

ART. VI.—*A little-known Late Medieval Industry,
Part II : the Ash Burners.* By M. DAVIES-SHIEL,
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Read at Carlisle, September 27th, 1974.

THE initial reference to this industry was in CW2 lxxi 290 f. CW2 lxxii 85-III was concerned with the identification of kilns, which were used to make potash for the early lyes and later soaps for the woollen trade, and with the methods of making lyes and soap. Brief reference was made to the people who were presumed to have used these kilns.

This part of the story is concerned with the results of an extensive fieldwork programme, subsequent to my noticing certain puzzling relationships in the locations of kilns. Three locational patterns have been identified concerning *two* types of kiln. Both types of kiln produced potash, but KILNWOOD kilns had a function unrelated to the soap industry. There are two locational patterns for the smaller POTASH kilns. One of these, which I term a CONSOCIATION, clearly indicates a direct link between the kilns, their users and the fulling mills which in turn relate to the beginnings of the wealthier clothier hierarchy that eventually dominated Kendal and its hinterland. The second locational pattern for potash kilns is less clear-cut. Many of the kilns that have been found do not conform to the consociation patterns and are not linked to fulling mills. Instead, there is much evidence to suggest that freeholders or customary tenants of township lands within Lakeland became involved in the potash trade since it provided an additional source of income.

Research has not been confined to Lakeland and indeed, teams¹ have covered many parts of Cumbria

and the North York Moors. Kilns have also been identified in Perthshire, Wester Ross and Caithness. The results are exciting, since correlations show a much greater involvement than expected of the rural population of the 16th and 17th centuries with the industries of lead smelting and woollen manufacture. Both industries were well-established in Lakeland by the 14th century, but by the 16th century the size of undertaking meant that extraction of raw materials was necessary over a very wide area.

The Potash kilns.

The POTASH kilns are the more common within Lakeland. They were built to produce ashes, mainly from bracken, although occasionally wood was used. We have found some two hundred of these in Cumbria, mostly in the south and east (Fig. 1). If all such kilns could be found, I think that one would expect at least one per square mile throughout hilly, brackenny Lakeland, with three or four times that number per square mile within the area of the Kendal clothiers' operations. We have a handful in the North York Moors and consociations lead us to expect at least 163 more.

The kilns themselves are fairly massively built, each being internally a squat, inverted, cone cylinder as wide across the rim as it is deep and narrowing to a smaller diameter of flat base. The whole kiln (Fig. 2, a and b) is cut into a steepish bank so that its rear rim is level with the bank top and the frontal air tunnel opens at ground level below the bank, or on to a platform made upon the slope. The enclosing walls are of a solid drystone construction, with the rim at the front of the kiln wider by four or five feet than the side rims. The rear wall is merely built of sufficient thickness to maintain a continuous pit lining, but the

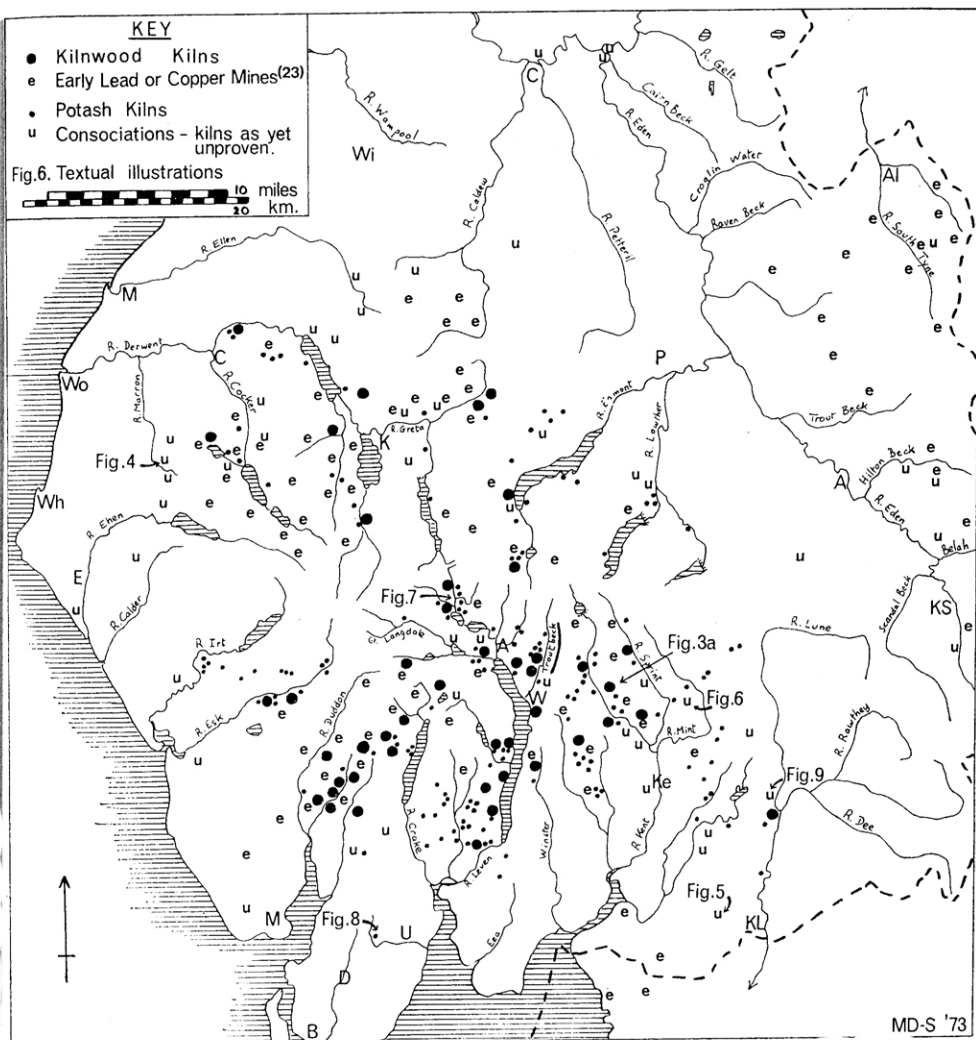


FIG. 1.

sides widen to a four foot rim and the front to a seven foot rim. The whole structure is usually about 18 feet across since the pit is nine or ten feet wide and deep. Since there is much batter on both internal and external walls, the base is wider still and partially-demolished kilns display a thicker wall-top than do kilns that are complete. The air supply tunnel at the

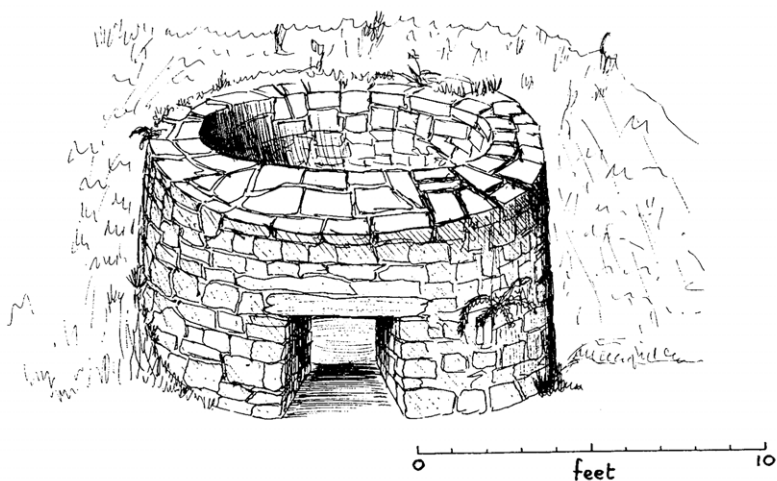


FIG. 2, a.

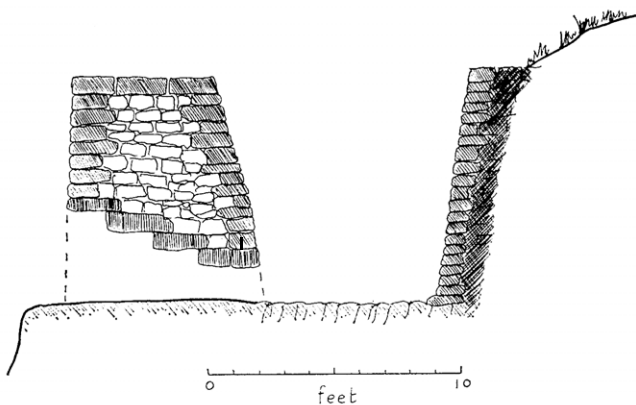


FIG. 2, b.

front is narrow, and the roof of large slabs steps down to the rear to make an inner opening less than 18 inches square. The kiln used as a model for Part I was discovered to have been partially destroyed and then rebuilt. Its flat tunnel roof is atypical. For other data see CW2 lxxii 85-III.

The Kilnwood kilns.

So far, we have found 47 very large kilns in Cumbria. They are of the same general external appearance as potash kilns, especially if they have been partially demolished or filled in. However, they are altogether much larger, being internally wider, deeper and with a much thicker and more massive enclosing wall. The kiln stands much higher at about 14 feet and with an overall width of about 25 feet at the rim and about 30 feet at ground level. By sheer chance, the first kiln of any type to be excavated proved to be a kilnwood kiln. It is at Elfhow, north of Staveley (MR 473001), on the north bank of a small beck and by a public footpath. Thanks to the co-operation of Mr M. Bland, of Low Fold, who removed a large ash tree that had been growing inside the kiln, we were able to clear the interior, measure and photograph it, mend the walls and then partly refill it on a temporary basis to protect farm stock. We hope later to re-excavate and fence it off for a permanent display.

The external appearance of this kiln differs from that shown in CW2 lxxii 87 only in the size of the inner tunnel orifice (Fig. 3, a), but the internal shape is markedly different (Fig. 3, b). The kiln is *ovoid* at the rim, being wider from side to side and continuing downwards in this way to the waist. About five feet above floor level, the kiln rapidly narrows and to a circular cross-section, continuing in like fashion to the flat floor cut from the country rock. In most of the

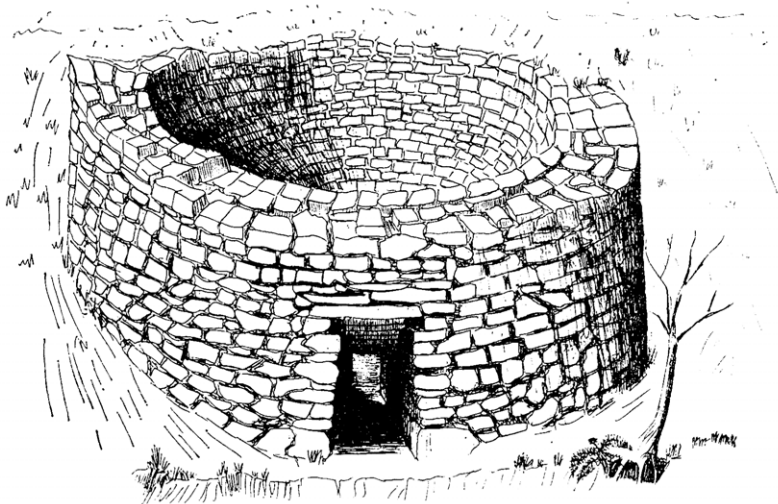


FIG. 3. a.

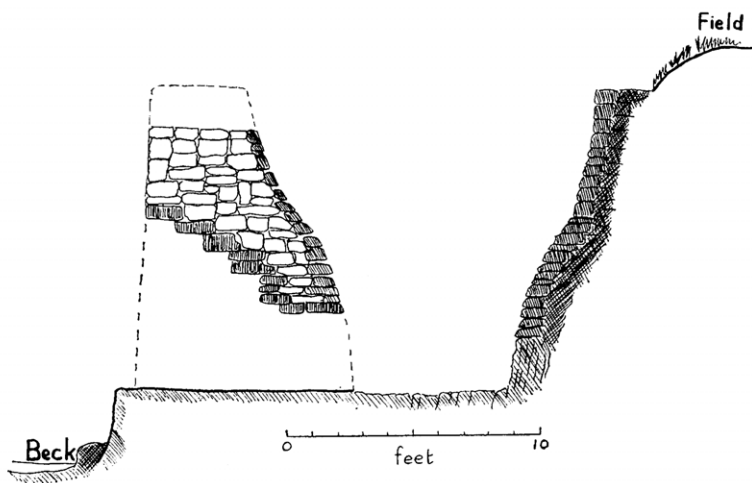


FIG. 3. b.

other kilnwood kilns that we have seen, sizes are remarkably constant, with a width of approximately 14 feet across the longer internal rim axis, which is at right angles to the air tunnel. The shorter axis is about 12 feet at the rim and the kiln is 12 to 14 feet deep. The largest kiln found so far is at Plattocks, South Torver, on Broughton Moor (MR 263938) and is 16 feet across. The rim at the front is never less than 7 feet wide and the side rims are usually five to seven feet wide. With the tremendous batter, the foundation walls are massive. The front rim at Elfhow kiln is narrower than most since the site is restricted between beck and bank; a band of harder rock had made it difficult to excavate deeper into the bank.

The team decided that the construction indicated the presence of heavy timber trunks across the upper part of the kiln, such that they would be separated from any fire in the kiln base, but this seemed improbable until Dr A. Raistrick described in correspondence the so-called elling hearths of the Yorkshire Dales, which were pits built by lead ore smelters. In use, "green timber trunks and branches thicker than four inches were laid across the upper part of the kiln and dried using the thinner brashwood burning at the bottom. The kiln thus prepared 'white coles' or 'chopwood' or 'kilnwood' — terms for dried timber free of sap and capable of burning at an even rate in the hearth".

Until c. 1566, all lead ores were smelted in boles (bowl hearths) and the fuel was always kilnwood or peats, these being sufficient to smelt the ores at relatively low temperatures since the operation merely removed the sulphur compounds and allowed metal to run out into pigs or lumps.² Thereafter, and mainly due to the superior metallurgical knowledge and smelting techniques of the German miners at Keswick and elsewhere, newer smelting methods were used that

not only removed more lead from the original ore and from the first (grey) slags and the second (black) slags, but also separated silver from lead in a final refining process. The processes worked in sequence, involving the use of peats or kilnwood in the first smelt, charcoal and cinders in the second and third smelts and charcoal, bones and potash in the refining process.³ In the Yorkshire Dales, where boles were used until the 18th century (since the ores contained little silver and did not need refining), there are records available from the 17th century onwards⁴ to show that potash derived from the base of elling hearths was sold either to professional soap-makers or to local farming folk — presumably to make their own soapy materials or lyes. If the upper timbers in such kilns charred in the process it did not matter much to the smelters. And if they caught fire, then there was more ash for the soap-makers.

At Brigham however, where the more advanced techniques of smelting had already begun in 1566, specific mention is made of ashes being purchased for the process. W. G. Collingwood, in *Elizabethan Keswick*,⁵ records in 1569, “smelting done as usual, with cleaning ashes, worth £6-1-4½” (although he equates “Aschen” with “kelp”). Again, “in 1573, the smelters used 357¼ bushels of ashes at 16d the bushel”.

With this data available, I re-checked the locations of our 47 large kilns. Significantly, 36 of them are situated in valleys where lead-mining is known to have occurred from Elizabethan times. Almost all of the kilns are well within a mile of mines.⁶ Fourteen kilns have been found along the flanks of the richly metalliferous Coniston Old Man range (Fig. 1). Five kilns occur in upper Kentdale,⁷ around Millrigg and its lead mines. Elfhov kiln is one of these, and several small lead mine adits occur along a vein, possibly the extension of the Millrigg vein, immediately west

of, and below, Potter Fell. Another large kiln is on Potter Fell itself, at the south eastern corner of an enclosure known as Fell Pott. Research on the Kentmere lead mines suggests that they were begun later than most in the district and it may be this factor that has caused Elfhow to be in such good condition. Other kilns are to be found near the Crook and Winstler lead mines, and near Threlkeld and Blencathra, Coledale, Embleton and Smithy Fell by the Lorton valley. Yet others occur in Eskdale close to the Penny Hill copper mines. More kilns ought to be found near Buttermere, in the Newland valley and in the Cross Fell mining districts from Warcop to Alston. Linked field-names suggest that it should not be too hard to locate some of them. One kiln — in Patterdale — is actually built alongside a lead smelting site known to have been in operation before 1643,⁸ but not after about 1730. Shaw, however, calls it a “beehive-shaped charcoal house”. W. G. Collingwood (*op. cit.*, 197), may unwittingly have referred to another at Loderbarckh (Lowther Park in Wythop) when he mentions three men “charcoaling” — “carrying to the Kollbüt, wood for 130 loads”. Literally translated the Kollbüt could be the roll-tub (Koller Bütte). It is certainly not a coalpit since charcoal pitsteads have always been flat, usually worked in threes and even three pitsteads could not cope with 130 loads of charcoal in under several weeks. Moreover, although the term “loads” is not used for charcoal, it is used for kilnwood in documents relating to the Yorkshire Dales. Perhaps a roll-tub, or Kollbüt was another name for kilnwood kiln.

There are eleven exceptions to the association of kilnwood kilns with lead mining. Nine of these lie on the western shores of Windermere and two on its eastern shores. All are very large kilns, appearing older and bigger than most of the other kilns. The

nine western kilns lie between Canny Hill in the south and Blelham Tarn in the north. There are lead and copper adits in the area, at Thwaite Head and Dale Head in Rusland valley, on Hawkshead High Moor and at Pull Wyke, Outgate, but there was never sufficient ore to have warranted such large kilns.

We have, however, in a decree of 1570,⁹ corroboration of the involvement of this particular area in kilnwood production. The decree is concerned with the urgent need for fuel to smelt lead and copper at the Queen's mines in Lakeland. Elizabeth's ministers assumed that since all residents were customary tenants, permitted by tenant-right to extract wood and woodland products for their own use, then there was also plenty of timber available for the royal needs:

" may very well spare yerely for the next twenty yeres six hundreth seme of coles to be delyv'ed to the quenes Ma^{ts} use nere the water of Wenndermyre at a reasonable p'ce . . . one hundreth and three score acres of underwoods to be taken out of Garthwait in the next place adjoyning to the water of Wenndermyre, and three score acres of underwoods to be taken out of Elterwater p'k and Coniston in one place next adjoyning to the said water, and three score acres of underwoodes to be taken out of Salterthwaite and Grasdale in one place next adjoyning to the water . . . "

The local Courts had given Elizabeth plainly to understand

"that her highnes myn'all workes wthin the said mynes nether have nor can have suche success, increase to, & her ma^{ts} com'odyty & proffett for *want of sufficient fewell woode & coles* (my italics) to be ymployed there-abowtes as otherwise they shold, if that want were sufficiently supplied & provided . . . "

It would seem to be no coincidence that new prospecting at Roughten Gill on Caldbeck Fell began in 1566 and that mining restarted in 1568. Profits were less than expected, however, since the ore had to be carted to Keswick and already that town was suffering from a shortage of fuel. If the old Cumberland proverb "Caldbeck and Caldbeck Fells are worth all England

besides'', really dates from Elizabethan times as is reputed, then one can understand the urgency behind the decree. After 1571, the situation was aggravated by the Germans buying ores from the Alston mines to smelt at Keswick. This might seem odd until one recalls that the Alston ores had been proved rich in silver when assayed at Augsburg and the Keswick smelters were keen to extract silver, please the Queen and so continue their venture. W. G. Collingwood¹⁰ mentions timber and charcoal culled from places as far away as Lamplugh, Calgarth (Windermere) and High Furness to supply the smelthouses at Keswick with fuel.

It is hardly surprising that the two largest kilns in High Furness (built in 1545 by Myles and William Sawrey) are at Graythwaite. Two years later, the Sawreys were granted permission to operate more kilns at Ealinghearth in the Rusland valley:

''Myles Sawrey and William Sawrey to be permitted to make two little houses and hearths called Ealing-hearths on their tenements in Furnessfells, Co. Lancs & to take broken wood and sticks ther & on all other men's farm holds in Furnessfells for the term of 21 years paying 40s a year.''¹¹

Such a scale of working seems surprising until one compares it with the records of the Yorkshire Dales. Raistrick states that the quantities of kilnwood used by the Yorkshire smelters were large, items such as ''139 loads of chopwood'' being common. Moreover, ''making, repairing, and re-making of kilns is recorded every year from the early 17th century''. The kilns that the Sawreys worked were due to be re-leased in 1568. Greythwaite then belonged to William Sandes, and his son William, at Colton Hall, was the Queen's bailiff for Furness. It would have been quite simple to alter the upper part of each circular potash kiln into a larger oval kiln. Since the original lease had permitted wood to be taken from sixty square miles of

High Furness, this was clearly a large business.

The other two kilns on the eastern shores of Windermere are at Holbeck Gill and in Rayrigg Wood, both within the original Calgarth woodland mentioned by Collingwood (*op. cit.*, 56, 66, 82 and 92). Within the same area, at Matson Ground, is an iron smelting site, robbed of its cinders. Luckily, we can date this robbing, for in 1569, in the German accounts there is an apparent reference to ashes here. It was interpreted by Collingwood as kelp.

"Calgarth, Mr Roulandt Philippson's servants for 80 stone kelp for coaling, and sent him by Niclaus Dee, foreman collier, cash, on the 16th, £11."

In his footnote, Collingwood put "'kelp' — for want of a better word". The German was "80 Stein Aschen zum Kolen", which translates literally as "80 Cinders for crushing", with "80 loads of" inferred, as in so many other entries. The ashes were always measured in bushels and £11 is a lot to pay for cinders unless there were 80 loads. Also much crushed cinder material was needed for separation of slags from metal in the second and third smelting processes.³

Other known kilnwood kilns are at Town Head and in the grounds of Lancrigg, Grasmere. In 1566, Edward Knott of Grasmere cut down a large quantity of timber at Rydal Head.¹² Miss M. Armitt presumed that it must be for making charcoal "as there was no export for wood in those days", but German miners were then prospecting Greenhead Gill for lead ore.¹³ And it was Edward Knott who then held the Greenhead tenement. A map of the area appears as Figure 7. Possibly then, there was an involvement from this time in kilnwood production in Grasmere.

It is not yet possible to report on the areas to the south and east of Shap Fells, the Black Combe district or the Haweswater area, all of which are reputed to have once been engaged in lead mining.

Most lead smelting ceased in the 1640's when the Keswick smelters were destroyed by Roundheads, although one copper venture continued with "Dutch" (German) miners and smelters at Smeltmill Beck, Stoneycroft, Newland valley, until 1715.¹⁴ At that time, the Dunnerdale copper mines were also at work. The Newland smelter continued and was still at work in 1789, so that the copper districts of later years might also be expected to yield kilns of this sort. In the late 18th century, lead ores were packed there from Green-side lead mine, Patterdale, to be smelted, but the practice ceased after 1824.¹⁵ In general, though, there was a shift of emphasis away from mining to the woollen industry in the 17th century, and gradually the kilnwood kilns would be re-converted to potash kilns wherever there was enough timber or bracken to warrant their continued use. Those that remain today as the oval-type kiln are few. We are fortunate to have any at all.

The Potash kilns and their consociation patterns.

Since publishing the first account of the potash industry of Lakeland, more has been discovered about the people who worked the kilns. This information has been derived almost entirely from patterns of kiln location.

Initially, discovery of kilns depended upon people from all walks of life. Many "kilns" proved to be holes only, but we also found ourselves checking pre-Roman hut settlements, limekilns, small quarries and even World War II machine-gun emplacements. We now know most of the obvious kilns, but team members are still reporting new locations. For a long time, no obvious pattern emerged. It was the near impossibility of looking for stone-lined holes across irregular countryside that forced me to try and narrow down

by other means the area of search for the teams. Whilst some documents referred to wood as the material for ashes, most mentioned bracken, although none have been found earlier than 1544.¹⁶ We were fortunate to have available the recently completed New Land Use maps for Cumberland, Westmorland and High Furness (see CW2 lxxii 85). On these, the areas under bracken indicated that whilst some valleys were heavily infested, others had little. It seemed reasonable to assume that if these areas were indeed being cropped for the bracken, then one should also find nearby occupation names for those who worked the kilns. Parish registers of the 16th and 17th centuries were searched for the surnames Ashburner, Kilner, Soper or Walker.¹⁷ The search proved rewarding and registers for Furness, Keswick, Borrowdale, Cockermouth and Lorton have now been checked. The results prove that Ashburners *had* lived in concentrations which coincided either with known kiln locations or with areas named Brackenrigg, Kiln Close, Walker Ground, etc., and also with those areas that are mainly still bracken-covered today. We then explored the most likely areas, but many hours yielded less than a dozen kilns. We obtained better results by asking Forestry Commission workers if they had seen any !

Miss Sheila McPherson then suggested the use of tithe maps. Since the potash trade ceased less than a generation before their date of *c.* 1840, the schedules with the maps have proved invaluable, as most field names indicated the traditional uses to which land had been put.

The Field names.

All the tithe maps for the Cumberland and Westmorland fell parishes have been checked and all field names that might help in the location of kilns and their relevant field boundaries transferred to 2½ inch

O.S. maps. Some likely areas of the Eastern Fells and districts north of Carlisle have also been covered but not, as yet, those of Furness.

My initial list of likely names included *Kiln*, *Pit*, *Pot*, *Kettle*, *Oven*, *Lime*, *Lye*, *Ealinghearth* and slight variations such as *Ellengarth*, *Kill*, *Kin* or *Ken*.¹⁸ The names *Lye*, *Pit*, *Oven* and *Kettle* have proved rare. The old term 'E-lye-ing' soon altered to *Ealing*; "Pit" is too general a term to be of value here; "Oven" has only been found linked with "Cinder Ovens" — a term used for early coking (i.e. making coke) ovens; "Kettle" has altered in meaning. At one time, as Barclay's Dictionary of 1812 categorically states, "... the name of Pot is given to a boiler that bellies out in the middle and grows narrower towards the top; but that of Kettle to the vessel whose sides are straight from the bottom, or grow wider towards the top". He added that "authors, however, use these words indiscriminately". Such vessels would be found inside an outhouse, however, and not in the fields. *Pot* or *Potts* has proved to be very common in certain areas, especially between Ennerdale Water and Egremont, and in the district north of Kendal.

Many other names have now to be included, for once the initial list was transferred to the modern maps, a series of derivation spellings became obvious. The names that have changed in sound, though not in substance, over the centuries of potash making are usually those that have been shortened through the Lakelander's habit of rapid, slurred speech, such that, for example, *Satterthwaite* becomes *Satt-u-thutt* and *Skelwith* becomes *Skellith*.

Without exception, kilns have been found nearby for every one of the field names listed below:

KILN — Kil, kill, kel, kell, kin, kinn, ken and king.

BRACKEN — Brack, brakes, brackenny, breck, brecon.

EALINGHEARTH — Ellenharth, ellinarth, ellen-garth, Allens Garth.

EALING — Ellin, ellen, allen, allens, lins, lin, linn, ling and possibly hollin. The latter word is usually thought to mean holly, but in areas where holly is absent, the name occurs within a quarter of a mile of nearly one hundred of the kiln sites.

Besides these more obvious names, other field names were usually present. These included especially

TENTER — Tentour, tanter, totter; Tenterbank and Tenter Close.

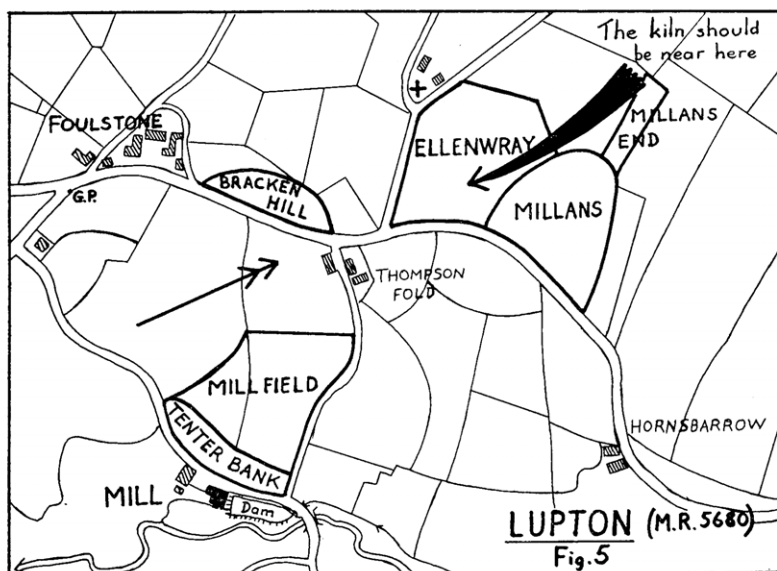
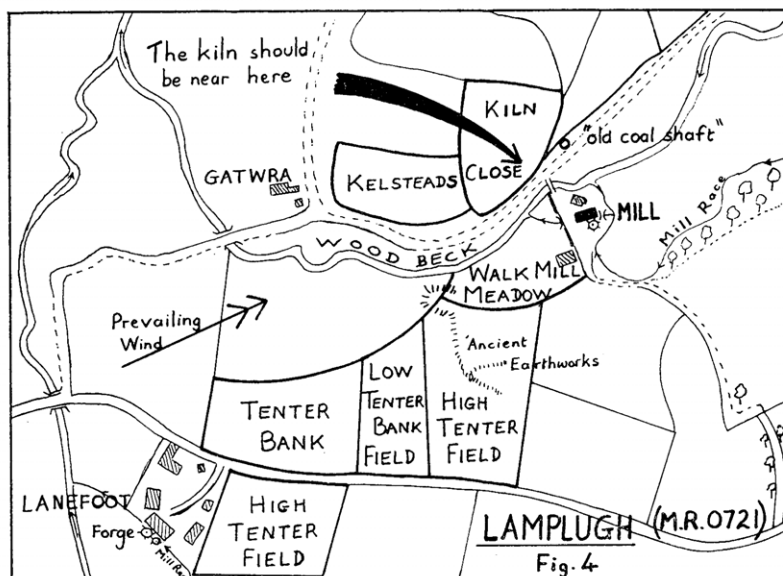
MILL — Millans (mill lands), Walk Mill, Milking (mill kiln). In Yorkshire we found that a common name for walkmill was Stockmill or Tockmill. Names like Stocking (stock kiln) and Tocking were to be found in their field-groups.

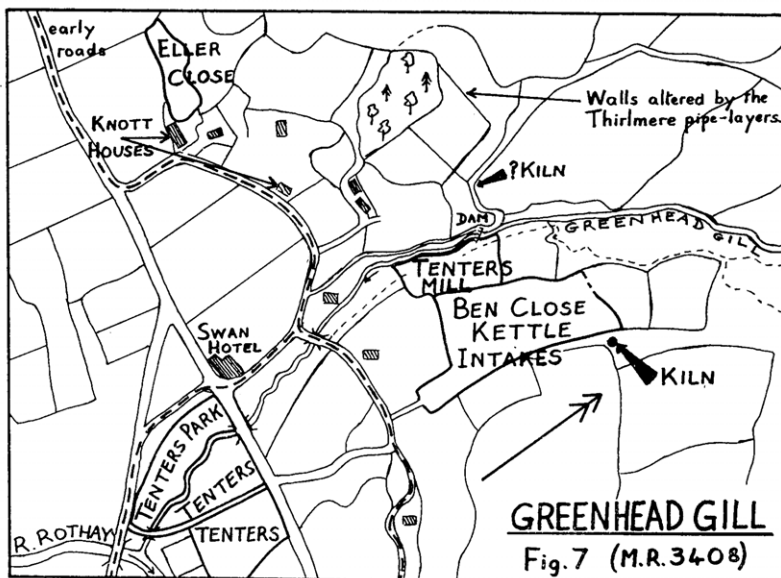
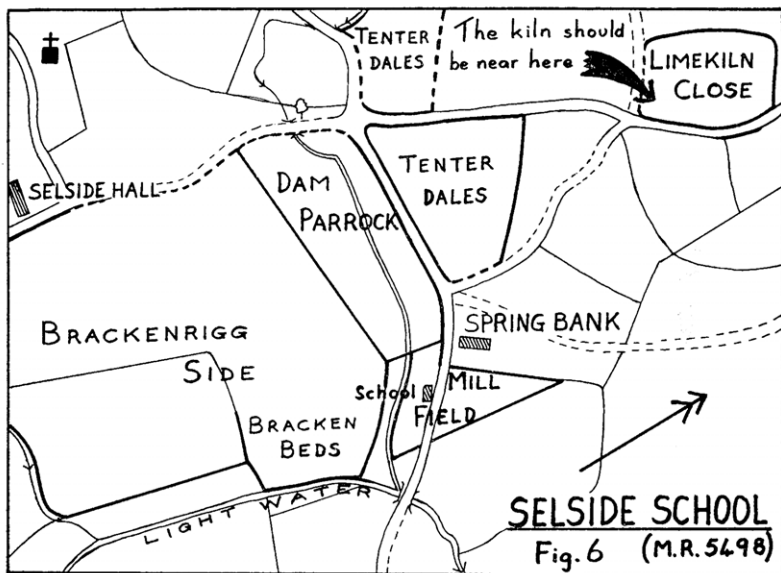
This basic field-name-group of *Kiln*, *Bracken*, *Mill* and *Tenter* I term the **consociation** (Fig. 10). On the tithe schedules, the fields are usually numbered only and therefore no pattern is discernible until all likely field names have been plotted. I now have over one hundred groups of consociation names, and without exception they exhibit a pattern within the group that is *dependent upon the local direction of the prevailing wind*.

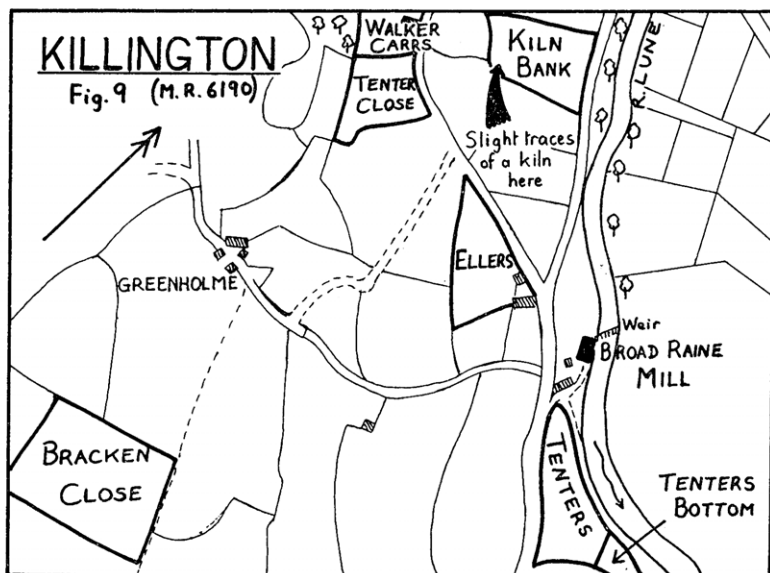
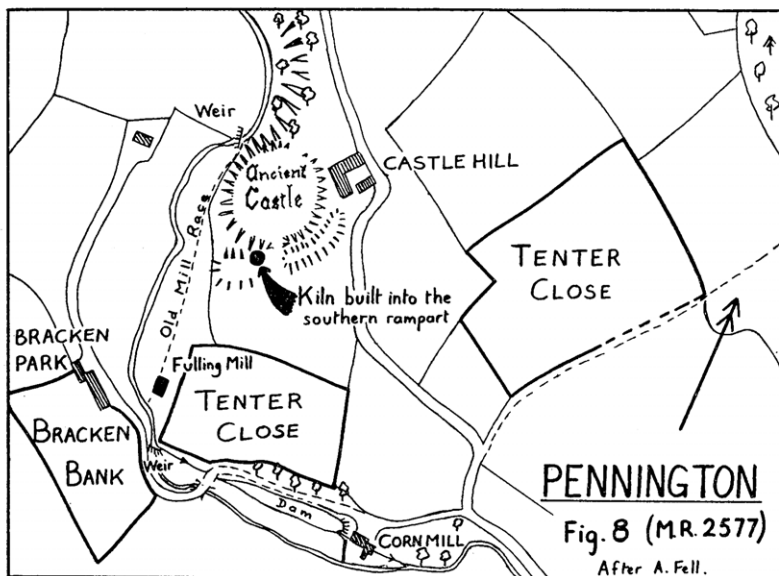
Six of these consociation patterns are shown in Figures 4 to 9. They have been chosen simply to indicate that such consociations are not confined to the southern half of Lakeland:

Lamplugh in West Cumberland;
Lupton near Kirkby Lonsdale;
Selside Hall north of Kendal;
Greenhead in Grasmere;
Pennington near Ulverston;
Killington near Sedbergh.

Other consociations have been found near Brampton,







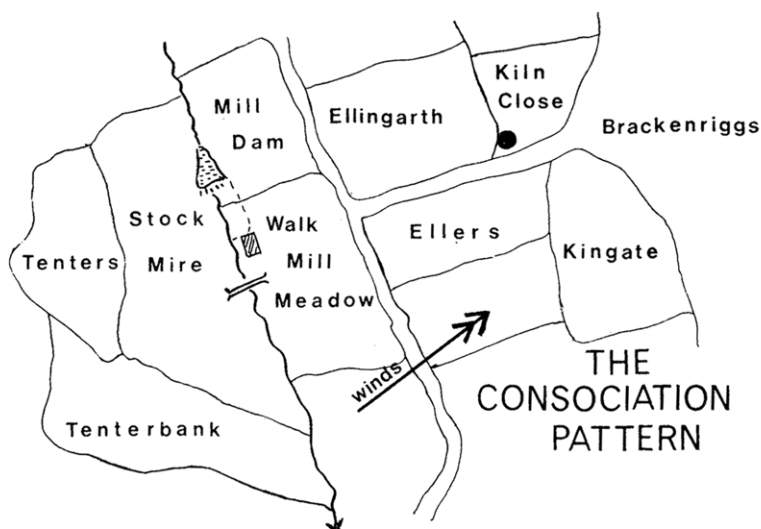


FIG. 10.

Alston, Appleby, Lorton and Caton. They occur also in the Yorkshire Dales and there is at least one in north Staffordshire, at Hollinsclough, where we located two kilns recently.

Armed with this data, we sought kilns in all the named kiln fields. Within eight weeks we discovered another 120 kilns, and with them many traces of small watermills. On several of the tenterfields we found the land to lie in steps about ten feet wide, two feet high and about fifty yards in length. High Tenter Fell in Kendal displayed this best, but unfortunately the land now carries houses.¹⁹

Whilst noting the main consociation names, others also obtruded. Besides *hollins* (holly?) already noted, "eller" has also shown itself near many kiln sites. It may sometimes be a careless derivation from ealing, or it may even be that eller (alder) trees preferred a habitat near a kiln. Some multiple names, when used

as guides, yielded further kilns. One such is Brocklebank. The brockbank is the badger bank, a common enough surname in Lakeland, but at two "Brock-kell-banks" we have found potash kilns. Stickle Gill in Great Langdale is another suggestive name, for where it enters the fields the stream is renamed Mill Beck, after a fulling mill that was here in the 14th century. We have yet to find a "Stick-kell" here. One kiln has been found about quarter of a mile to the west, by the old road.

Another term is *Bowker* or *Boucher*.²⁰ Winifred Bowman in writing about old Ashton (Manchester), states that "at one time the trade of bowking was very common almost everywhere and so much a part of the country scene that no comment was made about it". Apparently the bowker worked in a bowk-house, boiling woollen or other cloths in a solution of potash lyes to get rid of the original grease. It is said that this sub-trade was later incorporated into the fuller's work. In Lakeland, there are two Bowkersteads in Rusland (MR 336914 and 339917), although they have not yet been visited. In Mitredale, there is a fine kiln, found and identified by Mr J. Nettleton of Brockhole, at MR 16070231. Less than 200 yards away to the north-west is a derelict property now called Bakerstead, but spelt Beakerstead in 1774.²¹ A "Bouch House" occurs at MR 147294, in Embleton, east of Cockermouth. In this parish occur at least 14 separate kiln field names. One kiln has been found near Wythop Mill. Names include Low and High Milkin, Kiln Oaks, Eskin, Kelswick, Mill Allen Woods, Jinkin Park, Lime Kiln Close, Kiln Hill and three Kiln Closes. There is also a *Bawkin* Field and adjacent to Bouch House itself are the fields Potter Bank and Kiln Close. A second "Bouch House" lies at Deanscales, four miles south-west of the first.

One wonders about other names. Was keld (a

spring) always keld? Apparently not, for in south-west Cumberland at Whicham, a place called Keldbank was Kellbank in 1774.²¹ No other names have come to light that appear to have any links with the trade and none of the kiln names are listed in the place-name volumes of the counties concerned, so that we do not have any other aids towards finding more about kilns.

The Working Year of the Ashburner-Fuller.

That the ashburner was also the fuller seems fairly obvious from the consociation pattern. The fuller fitted into a trading pattern in the days when there was already specialisation in every branch of the woollen-manufacturing trade. The man who organised the whole unit was the clothier. He usually owned or leased a work-yard in a nearby market town. His town house straddled the gateway into the yard, having both a view down the main street and into the yard itself, where, on fine days, many of his men would be following their trade in the open air. Their cottages lined the sunny side of the yard and the "ware houses" lay opposite. The clothier organised a group of packmen or chapmen to collect fleeces from the countryside. This would be in the summer, after clipping. Fleeces were sorted, first into general types and then by quality. Better wool was sent to those out-workers who could be relied upon to produce the finest of spun yarns. Poorer wool went to beginners or the less skilled. Yarns were subsequently collected from the spinsters, again sorted and then sent to websters to weave into the standard narrow-loom webs of cloth. Some skilful websters might work in the town yard, but most were domestic workers. If patterned cloths were required, some yarns were fulled in order to be dyed before weaving; otherwise the main work of the fuller was done upon complete cloth lengths. All wool had

to be clean and free from its natural greases before it could be dyed. The dyer or dyer worked in the town yard since his work was skilled, his dyes often costly and some secrecy was needed to safeguard his results. It might well be that special lines in cloth were made in the yard from start to finish, i.e. from fleece to cloth. The standard cloths were usually dyed in one colour only. Some cloth was fulling twice, both before the main dyeing and again after the cloth had been impregnated with dye to ensure that the colour would hold.

Most of the processes described so far would be complete by the time that the fuller had finished his bracken-shearing and burning. He could not shear before 29 September (Michaelmas Day) and he must shear and burn as soon after as possible, for the greener the bracken, the richer its potash content. It would probably take him most of the following month to produce his lyes for the fulling mill. At the same time, the winter season would be coming on, providing more water for the mill, yet also making the drying of the fulled cloths more difficult. Since the fuller was also using adjacent land to rear beasts and grow crops, it is unlikely that he would wish to begin his main trade until winter had set in and harvesting was over. It seems likely that most fulling was done after the new year had begun.

The fulling mill itself was simple. The structure could be as small as 10 feet square, requiring only the waterwheel, its shaft, two boxes into which the water-driven hammers rose and fell, and space to walk round to get the clothes in and out (Fig. 11). To reduce wear and tear on the parts, the hammers or stocks were set in pairs so that one stock fell as the other rose from the box holding the "piece", the water and the lye. (Note that the mechanics of the diagram are not specific to one period but merely display the principle.)

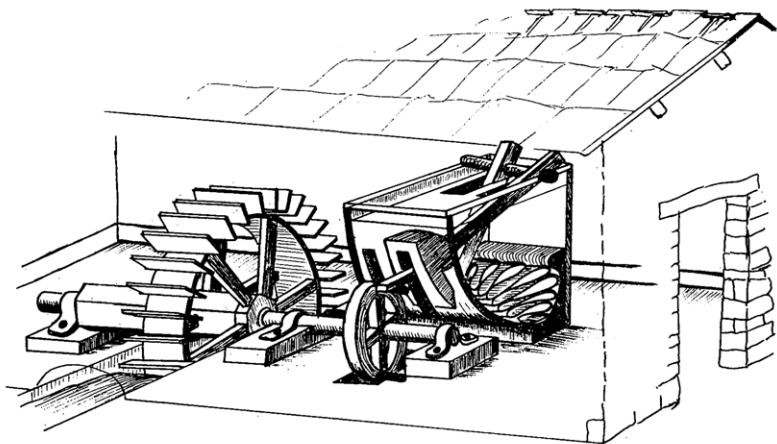


FIG. II.

The process was intended to bind the woollen fibres close together in order to improve the finish. Both fulling and felting were achieved in the one action. Felting mats together the loose wool fibres by pressure and pounding, especially when done in water. Fulling closes the threads together by pressing and kneading in a soapy liquid. The fibres are elastic, crimped along their lengths and covered with minute pointed scales. The action of soapy liquors causes the fibres to become plastic in nature and this aids the fulling action.²² Cloths thicked and cleaned in this way shrank considerably, usually by about one quarter of both length and breadth. On a narrow handloom, a webster could make a "piece" of 30 yards length in one week. On fulling, this shrank back to about 22 yards, the accepted sale length of the "piece". The width also shrank by one quarter from $4\frac{1}{4}$ ths or one yard, back to $3\frac{3}{4}$ ths or 27 inches (— still the correct width for standard narrow cloths, stair carpet, etc. in this country). The value of a fulling mill was that a greater amount of cloth could be fulled *evenly* at one time than by the

process of "wauking" it in a line of tubs, using human feet. The piece had to be folded upon itself in the box — which had to be fairly capacious — but could not be left for too long whilst the fuller went about other affairs. It would need turning from time to time to keep the felting and shrinking even, otherwise some disastrous mis-shapes could result. One report from Kent tells us that a fuller of the early 17th century could cope with 2,500 to 3,000 pieces of kersey in one year. At an even rate of working, with two cloths being treated at any one time, the smallest twin-boxed mill would need to process ten pieces per day in five shifts. Such a fuller would need a full-time partner in order to get some sleep. Even allowing a much smaller amount of cloth, the job can have been no sinecure, for we are also told that websters were expected to make their one piece per week, or 50 per year. Their work continued throughout the year and clothiers often employed large numbers of websters. Fifty websters could keep two fullers at constant work for most of the year.

This means that a man would have to work at his mill as well as his croft from January until the next sheep clipping in order to fulfill his likely quota. When the cloths had been thicked, they would be rinsed in a beck to rid them of their lyes, fluff, etc., then be carried out to the tenterbank to dry. The cloth was hooked by the lister or tenterer along both lists or selvages, on to sharp copper hooks set in rows on the top and bottom edges of the tenter row. The distance apart was about 27 inches. At intervals were uprights with holes set in them so that the ends of a piece could be bunched together with string and the latter wound around pegs set in the holes, to tighten and pull the piece straight again lengthwise. On a good, windy day many cloths could be dried in a very short time. They would then be collected by the packman who

might well expect to collect after every windy day. Once back with the clothier, the finish was applied to the requirements of the buyer.

Distances from mill to tenterbank and from mill to kiln (the latter never more than $\frac{3}{4}$ mile away), suggest that the fuller was alert for the heavier showers. Since the kiln is *always* placed downwind of the mill, and the tenterbanks are *always* upwind of the kiln, it is possible that cloths could be drying at the same time that a kiln was burning bracken. When cloths were nearly dry and heavy rain began to fall, the fuller and his wife would gather in the bulky cloths at the same time as the relief fuller or the children would be hastening up the opposite slope to save the ashes from being washed away. Apparently the nature of the chemical process of potash manufacture was so poorly understood that not everyone thought of putting a lid or roof across the kiln top — although by the 18th century there is reference to kilns inside open-walled “barns”.

In this description of the fuller's activities, I have touched on several problems of labour. Obviously, if the mill was very small and there was insufficient trade for it to be worked constantly, one man could probably cope quite well. On the other hand, in a large mill, we might expect to find a team working together. The bowker might prepare the cloths for the stocks. The fuller oversaw everything. The lister, or tenterer, put out and took in the cloth being dried. The kilner, or ashburner, got his ash and presumably produced the lyes ready for the fuller (although the Chandler might be the man who made the lyes — since lyes were essential in the making of candles). The lyes required much boiling-up or lixiviation of watery liquids to thicken them. This was done in vats or kettles, usually of lead or copper rivetted together in strips upon an iron frame. Heat was applied

with charcoal fuel. We have found triple charcoal pitsteads — they were usually worked in threes — by the side of many potash kilns. Thus we can expect that the ashburner was also skilled at making charcoal. Certainly many people making charcoal for the iron bloomsmithies were named “Ashburner” as evidenced in the parish registers.

To those who would say that this “Working Year” is surmise, I would reply that there appears to be a paucity of material published on fulling mills and none on the actual method of working. One detailed article was published by the Newcomen Society in 1933,²² relating especially to the machinery although giving a useful summary of known data. But no comment was made about workmen’s conditions or methods of working.

Other Potash makers.

Of kilns found, a score or so do not fit into the consociation pattern. They all occur on lands where the fields are small and highly irregular in shape and the names and appearance of the properties suggestive of great age. Almost without exception, the kilns occur either just inside fields which were at the upper limit of enclosure before the 19th century, or just beyond (Fig. 12). If the latter, then they are at the point where the old sheep-gates open on to what would originally have been common fell. Presumably kilns that lay inside the old fields belonged to the customary tenants and those on the common were held “in common”. Whilst there is no positive proof as to who worked these kilns, yet there is evidence in the solidarity and design of buildings that lie adjacent to the kilns. Since it seems reasonably certain that the ash-burning and fulling sections of the woollen industry were lucrative, it also seems that those who lived near mills but did not work them also made money. In

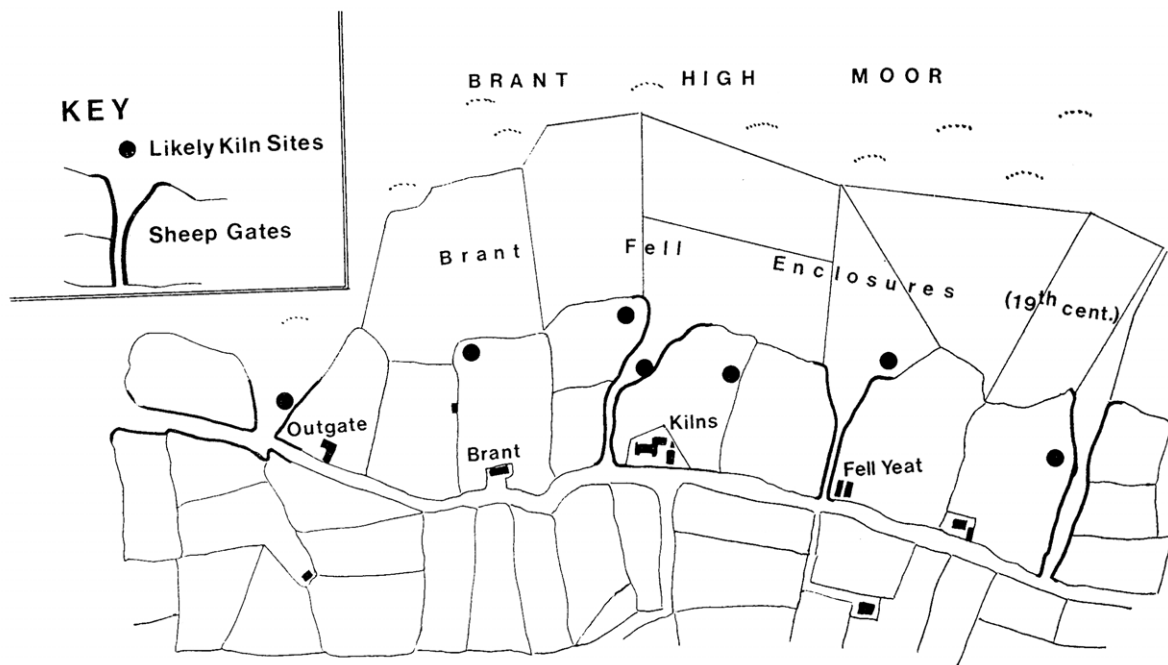


FIG. 12.

the Hutton-in-the-Hay district to the east of Kendal, the tithe map locations indicate a series of kilns around the lower edge of the old common lands. One site was Crag (MR 561936), where in 1745 John Slack was living. His will of 14 December 1745, indicated that he was much wealthier than any of the other inhabitants of the township. Most wills of customary tenants suggest their poverty, listing as they do their meagre property. But this man left a house of better quality than any of his neighbours and also what was in those days a small fortune. Owing to him were mortgages and bonds on three other properties, which, with some cash in hand, totalled £367. There was nothing in his family background to indicate the source of his wealth. His own larger than usual herd of cattle brought the total of his assets to about £500. None of his neighbours had similar assets. This was puzzling, but he possessed a kiln, now — unfortunately for my searches — ploughed out, but with two charcoal pitsteads still visible on the land to the south-west of Slack's home fields. The kiln name is to be seen on the tithe map although it was not mentioned in Slack's papers. None of his neighbours had a kiln. Of course, one property correlation does not prove a case, nevertheless it does raise the question of **Customary Tenant Right**.

I treated this matter far too lightly in Part I, but the laws of tenant right are of considerable importance here. One law lays down that tenant holders had the *right to cut bracken and sell it, or the ash from it, for profit*. Alfred Fell is my main reference for an excellent account of these laws, as explained to Queen Elizabeth in 1559.²³

The Queen had asked how local people could extract so much timber and woodland produce at a time when charcoal burners were beginning to decimate the once-vast forests. The northern land-holding system was such that:

"... customarie tenn'tes . . . have alwaies heretofore tyme out of the remembrance of man yerely used . . ." (there follows a list of the various rights). They included

"Two little houses called *Easinge Harthes with the brusinge woode and the Ealinge Asshes ther to be made nowe or late in the or occupat'on of Miles Sawrey and William Sawrey or of their assignes by a custom called tenante righte and likewise doe clayme that they the said ten'nts of the said Lordshipp of Hawkshede and Colton and of all the other the lordshipps landes tenem^{ts} and heridam^{ts} aforesaid (excepte before excepted) and their auncestors beinge customarie tennts of the said lordshipp landes and tenement have alwaies used to take and have the said comoditie and p'fitt of the said in maner and form above declared and do alledge that they do paie and yelde certeine yearly rents customs and services as well for the said customary landes and tenem^{ts} as for the woodes growinge and beinge upon the said customarie ten'nts and other places . . . and for the comoditie thereof.*" [My italics.]

Two things tell us here that "profit" cannot mean merely "use". First, the sheer quantity of bracken that by law must be cut after Michaelmas on each property; second, the absence of any great woollen industry in that area to use those ashes. All the indications are that these raw materials went to Kendal to supply the great concentration of mills there. Other — but smaller — concentrations appear to have been in Keswick, Cockermouth, Penrith, Wigton and Egremont, but of these, only the Keswick district effectively survived into the 19th century as a woollen-making area. Various Courts Leet records survive and in them are recorded the laws concerning bracken use. The Bampton court leet for 1613 lays down that —

"Tenants may enjoy all the woods, underwoods, etc to convert to their own uses, and

"You shall enquire if any within this Lordship have mown any brackens before Michaelmas yearly."²⁴

Following these clues, I checked the Bampton tithe maps and have discovered four potash kilns and one of the larger kilnwood kilns. There were copper mines on Bampton Common centuries ago.

If customary tenants were allowed to cut and burn bracken for potash in most of Lakeland, that might explain the sporadic distribution of some of the non-consociation kilns. It might also help to determine the the location of kilns in townships where all the lands had been commuted at one time, obviating the need for a tithe map for the individual fields. This happened in Grasmere, which, of all Lakeland townships, was the one for which I most needed a detailed kiln location map in order to link fulling mills with the densest stands of bracken for any valley amongst the fells. There were a few suggestive names: Stock Bridge and Tenters at Town End; the data displayed in Figure 7; Allen Bank and Kell Crag just west of the church; and Kelbarrow south-west of the church. But Miss Armitt had given approximate locations for 8 fulling mills in the valley and only three sets of the place-names given above might "belong".

Using the "upper-field-plus-sheepgate" pattern (Fig. 12), I chose seven possible kiln sites along the eastern side of the valley at about the 500-foot level where the tops of the older fields lay, and in one day found five kilns, four of which relate to known mill sites. Another six likely sites were chosen along the western side of the valley, and to date two kilns have been discovered, both of them conforming to consociation patterns. At this present time, ten potash kilns and two kilnwood kilns have been identified in the Grasmere valley. It seems likely from these results that some fullers may have worked several kilns, although not all at the same time. This would have permitted bracken to regenerate in one area whilst another was being cut over.

Not all the possible kiln sites in Cumbria have been visited and one might never be able to prove the full extent of the industry for written evidence is scarce. Yet the kilns are there, the mill sites exist, and much

is known of the woollen industry. The ashburners were one of the essential foundation-stones upon which Kendal's wealth was built.

Acknowledgements.

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