## OPEN FIELD AGRICULTURE IN MID-DERBYSHIRE

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N Derbyshire, which lies largely in a zone of transition from lowland to upland Britain, and on the fringe of midland England where the system  $\blacksquare$  of open field agriculture appears to have been most extensively employed, the great diversity of relief, from the flood-plain of the River Trent to the gritstone plateaux of the High Peak, has always engendered corresponding differences in land use. The upland limestone region of the Derbyshire Dome has long been a problem area in the study of medieval agriculture. The main question has been whether a system of open field farming of the midland type, characterized by the division of a settlement's arable into three fields, was ever practised on the upland. Valuable research already carried out in northern and mid-Derbyshire, notably by Eyre, Wightman and Jackson, indicated that open field agriculture was indeed practised, in some cases extensively, during the medieval period.<sup>1</sup>

The carboniferous limestone upland, extending for some twenty-five miles from Castleton in the north to Wirksworth in the south, is marked by the high degree of uniformity in the landscape. In the south the plateau-like surface lies between 900 and 1,000 ft. O.D., whilst in the north the surface has a more rolling character with summits rising to 1,400 and 1,500 ft. O.D. In their upper courses the river valleys of the upland are broad and shallow, but in the lower stretches they are often deeply incised forming steep cliff features. If it is accepted that climatic conditions have not changed radically since the early medieval period, then this factor would have made the physical environment as severe in medieval times as it is today, with low temperatures (only August has an absolute minimum which has not fallen below 32° Fahrenheit), high precipitation, and strong winds coming mainly from the south-west. Physical conditions being thus more suited to a pastoral economy, it seems unlikely that a well developed open field system would have been practised on the upland, and yet arable was important in the local economy during the Middle Ages.

Documentary evidence has already been dealt with in great detail in the last volume of this *Journal*,<sup>2</sup> and thus it is the physical evidence with which

S. R. Eyre, "The Upward Limit of Enclosure on the East Moor of North Derbyshire", Inst. of Brit. Geog. Trans., 23 (1957), 61-4; W. E. Wightman, "Open Field Agriculture in the Peak District", D.A.J., LXXXI (1961), 111-25; J. C. Jackson, "Regional Variations in Agriculture in Medieval England", Northern Universities' Geog. J. (February 1960), 41-52.
 <sup>2</sup> J. C. Jackson, "Open Field Cultivation in Derbyshire", D.A.J., LXXXII (1962), 54-72.



FIG. 12. Documented sites of open field cultivation.

this particular study is largely concerned. Direct references to arable in court rolls, cartularies of religious houses (particularly that of Darley Abbey), and in land charters are of major importance, even though it may be difficult to relate them to points on the ground or interpret a system of cultivation from them. The frequent occurrence of arable terminology in early documents dealing with the upland can only be of general use for the reason stated, a far more reliable type of document being one with a specific reference to open fields as such. On the upland and along its eastern flanks thirty-one settlements can be accredited with open fields from evidence of this kind.

The classification based on altitude devised and used by Jackson for the whole county, when applied to the limestone upland, shows that of the thirtyone settlements only eleven were described as having had three or more fields, the remaining twenty having had either one or two fields. The actual siting of the settlements appears to have had considerable effect on the number of fields created and tilled. Only seven one-field, two two-field, and two threefield sites can be found at or above 1,000 ft. O.D. Five of the eleven threefield villages, one two-field, and one one-field village (Edensor), are located below 500 ft. O.D., leaving eight one-field, one two-field, and four three-field sites between 500 ft. and 1.000 ft. O.D. From the map showing the distribution of these sites (Fig. 12), a general principle can be drawn of a decrease in the number of open fields per settlement with increases in altitude and exposure, the greater part of the total open field arable being found on the lower slopes of the upland. The distribution of one, two, and three-field villages suggests that there might have been basic differences in the agricultural method between areas dominated by one or another of the three categories. The three-field settlements lie in areas which by their geographical position and aspect would have been favourable for grain cultivation, whilst the one-field villages are located in areas which would not have been well suited to arable farming, but to pastoralism. The importance of the latter is well illustrated by the extensive areas of grazing which belonged to the one-field villages. In the case of Sheldon, the survey carried out in 1617 by William Senior<sup>3</sup> shows one arable field, partially enclosed, and two large areas of common pasture. In Wardlow, one of the few three-field villages sited above 500 ft. O.D., a similar survey by Senior shows three small arable fields which were approximately equal in total area to the single field at Sheldon, an equivalent area of common pasture, and one and a quarter square miles of rough moorland. The similarity of the areas of open field between Sheldon and Wardlow, regardless of the actual number of fields shown in these surveys, suggests that classification of open field arable on a purely numerical basis may not be wholly acceptable. The numbers of open fields accredited to settlements is no indication of the actual rotation used unless there is good documentary substantiation. In a three-field system one field would lie fallow and two whole fields would be given over to an autumn and a spring sowing respectively. The important difference between the two rotations was the greater cropping area which was available in a <sup>3</sup> Chatsworth MSS.

three-field system. The difficulties regarding a one-field system are apparent. The three-field system was naturally more desirable, and it is possible that in some cases one and two-field villages later converted their open arable to a three-field lay-out, but a re-arrangement of the two inferior kinds to a three-field type would have entailed considerable re-organization; such changes may only have occurred where the physical conditions would have obviously favoured increased grain cultivation. The limestone upland would hardly have presented such a favourable environment, and the persistence of the one and two-field villages suggests that any changes which may have taken place were not of this order.

The striking similarities in the total areas of open field arable in several upland villages could mean that the area of arable, reflecting its importance in the economy of a particular settlement, was of greater significance than the number of fields into which the arable was divided. Even a village with a single field could have had as much arable as a three-field one, as already shown in the comparison between Sheldon and Wardlow; thus a field, later described as a single field, could have been tilled in a similar way to a two or three-field system. Furthermore, as the documents mentioning open fields as such are often dated much later than the actual existence of the fields, doubt can be cast upon the actual numbers of fields mentioned; three contiguous arable fields without any obvious boundaries could have been reported as one open field. The system of rotation in a single field may have been not altogether different from those of the two and three-field arrangements, but using the single strip holding, or small groups of holdings, as the cropping units. Coaration could still have been the method of tillage, as it was in the two and three-field systems. In general terms a one-field form of arable farming would have been inferior, characteristic of localities unfavourable for extensive grain production. This certainly appears to have been true of the open field sites of the upland. Whether the actual number of fields or the total area of arable is taken as the criterion for a classification of open field agriculture in this area, the decrease in the importance of arable with increase in elevation is clear.

The limited extent of arable in the villages high on the limestone and their extensive areas of pasture suggest that a larger part was played in the local economies by animal husbandry. Twelfth-century charters in the cartulary of Darley Abbey<sup>4</sup> contain frequent references to tithes farmed from wool taken from sheep pastured in Alport, Aldwark, Wirksworth, and Youl-greave, and often mention pasture rights on open field stubble, together with seasonal enclosures from waste presumably for the abbey's own flocks.

In Hartington the evidence for open field arable is small, but the church living was worth forty marks in 1291.<sup>5</sup> Most of its territory was on the median ridge of the limestone upland (Fig. 13), an area of very sparse settlement dominated by the one-field village, and the relatively high value of the living may have been due to rich tithes farmed from wool. The Hope Easter Roll

<sup>&</sup>lt;sup>4</sup> R. R. Darlington, The Cartulary of Darley Abbey, 1945.

<sup>&</sup>lt;sup>5</sup> J. C. Cox, The Churches of Derbyshire, II, 474.



FIG. 13. Dry stone walls with the reversed "S" curve.

for 1658 (Table 1) further supports the greater importance of pasture on the upland.

TABLE	1.	The	Норе	Easter	Roll,	1658;	Selected	Settlements
		No	of					

	do oj	cumented pen fields	Landed Households	Unlanded Households	Cattle	Sheep	Ploughlands
Abney		2	9	25	19	3	2
Bradwell		2	87	86	145	26	8
Little Hucklow		I	IO	32	23	I	I
Wardlow		3	10	35	0	2	3

Bradwell's two open fields were described as such in a land lease dated 1714, and the discrepancy with the 1658 figure of eight ploughlands could be explained in three ways. First, there may have been a decrease of 75%in the area of arable between 1658 and 1714; second, error could have been made in the enumerations; or third, a different unit of assessment may have been used. The high proportion of unlanded households to landed ones in all four settlements is probably due to the households supported almost entirely by lead-mining, for Abney, Bradwell, Little Hucklow, and Wardlow were important centres of the industry. This high proportion could also have accounted for the temporary increase in ploughlands at Bradwell (presuming that both figures were accurate), and may also offer some explanation for the high numbers of cattle compared with sheep, for the lead-miners would have presented a ready local market for meat, sheep being kept largely for wool.

Where a system of agriculture has persisted for any appreciable length of time it is reasonable to assume that somewhere in the present landscape there will be visible evidence of that past system, however small. This is particularly true of the midland system of open field cultivation, which has left its mark in the landscape in the form of ridge-and-furrow, especially in midland England.

In northern Derbyshire the distribution of discernible ridge-and-furrow is restricted to small areas, and on the limestone upland it is not found extensively.<sup>6</sup> Yet there is evidence other than ridge-and-furrow, namely the extensive dry-stone walling which is so characteristic of the Peak District. These walls were always built of local stone and for centuries have provided the cheapest and most durable method of fencing, as hedging or stake-fencing suffer on the exposed upland and are expensive in time and money spent on maintenance. Dry-stone walling is the only kind of field boundary to be found above 900 ft. O.D., but below 750 ft. walls are interspersed with hedgerows.<sup>7</sup>

Although the greater part of the walling was built as a result of the enclosure movement of the late 18th and early 19th centuries, the dry-stone walling immediately adjacent to the nucleated villages originated during an earlier and more prolonged period of enclosure. This particular group of walls encloses long, narrow fields, and they display the reversed "S" curve found

<sup>&</sup>lt;sup>6</sup> Wightman, 122-3.
<sup>7</sup> K. C. Edwards, The Peak District, 1962, 168.

in ridge-and-furrow. This "aratric" curve has been studied in great detail,<sup>8</sup> and turther discussion is unnecessary. The evidence strongly supports the contention that the curve resulted from the type of plough and the way in which it was used. Where the curvature is of the reversed "S" type, it is widely accepted that the plough used was the heavy right-mouldboarded variety drawn by four pairs of oxen.

As the curvature of the dry-stone walls close to the settlements is the reversed "S" type, this was presumably the plough used on the limestone upland during the period of open field cultivation. As no examples of a conventional "S" curvature have so far been found in the area, the left-mouldboarded plough and the turnwrest plough may be tentatively excluded. It is not however suggested that the right-mouldboarded plough was used to the exclusion of any other type of plough. At present little is known of the plough types common to the limestone upland during the period of open neld cultivation, but the reversed "S" curvature hints at the system having been initiated on the upland with the right-mouldboarded plough, or by people with a strong tradition of its use. The persistence of the physical evidence associated with this plough type indicates the use of this plough, or of one very similar to it, over a considerable period of time.

The two main factors which governed the actual location of the open fields, contributing also to the location factors regarding settlement, are the nature of the soil and the degree of slope. The soils of the limestone upland are usually medium textured, but have a tendency to vary with relief. On the more level upper surfaces soils can often be deeper than 3 ft. but are prone to leaching owing to increased precipitation. On the slopes immediately below these upper surfaces (generally in the region of 850 ft. O.D.), soils can be very thin, experiencing a high degree of leaching, whilst on gentler slopes soils are somewhat deeper and undergo less leaching because of slower drainage. In general, the soils are well drained and workable, but often lime-deficient.

In present-day farming, gradients of one in five represent the slope limit for continuous ploughing"; thus it is possible that during the period of open field cultivation the critical angle may have been much less. Of the total number of dry-stone walls with the reversed "S" curve which have been mapped (Fig. 13), all except thirty were found to lie on slopes which appeared to be less than one in seven, slopes which have been described as "flat", "gently sloping", or "moderately sloping".<sup>10</sup> The thirty exceptions were also the only examples apparently contour-aligned, and they were found to occur in seven groups each lying on the fringe of a marked concentration of reversed "S" curved walls, or some small distance from them. These exceptions may represent later expansion of arable at a time when the plough and ploughing technique had undergone some degree of improvement.

<sup>&</sup>lt;sup>8</sup> S. R. Eyre, "The Curving Plough-Strip and its Historical Implications", Agric. Hist. Rev., 3

<sup>(1955), 80.</sup> <sup>9</sup> D. R. MacGregor, "Some Observations on the Geographical Significance of Slope", *Geography*,

<sup>&</sup>lt;sup>42</sup> (1957), 167. <sup>10</sup> L. F. Curtis, J. C. Doornkamp and K. J. Gregory, "The Subdivision of Slopes into Slope Cate-gories", British Geomorphological Research Group Report, 5 (1962), 4.

The sites thus chosen for the open fields were satisfactory on two counts, for it was on the upper surfaces and on the gentler slopes of the east and south-east facing flanks of the upland that the better soils were to be found. It was also in these localities that the heavy mouldboarded plough could be most effectively used. Continually cultivated soils are to a greater or lesser extent "man-made", but as there is at present little evidence to suggest a major soil change within this period, it may be assumed that soils today are basically similar, except perhaps for some increase in podzolisation by leaching.

One advantage of using dry-stone walls displaying the reversed "S" curve as evidence of former open field agriculture is that enclosure earlier than parliamentary enclosure was concentrated on the single furlong strip, or on small groups of them. The lay-out of dry-stone walls within the boundaries of the old open fields thus clearly exhibits the arrangement of the individual strip holdings. The nature of this enclosure and the ensuing changes in tenurial arrangements had an effect which is to some extent still being felt in the upland. The persistence of the small farm, stemming from the enclosure of the common fields, has had a restraining effect upon agricultural development for well over 150 years, and has only recently begun to change. The Land Tax Returns, shown in Table 2,<sup>11</sup> illustrate the dominance of the small occupying owners and the increase in the acreage held by them during the late 18th and the early 19th century.

TABLE 2	2. Land	Tax	Returns	for	Northern	Derbyshire
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										over	Total	Total
	4s.	IOS.	£I	£2	£4	£5	£8	£10	£20	£20	paying	paying
											4s. and	10s. and
Acreage	5	13	26	53	106	130	212	265	530	530	over	over
1780-2	599	429	201	160	99	33	32	6	3	0	963	534
1802	891	472	297	199	112	21	41	7	7	I	1,157	685
1832	1,344	594	331	233	125	35	37	9	16	3	1,383	789
The server is an estimated every												

The acreage is an estimated average.

The decline of the lead-mining industry contributed to the increase in the number of holdings through the purchasing of small acreages by redundant lead-miners. Subdivision of holdings was not unknown. At present approximately 75% of the farms on the limestone upland are of 75 acres in extent or less, and of these nearly 60% are under 30 acres.

The enclosure of holdings within the common field by walling must have meant the end of arable cultivation as it had been known in the open field, using the heavy mouldboarded plough. It would have been impossible to turn the team within so small an area as an enclosed furlong strip. There would also have been considerable wastage along the field sides where the plough could not approach closely. This, together with the area upon which the plough was turned, would have had to be laboriously spaded over in order to retain the same area of arable that had existed prior to enclosure.

<sup>11</sup> E. Davies, "The Small Landowner, 1780-1832", Econ. Hist. Rev., 1 (1927), 87-113.

Changes in arable cultivation alone would not necessarily have stimulated stone wall enclosure as it would have been more of a hindrance than an asset, and it is thus more possible that the enclosure of the common field was initiated by an overall change in land use from arable cultivation to pastoralism. The introduction of large numbers of livestock on to the upland would not have been a revolutionary move as the region already had a long tradition of animal husbandry. Enclosure of holdings would have helped in the segregation of livestock according to ownership, so restricting movement and minimizing the spread of disease. The existence of lead-mining added to the number of ailments to which animals were prone, for particles of lead transported by rainwash, wind, and on animals' hooves gave rise to a form of poisoning known locally as ''Belland'' which could be fatal. Stone wall enclosure would also have assisted in the organization of grazing and would have offered some shelter against inclement weather.

The enclosure of the common fields took place over a considerable number of years, during the later Middle Ages and after. The process was completed in most instances by the end of the 18th century, and in some places earlier. The change-over to a dominantly pastoral economy based on sheep was a result of the general economic decline which characterized the latter part of the 14th century, accelerated by the Black Death which reached the upland in 1349. It was, however, a gradual change in emphasis rather than an abrupt transformation. The slow progress of enclosure within the open fields is illustrated by the surveys of Sheldon and Wardlow previously mentioned, and by several other surveys in the same volume, all made in the early 17th century. In the two surveys cited only an area approaching half the total of open field was shown as enclosed. A disafforestation survey of Monyash,<sup>12</sup> made in the same period, described it as having one large open field, but the same area was described as "ancient enclosures" in an enclosure award of 1777, the open field thus having been enclosed since the beginning of the 17th century. The stone walls enclosing the former open fields of Monyash can be seen clearly on the ground and are represented on large-scale maps of the area. The pattern of enclosure stands out as a concentration of small, narrow fields surrounded by the rectangular fields created by the parliamentary enclosure (Fig. 14). If the origins of the various kinds of dry-stone walls are not discernible in their location and alignment, then close scrutiny of their actual construction often helps. Parliamentary enclosures were walled in accordance with specifications laid down by the enclosure commissioners. The walls had to be at least 6 ft. in height, 34 in. wide at the base, 16 in. wide at the top, with at least twenty-one throughbands in every 7 yds. of wall (twelve at 2 ft. above the grass, and nine at 4 ft.). Walls resulting from earlier enclosure were lower on average with fewer throughbands.

The high-banked strips of ridge-and-furrow cannot be traced over any large part of the upland. The majority are largely peripheral to the region, but examples at Aldwark, Buxton, Winster and Brassington<sup>13</sup> suggest that

<sup>12</sup> P.R.O., Duchy of Lancaster, M.P.C. 75.

<sup>13</sup> Wightman, 113-8.

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FIG. 14. Phases of enclosure in Monyash.

the distribution of ridge-and-furrow may once have been more widespread. It is uncertain whether all the open fields which once existed on the upland were thrown into ridge-and-furrow for, although land use since the enclosure of the strips could have disguised ridge-and-furrow to some extent, it is unlikely to have removed it completely from all the areas bounded by reversed "S" curved stone walls. As the enclosing of strips within the common field by stone walls would have prevented the continuation of open field arable cultivation, the paucity of ridge-and-furrow within these enclosures on the common field indicates that, if arable farming did continue after enclosure, it must have been of a kind capable of removing ridge-and-furrow from within the confines of the long, narrow fields.

Ploughing and re-seeding of upland pastures is a relatively new feature of high land farming in the region, and may not have been carried out over all the old open fields. Even improvements carried out in the early 19th century appear to have been confined to the clearing of areas of black ling by heavy liming.<sup>14</sup> In many places spoliation by lead-mining after the enclosures within the boundaries of the open fields probably deterred attempts to improve the land. Old lead-mines and their associated spoil heaps can be seen on the open field areas of Monyash, Flagg, Sheldon, Great Longstone, and Wardlow.

High banking of strip holdings to aid drainage would hardly have been necessary on carboniferous limestone, and the medium quality and often thin soils of the upland would not have benefited from being thrown into ridges, as this might well have exposed the underlying limestone. Because of these disadvantages, the building up of such banking may have been expressly avoided; a ridge formed at one ploughing could have been destroyed at the next, by running the first furrow down its centre.

As the greatest number of reversed "S" shaped walls are found on slopes of one in seven or less, physical processes such as "mass wastage" do not appear to be capable of large-scale removal of ridge-and-furrow, at least not within the time available. Furthermore, existing examples of ridge-andfurrow on similar slopes show no signs of having been extensively affected in this way, although "mass wastage" may have assisted in erasing traces indicating arable expansion on to steeper slopes.

As no satisfactory explanation can at present be found for the removal of ridge-and-furrow from between the dry-stone walls enclosing old open field arable, and, as there are good reasons why its initial creation might have been purposely avoided in unfavourable conditions, parts of the upland may never have had open field agriculture with ridge-and-furrow. The absence of evidence of this kind in some areas where open fields existed and its presence in others, generally in more favourable areas, suggests that even in such a small area as the limestone upland there were variations in the methods of open field agriculture.

Decrease in the importance of arable within the economies of the open field settlements with altitudinal increase of the land seems likely. The median ridge of the limestone upland (Fig. 13), standing generally over 1,000 ft. O.D., is devoid of field walls with the reversed "S" curve, and there is very little other evidence to suggest that open fields once existed upon the ridge. This ridge is probably the most exposed part of the upland, standing in the path of prevailing westerly airstreams, and thus settlements have tended to develop on the lee side where the local climate was probably more amenable. The hostile nature of the ridge possibly had more influence upon the settlers of the Anglo-Saxon period than their inhibitions regarding the Roman road which ran along the top.

All the evidence supports the view that open field agriculture on the limestone upland and its border lands was far more extensive during the medieval period than was previously supposed. Both the documentary evidence and the relics of the system which can be seen in the present landscape show that there were marked variations in the importance of open field arable and in the method of its cultivation, not only with differences in altitude but also between settlements at similar heights and within short distances of each other.

14 J. Farey, A General View of the Agriculture and Minerals of Derbyshire, II, 1813, 345, 437.