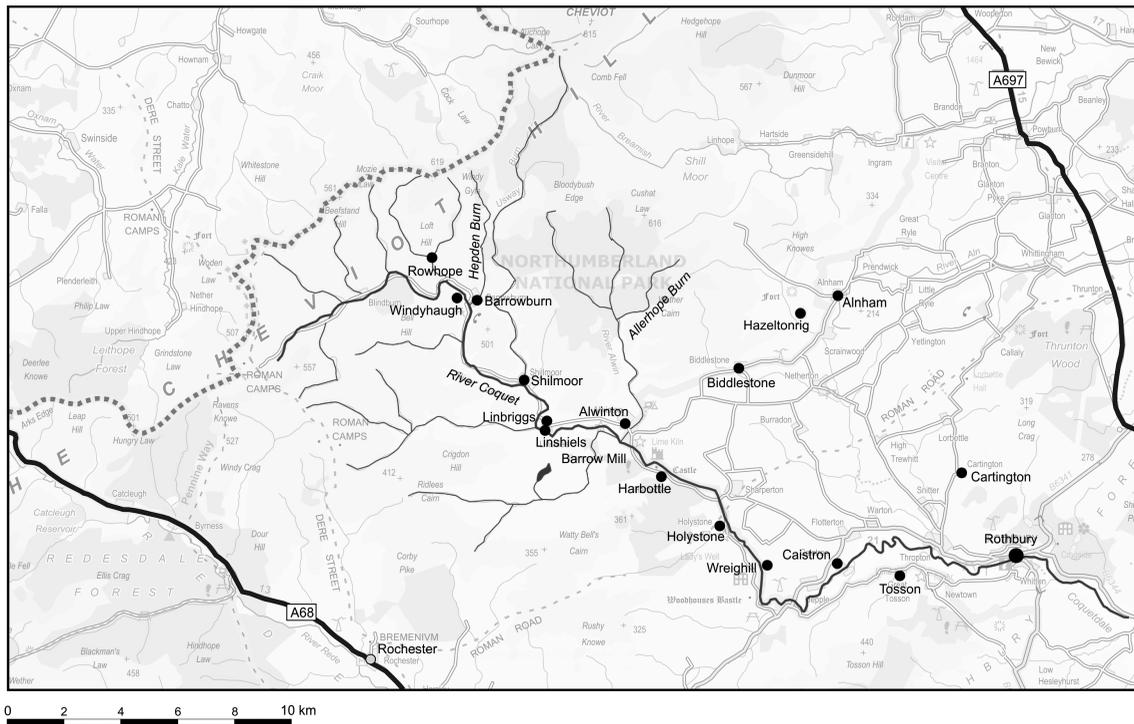


Fig. 2 Detailed map of the study area in Upper Coquetdale, featuring places mentioned in the text.

Barrowburn and exploring the economic, social and historical implications of a mill there. A subsequent paper will describe the archaeological investigation and results at Barrowburn site, and will set out evidence for its chronology and function.

## THE HISTORICAL BACKGROUND TO MILLS, WOOL AND FULLING

### *The development of mills in Britain*

Watermill technology is thought to have arrived in Britain with the Romans and in Northumberland there is evidence for its use along Hadrian's Wall at Haltwhistle Burn (Wilson 1976, 26–32). Although only a few Roman-period watermills have been excavated, the available evidence indicates that vertical waterwheels were used to drive millstones through rudimentary gearing. It is not known, however, whether they were used for purposes other than milling grain.

Following the Roman period there is evidence for the continued use of water power from around AD 700 up to the Conquest: most, though not all, of the few known examples seem to have used horizontal wheels. The best known and most well-preserved mills of this type in the early medieval period are those excavated at Tamworth, where wooden floors and remains of side planking, corner posts and the water supply system were preserved in river silts (Rahtz and Meeson 1992, 32–42). Less well-preserved are a series of three mills built

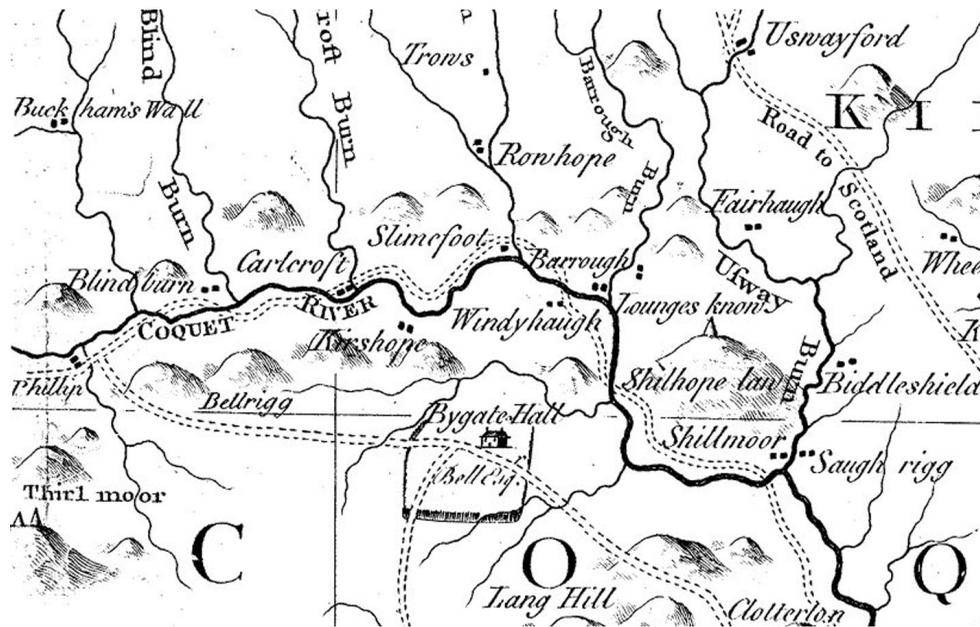


Fig. 3 Extract from Armstrong's Map of Northumberland (1769) centred on Barrough (Barrowburn) in Upper Coquetdale.

between the tenth and twelfth centuries at West Cotton, Northamptonshire, where a sequence from vertical wheels at the start of that period to horizontal wheels at the end is suggested by the excavators (Windell *et al.* 1990, 29–32). Many more examples of horizontal watermills are known in Ireland, where their use is attested from the mid seventh to mid nineteenth centuries (Rahtz and Meeson 1992, 156). In Northumberland the only known example of a watermill with a horizontal wheel, prior to modern water turbines of the last two centuries (Hutt 2001, 13–20), is represented by the masonry paving and timbers of an Anglo-Saxon mill excavated at Corbridge (Snape 2003).

Although many mill sites are known from documentary references in the immediate pre-Conquest period, there is a proliferation of such references following the Conquest, particularly as a result of the Domesday Survey which lists over 5000 examples in England. References in Northumberland which, along with Durham, was excluded from Domesday, begin only in the twelfth century. During this period, watermills were normally the property of manorial lords or religious houses, but not all were kept as part of the manorial demesne; some were let out to tenants, a practice that became more common with time (Allison 1975, 7). It is likely that most of these post-Conquest mills used vertical watermill technology and that horizontal wheels went out of use in or before the thirteenth century (English Heritage 2011, 4).

The most common medieval application for mill technology was that of grinding grain. However, the power that could be derived from a rotating shaft was put to other uses as well; in medieval Europe these included activities such as sawing, ore-crushing and metalworking (for example, Astill 1993, 272–8). Apart from the production of flour from grain, the most

common application of mill technology in later medieval and early modern England was that of fulling, a process inextricably linked with the source of national wealth, the wool industry.

### *Wool in medieval Britain*

Davies describes the special position occupied by wool in the English economy throughout the Middle Ages, noting the thirteenth-century use of the epithet 'carrying wool to England' in the same sense that 'carrying coals to Newcastle' came to be used in the nineteenth century (Davies 1954, 220).

Britain as a whole, and England in particular, exported significant quantities of raw wool and woollen fabrics to the Continent, a trade which grew after the Conquest to such an extent that by the twelfth century wool had become England's greatest economic asset. The great landowners, including the Border monasteries and in particular the Cistercian houses, grew wealthy as a direct result of the wool trade. However, successive monarchs from Edward I taxed the trade in raw wool heavily, ultimately damaging it and causing more of the wool to be converted into cloth for both the domestic and export markets. The former was stimulated by a significant growth in population from around 1.5 million in 1086 to between 4 and 5 million in 1300. Although for much of the medieval period the export of raw wool remained more important than fabrics, cloth making became increasingly important in the large towns of southern and eastern England nearest the Continent, where the peak of production was reached in the later thirteenth century, before political strife, followed by the Great Famine of 1315–17 and the Black Death (from 1348) precipitated a period of decline. In Northumberland and the Borders sheep stocks appear to have been high and exports involved both raw wool and cloth; in 1201–2 Newcastle seems to have been the third most important cloth producer in the country after York and Lincoln (Miller 1965, 66) whilst towards the end of the thirteenth century it was one of the six most important exporters of wool in the country (Davies 1954, 272; Lloyd 2005, 80). This prosperity was probably damaged by the Scottish attacks that started in the 1290s, but it is clear that financial burdens arising from overseas staples such as that at St. Omer also did serious harm to an export industry which, because it was reliant on relatively poor quality wool, found it hard to manage the resulting costs and competition. When the overseas staples were finally abolished, exports of northern wool through Newcastle recovered faster than did those from the rest of the country (Lloyd 2005, 127).

Though most of the wool produced in Britain was exported as fleeces, the domestic fabric industry grew rapidly following the introduction of water-powered mills, such that by 1300 there were important wool-manufacturing centres in the south-west and south, and in Yorkshire and Cumbria, as well as smaller concerns supplying local, domestic markets in north-east England and the Borders. In 1331 Edward III encouraged Flemish master weavers to settle in Britain, particularly in regions such as Cumbria where populations were below the optimum levels needed to service the fulling mills, which required up to 100 man-days of labour to produce and process the wool into cloth for each day of fulling. Following the Black Death, sheep farming increased because of lack of manpower to carry out arable farming, but for the same reason raw wool exports also expanded, while the labour-intensive manufacturing of wool fabrics became both specialised and localised, moving from the east coast towards the west. The result of this was that whereas England exported almost no cloth at all in 1347, in the later fourteenth and fifteenth centuries it became a manufacturer and exporter of cloth rather than primarily a raw wool exporter.

*Fulling*

Fulling involves closing together the threads of newly woven woollen fabric with the purpose of producing a grease free cloth of the correct thickness for future use or process, such as dyeing. After weaving, the fibres of a piece of cloth are loose and unmeshed and the woven threads need tightening. The fulling process thickens the structure of the fabric by knitting the fibres together and by shrinking them, transforming the cloth from a loose net into a compact whole. Several discrete steps are required as part of the fulling process, the main ones being scouring, consolidation of the fabric fibres and rinsing, although the nature and number of these steps may vary according to local resources and the kinds of fibre being treated. The scouring phase reduces the oils and grease in the cloth; it is carried out using water and a cleaning agent such as Fuller's earth (a fine siliceous clay with a high magnesium oxide content particularly valued in this process for its de-greasing and de-colourising properties), or substances such as animal fat, burnt bracken (a source of potash), stale urine, or soapwort. The other main part of the fulling process, the knitting together of fibres, is achieved by agitating the fabric in such a way that the scales of the individual fibres of the fabric hook together.

Although most of the grease and other substances removed by medieval fulling was natural, some may have been artificially introduced. On occasions, for example, shepherds would use a mixture of tar and butter or other fat on their flocks as a salve, in order to maintain their condition by killing parasites (Walker 2000, 59; Fitzherbert 1882, 46).

Until the twelfth century the fulling process in Britain was a manual one, with people physically trampling the cloth in tubs (fig. 4) and then rinsing it in streams. This labour-



Fig. 4 Waulking cloth in early twentieth-century Connemara, Ireland (Pelham 1958, pl.1).

intensive approach was also called 'waulking' and in some places, notably rural Ireland (fig. 4; Pelham 1958, pl.1) and Western Scotland, it lasted well into modern times; it also provided a common basis for place-names, such as the small medieval settlement of Walkmill, at Warkworth on the lower Coquet.

Fulling mills replaced this manual process with wheel-driven horizontal shafts equipped with one or more cams (fig. 5). As the shaft rotated, the cams lifted and dropped hammers or mallets, pounding the cloth which was immersed in tubs with the appropriate agent. The technology was introduced in the south of England by both the Cistercians and the Knights Templar in the late twelfth century; such mills had appeared in France about 100 years earlier, probably with their origins in the Middle East (Gimpel 1992, 14). The time needed for fulling a particular cloth depended on the type of wool and weave of cloth, as well as the temperature of the water-based liquor in which it was pounded. Vigilance was required to ensure that a piece of cloth received an equal, consistent treatment, since too little or too much pounding would produce inferior results. In this regard the skill of the fuller was supplemented by specially-shaped features of the stock face and the vat in which the cloth was placed, which allowed the stock to turn the cloth round gradually after each blow so that fulling was applied evenly.

After the fulling process, the cloth was rinsed to remove all traces of the liquor in which it had been treated, and then attached to a tentering frame in order to stretch it and dry it, a process that could also lead to bleaching in sunny conditions. The fence-like frame consisted of a number of upright posts in a line with two long horizontal bars stretching from one end of the row to the other. The lower of these was adjustable to suit the required width of the

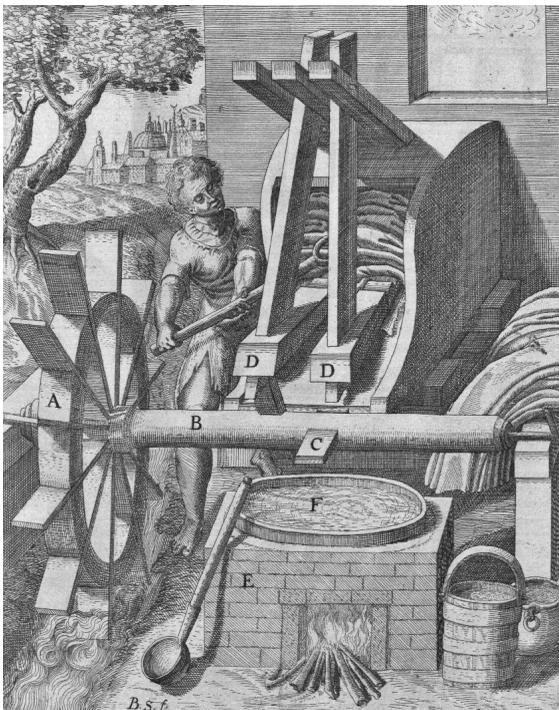


Fig. 5 A seventeenth-century fulling mill, from Böckler's *Theatre of New Machines* (1661).

fulled cloth. Such tentering areas formed an integral part of the fulling mill complex and occupied large areas adjacent to the mill structure itself.

The technological transformation of what had hitherto been a labour-intensive process provided clear economic benefits. Munro has described how a team of three fullers could take three to five days treading cloth immersed in a suitable agent in order to remove grease from the material and mat it appropriately to make a high quality product ready for tentering, napping and shearing (Munro 2003a, 245–54). Although lower quality cloth could be processed faster, the fulling mill reduced the time taken to a day or less, with just one man — or, as is attested in the eighteenth century, a man and a boy operating the mill (Pelham 1958, 16, end note 11). Overall, the improvement in fulling technology seems to have resulted in three or four-fold productivity gains for this stage of the cloth production process. Analyses vary as to what proportion of the total cost of cloth production was represented by foot-fulling, but the highest is 20% (Munro 2003a, 254). Mechanised fulling reduced this cost to around 5% although in terms of man hours involved, the scanty evidence available suggests that the fulling process (scouring, milling, and washing) represented less than 1% of production time, suggesting that fulling was a highly-skilled and probably well-remunerated job.

The economic benefits of mechanised fulling, together with the increasing wealth of the monastic houses, led in the late medieval period to heavy investment by those houses in fulling mills. Indeed, it has been estimated that some 85% of the industrial mills owned by the houses were fulling mills, and between a third and a half of all houses built or managed at least one such mill (Lucas 2005, 181–2).

### *Mills in Northumberland*

Although there are very few remains of the Northumbrian watermill heritage from before the early modern period — the earliest surviving example being the late seventeenth century Linnels Mill on Devil's Water, south of Hexham — documentary references to medieval mills in Northumberland are reasonably frequent and, although few can be identified securely as fulling mills, it is likely that many performed that function, particularly those on upland sites (See figs. 1 and 2 for locations mentioned in the text). The Newminster Chartulary and associated documents, for example, list at least eight mills of which four are described as for fulling: one at Castron, near Hepple in mid Coquetdale (Fowler 1878, 132); two on the Wansbeck near the abbey (Fowler 1878, 308); and the site on the Coquet between the Rowhope and Hepden Burns (Fowler 1878, 78), presumed to be the current Barrowburn.

Other examples in north Northumberland, none of which is mentioned by Pelham (1958), include the fulling mill attested by a reference in the Iter of Wark at Tarsset (*molendinum fullonicum de Tyrset*) where Richard the Fuller (*Ricardus le Fulur*) suffered a burglary in 1279 (Hartshorne 1858, liii), and a fulling mill listed, along with a corn mill, bakehouse, brewery and a forge, in association with the late thirteenth-century manorial complex at Wark in Tynedale (Dodds 1940, 282–3; Charlton 1987, 30).

Other Northumbrian watermills of the medieval period include a site that is still traceable on the west side of Kilham village in Glendale — one of at least four mill sites mentioned at Kilham in medieval sources (Carlton and Rushworth 2004, 30) — which is probably the same mill that was later held by Kirkham Priory (Vickers 1922, 160, 166 n. 7). Also in Glendale, a mill at Newton is mentioned in the early thirteenth century when Walter Corbet gave a rent of 12d per annum from the mill to the monks of Farne (Vickers 1922, 143).

The number and diversity of mills in Northumberland, as more generally in mainland Britain, increased in the later medieval and post-medieval periods as waterwheel technology was applied to the production of cloth and metalwork, as well as the milling of grain for bread-flour, brewing and animal meal — and more esoteric applications such as the production of snuff. Later, from the eighteenth century, mills started to be used in the extractive industries, while their use in rural areas was intensified to drive threshers and other farm machinery, and in woollen mills. Examples of post-medieval woollen mills in Northumberland include those at Otterburn, Bardon Mill, and Tosson, some probably occupying the sites of earlier fulling mills, the remains of which are likely to have disappeared in consequence.

In Upper Coquetdale, two mills were recorded at Alwinton in 1623 (Dodds 1940, 420), one of which was probably a fulling mill since, in 1654, such a mill was confiscated from Sir Edward Widdrington of Cartington. The location of this seventeenth-century fulling mill, which may have had earlier phases, is likely to have been at Linbriggs or Barrow (Carlton & Rushworth 2004b, 40), although the latter (not to be confused with the current farmstead of Barrowburn) operated as a corn mill from at least 1712 until the later nineteenth century. Also in Coquetdale, Holystone Walk Mill is shown separately from the site of a corn mill (first mentioned at the dissolution of Holystone nunnery in 1539) on a map of 1765 (Carlton and Rushworth 2004f, 37); and at Harbottle in 1655 the manor house and all of the demesne lands, with a corn mill and a fulling mill, were sold to John Rushworth and John Brownell, but recovered by Sir Edward Widdrington after the Restoration (Carlton and Rushworth 2004e, 49, 64). Further down the valley, Tosson fulling or woollen mill is first recorded at Newtown in 1622, but it is considered likely to have medieval origins (Carlton and Rushworth 2004d, 34), although only a corn mill is attested from records in *c.* 1290 and in 1436/7 (Dodds 1940, 396).

In the adjacent valleys of the Rede and Aln, corn and fulling mills were recorded at Elsdon in the possession of Alexander and William Brown in 1699 (Carlton & Rushworth 2004c, 43), and at Alnham, where there is evidence for two historic mills in the township. One, at Hazeltonrig, attested by maps held in Duke of Northumberland's collection, beginning with Norton's plan of 1619, is suggested as a fulling mill on the basis of an adjacent fieldname, 'Dyer's Field' (Dixon 1895, 35). South of the Coquet, woollen and fulling mill sites are known in the Wansbeck Valley, most notably at Newminster itself, on the west side of Morpeth, where corn and woollen mills are shown using the same leat on early editions of the Ordnance Survey series some 400 m west of the Abbey site. The fulling mill there was certainly active in the seventeenth century; it may well have occupied the site of one of its medieval antecedents and may be the same one referred to by Mackenzie (1825, 200) as still being functional in the nineteenth century.

## THE FULLING MILL AT BARROWBURN

### *Historical background*

Early in the twelfth century Robert d'Umfraville was granted the Northumberland barony of Prudhoe by Henry I, and from this point the Umfravilles became large landowners in the county, with substantial holdings in the Cheviots (fig. 6). In 1138, a group of Cistercian monks from Fountains Abbey in Yorkshire founded Newminster Abbey, outside Morpeth, the administrative records of which are preserved in the Newminster Chartulary (Fowler 1878).

In 1181, Odelin de Umfraville leased the grazing in his forests of Alwent and Kidland to Newminster Abbey for a term of 29 years (Fowler 1878, 76). After Odelin's death in 1182 his descendants confirmed and extended the scope of the lease and eventually gave large tracts of land to the north of the River Coquet to the abbey (Fowler 1878, 73–83). In one particular transaction the gift included a property called Alribarnes (Fowler 1878, 76) which Dodds (1940, 449) has tentatively identified as Barrowburn (see fig. 6).

At some stage between 1226, when his father Richard died, and 1245 (when he died) Odelin's grandson, Gilbert, granted the monastery a licence in connection with its fulling mill on the River Coquet on the Kidland estate between Hepden Burn and the Rowhope Burn.

Fowler (1878, 78–79) glossed the entry in the cartulary about this as a licence for the mill itself on the south bank. However, a re-translation by Alan Binns shows that it is more likely to be a licence for a pond for either an existing mill or for one planned or under construction. 'I, Gilbert de Umfravill, give greetings. May you know that for the salvation of my soul and of my ancestors and heirs I have given and granted and, confirmed by my charter, have conferred on St Mary Newminster in full and perpetual liberty for its benefit a licence for the making and establishment of a pond for its fulling mill at Hepden on my land on the southern side of the Coquet, between Hepden Burn mouth and Ruthhope Burn, wherever it might be most convenient and as often as repairs may be needed. And I and my heirs warrant this gift and concession from my estate against all men.'

The construction of a mill was only part of the investment the monks made in the area. Extensive boundary dykes delineating their landholdings are still visible and there is evidence that they built a grange at Rowhope, about a mile upstream from the mill (Bain 1881, no. 1667).

The fulling mill on the Coquet between the Rowhope and Hepden Burns would have been an early example of its sort, certainly in north Northumberland. Dippie Dixon noted that remains which he interpreted as those of the mill could be seen in the river opposite Windyhaugh in the nineteenth century (Dixon 1903, 21). 'In the bed of the Coquet, on the north bank of the river, opposite Windyhaugh, the foundations of an ancient building and fragments of timber were discernible a few years ago when the water was low and clear. These were no doubt the remains of the fulling mill of the monks of Newminster, whose possessions in mediaeval times extended to and beyond Barrowburn. Many of the larger stones have been taken out and used as gateposts, and several are to be seen in the adjacent buildings. Porphyry is the only stone obtainable for miles around; these blocks are of a very hard, close-grained freestone, unlike any found in the freestone quarries lower down the valley.'

In the 1950s Miller (1956, 271) recorded that traces of the mill could still be seen, although he may have based his report on a combination of Dixon's observations and Fowler's translation.

It is not clear for how long the monks operated the mill. There appear to be no further references to it in contemporary sources and, in the context of the abbey, Kidland itself disappears from its records early in the fourteenth century. Kidland is mentioned as belonging to Newminster in the *Placita de quo Warranto* of c. 1292 (Hodgson 1820a, 139) and it appears in a list of the abbey's *desmesnes* when the abbot was summoned before the Newcastle eyre in 1293 (Fraser 2007, 232). Finally, in 1304, there is a record of a group of men, including an Umfraville, chasing and stealing the abbey's oxen at Rowhope and Barrow Law, within a mile of the mill site (Maxwell Lyte 1898, 280). Anglo-Scottish relationships deteriorated from 1296, with cross-border raiding becoming frequent, a state of affairs that persisted until the

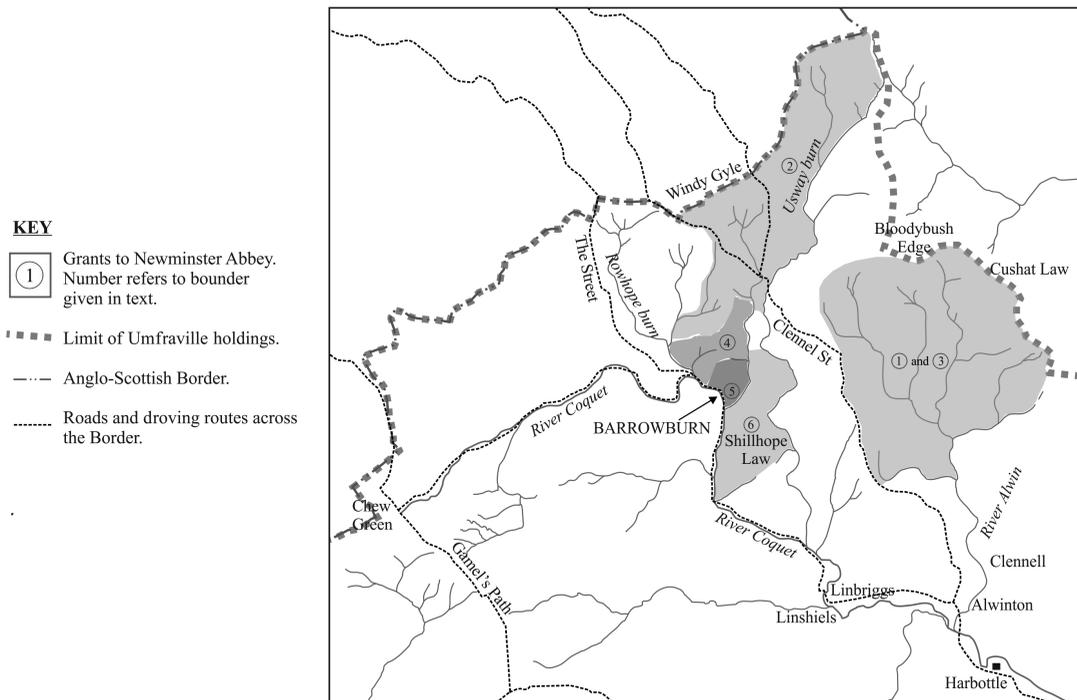


Fig. 6 Map of 12th–13th century Umfraville upland pasture grants to Newminster Abbey (following Carlton and Rushworth 2004, Fig. 54).

seventeenth century. Indeed, the next description of Kidland (Fowler 1878, 307; translated here by Alan Binns) is at the abbey's dissolution in 1538, when Henry VIII's ministers' accounts describe the estate. 'Concerning the rent or produce of the lordship of Kidland, which lies next to the march land of Scotland and contains in its bounds around the same lordship 16 miles approximately and makes no return from any buildings there, just as it appears in the aforesaid book of supervision, for the reason that the whole aforesaid lordship lies waste, and no income can be obtained there except for such fees for pasturage there in summer time by guarding their stock there with a strong force of men, and the expenses of the guard of the aforesaid stock exceed the income from the same fees for pasturage, because [the lordship] is ravaged by the Scots each year.'

At around the same time Kidland is valued at nothing 'except for the pasture' (Dodsworth, 1825, 401). It seems reasonable to assume that this collapse had not been recent, and that the abbey might have withdrawn from its activities in the area in the fourteenth century as cross-border conflict intensified. This is not to say that the area was completely depopulated. A remnant local population probably persisted, operating on a subsistence basis, perhaps using the mill for shelter and then its timber and masonry for firewood and building. Pollen samples from the Bowmont Valley (about 10 km to the north of Barrowburn) show that grazing was continuous through this period, indeed intensifying after 1400 (Tipping 2004, 11–20). There seems to have been a similar increase in arable farming after 1450, suggesting that an agricultural economy continued despite the instability caused by periodic raiding.

There is no evidence for any later mill in the immediate area, even after border unrest subsided in the early seventeenth century. In 1603 Kidland is described as rough pasture that, because of the Scottish borderers, had been unused for many years (Sanderson 1891, 115) and no mill in the area appears in a listing of 1663 rentals and rates for Northumberland (Hodgson 1820a, 272–3). An eighteenth-century rates book lists many Coquet mills individually (Book of Rates 1731, 17–25), but mentions nothing in Kidland.

*An economic and social rationale for the mill*

In attempting to assert a connection between the surviving archaeological remains in the Coquet opposite Windyhaugh and the available documentary evidence for a fulling mill on that site, it is important to consider why Newminster Abbey would want to build a mill in such a remote location, when it had existing fulling operations closer to home on the River Wansbeck (Fowler 1878, 308). A number of reasons may be suggested.

First, because of the more labour-intensive nature of medieval sheep farming and other agricultural practices, it is likely that population levels in Kidland and the surrounding rural areas were substantially higher than today and thus provided a local market for cloth. It would therefore have been uneconomic to take bulky fleeces or unfulled cloth 30 miles to Morpeth for processing, and then transport it back. Even if the cloth was for use elsewhere, it would have been cheaper to transport finished cloth from Kidland than fleeces, especially if the monks planned on a long life for the mill and planned to amortise the cost of its construction over a substantial period.

Second, there was a supply of ‘free’ labour in Kidland — the wives and children of the shepherds and farmers — available for combing, carding and scribbling, spinning, and weaving. According to Miller and Hatcher (1995, 95, 107–27), these processes could amount to over 70% of the labour costs in the cloth production cycle, although the process of spinning was accelerated after circa 1370 by the invention of the spinning wheel.

Furthermore, this labour in a remote rural location would have been untrammelled by any guild restrictions or taxes that might have troubled the monks nearer home. Guilds, and a corresponding opposition to mechanisation were particularly strong in urban centres (Pelham 1958, 3). Although there are no comprehensive surviving records of contemporary guild activity in Morpeth, there are indications that some system was in place by AD 1250: later in the medieval period there were as many as 24 craft guilds in the town, including weavers and fullers (Bibby 1998, 6–8). One function of guilds was to control the number of specialist craftsmen available, their wages and the hours they worked; this would have run counter to the interests of the monks who were clearly seeking to develop and expand their cloth production business. In exchange for this control, guilds typically paid a ‘farm’ or tax to the king; Miller (1965, 70) points out that in the thirteenth century many town-based weaving and fulling guilds were increasingly unable to pay these taxes as their business came under competitive pressure from lower-cost operations which had set up in the countryside to escape their control. A specific instance of the church encouraging this was in Winchester, where in the 1230s and 1240s the bishops appropriated parts of the suburbs and persuaded weavers to relocate there, which meant they avoided annual levies on looms and other payments to the city and the king (Smirke 1850, 377).

It is also possible that the local fullers resisted the introduction of mills, as did the fullers of London between the later thirteenth and fifteenth centuries (Pelham 1958, 4), and as the

fifteenth century cloth industry as a whole resisted the introduction of another technology — gig-mills — so successfully that these were eventually banned by Parliament (Munro 2003a, 263). On the other hand, the mill owners, principally the lords of the manor and the monastic orders, sought to compel their tenants to use the new fulling mills, for which they could be charged, and probably attempted to outlaw traditional ‘waulking’, for which they could not. It is likely to have proved more difficult to ban ‘waulking’, which demanded little specialist equipment, than the possession and use of hand-querns for milling grain, which documentary evidence shows were prohibited by numerous landlords from as early as the mid-twelfth century until the end of the fourteenth century: Syson 1980, 26).

An additional reason for establishing the mill at Barrowburn could be that, in doing so, the monks may have hoped to attract additional people to the area and increase the labour available to work on the Kidland estate. There is also a school of thought, originating with Carus-Wilson, that upland areas offered superior opportunities for fulling mills anyway, with generally lower costs and faster flowing streams (Munro 2003b, 273).

Finally, the abbey’s grange in nearby Rowhope, mentioned above, would probably have had a steward in residence, and he would have been able to oversee the mill operations in addition to his other duties.

#### *The abbey’s wool-based economy*

It must be assumed that the productivity gains of mechanization, and the volumes of cloth involved, resulted in the traditional ‘waulking’ operation being abandoned — either that or the monks saw the building of a mill as a status symbol or a demonstration of authority. Certainly, the investment in construction and subsequent maintenance must have been considerable, if only because of the remote location. The exact route of any road into the valley in the thirteenth century is unknown, but an old drove road and trading route, The Street, runs alongside the river in this area. The road down to Alwinton must have followed the valley; below Alwinton, there would have been a road up the valley to Harbottle, serving the castle there (and the priory at Holystone), and it seems reasonable to assume that there was a link between Harbottle and Alwinton.

Access to Kidland was certainly a concern for the monks. In AD 1240 they reached an agreement with Robert de Feritate and his wife, of Biddlestone, getting free passage for their servants, cattle and carts across an area near where the Allerhope Burn joins the Alwin, providing they did no damage to wood, crops or pasture (Fowler 1878, 164). This route was obviously an important access point to the Kidland estate, but was probably too far north to be used as the way to Barrowburn.

Although sledges may have been used for carrying building material, it is more likely that carts hauled by oxen or horses were the preferred means of bulk transport. The horse collar, widespread in Europe before the thirteenth century, made horse teams more efficient than oxen. A single horse could haul over 600 kg (Needham 1965, 312), whilst a team could pull up to 2500 kg (Gimpel 1977, 32). Local road conditions and gradients may have reduced these potential loads considerably. Teams of pack-horses would have provided a viable alternative to cart transport for most materials, including wool and cloth, in the absence of viable cart roads or when weather conditions made them impassable.

Interesting as it might be to try to construct an economic model for the area based around the presence of the mill — a model that might indicate the number of sheep being managed,

the size of the population involved and the amount of cloth produced — no concerted attempt has been made to do this. Any such effort would involve unacceptable amounts of guesswork; there is no information, for example, on how often the mill was actually in action. Was it in use every day? Was its use seasonal, depending on the supply of cloth? How often did high or low water levels mean that operation had to be suspended?

It is also worth noting that during the thirteenth century the Newminster monks exported raw wool in parallel with their cloth-making operations. The abbey was shipping wool to Flanders through Newcastle as early as 1224, whilst in 1275, when the wool trade with Flanders was being controlled by licence, it was in dispute with the celebrated Flemish merchant, Jehan Boinebroke, over a shipment (Lloyd 2005, 17, 36). The size of the shipment was substantial — 92 sacks 10 stone, which is *c.* 15 tons if the 364 lb sack and not the lighter 315 lb Calais sack was used (Carus-Wilson and Coleman 1963, 13); it was valued at £646 10s 9d, equivalent to £7 a sack. A labour value calculation (i.e. measuring the inflation in wages a worker would need to buy a commodity) shows that this equates to a current value of some £9.5 million (Officer 2013).

Although this was a large amount, it was just a foretaste of the value the wool would gain. With no guilds to protect workers in his home town of Douai, Boinebroke could give free rein to his commercial instincts; his business model was based on hiring a series of individuals, each one carrying out one of the steps involved in turning the wool into cloth. He would sell the part-finished product to each such sub-contractor in turn, sometimes lending him the necessary money, and then buy it back before selling it on to the next in line. This enabled him both to extract profit at every stage of the process and continually adjust his prices to reflect immediate market conditions. It meant that the cloth from a £7 sack of wool might sell for as much as £40 (Gies and Gies 2010, 174). Unsurprisingly, Boinebroke was not a popular man; on his death in 1311 his sons fled the city and were subsequently banished (Gras 2003, 98).

Fourteenth-century lists identify 51 grades of wool, ranging from £9 7s 6d down to £2 10s a sack (Power 1941, 23). These lists predate the collapse in wool prices late in the century (Stone 2003, 6), so it is reasonable to assume that with a price of £7 the abbey's superior lowland wool was being shipped overseas while its local fulling operations satisfied demand for lower-quality cloth. The wool from northern upland fleeces was of relatively poor quality but it found markets domestically as well as in the Low Countries; in the north-west of England a cloth called Kendal Green sold well (Elliott 1961, 113).

The construction of a model for the abbey's wool-based business would be further complicated by this trade in unprocessed wool, but an indication of its overall scale can be developed by calculating the number of fleeces in 15 tons of wool (the size of Boinebroke's shipment, detailed above). The weights of medieval fleeces varied considerably. Ryder (1984, 24) describes a range from 1.1 lbs to just over 2 lbs. Stephenson (1988, 370–85) provides evidence for average yields of 1.35 lbs per fleece between 1209 and 1454 on the Winchester estate, while on the Holderness estates the mean fleece weight for the years 1264 to 1292 was 2.24 lbs. If we use an (admittedly arbitrary) average of these two figures (1.8 lbs) to get some indication of scale, then the 15-ton shipment may have consisted of the clip from nearly 20,000 sheep. This was probably from a single season; keeping fleeces from one year to the next only became more common as wool prices fell in the late fourteenth century (Stone 2003, 6). Even if the wool was all from Newminster, and not being bought in and sold on — and there is no reference to the 1275 shipment containing *collecta* wool as there had been in previous years (Lloyd 2005, 39) — the resulting figure is large but reasonable; the fenland abbeys of

Peterborough and Crowland were running 16,300 sheep between them early in the fourteenth century (Power 1941, 35), and the flocks of the Bishop of Winchester peaked at 30,000 in 1258 and 1273 (Page 2003, 141).

There is no information about the number of sheep on the Kidland estate itself or on the extent of transhumance, although there are records that the abbey was granted wayleaves for some 420 sheep (and some cattle and horses) at Caistron in the thirteenth century (Dodds 1940, 392). However, given the estate's size of as much as 17,000 acres (6900 hectares), and assuming a conservative stocking level of one sheep per 2 or 3 upland acres (0.8 to 1.2 hectares) (Roberts 1992, 78) it is clear the area had potential for approximately 5000 sheep. Even if not all the land was suitable for grazing, and even if some of the Kidland wool went direct to export (and is therefore included in the disputed 15 tons), adding the numbers of sheep whose wool went for export to those that produced wool for local cloth manufacture suggests that the Newminster monks may have owned some 25,000 animals.

As well as providing wool, the upland sheep would have been an important source of milk and meat products for local consumption and wider trade, but shepherding them must have been a demanding task. Not only was the terrain difficult, but it is likely that the flocks would have been open to attack from natural predators. In 1235 the monks of Melrose, less than 30 miles away, reached an understanding with Alexander II, the king of Scotland, that permitted them to hunt or trap wolves (Jeffrey 1864, 17).

#### *Pressures on the mill and reasons for its demise*

There is no record in the Newminster Chartulary of what it would have cost the monks to construct the mill. However, a broadly contemporary fulling mill built at Marlborough Castle in 1237–8 cost a little over £18 (Lucas 2005, 142). Although the monks at Newminster might have had access to cheap labour, the remote location of the Barrowburn mill may mean that £18 is an underestimate. Whilst it is difficult to make a completely accurate comparison between the historic value of a commodity (high quality wool) that would be sold to relatively wealthy clients, and the historic cost of a building project the largest component of which consisted of manual labour, it is clear that although the mill represented a substantial investment, the outlay was fairly small when compared with the scale of Newminster's trade with Flanders.

But whatever the cost and whatever the economic model, the investment was probably not as stable for as long as the abbey had hoped. From the beginning of the fourteenth century the Borders had a troubled and violent history, especially after the accession of Edward II in 1307 (Tuck 1971, 29). In Coquetdale, at Harbottle, there are records of the financial damage these troubles caused. The castle there was attacked by the Scots as early as 1296, perhaps because its owners, the Umfravilles, were supporters of Edward I. After their victory at Bannockburn in 1314, the Scots conducted further regular incursions into northern England (McNamee 1997, 72–122) and the castle was finally captured by Robert the Bruce in 1318, subsequently going through cycles of ownership and concomitant decay and repair. In 1387, on the death of Thomas Umfraville, his holding of the castle and two thirds of the manor were described as 'worth only 100 shillings a year because of the war and the destruction and burning by the Scots'. In 1391, the valuation of the same assets was slightly more optimistic at just under 140 shillings: 'They are worth only 10 marks yearly due to the war and destruction and burnings formerly done by the Scots' (Kirby *et al.* 1974, no. 1043).

As well as physical destruction, communities were also held to ransom. Sometimes extortion took place at a county or bishopric level (Scammell 1958, 393–403), but in 1297 Newminster Abbey itself promised the Scots unspecified gifts to escape arson. Unfortunately the monks reneged on the arrangement, and the Scots retaliated by abducting the prior (Wright 1839, 174).

Individual installations such as farms and mills must have been particularly attractive to raiders. In 1297, Wallace's troops destroyed mills in Northamptonshire, Islandshire and Embleton before moving west to carry out similar destruction (McNamee 1990, 45–50) and two mills in Cumberland — at Dockray and at Waverton — were badly damaged during the Scottish incursion of 1327 (Longley, cited in Tuck 1985, 37). An inquisition of 1326 — one of a series detailing the distribution and organisation of settlement at the late thirteenth century high point, as well as revealing the devastating impact of Robert the Bruce's raids — lists the fulling mill at Tasset as having been worth £30 per annum, 'but now nothing because it lies broken and out of order'.

In the same timeframe (1325), there is an entry in the *Calendar of Inquisitions Post Mortem* for one Robert de Umframvill. In this, property at both Alwinton and Linshiels is described as being 'wasted by the Scots' and 'now worth nothing by the devastation of the Scots' (Sharp 1910, 381). In 1331, Newminster Abbey was excused a payment to the king of £143 6s 8d 'in consideration of their losses by the frequent forays of the Scots' (Maxwell Lyte 1893, 52), while only 5 years later it received an annual grant of 40 marks for 6 years for the same reason (Maxwell Lyte 1895, 340).

The specific destruction of mills by the Scots shows up increasingly in inquisitions post mortem after 1314 (Langdon 2004, 27). One of these, dated 18 Edw II, mentions a mill at a location called Ryhill (National Archives 1325). Examination of land ownership in other broadly contemporary documents, in particular the Close Rolls of 1346 (Maxwell Lyte 1905, 88), indicates that this is probably a reference to modern Wreighill, now a farm on the Coquet below Harbottle.

It was not just institutions and the wealthy that were affected. The 1296 Lay Subsidy Roll records 40 taxpayers in Alwinton paying £6 12s 3¼d, including a John of Hepden, who perhaps lived near the mill (Fraser 1968, 174–5); but in 1336 there were just eight taxpayers contributing £1 7s 4d (National Archives 1336, rot 5d). Given that the rate in 1296 was one-eleventh, and in 1336 one-fifteenth, this effectively represents a drop of about 72%. However, the 1377 poll tax, which cast its net wider by raising a groat from every individual over 14 who was not a beggar, lists 75 people in 'Alnewenton and Cokettuer and Kedland', including a Gilbertus Hepdon and his (unnamed) wife (Fenwick 2001, 262, 267), which may mean that there were still people living near the mill site in the late fourteenth century. However, such names are often indicative of origin rather than current domicile.

Some 150 years later, with the Abbey's dissolution pending, a survey of its possessions in 1536 opens its description of Kidland with 'the lordshipp hath no man(ner) of edifices or buyldings' (Grey *et al.* 1536, unnumbered). A few years later, in 1542, a survey of the Border Marches carried out by Sir Robert Bowes and Sir Ralph Elleker concluded that it would be dangerous for anyone to live in Kidland, and that summer pasturage there was both uneconomic and life-threatening due to raids from both Scotland and Redesdale (Hodgson 1820b, 222–5). Even at the end of the century, in 1597 and only a few years before the accession of James I, there was still substantial thieving, robbery and violence in the area. Sir John Forster managed to maintain two or three shepherds and between 2000 and 3000 sheep at

nearby Shilmoor, although it was stated that 'no man's sheep durst go there but Sir John's' (Bain 1896, 401–3). This may have been due to his position as Lord Warden, but there are also indications that he deliberately fostered good relationships with some of the raiding families (Bain 1894, 262–3).

However, violence was not the only issue the region had to contend with. R. H. Tawney (1912, 35) wrote that pre-industrial societies 'lived in terror of floods and bad harvests and disease, of plague, pestilence and famine'. In the fourteenth century many of these terrors were realised and they may well have contributed to the demise of the mill and the surrounding community. Chief among them was the Black Death, which reached the area in 1349. Although there are few specific figures for Northumberland, analysis of data from 28 townships of the priory of Durham (two of which were in Northumberland) shows that mortality rates among tenants ranged from 20% to nearly 80%, with a probable mean of over 50% (Benedictow 2004, 367). Whilst the 1349 plague was by far the worst, there was a subsequent outbreak in 1361, with further occurrences at intervals after that.

Another adverse factor was the deteriorating climate — specifically the disastrous harvests and ensuing famine brought on by a series of extremely poor summers from 1315 (Prestwich 2007, 6). Crops failed in 1315 and 1316, and again in 1321, resulting in three-fold increases in the price of grain (Campbell 2010, 288–9). A contemporary chronicler records that the North of England may have been particularly badly affected: 'I have even heard it said by some that in parts of Northumbria dogs and horses and other unclean things were eaten', although he does go some way to excuse this behaviour by pointing out that raiding Scots were responsible for stealing food (Childs and Denholm-Young 2005, 120). At Bolton Priory, in Yorkshire, the rye crop was down to 28% of its normal yield in 1315, and 11.5% in 1316, and estimates of rural mortality in this period vary between 10% and 20% (Dyer 2002, 229, 232). Finally, although there are no relevant records that link it to the Newminster flocks, animal disease was a permanent threat; sheep scab became much more serious from the 1270s (Farmer 1991, 400) and there were murrains associated with the famine in 1315–1321. At Crowland, in Lincolnshire, the overall effect was to reduce the size of the flocks from some 11,000 to less than 2,000 by 1324 (Page 1934, 189). Furthermore, the fleeces of the survivors deteriorated in both quality and weight (Stephenson 1988, 381). It is apparent that factors such as these caused significant depopulation in other parts of Northumberland (Britnell, Ety and King 2011, 21), and so it is easy to see how a cloth production industry could have failed at Barrowburn, operated as it was by an isolated upland community.

## CONCLUSION

Although Barrowburn is some 50km from Newminster, in an isolated Cheviot valley, and although there is only a single contemporary reference to a fulling mill in the area, it is very likely that the monks from the abbey did indeed build a fulling mill there in the thirteenth century. Wool was clearly a major contributor to the abbey's economy, and such a mill would have been an integral part of an upland cloth-production industry. The mill and its associated cloth industry failed, probably at some stage in the fourteenth century.

In 2010, members of Coquetdale Community Archaeology explored the area mentioned in the licence granted by the Umfravilles and identified the remains of masonry and timber structures in the bank and on the riverbed, broadly in the location described by Dixon over 100 years ago. Dating of the timbers has showed that they were medieval in origin, with dates

compatible with the licence. Since then, a series of excavations have been undertaken to explore these remains further. This work will be the subject of a future paper.

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