The Curving Plough-strip and its Historical Implications

By S. R. EYRE

To all those who find delight in the changing face of the countryside the problem of locating and delimiting the areas of medieval ploughland is a fascinating one. In spite of all the investigations that have been carried out during the past hundred years, however, the problem remains, in the main, unsolved. In some localities a high degree of certainty may have been reached, but the exact boundaries on the medieval land-use map have yet to be drawn for most of Britain. There is still far too much basic disagreement over the interpretation of evidence for even tentative conclusions to be reached.

Contemporary documentary evidence must, of course, remain the chief source of information, but for two reasons documentary evidence in itself usually fails to provide the required answers. In the first place, it is usually fragmentary and scanty, and secondly the places named in documents often cannot be identified on the present landscape. For this reason archaeological evidence and the evidence of place-names and field-names have all to be taken into consideration. The writer emphasizes that he is fully aware of the necessity for using all available evidence in the study of any one small area and that there can be no easy answers or valid short-cuts in historical geography. This paper merely attempts to examine one approach to the problem which has frequently been overlooked.

The occurrence of ridge-and-furrow on the present landscape has frequently been invoked as evidence of former open-field cultivation, and since there is little evidence of the extension of the open fields after the Black Death,¹ the limits of ridge-and-furrow can thus be held to be the same as the limits of late-medieval cultivation.² Unfortunately, it has been demonstrated quite conclusively that the practice of throwing land into ridge-and-furrow persisted right up to the end of the nineteenth century and even beyond.³ In upland Derbyshire considerable areas of land which were, without doubt, common grazing land until after 1800 are today in ridge-and-furrow.

Furthermore, huge areas of former arable land in this country, particularly the chalklands and other free-draining soils, have always been cultivated in flat lands, no attempt having ever been made to raise ridges. Finally, there is the obvious point that large areas which were in ridge-and-furrow until the beginning of this century have been levelled since the beginning of the first German war in order to facilitate the cultivation of the land with modern implements. It is clear therefore that an uncritical use of the present distribution of ridge-and-furrow must inevitably lead to most erroneous conclusions.

\[^1\text{Ibid.}, \text{pp. 17-8.}\]
A closer inspection of the form of ridge-and-furrow reveals differences which may be of great historical significance. Some ridge-and-furrow is perfectly straight, but much of it is curved or serpentine in form. Furthermore, wherever the curved ridges have persisted, unmodified, through the centuries, they have exactly the same form when viewed in plan. They are not in simple curves, nor are they S-shaped; they are always in the form of an elongated and reversed letter S. Not a single example of a complete furlong composed entirely of well-formed S-shaped ridges has been seen by the writer in this country, whereas hundreds of blocks of reversed-S ridges have been examined. Locally in Germany attention has been drawn to abnormal S-shaped furlongs, but here again the vast majority are of the orthodox form. The anomalies are thus so few in number that they can be ignored in the present study, though, as will be seen below, their significance in a study of the evolution of farming technology must not be underestimated.

FIG. II

Present field patterns around Wadshelf in the parish of Brampton near Chesterfield.
An examination of the open fields shown on manorial plans of the sixteenth, seventeenth, and eighteenth centuries reveals that in most cases large numbers of the strips had exactly the same form as the curved ridge-and-furrow. Indeed, even in those fragments of the open fields which have per-

sisted into the twentieth century, as at Laxton and Epworth, strips of this form can still be observed.

Finally, in many parts of northern England, particularly in upland areas, exactly the same form is seen, repeated many thousands of times, in the field boundaries. It is particularly frequent in north Derbyshire, where many hundreds have been investigated¹ (Figure I), but it is also found occurring

in greater or lesser numbers in Yorkshire, Durham, and north Nottinghamshire. Indeed, isolated groups of such field boundaries can be found in most counties in England, Wales, and southern Scotland.

It seems logical to suppose that so widespread and constant a form must be evidence of a pattern of activity which was, at one time, at least as widely distributed. The occurrence of the reversed-S pattern may thus be of much greater historical significance than that of mere ridge-and-furrow. The first obvious deduction is that since many open-field strips and much extant ridge-and-furrow have this form, the ploughman, at one time, must have found it convenient to plough furrows of reversed-S shape. The reason why some field boundaries possess the same form is not so immediately obvious, but ultimately has even deeper implications. It has been shown that many fields in north Derbyshire which have such boundaries have names which have usually been accepted as evidence of former open-field cultivation. These fields have such name suffixes as "—furlong," "—flatt," "—townfield," and "—dole." On the other hand, there are, in the same locality, fields called "—intakes" which were all situated around the fringes of the commons at the time of the parliamentary enclosure awards. These fields had obviously been assarted from the waste at a relatively late stage prior to parliamentary enclosure, and the complete absence of the reversed-S form in their boundaries is quite striking. The inference that the fields with such distinctive boundaries were once parts of open fields is thus almost inescapable.

Wherever such field boundaries occur it would appear therefore that they are evidence of the piecemeal enclosure of former open fields. Strips were enclosed as they lay in the open fields, probably in most cases after a certain amount of exchange and consolidation. No recasting of the former pattern of strips and furlongs occurred, so that today this pattern lies fossilized in the field boundaries. In the township of Brampton, near Chesterfield, this process was arrested, almost at the half-way stage, by the parliamentary enclosure award of 1827 (Figures II and III). Here the contrast between the curved boundaries of the islands of ancient enclosure and the straight-sided pattern of the parliamentary enclosures is apparent.

A careful examination of ancient tracts on agriculture from the time of Walter of Henley onwards has yielded no direct explanation for the form of the ancient ploughlands. Just as, in all probability, no modern farming journal would ever feel it necessary to provide space for explaining why modern farmers prefer to plough in a straight line, so no medieval writer ever seems to have felt impelled to explain a practice for which the reasons

1 S. R. Eyre, *op. cit.*
must have seemed equally obvious. Because of this, writers during the past half-century have been forced into speculation, but only two hypotheses have ever achieved any degree of popularity. It was held by some that the lands were curved so that water draining into the furrows should not flow off so rapidly as to cause serious soil erosion. This hypothesis never achieved a great following, however, and it is obvious that if it were the true reason, an S-shaped curvature would have been just as efficient as a curvature of reversed-S form. Apart from this, the way in which the curved strips ran sometimes up and down, sometimes directly across and sometimes obliquely to the slope of the ground indicates that the curvature of the ridges can have had nothing to do with drainage.

The second hypothesis has come to be held by a number of eminent social historians. It is pointed out that the long medieval plough-team of eight or more oxen yoked in pairs must have been a most cumbersome one to turn at the end of the furrow, and because of this the ridge had to be curved. Even this, however, is not a complete explanation of the characteristic form of the plough-strips. Homans maintained that with a long plough-team, it was "... only natural ..." that the ploughman should begin to turn the team before the plough reached the end of the furrow, and consequently the land gradually became curved at its ends.¹ This explanation assumes two points: first that the land, as initially laid out, was perfectly straight, and secondly that the plough-team was turned right round to the LEFT at the end of the furrow. As will be seen below, neither of these points can be conceded.

The reason given by the Orwins for the curvature of the land is now the one which is almost universally accepted.² They point out that a long plough-team ploughing a straight furrow would need a very wide headland on which to turn. This would have entailed a large amount of waste land, or at least it would have involved the inconvenience of a great deal of badly poached land which could not be cultivated until the ploughing of the main furlongs was completed. This was obviated by having the lands curved at their ends so that the whole team of oxen could continue to pull its weight until the plough itself reached the end of the furrow. At the same time all the oxen could walk out on to a narrow headland at right angles to the general alignment of the strip. When this was completed the front oxen could be led round to re-enter the land. The headland thus needed to be no wider than the width of four oxen.

Unfortunately the above explanation attempts no step-by-step explanation of the processes involved. In particular, it does not explain why the

curvature of the end of the furrow was almost invariably to the left and not to the right. Bearing in mind the construction of the plough and the form of the ridge, however, one can see why curvature to the left was a necessity. In the first place, throughout the past thousand years of farming in this country, and possibly long before that, the mouldboard has always been on the right-hand side of the plough: the furrow slice has thus been turned over towards the right. It is true that the turn-wrest plough with its transferable share is of great antiquity, but as far as is known at present, down to the last two hundred years it was of purely local occurrence in south-eastern England. There can thus be little doubt that, in spite of the immense number of local variations in plough construction, the vast majority had a fixed share and mouldboard on the right-hand side.

In the second place, we know that medieval plough-lands commonly took the form of high-backed ridges, this being the method by which cultivated land in this country was effectively drained before sub-surface drainage became a common practice in the nineteenth century. There is certainly incontrovertible evidence that the lands were left flat on many areas of good free drainage, such as the chalklands of the south and the Lincolnshire and Yorkshire Wolds, but though extensive, such areas appear to have been in the minority in Britain. The only method of ploughing a land in order to produce a ridge was to turn all the furrows inwards. This process was called "filling" or "gathering."

If the above facts are considered together, it becomes obvious that the only way to "fill" a land was to plough round it in a clockwise direction beginning near the centre and working outwards. This means that the turning about at the end of the furrow was ultimately to the RIGHT and not to the left as the curve of the strip might suggest. It might be objected that there is no proof that one ridge was completed at a time; is it not possible that the ploughman would plough up the side of one 'rigg' and back down the side of another as is frequently done at the present time? There are two reasons for believing that this was not a common practice. First, Walter of Henley stated quite clearly that the way to plough a land "forty perches by four" was to "go round it thirty-six times." Secondly, many strips shown on manorial plans of the sixteenth and seventeenth centuries are so narrow that they cannot have consisted of more than one ridge, and it seems reasonable to suppose that in most cases, at least, each man's strip would be ploughed as a unit.

1 F. G. Payne, 'The Plough in Ancient Britain', Archaeological Journal, ciii, 1948, p. 82.
2 W. Mayor, General View of the Agriculture of the County of Berkshire, 1813, p. 160; J. Tuke, General View of the Agriculture of the County of York, North Riding, 1800, p. 103.
Bearing in mind the above points, there appear to be very good reasons why the ploughman should have required curvature to the left at the end of the furrow. It must be remembered that the ridges were frequently very high and steep-sided; they were in fact referred to as “high-backs” in many counties. It was said, for instance, that in Gloucestershire “… a person six feet high may stand in some of the furrows and not be able to see the top of the second ridge from him.”¹ These were probably higher than the average, but observations from other counties show that they were not unique. Height differences of three or four feet between the crests of the ridges and the bottoms of the furrows were commonplace. Such heights were necessary on heavy soils, particularly for the growing of wheat.² A ploughman in the last stages of ‘filling’ a land would thus be turning a furrow uphill on a quite considerable slope, encountering all the difficulties that that implies. Any one who has ever attempted to plough across a steep slope will be aware that when the furrow slice is being turned uphill the greatest difficulty is experienced in preventing it from falling back into its original position. Indeed, it is almost certainly because of this difficulty that the lynches of our upland areas were made. The problem is aggravated if, for any reason, the direction of the plough deviates sharply to the right. If this is allowed to happen, the rear end of the mouldboard draws away from the slice which it is in process of turning over and the latter almost certainly falls back. With a swing to the left at the end of the open-field ridge, the ploughman was able to keep the mouldboard pressed against the furrow slice during the period when the plough-team was performing its sharpest turn out on to the headland. The inevitable swing to the right when the land was re-entered was not so difficult to negotiate since the oxen had all entered the land and were pulling steadily before the plough was set in the new furrow. No sharp twist to the right would thus be experienced.

The task of manoeuvring the plough-team on the headland would also have been a much longer and more difficult operation had the ridge been curved to the right instead of to the left. As it was, the ploughman, when ‘filling’ a land, was able to halt his plough immediately it reached the end of the furrow and still allow plenty of room for the front oxen to be led back, unhindered, into the required position for ploughing the next furrow (Figure IV A). If the ridge had been S-shaped, the plough would have obstructed the returning oxen, which would have been forced to pass between it and the ends of the ridges, a most cramped and awkward procedure (Figure IV B). The only method of circumventing this difficulty would have

¹ T. Rudge, General View of the Agriculture of the County of Gloucester, 1813, p. 103.
been to take the plough a considerable distance along the headland and thus leave the end of the ridge open for the returning oxen.

The above reasons seem sufficient to account for the characteristic form of the plough-strips. The assumption has been made, however, that 'filling' the land was the dominant ploughing operation in the open fields. To what extent would the above arguments be affected if 'splitting', 'cleaving', or 'shedding' was equally important? Quite obviously, in order to 'shed' a ridge, ploughing would have to begin on its flanks and the team would have to move in an anti-clockwise direction. Even if this occurred frequently, however, it does not invalidate the first reason given above. No difficulty would ever be experienced in making the furrow slices fall outwards whichever way the 'tail of the plough' was swinging. If 'shedding' was just as
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frequent an operation as ‘filling’, however, the second reason is invalidated; all the difficulties in turning which were obviated by the reversed-S form when ploughing clockwise, would accrue when ploughing anti-clockwise. In spite of what has been said to the contrary, however, the writer is of the opinion that ‘shedding’ was of much less frequent occurrence in the open fields than ‘filling’. Statements made in the County Agricultural Reports and in other writings of the same period have been cited as evidence that the ridges in the open fields were completely lowered in the fallow year. These same sources can be used to demonstrate that the exact opposite was the case.

Time and time again in the County Agricultural Reports references are made to the hazards of levelling the “old-fashioned” curved ridges in order to straighten them, lower them, or make them narrower. In Buckinghamshire, for instance, even good farmers who recognized the necessity for lowering the old ridges gradually, sometimes carried through the process too rapidly, with resulting infertility. The cores of these old ridges were obviously very infertile, and there can be but one reason for this: the soil there must have been buried for a very long period. It is thus impossible that these ridges should have been completely lowered and remade every third or fourth year, as has been suggested by Kerridge and others. It is known that a certain amount of ‘cleaving’ went on during the fallow year, since among others Marshall refers to it in the Midlands and Rudge in Gloucestershire, but the evidence here cited would suggest that the ridges never lost their identity.

Apart from the above argument, it is difficult to see how “serpentine” strips could possibly have survived in that form if they were being completely obliterated at regular intervals. It is particularly difficult to see how complete obliteration could have occurred in those areas where no balks separated the strips. During the eighteenth century, when all farmers seemed to desire straight ridges, it seems obvious that they would soon have altered the ancient curved pattern had they been completely lowering the ridges at frequent intervals. Nevertheless the curved strips persisted.

The process of ‘shedding’ must therefore have been of much less frequent occurrence in the open field than that of ‘filling’. The action of rain-wash

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2 St J. Priest, *General View of the Agriculture of Buckinghamshire*, 1810, p. 140.
and the trampling of animals must have caused a considerable movement of
soil down the steep sides of the ridges, so that much more ‘filling’ than
‘splittting’ was necessary to maintain them at a constant height. Because of
this, it was more convenient to have curvature to the left at the end of the
ridge than curvature to the right.

The important problem now arises: how can this distinctive pattern be
used in historical geography? Can it be shown that plough-lands with this
form could have arisen only in open-field cultivation, and, furthermore, can
the origin of such plough-lands be assigned to a particular period in history?

The first part of this question is easily answered. New enclosures were
asserted from the waste in late medieval times and farmed in severalty from
the outset. There is no conceivable reason why these should have been con-
structed with their long boundaries in the form of a reversed-S. A brief
consideration of the movements of a lane plough-team on the headlands
shows quite clearly that the surrounding walls of a close would have in-
hhibited the very movements which the form was designed to permit. Closes
which today are found to have the fences on opposite sides parallel with one
another and with the reversed-S curvature must therefore have arisen by the
enclosure of open-field strips.

The problem of the age of the reversed-S forms is a more difficult one,
but a study of literary and documentary evidence leads one to almost ines-
capable conclusions. In the first place, the attitudes of agricultural writers in
the late eighteenth and early nineteenth centuries are instructive. Thomas
Batchelor remarked that “… all the clay land in the county is in the state of
high ridge and furrow bent at the ends into a serpentine form, by some uni-
form cause, which, in the course of many centuries, has removed the ends
of the lands out of their original places.”1 Bailey and Culley noted that “… on
the deep-soiled lands, that were used for arable some centuries since, the
ridges are mostly very high, broad, and crooked; upon lands that have
recently been brought into cultivation, they are straight…” Bailey and Culley noted that “… on
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ridges are mostly very high, broad, and crooked; upon lands that have
recently been brought into cultivation, they are straight…”2 Arthur Young
saw that near Skipwith the “old highlands” were being ploughed down
because “… they were of bad form, too high for the breadth … crooked,
and wider at one end than the other.”3 Finally the writer of British Hus-
bandry referred to ridges in many old enclosures as being “… ploughed
time out of mind in a variety of uncouth shapes.”4 Similar reports, all in the
same tone, were made for counties in all parts of England and southern

1 General View of the Agriculture of Bedfordshire, 1808, p. 279.
2 J. Bailey and C. Culley, General View of the Agriculture of Northumberland, 1805, p. 66.
3 Arthur Young, General View of the Agriculture of the County of Lincoln, 1799, p. 94.
4 British Husbandry, 1837, p. 47.
Scotland, and several clear inferences can be drawn from them. First, there was a distinct correlation between the distribution of crooked lands and the distribution of the better, deep-soiled lands which had long been in open-field cultivation. Secondly, the enlightened farmers had a complete contempt for the curved lands and were anxious to get rid of them wherever possible. The curvature of the ridges by this time performed no useful function and the form was thus completely obsolete. Finally, not only was the “old-fashioned” ridge obsolete, but the farmers were at a loss to understand why men should ever have created such lands. Knowledge of the former function of the curvature of the ridges was lost in the mists of antiquity.

It is therefore apparent that long before the end of the eighteenth century men had ceased to make new curved ridges. When new ridges were made in the seventeenth and eighteenth centuries they would be straight unless the long boundaries of the close containing them had the characteristic curvature of the ancient plough-strips, in which case the new ridges might be made parallel to the fences. In the latter case, however, the curvature of the field boundaries is clear evidence that the land within the close was initially part of an open field.

The origin of the curvature must therefore be assigned to an earlier period, for which manorial plans provide valuable evidence. Documents such as the 1635 plan of Laxton\(^1\) show that many strips were curved but that a considerable proportion were perfectly straight. It seems possible therefore that as early as the beginning of the seventeenth century the curved form had long been obsolete and that new straight strips had, in places, replaced the old curved ones.

The above hypothesis is however open to an obvious objection. How can one be sure that the straight strips were not just as old as the curved? Is it not possible that, at the outset, there were some curved ridges and some straight ones? A further study of early manorial plans provides the probable answer to this objection. The straight strips are found to be, on the average, much shorter than the curved ones. Furthermore, in many of the furlongs of straight strips the alignment of the strips was parallel to the short axis of the furlong. This suggests that the straight strips had arisen as a result of complete reorientation; the land had been levelled and new strips created at right angles to the old. This view is strengthened by the fact that many of the headlands of these reoriented furlongs were curved in the characteristic form. An admirable example of this is found on the manorial plan of Lower Heyford in Oxfordshire,\(^2\) dated 1606, where, in the East Field, two of the

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1 Orwin, op. cit., at the end, Diagrams I to v.
2 J. A. Venn, The Foundations of Agricultural Economics, Cambridge, 1933, Plate II, p. 34.
original strips had been left as headlands or access strips but the original central strips had been erased and new shorter ones created at right angles to them (Figure V). There is thus very strong evidence indeed to suggest that the straight strips post-date the curved ones.

Part of the East Field of Lower Heyford, Oxfordshire, in 1606. The old curved strips which now served as access strips and headlands are cross-hatched.

Since manorial maps of the first half of the seventeenth century covering areas in many parts of the country show the presence of these short, straight strips, there is every reason to suppose that the reversed-S shape was obsolete even by 1600. Since it is, in the main, agreed that there was no enlargement of the open fields in most parts of the country after the great plagues of the mid-fourteenth century, it can be argued that the incidence of curvature be it in ridge-and-furrow and field boundaries on the present landscape or in the form of the strips shown on manorial plans, is evidence of medieval ploughing.

No indication has yet been given to explain why the reversed-S form should have become obsolete at the end of the medieval period. Improvements in farming technique certainly occurred in early Tudor times, how-
ever, and if it can be shown that this made the long plough-team unnecessary, then one can be certain that curvature of the strip was no longer required.

The shortage of winter fodder was one of the main problems of the medieval farmer. The extremely high value of stinted meadow land as compared with that of arable land is evidenced in many medieval surveys and proves beyond doubt how precious were supplies of hay. With the throwing down to grass of much former arable land in the fifteenth and sixteenth centuries it seems reasonable to suppose that this situation would be greatly improved. It is most unlikely that summer pasturage and numbers of livestock could have been greatly increased without a concurrent increase in the hay harvest. This almost certainly happened with the large-scale early-Tudor enclosures in the Midlands, and recent research into Derbyshire court rolls has revealed that many pieces of land which were arable in the fourteenth century were referred to as "pastures" in the fifteenth. ¹

Because of the shortage of fodder, the medieval plough oxen must have been extremely weak when they left the stall at the end of the winter. In the nineteenth century this time of year was still known as "the lifting" in some parts of Britain, and it is thought that this term arose because the oxen had actually to be lifted from their stalls and dragged out on to the pastures. ² Only a week or so after this operation these same oxen had to begin the spring ploughing. It is small wonder that a large team was required for the task. In his study of the history of the manors of Ramsey Abbey Homans found that "... more men joined together in partnership in spring and summer than in winter, that is, the medieval winter, before Christmas." ³ It seems possible, therefore, that a long plough-team may never have been absolutely necessary for the autumn ploughing. If, therefore, the winter nourishment of the oxen was greatly improved at the end of the medieval period, there is reason to suppose that the average plough-team may have been much reduced even for the spring ploughing.

In any case, great changes in the actual breed of oxen are known to have taken place in early Tudor times. Medieval cattle appear to have been relatively small. Thus all the cattle skeletons found in the medieval ditches in Cambridge appeared to be of the longifrons breed, representatives of which are today found locally in Ireland and western Britain. ⁴ According

¹ S. R. Eyre, *op. cit.*
to data collected by some historians "... oxen, cows, and steers of the fifteenth century were no more than a third of their present bulk." Since there is evidence that much heavier cattle from the Low Countries were imported in early Tudor times, here is another possible reason why the long plough-team may have ceased to be an absolute necessity.

Though the presence of the reversed-S pattern on the landscape can be used as evidence of medieval ploughing, the absence of such a pattern demonstrates absolutely nothing. Both ridge-and-furrow and field boundaries may have been straightened or completely obliterated by various processes, and furthermore, it is still quite possible that in some areas no such form was ever used. In any case no significance should ever be attached to an isolated field boundary of reversed-S form. By sheer chance many of the assarts made in late medieval times must have had single boundaries of this form. It is only when a group of such forms are found en échelon that they should be regarded as useful evidence.

Finally, even when all the above provisos have been observed, an uncritical application of this technique is still to be deprecated. No conclusions about the distribution of medieval ploughlands should ever be reached without full reference to all other possible sources of evidence, documentary, archaeological, and philological.


Notes and Comments

THE JOHN NICHOLS PRIZE

The University College of Leicester offers an annual prize, open to graduates of any university, and also to candidates who are not members of a university, for an essay on some topic of English local history. Candidates may write on a subject of their own choice, provided that such subject has been previously submitted to and approved by the Head of the Department of English Local History. Compositions which have already been published, or which have been awarded any other prize, are not eligible.

The value of the prize is £25. The College reserves the right to make no award if no essay of sufficient merit is submitted. The College also reserves the right, but does not bind itself, to publish the winning essay in printed form.

The essay must be an original contribution to knowledge, based on genuine research. It must be typewritten, and must not exceed 20,000 words in length. It must be submitted, with a stamped, addressed envelope for return, on or before the 31st of March 1956. Communications, marked "John Nichols Prize," should be addressed to The Reader, Department of English Local History, University College, Leicester.