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# Aspects of the Ecology of The Northern Pennines

## Occasional Papers

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### MOOR HOUSE

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"Aspects of the Ecology of the northern Pennines" is a series of informal review and discussion papers for the reader with a general interest in the subject. They are not official publications of the Nature Conservancy Council and do not necessarily reflect the Council's official views.

## Aspects of the Ecology of the northern Pennines

### 7. A History of the Moor House area

by

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This paper attempts to bring together the information that is available on the influence of man on the Moor House National Nature Reserve, up to its acquisition by the Nature Conservancy in 1952. Where relevant, material about the surrounding area is included, particularly the parishes and manors which contained or adjoined the Reserve.

The Reserve, some 3850 ha in extent, straddles the Pennines in the north-east corner of Westmorland, England (Fig. 1). A summit ridge varies in height from 750 m to 848 m; to its west a steep grassy scarp falls to 300 m in the Vale of Eden, to its east a tract of boggy heather moorland, drained by the headwaters of the River Tees, falls more gently to 480 m. The climate is severe and trees are absent apart from a few isolated specimens below 450m. The area is surrounded by similar bleak moorland except on the west, where good agricultural land adjoins the River Eden.

Relatively few studies, local, regional or national have focussed on the history of remote, high-lying ground in Britain. Partly this has been due to lack of source material, and partly to lack of incentive, because what happened in the 'waste' was considered unimportant. Until patterns of upland usage in relation to resources and types of ownership have become clear, much caution is needed in extrapolating findings from one area to another. But by good fortune documents and other artefacts have survived which throw some light on the previous land-use of the Reserve, and this in turn helps our understanding of the present vegetation and ecology.

#### Prehistory, Settlement and Land Ownership

The first evidence of man on the Reserve is of Mesolithic date. Blanket bog was then beginning to form, and numerous microliths have been found low in the peat. Thereafter, the high-level ground appears to have been little used, for no certain Neolithic, Bronze Age or Iron Age remains have been found. At four places on the western escarpment there are ancient sandstone walls enclosing several contiguous and roughly crescent-shaped areas, covering around 4 ha at each site and containing small ruined buildings. Goodchild<sup>2</sup> considered them to be settlements of a British pastoral people driven from lower ground by a more dominant race, but had no definite evidence on their age. Local tradition and recent work in the Lake District<sup>3</sup> suggest that the buildings may have been altered to make fox traps in more recent times.

The only certain trace of Romans on the Reserve is an altar dedicated to Silvanus which was found at 670 m on the south side of Great Dun Fell<sup>4</sup>. There may also have been a signalling station at the north end of Little Dun Fell<sup>5</sup>. The Maiden Way, a Roman road linking Whitley Castle on Alston Moor to Kirkby Thore on the Carlisle - York road, crosses the Pennine ridge five miles to the north-west.



After the Roman withdrawal, Britons remained in the Eden Valley, and two of their settlements, Culgaith and Blencarn, retain British names. Anglians arrived in the seventh century, and either formed new settlements or colonised existing ones; Dufton and Milburn are Anglian names<sup>6</sup>. Norsemen invaded north-western England early in the tenth century, settling in the valleys. They probably made much more use of the fells than the Anglians or the British because the stream names of the Reserve almost all have 'gill', 'beck' or 'sike' elements. Blencarn or Crowdundle Beck had the typical Irish-Norse reversal form of Becblencarn in 1228<sup>7</sup>.

Regular use induces a need of boundaries, but the date of their establishment on the Reserve is uncertain. The earliest record of the boundaries being ridden is in 1564 for Dufton parish<sup>8</sup>. The boundary along Crowdundle Beck separating Milburn in Westmorland from Blencarn in Cumberland dates back to the early thirteenth century, as this stream was said to bound the royal forest to the north-west in 1228, and King John had sold Milburn Forest in 1201<sup>9</sup>. There is also evidence that in 1219 and 1229 the boundary between Cumberland and Durham was causing dispute in a remote area adjacent to the Reserve<sup>10</sup>. Thus it seems likely that usage had become sufficiently intense by the twelfth century for boundaries to exist.

The Reserve comprises the commons of Milburn and Knock manors, and approximately one third of the common of Dufton. These manors belonged to the Barony of Appleby, and lay respectively within the parishes of Kirkby Thore, Long Marton and Dufton, although Milburn is now a civil parish in its own right. The manorial lordships were held in medieval times by many different families, but Knock was in possession of the baron, the 3rd Earl of Cumberland, when he came of age in 1573<sup>11</sup>, and the Earl of Thanet bought Milburn in 1780<sup>12</sup> and Dufton in 1785<sup>13</sup>, this family having succeeded to the barony in 1675 through marriage. Much of the lower ground in these manors, lying in the Eden Valley, was enclosed early, but further enclosure of the lower part of the Pennine escarpment was made in 1823 (692 ha of Knock enclosed by an Act of 1815), 1827 (930 ha of Dufton enclosed by an Act of 1802) and 1857 (66 ha of Milburn). The fell-wall built at this time is the lower limit of the Reserve. In 1849 the Thanet male line was extinguished, and the barony, with the Appleby Castle Estate, passed to the Hothfield family again through marriage. The Hothfields sold the fell commons to the Nature Conservancy in 1952, and themselves came to an end in 1963, whereupon the rest of the estate was divided and sold.

### Usage for hunting

The earliest evidence of hunting is afforded by the association of horn sheaths of the ox, Bos taurus primigenius, with some of the finds of Mesolithic microliths in the blanket peat<sup>14</sup>. Johnson & Dunham believed these flint and chert tools were accidentally lost by bands of wandering hunters at the site of their kills. They also infer that the area was used for hunting by the Romans from the dedication to Silvanus of the altar found on Great Dun Fell. The quarry was probably deer at this time.

In later years, Henry II was entitled to hart, hind, roe and wild boar in Inglewood, the Royal Forest to the north-west of the Reserve<sup>15</sup>. There are many records of stags and venison being sent south from Cumberland and Westmorland in the period 1222 - 1260<sup>16</sup>, and in 1231 the parson of Kirkland, the village and common lying immediately north of Milburn, was fined five marks for taking deer and harbouring poachers<sup>17</sup>.

In Milburn Forest, which is still the proper name for the fell or common of Milburn manor, the hunting seems to have been reserved to the baron rather than the lord, because in 1357 Roger de Clifford, Baron of Appleby, complained that Roger de Warthecoppe and others 'broke his parks.....and hunted in his chaces at Mallerstang and Milburn Fell,... ..and carried away deer from the parks and chaces...<sup>18</sup>'. Hunting for deer probably continued into the seventeenth century. In 1673 there were over 400 red deer in Teesdale Forest in September, but only 40 or 50 remained after the snows of the winter<sup>19</sup>. In the account book of Sir Daniel Fleming<sup>20</sup> an entry for 17 August 1669 reads 'given unto my cosin Hodleston's man who brought venison from Milburn 4s Od.' Next century deer became virtually extinct, Hutchinson commenting in 1794<sup>21</sup> of a 1744 report of several deer on the heights of Cross Fell that they would only be strays. Other creatures have doubtless been hunted on these fells. Thus in 1270 Richard de Middleton, the King's household clerk, was given licence for life to hunt with his dogs the fox, hare, badger and cat through all the king's forests in the counties of Yorkshire, Northumberland and Cumberland<sup>22</sup>.

On the eastern side of the Reserve the plentiful heather supports many grouse. In 1774 Nicholson & Burn<sup>23</sup> referred to the abundance of grouse on the Pennines, though it seems that shooting on a large scale did not start until the advent of breech-loading shot-guns in the next century. In 1842 Nether Hearth mine-shop on the eastern side of the Reserve, was extended by the earl of Thanet to become a shooting lodge called Moor House<sup>24</sup>. For the next hundred years keepers lived throughout the year in this remote building, managing the fell for grouse. They killed many predators (fox<sup>25</sup>, weasel, stoat, raven, hawk), and endeavoured to encourage an abundant growth of young heather by draining the wetter parts of the blanket bog and at one time burning in the heather many small strips about a half hectare in size. Records from 1909 show that many excellent bags have been obtained at Moor House (Table 1), but latterly there was a decline.

Fishing on the Reserve seems to have been little valued, with no mention of it in descriptive accounts or local documents. Recently, Crisp has found trout to be abundant but small, probably from a shortage of food<sup>26</sup>.

#### Usage for agriculture

##### 1.) Sheep

It has been generally accepted that Norsemen introduced the horned black-faced mountain sheep into north-west England. The terms applied to the sheep, and the system of marking are Norse according to Ellwood<sup>27</sup>. However Ryder is uncertain as to when this coarse-woolled type arrived in northern England: he believes it had ultimately an Asian origin, with resemblance in fleece to examples from western Mongolia of Iron Age date<sup>28</sup>. He also considers that the sheep brought by the Norsemen were more hairy and pigmented, and have probably evolved into the Herdwick breed.

The majority of sheep grazed in the Moor House area belonged to commoners or lords, since the farms in the manors adjacent to the Pennines all have common rights, and monastic holdings were few. Milburn Grange was a vill originally in the possession of the twelfth century Cistercian foundation at Holme Cultram, but in 1212 it was

granted by the Baron of Appleby to the White Canons of Shap Abbey<sup>29</sup>. Its value at the start of the fourteenth century was half that of Milburn<sup>30</sup>, which was a separate manor until the lord of the latter acquired the grange after the Reformation<sup>31</sup>. Also some 3200 ha in Alston parish immediately adjacent to the Reserve, was granted to Hexham Abbey early in the thirteenth century, becoming known as Priorsdale<sup>32</sup>.

The view is sometimes put forward that sheep did not go far from the valley bottoms in medieval times because the high fells were too dangerous, with treacherous bogs and prowling wolves. Johnson & Dunham<sup>33</sup> support this, and state that many small grazing shelters or shielings are scattered over the more accessible western slopes of the Reserve. However, the parishes and manors of the Eden Valley extend across the Pennine ridge in narrow strips, an indication that the fells were being used for grazing at the time the boundaries were defined<sup>34</sup>. It is known that in 1327 Yad Moss, a stretch of blanket bog two kilometres north-east of the Reserve, was successfully crossed by 4,000 Scottish horsemen and 20,000 light horse<sup>35</sup>, and probably much of the blanket bog, at least, was no more treacherous then than now. Evidence for this is the finding by Johnson & Dunham that most of the blanket peat laid down in the last thousand years contains remains of Calluna and Eriophorum, plants dominant in present non-treacherous bog, whereas little-humified pure Sphagnum peat, such as forms in wet and quaking bogs, occurs only rarely<sup>36</sup>. Camden visiting Alston moor, remarked that 'Tyne riseth at Tyne boggs, southren men calls them quabbmyres'<sup>37</sup>; this area at the source of the Tyne is still particularly wet.

From the fourteenth century onwards documentary evidence shows that sheep and other animals grazed the Reserve and surrounding fells. In 1356, the miners of Alston moor were keeping sheep<sup>38</sup>, and an inquest in 1416 said that they had laws for dealing with strays, and referred to shepherds who might be living on the moor<sup>39</sup>. An Elizabethan remembrance on Milburn Fell<sup>40</sup>, says that the agistment and harbys belonged to Robert de Clifford in 1314, and beginning in 1390 lists many payments made to the forester of Milburn Fell. These include sums for agistment and 'estape' on the fell, and also for the separate pasture called Myddletonge where the lord grazed his ewes. It is of interest that Middle Tongue, on the western escarpment of the Reserve, rises to over 700 m. There are payments of estape for the beasts of Knock, Blencarn, and Priorsdale, and as blanket bog stretches along the whole boundary of Priorsdale and Milburn, these beasts must have been able to cross the peat. In a charter of 1580<sup>41</sup> Anne the Countess of Cumberland (and Baroness of Appleby) gave Richard Sandford the Lord of the manor of Milburn, and his tenants, the right to occupy the whole of the fell with sheep and cattle as of ancient time, except that Middle Tongue was reserved for sheep belonging to herself and her heirs. However, even though the whole moorland was subjected to grazing, the numbers of sheep were probably much smaller than in modern times, for in 1700 it is estimated that 500 packs of wool were produced in Westmorland<sup>42</sup>. This indicates a total of 60,000 sheep, about one-eighth of the present number.

All the wool produced in northern England was coarse, and it was not until the nineteenth century that the black-faced sheep were improved by crossing with Leicester and perhaps Warton Crag types<sup>43</sup>. The Rough Fell, Scots Blackface and Swaledale breeds were the results, and all have at sometime grazed on the Reserve. An abortive attempt to introduce Cheviots to Cross Fell, just north-west of the Reserve, is well described by Dickinson<sup>44</sup>. Since the start of the twentieth century most flocks have been Swaledale. A few Cheviots have been grazed on the lower part of the western escarpment of the Reserve and in the last decade the numbers of Swaledale ewes suckling half-bred lambs have become appreciable.



In recent times between 20 and 30 commoners in the manors of Milburn, Knock and Dufton have had grazing rights on the Reserve. The management of the sheep appears to have changed little down the centuries; the Elizabethan remembrance says the ewes grazed the fell in the summer time, and the practices described as ancient in 1876 by Powley still occur<sup>45</sup>. Gimmer hoggs (one-year-old unmated female sheep) are put on the fell in April, and the ewes with their lambs follow at the end of May. Except when rounded up for shearing and dipping, the sheep are seldom visited<sup>46</sup>. Lambs are gathered in September for the sales, and normally the fells are cleared of all sheep by the end of October. On the fell, the sheep belonging to each farmer are heafed i.e. they occupy by instinct and shepherding the same ground year after year, and when the farm is sold, the sheep are sold with it. Many indentures testify to this, the oldest example found being of 1705<sup>47</sup>.

The number of sheep on the fells seems to have increased steadily during the last three centuries. Nicholson & Burn speak of the Westmorland Pennines in 1774<sup>48</sup>; 'Yet these mountains are not altogether unprofitable..... they feed large flocks of sheep whereof the farmers make great advantage. And the sheep being very small and fed for the greater part of the year upon the ling, their mutton is most excellent, especially that which is killed in summer and autumn off the common'. Hutchinson in 1794<sup>49</sup> gives numbers of sheep for the Cumberland parishes to the north, showing that by this time stocking had risen to about one third of the present levels (Table 2). By 1800 'turnips were cultivated to perfection' on some farms between the Eden and the Pennines<sup>50</sup> allowing more sheep to be kept through the winter, and probably increasing the total number of sheep, because in this district the problem of over-wintering sheep has always limited the size of the flocks. The value of the grazing on the fell is shown by the fact that a dispute which arose in the eighteenth century between Dufton and Knock over 236 hectares was still causing trouble well into the nineteenth century, even though both manors had had the same lord since 1785<sup>51</sup>.

Returns held by the Ministry of Agriculture show a considerable increase in sheep numbers since 1867 for the parishes of Milburn, Long Marton and Dufton (Fig 2). It is not certain to what extent the fells have shared in this increase because the totals include cross-bred sheep never grazed on the fell. However, as some of the better-quality farmland is now devoted to corn and dairying, the increase in lowland sheep cannot have been great, and any increase in fell sheep must have led to an increase in the acreage devoted to growing their winter feed (hay or turnips). A further point made clear by the agricultural returns is that the number of wethers (castrated male sheep) had declined in this area before the end of the nineteenth century, much of the decline occurring in its last decade.. In the past male lambs, instead of being sold for fattening and butchering as is now the practice, were kept on the fells till three years old, chiefly for their wool crop, which was worth more than that from ewes. The low totals in 1866 can be attributed to the effects of plague, and in 1947 to the severe weather of the preceding winter.

## 2) Cattle

Cattle have not been grazed on the Reserve within living memory, because the farmers consider the dangers to be too great. However, according to the 1580 charter for Milburn Forest<sup>41</sup> both Lord and commoners had the right to graze cattle on the fell, and the 1780 indenture for the sale of Milburn manor<sup>13</sup> still mentions 'common of pasture for all manner of cattle'. Further evidence is afforded by a 1677 description of Melmerby<sup>52</sup> (a manor similarly situated to the ones under consideration, but ten miles to the north-west): 'the whole mountain is excellent pasture for sheep and ..... horses and sometimes for the young cattle also'. The beasts of the Elizabethan remembrance<sup>40</sup> may well have included cattle, but additionally there is a payment for 'agistment averorum'. It is possible that these draught animals were oxen. Thus the facts available are consistent with Donkin's view<sup>53</sup> that the importance of cattle relative to sheep on the hills in northern England was greatest in the later Middle Ages.

## 3) Other animals

Horses have probably grazed on the Pennine fells in small numbers for several centuries. Besides the instance at Melmerby just given, the forester of Milburn fell was receiving payments for their agistment in the fifteenth century<sup>40</sup>, and Powley described the practice in the nineteenth century<sup>45</sup>. There are still 'fell ponies' on the Reserve, owned by local farmers but living wild most of the time.

Geese are recorded in considerable numbers in medieval inventories, but there is no indication that they grazed on the fell until the nineteenth century. In 1862, the Cross Fell District Goose Shepherd's Guide was published, listing identification marks (coloured rings around the neck and web-cuts) for 62 owners on Milburn, Kirkland, Skirwith and Ousby parishes. According to Miss Powley, the geese were driven to their heafs on the fell when the goslings were fit to travel, and stayed till the stubble fields were ready. A little corn was scattered for them, and the back of Cross Fell was a favoured situation, as the fox preferred the sunny side and lower level.

Finally, it should be mentioned that the keepers who lived in Moor House kept fowls, a few pigs and a cow around the house, and were also entitled to keep 100 sheep. These were wintered on the fell around Moor House, but brought into a building during bad weather.

## Usage by extractive industries

The underlying rocks of the Reserve belong to the Yoredale Series of the Carboniferous period<sup>54</sup>. The limestone bands have been extensively mineralised giving rich veins containing galena (PbS), pyrite (FeS<sub>2</sub>), barite (BaSO<sub>4</sub>), siderite (FeCO<sub>3</sub>), limonite (hydrated ferric oxide) fluorite (CaF<sub>2</sub>) and sphalerite (ZnS). Thus the Reserve had, and still has, considerable mining potential.

### 1. Lead

It is known that lead mining has occurred on Alston Moor since Roman times<sup>55</sup>, but it is less certain when mining began on the Reserve. Alston parish became part of Cumberland so that the royal dues could be collected from Carlisle<sup>56</sup>, though geographically and ecclesiastically it belongs to the north east, and it is just possible that the adjacent fells in



Westmorland were mined and taxed with 'the mine of Carlisle'. William de Stuteville, who was paying the dues for the Alston mines in the last decade of the twelfth century<sup>10</sup>, bought Milburn Forest from King John in 1201<sup>9</sup>.

Galena was certainly being mined on the Reserve in the sixteenth century, since the 1580 charter mentions men who have 'digged and gotten lead ore in the said fells<sup>41</sup>.' Johnson & Dunham who give a full account of the veins and mineralisation on the Reserve, suggest that the vein names Henrake and Rowpetts at the Silverband Mine (situated at 670 m on Milburn Fell) may be corruptions of Heinrich and Ruprecht, German miners possibly encouraged to come to this country by Elizabeth I.<sup>57</sup> Production was considerable by the eighteenth century, as in 1709 Robinson<sup>58</sup> commented about Dufton Fell '..... Lead, of which there is such a Plenty got, as keeps a Lead-Mill for the most part smelting the Ore', and about Silverband 'which Name it has.....from the Nature of the Ore, which, when refined by Art, yields a valuable Product of Silver. ....the Lessee and Manager, is the Ingenious and Famous Mr. Bacon, who, by his great Judgement and Adventures in Minerals, have advanced to himself a great estate in Northumberland'. Furthermore, a miner was killed at this time by falling down a shaft at the Dunfell Mine (which was probably Silverband), and 1749 a 'poor smelter' from Cornwall was buried at Milburn<sup>59</sup>. Also, in 1742, hushing<sup>60</sup> at Silverband led to Samuel Storey and Thomas Parker appearing at the Quarter Sessions, because the pollution in Newbiggin Beck poisoned both men and cattle<sup>61</sup>.

Although the London Lead Company (LLC) was responsible for much of the exploitation of lead deposits in northern England in the eighteenth and nineteenth centuries, the mine leases in the Hothfield papers<sup>62</sup> show that it took second place to adventurers in working the richer veins on the Reserve (Table 3). The leases were made by the manorial lords, for periods of 21 years, but were sometimes surrendered or forfeited early. Some idea of the success of a mine is given in the comments column of Table 3, which is based largely on the size and nature of the waste-heaps thrown up at each mine. It is interesting that the best mine, Silverband, was held by local farmers for many years. William Waugh, for example, lived at Howgill Castle, and Thomas Collin at Lownthwaite, both in Milburn. A LLC map of the Reserve area, apparently drawn in 1828 with additions up to 1831<sup>63</sup>, shows that the company was then driving levels underneath the Silverband lease from the sides, but it did not obtain this lease until 1846. The LLC had started operations from the Reserve in 1802, probably being given a lease of all mines in Dufton, Knock and Milburn not already leased, as in a further lease of 1820, and it also took over Dufton smelt mill in 1801. After 1831, the LLC concentrated its operations around Silverband, because large-scale explorations in other parts of the Reserve met with little success. Three major levels, Trout Beck, Over Hearth and Green Burn, begun in 1825, ran respectively 2103 metres, 1311 metres and 914 metres, but seem to have yielded little<sup>64</sup>.

Mining activity on the Reserve probably reached a maximum in the early years of the nineteenth century. With the decline in the price of lead subsequent to 1829<sup>65</sup>, many mines were abandoned, and by the middle of the century only Silverband, Nether Hearth and Hardshins were being worked. All closed before 1905. Production from individual mines is unknown, but the average from 1800 to 1821 for the Westmorland mines (those of the Earl of Thanet on Milburn, Knock and Dufton Fells,

and those of the Earl of Lonsdale on Hilton and Murton Fells) was 620 tons of lead ore per annum<sup>66</sup>. In the next decade the Earl of Thanet's mines alone were said to produce 620 tons per annum<sup>67</sup>, but in 1847 the Earl of Thanet's mines produced 264 tons and the Earl of Lonsdale's 287 tons<sup>68</sup>. Johnson & Dunham<sup>69</sup> give the production of the LLC mines for the period 1831-1879 as 15,062 tons, an average of 307 tons per annum, and suggest that half this came from the Dufton mines outside the Reserve. Thus production figures are small compared to those of Alston Moor and that part of Teesdale in Co. Durham, but it is possible that considerable quantities had been extracted by adventurers during the eighteenth century. The large deep hushes along the veins at the Dunfell mine shown on the LLC map of 1831 to be prior to its occupation, indicate very considerable activity by adventurers.

In later years, the ore was taken to Dufton for smelting by teams of pack-horses, but the names Nether Hearth (in use prior to 1767, Table 3) and Over Hearth suggest the presence of an ore hearth on the eastern side of the Reserve. These were used for smelting during the eighteenth century<sup>65</sup>. There is also a small primitive furnace at about 400 m in Knock Ore Gill on the western side of the Reserve<sup>70</sup>.

## 2. Coal

In a charter of 1589, between the Earl of Cumberland and Richard Sandford<sup>71</sup>, coal and other minerals on the fell, and the right to mine them, are reserved to the Earl. Prior to 1823 coal was mined at Nine Wells Head and in Sink Beck, these two mines being shown on a map of Westmorland by T. Hodgson<sup>72</sup>. The amount produced is not known, but the workings at Nine Wells were sufficient to justify the erection of a shop, called Knock Coal Shop. Much coal would have been needed to supply the mills smelting lead.

## 3. Barytes

An unsuccessful attempt was made to mine barytes after World War I in the then disused Silverband Mine. With the coming of World War II mining was resumed, and between 1939 and 1962 B. Laporte & Co. (now Laporte Industries Ltd.) extracted over 190,000 tons of dressed barytes<sup>73</sup>. Mining then ceased because drainage problems made extraction uneconomic, but considerable reserves remain, and open-cast operations have been resumed in 1973.

## 4. Iron

Early in the fifteenth century iron was being extracted on Milburn Fell. The Elizabethan remembrance<sup>40</sup> lists a payment of 26s 8d in 1420, and in 1427 the iron mine was leased to the prior of St. Mary's monastery, Carlisle for 40s. An increase to 46s was agreed for the next year, and in 1431 the forester also received 20d for 40 loads of iron at  $\frac{1}{2}$ d each. However, by 1466 the rent of the mine had fallen to 3s 4d, and remained so in the next years listed 1499, 1500, 1501 and 1529. The 1580 charter<sup>41</sup> also mentions iron, but there are no later records of iron mining. Explorations by Colvilles Ltd. during World War II revealed a large tonnage of limonite on Great Dun Fell, but according to Greives<sup>74</sup>, the ore proved too phosphoric and siliceous to be worth working in such an inaccessible locality, although analysis indicated 41.4% metallic iron.

## 5. Other products

There is no evidence that copper has been mined on the Reserve, although a rich vein was worked at Tynehead, 5km to the north<sup>75</sup>. Sandstone has been quarried at a few places, probably for the mine activities or the building of walls (the Dufton and Knock enclosures would create a demand). Both Hodgson's map<sup>72</sup> and the LLC map<sup>63</sup> show so-called slate quarries at Swindale Beck Head and on Great Dun Fell summit, which are in outcrops of flaggy sandstone. A ganister sandstone at the quarry above Knock Ore Gill may also have been worked. Limestone was obtained here and at another quarry on the Milburn side of the stream, probably in some quantity because there are four kilns, one at each quarry and two others nearby. Below the fell wall, igneous rocks have been thrown up by faulting and Permian sandstones underlie the Eden Valley; hence the limestone at the west end of the Reserve was the most accessible to farms in the valley, and this was exploited.

The 1580 charter<sup>41</sup> states that there are rights of cutting turf and peat. Much peat remains on the Reserve, but there are now no signs of cutting, and there is no mention of it in other Hothfield papers. In view of the relative abundance of coal in the area, and of wood in the adjacent valleys, it is unlikely that peat-cutting for domestic purposes ever took place on a large scale. But ore hearths worked best on peat<sup>65</sup>, needing considerable amounts which would be obtained from the nearest convenient deposit; possibly Nether Hearth Green<sup>76</sup>, now largely enclosed as the Moor House meadow and pasture, originated in this way. The present widespread peat erosion is not necessarily evidence of cutting. Bower<sup>77</sup> believes the erosion started in early times, and the 1794 description of Melmerby Fell supports this - 'heath land, rent with descending torrents into ten thousand chasms, black with peat earth'.<sup>78</sup>

## Conclusion

The high-level moorland which now forms the Moor House Nature Reserve has been of considerable value to its owners and to the three manors of which it was the waste. To the commoners it has given cheap summer grazing for as many sheep as their in-bye land could support during the rest of the year. To the landowners it has given grouse-shooting, and provided revenue from the leases to mining companies. To the local people it has been the source of requisites such as coal, stone and lime.

The impacts of these usages are still clear: trees are virtually absent; the vegetation of the western half of the Reserve has been converted by grazing into various monocotyledonous plagioclimaxes; in the less accessible eastern half heather dominance on the blanket bog has been encouraged for grouse; and the spoil produced at the many sites of mineral extraction remains to provide visual interest and distinctive habitat.

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Notes

1. G.A.L. Johnson and K.C. Dunham, The Geology of Moor House. (Monographs of the Nature Conservancy No. 2), London, 1963. p.139.
2. W. Goodchild, 'Milburn: archaeological notes', Trans. Cumb. & Westm. arch. & antiq. Soc., new series, 32, (1932), pp. 107-115.
3. R.G. Plint, 'A goose bield at Coniston', Trans. Cumb. & Westm. arch. & antiq. Soc., new series 72, (1972), pp. 332-333.
4. Johnson and Dunham, op cit, p.161, give details on the finding and description of the altar.
5. Johnson and Dunham, op cit, p.161.
6. A.M. Armstrong, A. Mawer, F.M. Stenton and B. Dickins, The place-names of Cumberland, iii (Cambridge, 1952), pp. xx-xxiii.
7. Pleas of Forest, 1228.
8. Hothfield Manorial Papers, formerly held by the Steward of the Hothfield Manors at Appleby, but now removed to the Kendal Office of the Joint Archive Committee of Cumberland and Westmorland. Certain of these relate to a boundary dispute on the fell between Dufton and Knock, and quote from a book of 1564.
9. Rot. Chart. p.89b.
10. J. Walters, 'The Medieval Mines of Alston', Trans. Cumb. & Westm. arch. & antiq. Soc., new series, 45, (1945), pp. 22-35.
11. R.T. Spence, The Cliffords, Earls of Cumberland, 1579 - 1646: a study of their fortunes based on their household and estate accounts, (Ph.D. thesis, University of London, 1959), p.385. J.F. Curwen, Later Records of North Westmorland, (Kendal, 1932), p.59, says Knock passed to the lord by 1617. This book gives more information about the manorial lords.
12. Hothfield Papers, now held in the Kendal Office of the Joint Archive Committee of Cumberland and Westmorland, include an indenture between Ann Allen and the Earl of Thanet for the sale of the manor in 1780.
13. Sold by Edward Milward - P.J. Mannex, History, Topography and Directory of Westmorland and Lonsdale north of the Sands in Lancashire, (Beverley, 1849), p.152.
14. Johnson and Dunham, op cit, p.156.
15. Forest Proceedings Ancient; Chancery, 1217.
16. F.H.M. Parker, The Pipe-rolls of Cumberland and Westmorland, 1222-1260, (Extra Series of the Cumberland and Westmorland Archaeological and Antiquarian Society, Kendal, 1905), p.xxvii.
17. Parker, op cit, p.38.

18. Patent Rolls 31 Edw III pt 2 p. 615.
19. D.M. Ramsden, Teesdale, (London, 1947), pp. 52-53.
20. Historical Manuscripts Commission 12th report, Appendix part 7, The Manuscripts of S.H. Fleming, Esq., (London, 1890), p.379.
21. W. Hutchinson, The History and Antiquities of Cumberland, (Carlisle, 1794), p.264.
22. Patent rolls 54 Henry III.
23. J. Nicholson and R. Burn, History and Antiquities of Westmorland and Cumberland, (London, 1774), p.3.
24. J. Bell, 'New locality for Saxifraga hirculus', The Phytologist, 1, (1843), p. 741. He discovered the plant  $1\frac{1}{4}$  miles from a shooting box erected the previous year by the Earl of Thanet. Mine-shops, situated close to the workings, were stoutly built buildings in which the miners fed and slept during the working week.
25. 301 foxes were killed at Moor House between 1900 and 1925 - Vermin list of the keeper, Mr. T.W. Pearson, in Moor House Reserve Record.
26. D.T. Crisp, 'A preliminary Survey of Brown Trout (Salmo trutta L.) and Bullheads (Cottus gobio L.) in High-altitude becks'. Salmon and Trout Magazine. Jan. 1963, pp. 45-59.
27. T. Ellwood, 'The Mountain Sheep: Their Origin and Marking', Trans. Cumb. & Westm. arch. & antiq. Soc., old series, 15, (1899), pp. 1-8.
28. M.L. Ryder, 'Changes in the fleece of sheep following domestication (with a note on the coat of cattle)', in P.J. Ucko and G.W. Dimbleby (eds.), The Domestication and Exploitation of Plants and Animals. (London, 1969), pp.495-521.
29. H.M. Colvin, The White Canons in England, (Oxford, 1951) p.169. The Cistercians held the grange by 1175 - F. Grainger and W. W.G. Collingwood, The Registers and Records of Holm Cultram: (Record Series of Cumb. & Westm. arch. & antiq. Soc., 7, Kendal, 1929), p.123.
30. F.W. Ragg, 'The Feoffees of the Cliffords from 1283 to 1482', Trans. Cumb. & Westm. arch. & antiq. Soc., new series, 8, (1908), pp.253-330.
31. F.W. Ragg, 'Helton Flechan, Askham and Sandford of Askham', Trans. Cumb. & Westm. arch. & antiq. Soc., new series, 21, (1921), pp.174-236.
32. The bounds, charters and rights are contained in Black Book of Hexham, 1479, which is transcribed in 'The Priory of Hexham, its Title Deeds, Black Book, etc.', Surtees Soc., 46, (1864) Volume 2. Tynehead is included.
33. Johnson and Dunham, op cit, p.162.
34. D. Welch and M. Rawes, 'The early effects of excluding sheep from high level grasslands in the North Pennines', J. appl. Ecol., 1, (1964), pp.281-300.

35. Ramsden, op cit, p.50.
36. Johnson and Dunham, op cit, pp.136-151.
37. Cotton Iulius F.VI fo. 345<sup>d</sup>.
38. Patent Rolls 30 Edw III pt 3 m23.
39. F.J. Monkhouse, 'Pre-Elizabethan Mining Law, with Special Reference to Alston Moor', Trans. Cumb. & Westm. arch. & antiq. Soc., new series, 42, (1942), pp.43-55.
40. Hothfield Manorial Papers, A Remembrance for Mylburnefell.
41. Hothfield Papers, Indenture between Anne, Countess of Cumberland, and Richard Sandford, of Howgill Castle, concerning Milburn Fell, 1580.
42. P.J. Bowden, The Wool-trade in Tudor and Stuart England, (London, 1962), p.40.
43. F.W. Garnett, Westmorland Agriculture 1800-1900. (Kendal, 1912), p.150.
44. W. Dickinson, 'On the Farming of Cumberland', J. Royal Agric. Soc., 13, (1852), pp. 207-300.
45. Miss Powley, 'Past and present among the Northern Fells No. 1', Trans. Cumb. & Westm. arch. & antiq. Soc., old series, 2, (1876), pp.171-186.
46. The lack of shepherding may make this area atypical of high ground in northern England; perhaps the distance from fell to home-farm is the cause.
47. Hothfield Papers, Indenture between Christopher Todd and Edward Barugh and Christopher Furnass of Dufton. Nowadays the sheep are often sold separately.
48. Nicholson and Burn, op cit, p.3.
49. Hutchinson, op cit.
50. J. Housman, A Topographical Description of Cumberland, Westmorland, Lancashire and a Part of the West Riding of Yorkshire, (Carlisle, 1800), p.98.
51. Hothfield Manorial Papers, many documents and a map.
52. Singleton, The Present State of the Parish and Manor of Melmerby in Cumberland, (1677), unpublished MS. formerly held by the Dean and Chapter of Carlisle Cathedral, now in the Carlisle office of the Joint Archive Committee of Cumberland and Westmorland.
53. R.A. Donkin, 'Cattle on the states of medieval Cistercian monasteries in England and Wales', Econ. Hist. Rev., second series, 15, (1962), pp.31-53.
54. Johnson and Dunham, op cit.



55. R.G. Collingwood, 'Two Roman Mountain Roads', Trans. Cumb. & Westm. arch. & antiq. Soc., new series, 37, (1937), pp.9-12. He gives evidence for lead and silver having been produced in Roman times.
56. R.S. Ferguson, 'Why Alston is in the Diocese of Durham, and in the County of Cumberland', Trans. Cumb. & Westm. arch. & antiq. Soc., old series, 8, (1886), pp.21-39.
57. Johnson and Dunham, op cit, p.94.
58. T. Robinson, An Essay towards the Natural History of Westmorland and Cumberland, (London, 1709), pp. 37-38.
59. H. Brierley, The Registers of Milburn, (Parish Register Section of Cumb. & Westm. arch. & antiq. Soc., 2, Kendal, 1913), p.45.
60. Hushing was the practice of baring mineral veins by a torrent of flood-water released on breaching a dam constructed in a suitable place.
61. Curwen, op cit, p.188.
62. There are numerous leases in both Hothfield Papers and Hothfield Manorial Papers, but some gaps in the leasing of particular mines remain.
63. This map is held by the North of England Institute of Mining Engineers, Newcastle upon Tyne, and a copy is kept at Moor House.
64. C.J. Hunt, The Lead miners of the northern Pennines in the Eighteenth and Nineteenth Centuries, (Manchester, 1970), p.78. Hunt says the LLC reaffirmed in 1829 its policy of carrying out major exploration work when the cost of labour was cheap because of reduced production in times of low lead prices.
65. C.J. Hunt, op cit.
66. W. Forster, A Treatise on a Section of Strata from Newcastle upon Tyne to Cross Fell, second edition, (Alston, 1821), p.420.
67. W. Parson and W. White, A History, Directory and Gazetteer of the Counties of Cumberland and Westmorland, (Leeds, 1829), p.61.
68. Mannex, op cit, p.49.
69. Johnson and Dunham, op cit, p.95.
70. Johnson and Dunham, op cit, p.95-96.
71. Hothfield Manorial Papers, Indenture between George, Earl of Cumberland, and Richard Sandford, granting him part of Milburn Fell to enclose and improve, 1589.
72. This map, surveyed in 1823 - 1825, was published by C. Smith in 1828 at  $1\frac{1}{4}$  in. to the mile.
73. Johnson and Dunham, op cit, p.95.

74. D. Grieves, The Mineral Resources of Cumbria and the Influence of their Exploitation on Population Growth and Distribution. (Ph.D. thesis, University of Durham, 1957).
75. Parson and White, op cit, p.456.
76. Nether Hearth Green is so-called in Hothfield Manorial Papers.
77. M.M. Bower, A Summary of Available Evidence and a Further Investigation of the Causes, Methods and Results of Erosion in Blanket Peat, (M.Sc. Thesis, University College, London, 1959).
78. Hutchinson, op cit, p.218.

Table 1

Grouse bags obtained at Moor House in five-year periods from 1909.

Period	Total Grouse	Comments
1909-13	14427	
1914-18	7361	Few drive s, with no shoot in 1918, because of war.
1919-23	7167	
1924-28	7185	No record for 1926, probably few shot.
1929-33	3703	
1934-38	5459	No shoot in 1937.
1939-43	2843	No shoot in 1940 and 1943.
1944-48	0	No shooting.

Figures obtained from Moor House Reserve Record.



Table 2

The increase in the number of sheep since the eighteenth century in  
three Cumberland parishes

	1794	1934*	1962*
Alston	10,000	27,321	33,132
Kirkland, including Blencarn, Skirwith and Culgaith	4,000	11,755	12,591
Melmerby and Ousby	4,000	11,935	16,087

\* Figures obtained from the annual returns  
of Agricultural Statistics held by the  
Ministry of Agriculture.

Table 3 The Mines on the Reserve, giving dates of working and the lessees.

Mine	Lease	Comments
1. NETHER HEARTH part west of engine shaft part east of engine shaft both parts east west east west	1767 was already leased by Mrs Blackwell, lord of manor 1817-? J. & T. Cousin of Garrigill, and T. Shaw & J. Stout of Harwood 1820-? J. Cousin 1844-52 LLC (= London Lead Company) 1852-55 LLC, forfeited in 1855 as not being worked 1852-67 LLC, forfeited in 1867 1855-? J.H. Robinson, J. Woodmass, H. Gilpin, Utrick Vipond 1874-? Messrs White & Austin	productive parts were 120 yards long and 40 yards broad. not held by LLC in 1831, and in 1838 Nether Hearth Lead Co. was in existence.
2. TROUT BECK FOOT (TEESIDE OR TODD PROVIDENT)	1821 William Todd held (W. Forster, op cit) 1822-? W. Todd (Until at least 1831)	productive
3. HARDSHINS	1821 working (W. Forster, op cit) 1831 held by LLC 1883-? W.H. Robinson (still being worked in 1903 according to an old resident of Garrigill).	productive, this mine is near to Trout Beck Foot, but runs up the Tees.
4. FORCE BURN	1791-? Mr. Gorst & Joseph Dickinson 1831 held by LLC, but not being worked	was probably the level high up Force Beck
5. OVER HEARTH	1821-25 J. Crosby, R. Atkinson & W. Dover (low part only) 1831 LLC, trial level work virtually ceased in 1834	
6. DUNFELL	1772-? Geo. Atkinson et al ?-1825 J. Crosby et al forfeited in 1825 1825-? LLC, level was at present head by 1827	was on east side of Gt. Dun Fell very productive to 1794. not worked for many years in 1849 (Mannex, op cit)
7. LOPPSIDE	1806-? T. Bowman & J. Harrison 1824 LLC drove unsuccessful level	
8. HUNTER'S VEIN	1806-? J. Wilson, T. Cowper & J. Johnston 1831 held by LLC, not being worked	productive
9. SWATH BECK	1807-? J. Laurie, R. & I. Vipond 1831 held by LLC, not being worked	productive

Table 3 cont.

10. SILVERBAND

1709 being worked  
 1742 S. Storey & T. Parker were hushing  
 1772-? Geo. Atkinson et al  
 1795-? J. Skeld, J. Walton, T. Walton & T. Waugh  
 1808-? W. Waugh, T. Collin, J. Robinson, W. Graham,  
 J. Shield, J. Bunting & L. Twentymen  
 1829-? W. Waugh, Geo. Rimington et al  
 1846-? LLC  
 1878-? Silverband Co.  
 1824 LLC level stopped  
 1831 LLC held  
 1831 worked at some previous period  
 1767-? Geo. Atkinson et al (Dufton only)  
 1802-81 LLC; ? Forfeited  
 1878-? Silverband Co. (Knock and Milburn only)  
 1894-? W.H. Gibson (mines in Knock and Dufton south of  
 a line from Knock Ore Gill to Nine Wells Sike)

11. LORDS SEAT

12. LOWRY'S LEVEL

GENERAL LEASES OF ALL LAND  
 NOT ALREADY LEASED

TRIAL LEVELS OF LLC in 1820-35 period which probably all gave poor results:- Troutbeck, Force Burn (low), Green Burn,  
 Knock Ore Gill Head, Greensike (in Crowndundle Beck).

HUSHES made in connection with the mining have the following dates\*

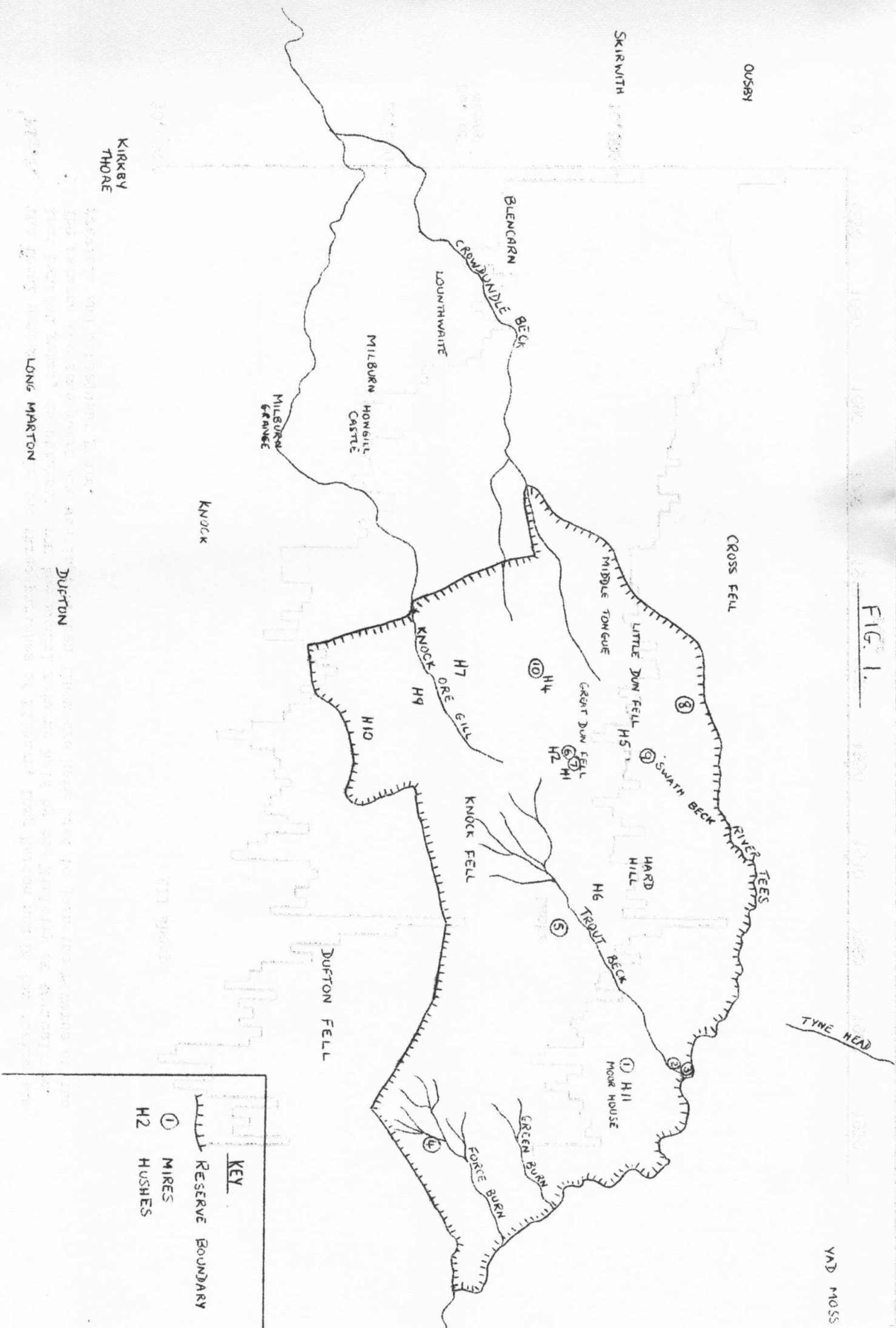
H1-H4 C.17 or C.18 :- Henrake, Dun Fell, Rowpotts, Silver  
 H5-H7 1800 - 1831 :- Swath Beck (probably by J. Laurie et al), Hard Hill (LLC)  
 and Knock Ore Gill North (LLC).  
 H8-H11 after 1831 :- Lord's Seat, Knock Ore Gill South and Swindale Beck North  
 (all probably LLC), Nether Hearth East (to  
 Valley Bog')

Lead, land and coal as sources of landlord income in Northumberland between 1700 and 1850, (Ph.D. Thesis, University of  
 Durham, 1963)

\* M. Hughes, quotes a letter of 1736 by Walton & Boag of Alston, complaining of damage caused by hushing, saying this  
 'though long known yett was not practised till late years'.



FIG. 1.



**KEY**

① MIRE

H2 HUSHES

RESERVE BOUNDARY

Fig. 2.

The total number of sheep in the three parishes of Wilburn, Long Marton and Dufton during the last hundred years, as obtained from the annual returns held by the Ministry of Agriculture. The returns for some years are wanting: broken lines are here used to join the returns of the previous and subsequent years.

