PART III, A

THE PLOUGH IN ANCIENT BRITAIN

By F. G. PAYNE

Department of Folk Life, National Museum of Wales

Students of field archaeology owe a debt of gratitude to Dr. E. Cecil Curwen who, over a long period of years, has in the most practical manner created interest in the problems of early agricultural technique and early field types—problems important both from the social and economic points of view. One part of Dr. Curwen's work in this field that has been accorded wide approval is his attempt to demonstrate that there was a close relationship between plough type and team on the one hand and field type on the other. The validity of his arguments and conclusions, however, is open to doubt and I venture to think it is time that the whole question should be re-examined.

The first full statement of Dr. Curwen's theory occurs in the course of his paper ' Prehistoric Agriculture in Britain ' in *Antiquity*, i. The conclusions to which Dr. Curwen came, now very widely known and almost generally accepted, were based upon a number of assumptions which may be summarized as follows :

1. The type of plough used determines the shape and characteristics of a field.
2. The type of plough is itself determined by and can be inferred from the share type.
3. Pre-Saxon shares found in Britain simply scratched a groove instead of cutting a furrow-slice ; the ploughs to which they were fitted did not turn the slice and clear the furrow.
4. Saxon ploughs used only broad-bladed shares which undercut the slice, the slice being turned.
5. The Celts used only two-ox teams and light ploughs.
6. The Saxons used only eight-ox teams and heavy ploughs.

Since 1927, however, Dr. Curwen has returned to the subject several times,[1] and certain of the above six points have been amplified, qualified, or rendered doubtful. Unfortunately, many of those who were satisfied with the general theory put forward in *Antiquity*, i, do not appear to have appreciated the way in which these later writings have blurred the clarity of the earlier picture, neither have they realized how bold and mutually helpful were the six assumptions on which that picture was based. My main purpose here is to show that these assumptions are not supported by the evidence and that the picture they conjure up is misleading. In addition I hope to be able to remove certain misapprehensions concerning agricultural technique among the Welsh in early times ; but no attempt is made to provide a new theory of field origins.

In his 1927 paper, Dr. Curwen's statement that ' on the type of plough used depend the shape and characteristics of the field ploughed ' was obviously meant

[1] *Antiquity*, vi, 389 ; *Proc. Prehist. Society*, iv (1938), 27 ; *Air Photography and the Evolution of the Corn-field*, 2nd ed. (1938).

to apply to the ancient fields of Britain, one of the types of plough in the writer's mind being that which utilized the narrow type of share found on Iron Age A and AB sites. This share is conjectured to aerate the soil so ineffectively that, as a condition of its use, the field must also be cross-ploughed. It was this cross-ploughing which necessitated the field's being broad in proportion to its length. Later (*Antiquity*, vi, 406) the above statement is greatly qualified by another: 'I do not believe that cross-ploughing was practised in Britain, but it may have been by those who first invented the square acre, wherever that may have taken place.' Now, with this qualification Dr. Curwen robs the narrow shares of the evidential value he formerly placed upon them; for, if cross-ploughing was not practised in ancient Britain, then the breadth of the British fields in proportion to their length does not depend upon the type of plough assigned to them by the theory. Their characteristics would therefore appear to be due not to the possession of inadequate ploughs, but to the inheritance of a conservative agricultural tradition. However, in 1938, in the second edition of *Air Photography and the Evolution of the Corn-field* (page 18), Dr. Curwen appears to return to his original contention; yet in the *Proceedings of the Prehistoric Society* for the same year (page 39) it is the use of two oxen to draw a light plough that is specifically mentioned as the factor which kept the furrow-length short and resulted in squarish plots. For my part, I see no reason to doubt that cross-ploughing was practised in ancient Britain; what is doubtful is the suggested reason for it. In later times, this common spring operation was designed either to help pulverization by cutting the earlier furrows into small pieces, or as a part of the process of bare fallowing.

Actually, notwithstanding Dr. Curwen's emphasis on the importance of plough type, it was upon a combination of a poor plough, supposedly necessitating cross-ploughing, plus a two-ox team, supposedly necessitating a short furrow, that his original theory as applied to the squarish *British* fields rested. By denying cross-ploughing, Dr. Curwen, whatever he may think of the ineffectiveness of the early narrow shares, has left the theory supported only by conservatism in agricultural tradition and the limitations[2] of an exclusively two-ox team. The charge of the active complicity, as it were, of the Early Iron Age plough is not proven but reduced to one of being capable of being drawn by two oxen.

These two oxen are so important in Dr. Curwen's explanation of the genesis of these 'Celtic' fields that it is as well to review the evidence for this size plough team introduced into Britain in the Late Bronze Age and its exclusive use here down to Belgic or Roman times. There is, as Dr. Curwen says, no direct evidence. There is the suggestive fact that many of the fields are short, and this can be interpreted in the light of Columella's statement that a furrow of 120 feet is enough for a team of two oxen. Again, two-ox teams drawing ploughs, similar to the kind inferred to have been used in Britain, are depicted in rock carvings of Bronze Age date in the Alpes Maritimes and in others at Bohuslän, Sweden. It sounds plausible

[2] These limitations depend very much upon the nature of the soil, the depth of the ploughing, the climate, and the animals themselves. In any case, a light plough that merely scratches a shallow groove in 'light upland soil' and a pair of oxen that tire after pulling it 100 ft. or so are an incredible combination. Yet those who accept it see nothing odd in believing also that a team only four times as strong could drag a very much heavier plough turning over a very much greater quantity of 'heavy lowland clay' four times as far without a rest.

enough until one realizes that only a part of the indirect evidence available has been emphasized. To take the question of field length first. As Dr. Curwen says, ' the prehistoric Celtic fields . . . may vary considerably between such dimensions as 100 by 100 feet, 300 by 200 feet, and 400 by 100 feet, but the length is scarcely ever more than about 400 feet nor the breadth less than 100 feet '.[3] The value for our purpose of Columella's statement vanishes when we consider the furrow-length of these three and four hundred feet fields. Then again, fuller evidence of the rock carvings in the Alpes Maritimes is even more damaging to the theory; for, according to Bicknell[4] the carvings depict ploughs with two-, three-, four-, five- and six-ox teams. These larger teams, extracted from the plates in Bicknell's book, are reproduced in Plate V. The three-ox team shown is unsatisfactory; in practice it would be found well-nigh impossible to yoke it to the plough in the formation shown. The other large teams are straightforward and convincing. In the plates which reproduce yoked oxen from the carvings[5] Bicknell shows eighteen two-ox ploughs, three two-ox teams without ploughs, one three-ox plough, one four-ox plough, one four-ox team without plough, one five-ox plough and one six-ox plough. Since Bicknell reproduces only a part of the large number of plough carvings, it is profitless to consider the proportion of large to small teams. What *is* important is that teams of up to six oxen are shown.

It is, I think, clear that if these carvings are of any value in indicating the kind of plough team introduced into Britain in the Late Bronze Age they damage Dr. Curwen's ' Celtic Field ' theory beyond repair, and suggest, as might have been expected, that the picture we have to draw of early agricultural technique is a good deal more varied and complex than had been supposed. But, have these carvings any value for the student of early British agriculture? Do they in any way agree in detail with what is known of any ancient ploughing technique in Britain? The answer is, that they correspond exactly to the chief characteristics of a method of plough-team organization that persisted in parts of Britain until the 19th century.

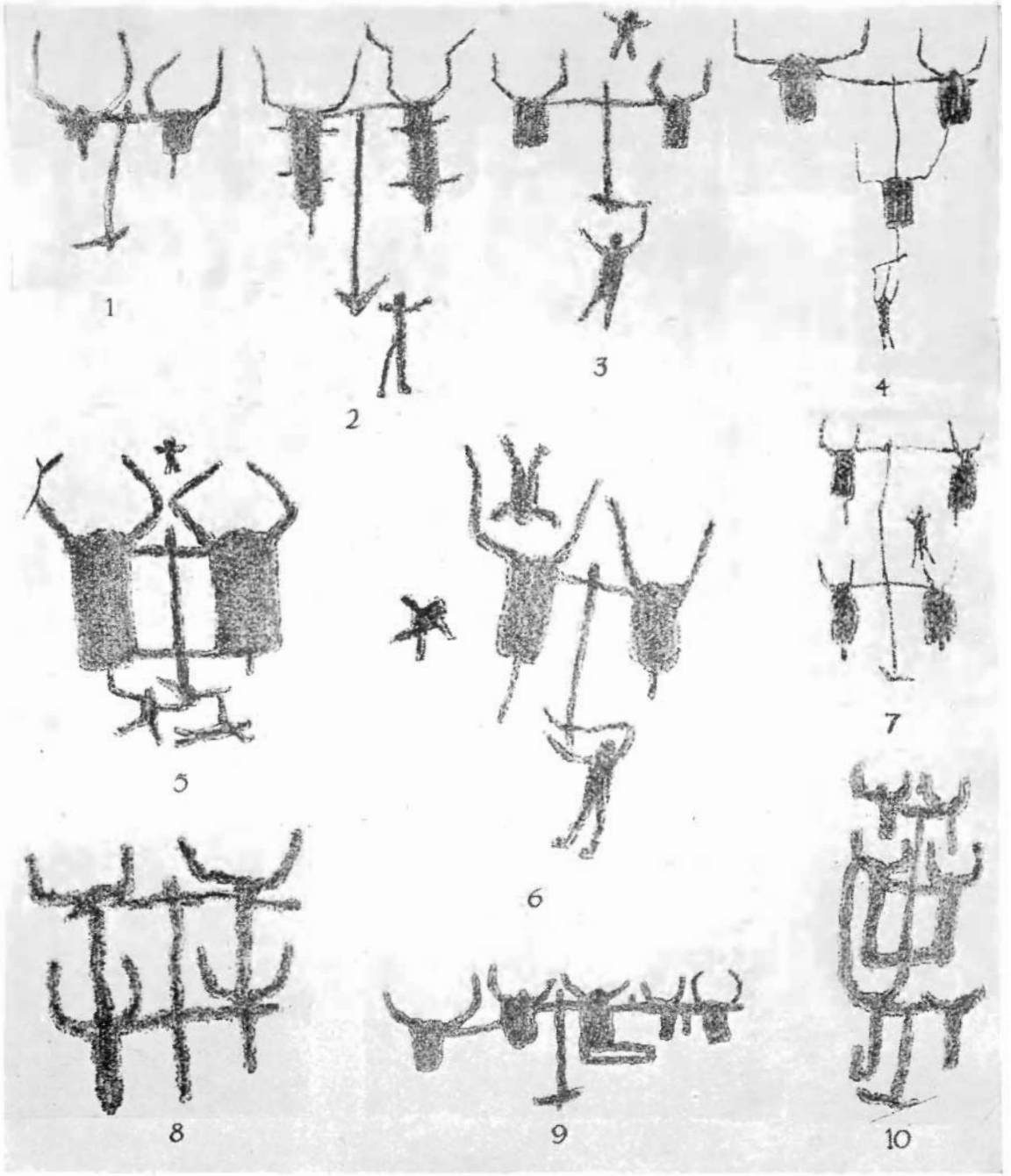
If the reader will examine Plate V he will notice that where more than two oxen were employed they could be yoked in alternative ways; either abreast beneath one yoke (no. 9) or in couples in line ahead. It will also be noticed that where a driver is present in addition to the ploughman, he is depicted with outstretched arms *in front* of the oxen. It will be seen too that a third man was occasionally present placed near to the ploughman. Now these alternative methods of yoking and this disposition of the ploughing personnel is fairly well documented in Britain from the close of the Dark Ages down to the early 19th century. The earliest evidence that I am aware of is found in the Welsh Laws codified (*circa* 945) by Hywel Dda. Yokes of four different lengths are mentioned and, the section dealing with *cyfar*, or co-tillage, paragraph XXIX,[6] in stating that it is the duty of the ox-driver to furnish certain items of the yoking gear, specifies alternative sets of gear, one of which is to be provided ' os hyrguet vyd ', i.e. ' if it be a long team '. Evidence

[3] *Air Photography and the Evolution of the Corn-field*, 2nd ed., 26.

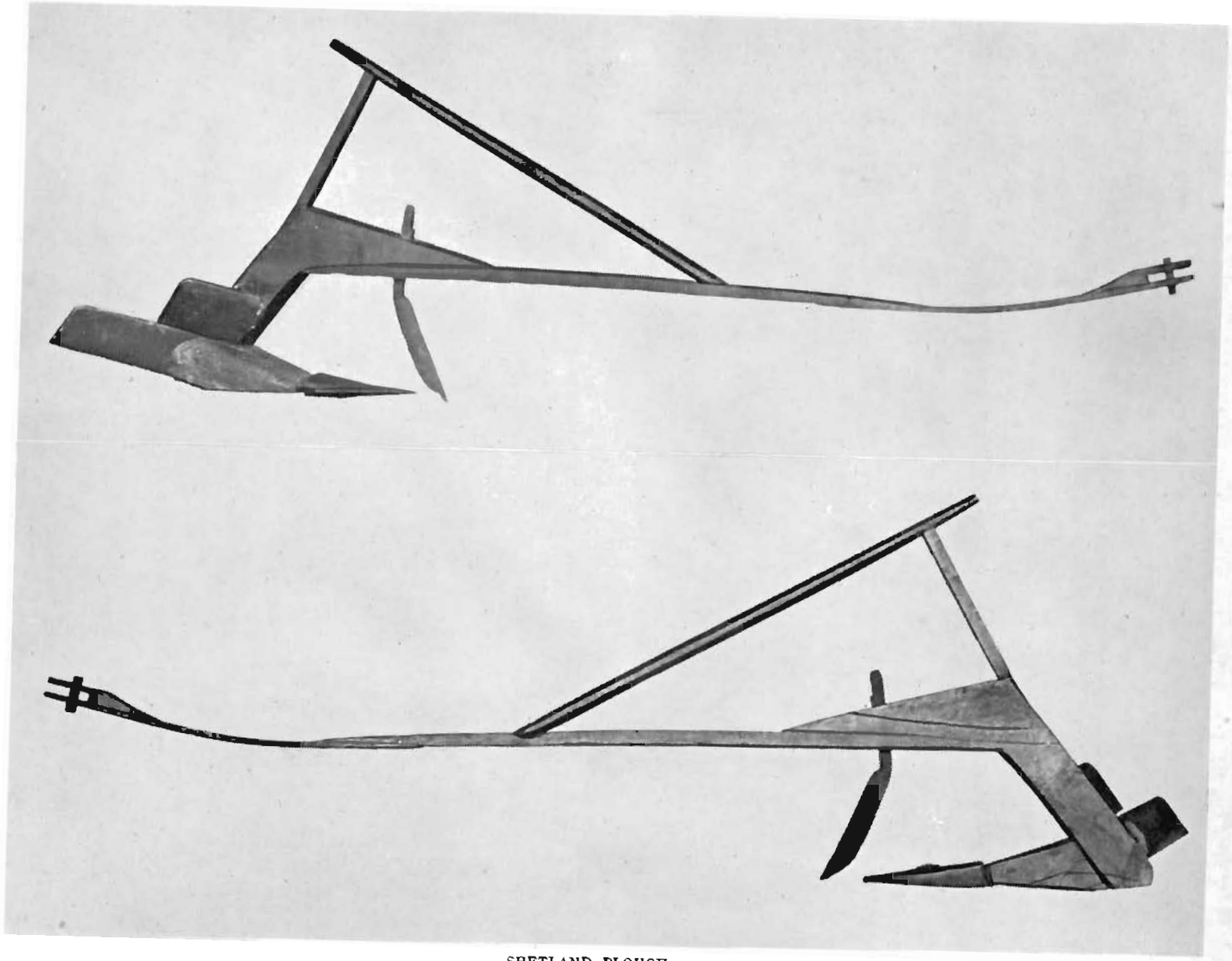
[4] C. Bicknell: *The Prehistoric Rock Engravings in the Italian Maritime Alps* (1902).

[5] I exclude Bicknell's actual photographs of rocks since they are not sufficiently clear in reproduction.

[6] Aneurin Owen, *Ancient Laws and Institutes of Wales* (1841), I, 322-3. The earliest surviving MSS. of the Laws are of the 12th century, but since mention of the long yoke is found in all three groups of Law MSS. it obviously had a place in the original nucleus, to be referred to the 10th century.



PREHISTORIC ROCK ENGRAVINGS IN THE ITALIAN MARITIME ALPS.
(after C. Bicknell)



SHETLAND PLOUGH.

By courtesy of the National Museum of Antiquities of Scotland.

To face page 85

from a 12th century source to be adduced presently provides additional proof that these alternative team arrangements were in fact either abreast under one long yoke or in couples one before the other, i.e. the ' long team '. The second detail noticed in the rock engravings was the position of the driver, who with outstretched arms stands in front of the oxen. In the Welsh Laws the driver is called the *geylguad*, modern Welsh *geilwad*. The word really means ' a caller ' not a driver, and has reference to his position *in front* of the ox-team. We know from other early evidence as well as from comparatively modern practice that the *geilwad* walked backwards in front of the team, usually with his hands outstretched along the centre of the yoke which he pulled, calling the oxen on the while with a kind of song or chant. In the Laws he is bidden to be gentle, ' to call so that they shall not break their hearts ' at their work. The third detail of the arrangement shown in the rock carvings, namely the ploughman's assistant, is almost embarrassingly present in the Laws. The ideal or conventional arrangement set forth there envisages twelve acres (*erwau*) being ploughed by the contracting parties before the communal team is broken up. Since it appears that four of the acres ploughed went to the ploughman, the driver, the owner of the plough-irons, and the owner of the wooden plough frame, and the rest to the owners of the eight oxen, the field was apt to be overcrowded with helpers ; because everyone was bidden by law to bring his contribution to the ploughing (i.e. oxen or irons) personally.

The medieval evidence corroborating that of the Laws comes from Giraldus Cambrensis. Giraldus is often an unreliable witness ; but, providing that one avoids Colt Hoare's translation which is misleading in this particular passage, as in others, he gives us a clear account of the two methods of yoking and the position of the driver : ' The oxen that they yoke to the ploughs, or the wains, are sometimes, it is true, in pairs, but most frequently in fours ; with the man with the goad walking before them, but backwards.'

Welsh references to yoking from the 14th century onward lead me to suppose it probable that the long yoke had been laid aside in Wales in favour of the long team by the end of the Middle Ages. At any rate, every subsequent Welsh reference that I have seen is to teams made up of pairs of coupled oxen in line ahead*. However, large teams, both oxen and horses, continued to be yoked abreast in parts of Scotland, Ireland and in the Isle of Man[7] down to the early 19th century. The practice is referred to in several of the ' General Views ' of Scottish agriculture published in 1794 and 1795,[8] and we meet again the driver who walks backwards before his team. The practice is, of course, condemned by the writers, reformers to a man ; but a somewhat grudging defence of the custom is allowed to appear in the Perth report : ' they contend, in their own defence, that the horses act with greater power, when yoked abreast, than long ; that the ground is in many places so full of large stones, as not to admit the long plough ; that the driver, by having his eyes at once on the horses and plough, can stop the draught more instantaneously ; and save the *graith*[9] better, than in any other position '. The ploughman's assistant is still

[7] ' The Ettrick Shepherd in Lewis ' in *The Scottish Geographical Magazine*, Sept., 1942. Joseph Train : *An Historical and Statistical Account of the Isle of Man* (1845), II, 241.

[8] e.g. the reports on the Northern Counties and Islands, 203, 251 ; Angus or Forfar, 17 ; Argyll and Western Inverness, 15, 24 ; Galloway, 12 ; Perth, 50. See also Arthur Young : *A Tour in Ireland* (1780), I, 350, 365 ; II, 12.

[9] i.e. the gear.

* See postscript, p. 109.

met with in some of these later accounts.[10] In Wales there is evidence for the occasional retention of the *geilwad* (but whether backward walking is not clear) and other helpers as late as the beginning of the 19th century, although, as I believe, the long yoke had been laid aside for a long time.

It is, of course, the long yoke that supplies the answer to a question which, I am sure, will have occurred to some readers upon realizing that the small squarish prehistoric fields may often have been ploughed by large teams. So much has been made of the ' difficulty ' of turning a large team upon a short headland, a ' difficulty ' so great that it is credited with having presented Britain with its strip-system ! However, yoked abreast, four or six oxen require no more headland space to turn in than two oxen do. In Wales, in the Dark Ages, eight animals were sometimes worked abreast. The fact that, yoked abreast, half the team would constantly tread the turned earth in one-way ploughing,[11] and that the rest would occasionally do so in ploughing ridges, was no great deterrent on some light soils, particularly on the chalk. The hard treading of such land by oxen was considered to be beneficial before the days of efficient rollers.[12] On land unsuited to such treatment the alternative yoking in couples could, as we have seen, have been employed.

The evidence put forward above proves the existence in Britain from the close of the Dark Ages until the beginning of the 19th century of a variable type of plough-team organization exactly similar to that depicted in the Alpine rock carvings. As for the carvings themselves, they shatter the notion of an exclusively two-ox team even in the Bronze Age.

It may be as well to add two warnings. First, against the idea that the large team abreast or backward-walking driver are necessarily more ancient or ' primitive ' than the now more familiar arrangement of coupled teams and no driver. All are represented in and equally dated by the carvings. The second warning is against rashly supposing that these now unfamiliar arrangements were exclusively ' Celtic '. For example, a driver walking ahead of his team and twisting backwards to goad the oxen is prominent in that well-known illustration here

[10] The precise nature of the help given to the ploughman, when not occasioned by gregariousness, would vary from place to place in accordance with the ability, or lack of it, of the local ploughwright. Infinite slight variations in design and pitch of plough and irons coupled with the degree of skill of individual ploughmen (when so much depended upon it) and varying soils—these probably ensured that the precise nature of the helpers' task varied. The object was, of course, always the same : to see that a proper furrow was turned by the plough. This might be attained by the occasional pressure of a forked stick on the end of the plough-beam, as in Galloway and the Isle of Man ; or, at the other extreme, it might necessitate the use of followers with spades, as in Delting, Shetland. The speeding-up of the team by the addition of, or the replacement by, horses was, possibly, a main reason for the poor ploughing commented on in many of the late 18th-century ' General Views '. A plough with which a man could turn a good furrow at a speed of 1½ m.p.h. was often too much for him at an increased speed.

[11] It is clear from their writings that some archaeologists do not understand what a one-way plough is. The term ' one-way ' refers not to the inability of the plough to turn its furrows to either side at will ; for such a plough has just that ability. The term refers to *the position of the furrows on the field*. A one-way plough can turn its furrows so that they all lie the one way either because it has a ' turn-wrest ', ' shifting-ear ', etc., or because it has no mould-board device whatsoever and turns its furrow simply by being tilted over to the desired side. The typical British plough of recent times, having one fixed mould-board, can turn its furrow only to the right. In moving back and forth across a field it cannot leave its furrows lying in one direction and is therefore not a one-way implement. A ' turn-wrest ' is a detachable ground-wrest (fig. 4, no. 15) which is fixed to either side of the plough as required. A ' shifting ear ' is a small detachable mould-board similarly used.

[12] See, for example, *The Sussex County Magazine*, September, 1935, 597, and January, 1939, 20.

reproduced as Plate IX which, in one or other of its two versions, is so persistently and misleadingly reproduced as a delineation of an Anglo-Saxon ploughing scene (see below on this). Again, four oxen abreast beneath one yoke are illustrated in the Bible Moralisée, a French MS. of the late 13th century, and Richard Surflet in his translation, *Maison Rustique or The Countrie Farme* (1600) instructs one in breaking in a stubborn ox to ' put him in a great yoke, betwixt other two of his owne stature ' (p. 130). And as late as the 1830's a lad could still be found riding on the beam of an English plough to keep it in the ground.[13]

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To leave the plough-team and return to the plough, a question immediately arises : is the type of plough depicted in the Alpine rock carvings the same as that which Dr. Curwen maintains to have been largely responsible for the shape and size of the ' Celtic ' fields of Britain ? Since a close similarity between the plough-team organization of the Alpine carvings and that once common to the Celtic-speaking peoples of Britain has been demonstrated, it would not be unreasonable to assume that a similar plough was introduced here in the Bronze Age. There is, however, no evidence to show that this was so. And it is important to bear in mind that the type of a plough is more likely to adapt itself to, and be modified by, local conditions of soil and climate than is the type of team. As will be seen later, the earliest plough-shares found in Britain strongly suggest that the share-beams of the ploughs that used them met the ground at a very much more acute angle than that indicated in the implements of the Alpine carvings. The Swedish carvings at Bohüslan and the remains of ploughs found at Døstrup, Papau, Dabergotz, Walle and Tømmerby show that the prehistoric ploughs of northern Europe varied in type, and also in detail within the type, and afford examples of both horizontal and near-horizontal share-beams.

The only surviving type of British plough that shows any correspondence to some of the characteristics of the ancient ' non-rectangular ' ploughs is that of which the so-called Shetland plough is the best-known representative. For such as are lightly versed in plough lore it has a dangerously deceptive appearance. Long ago, in the careless manner still met with, it was opined to be ' probably the ancient plough, which formerly prevailed over the whole kingdom '.[14] Because of this, and since the Shetland plough does not appear to have been clearly figured, photographs[15] (Plate VI) and a brief commentary may be useful. The plough's most unusual feature—the frame stilt or handle—immediately reminds one of those which characterize some Scandinavian ploughs,[16] and the introduction of this plough from the northern countries in Viking times is a distinct possibility. It may, indeed, appear to be very probable when considered in conjunction with the *ristle*

[13] J. E. Burke, *British Husbandry* (1837), II, 6.

[14] Sinclair, *Gen. View of the Agric. of the Northern Counties and Islands of Scotland* (1795), 251.

[15] The plough shown is one of two in the National Museum of Antiquaries of Scotland.

[16] Paul Leser, *Entstehung und Verbreitung des Pfluges* (1931), 164-171. Axel Steensberg, *Fortid og Nutid*, xii (1937), fig. 3, a. Ragnar Jirlow, ' Jordbruket ' in *Gruddbo På Solleron* (1938), figs. 6–10.

'plough' of the northern islands.[17] The illustration shows how easily a mould-board could be attached to the crooked plough. A piece of wood which functions as the ground-wrest (fig. 4, no. 15) or lower portion of the mould-board is attached to the furrow side of the share-beam. Another, shorter, piece of wood is placed above this and fastened to the rear of the plough-beam where it slopes down to the share-beam. Both pieces together make up the mould-board. The second plough in the National Museum of Antiquities has a similar arrangement; but the upper portion of its mould-board projects at a more obtuse angle over the lower part. It is clear that some control over the nature of the furrow-slice could be exercised by the placing of the upper element. The form of the mould-board of the second plough seems calculated to pulverize the furrow-slice rather than to turn it unbroken, and affords a by no means isolated indication that the desirability of a crumbled furrow in spring is not a modern discovery.[18] An apparently similar type of Scottish plough had its mould-board ribbed or furrowed in order to break up the slice.[19] The share-beam of the Shetland plough illustrated is three inches in width where it meets the plough-beam and narrows to two and a half at the share socket. Its effective width, however, is increased to over four and a half inches through having the front part of the ground-wrest nailed alongside. The share, a large winged one, is twelve inches long, and its four and a half-inch wide socket receives both the neck of the share-beam and the front end of the ground-wrest. This share illustrates the danger of assuming that the type of an old plough can be deduced from its share alone; for this particular share could be paralleled on many of the old, heavy, long-soled, rectangular-framed ploughs; that is to say, on the type most dissimilar of all to the Shetland plough.[20]

These 'crooked' ploughs varied a good deal in important details. In Caithness about the end of the 17th century the 'thrapple' plough is said to have had a mould-board on each side[21] and was, presumably, a one-way or turn-wrest implement. In the Orkneys at the same time and, apparently, for a century after in some parishes, neither ground-wrest nor board was used.[22] In the Island of Lewis, the share-beam could be adjusted laterally or vertically in order to regulate the size of the furrow-slice.[23]

If this kind of plough were used further south, in districts more suitable for tillage, other variations in its size and weight would have been inevitable. The extreme lightness and smallness of the Shetland plough suggests very strongly an implement adapting itself to local conditions.[24] The scarcity of suitable timber

[17] This is an implement armed with a coulter only. According to Robert Heron, *Gen. View of the . . . Hebrides* (1794), 40, its function was to cut the furrow vertically and was closely followed by a plough which cut the furrow horizontally and turned the slice. According to Wright's *English Dial. Dict.* its name *ristle* is from Old Norse *ristill*. For Scandinavian examples see Leser, *op. cit.*, 171, and Jirlow, *op. cit.*, fig. 16.

[18] Sinclair remarks that no land was ploughed in Shetland before spring: *The Statistical Account of Scotland*, V, 192.

[19] Wright, *The English Dialect Dictionary*, *s.v. thrapple-plough*.

[20] Other examples of misleading shares could be cited on 18th- and early 19th-century British ploughs; but the point is more conveniently illustrated by reference to the great variety of shares on the selection of the world's ploughs figured by Leser and by noting how similar types of share are found on dissimilar types of plough.

[21] Sinclair, *Gen. View of the Agric. of the Northern Counties and Islands . . .*, 203.

[22] *Ibid.*, 226.

[23] *The Scottish Geographical Magazine*, September, 1942, 70.

[24] Sinclair, *Statistical Account of Scotland*, V, 409, describes the process at work in the Orkneys with a different type of plough: 'A few two-stilted ploughs in miniature, a faint imitation of the old Scottish plough . . . are beginning to be used . . .'

To face page 89

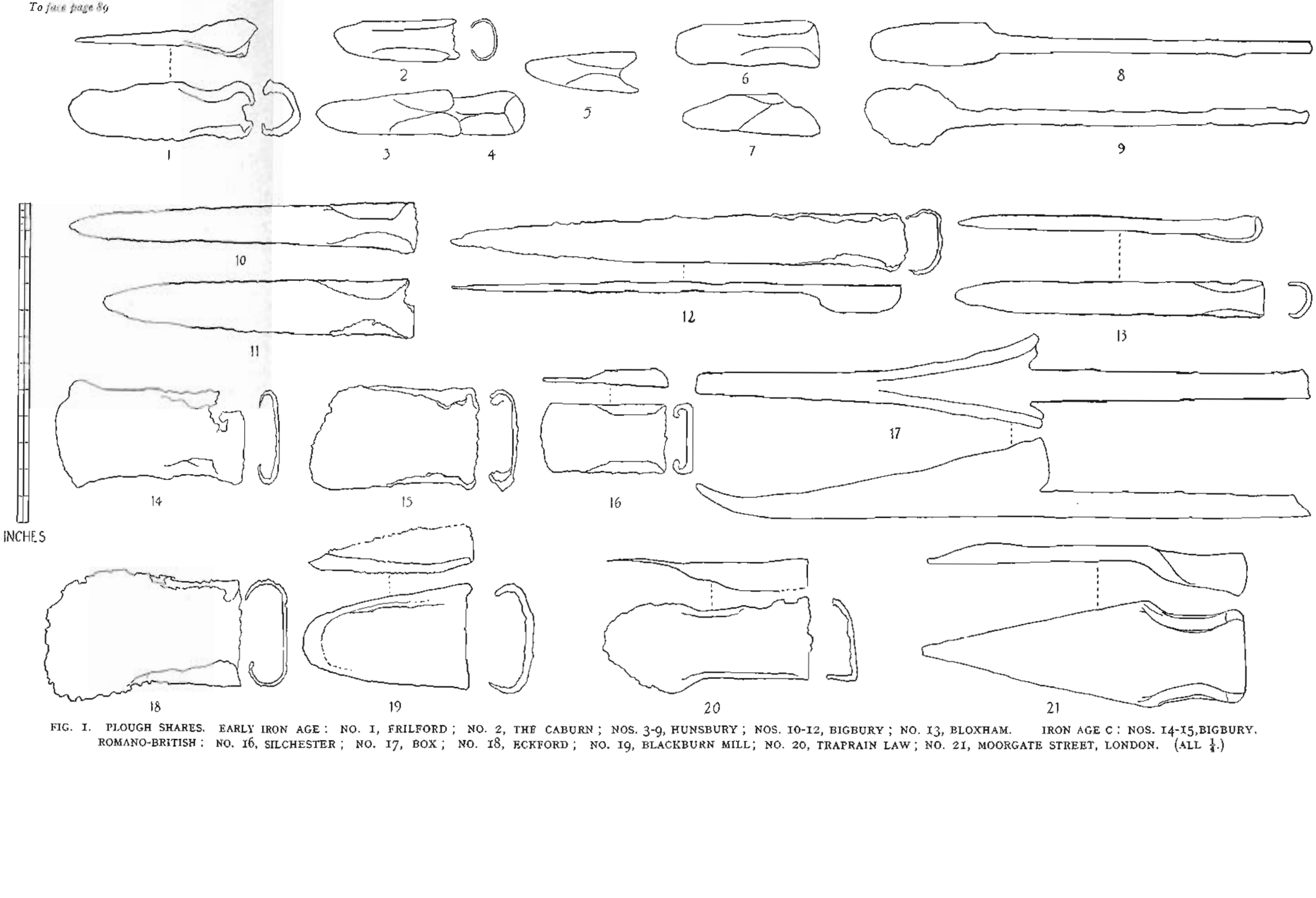


FIG. I. PLOUGH SHARES. EARLY IRON AGE: NO. 1, FRILFORD; NO. 2, THE CABURN; NOS. 3-9, HUNSBURY; NOS. 10-12, BIGBURY; NO. 13, BLOXHAM. IRON AGE C: NOS. 14-15, BIGBURY. ROMANO-BRITISH: NO. 16, SILCHESTER; NO. 17, BOX; NO. 18, ECKFORD; NO. 19, BLACKBURN MILL; NO. 20, TRAPRAIN LAW; NO. 21, MOORGATE STREET, LONDON. (ALL $\frac{1}{4}$.)

for implement making,[25] a thin rocky soil and natural features prohibiting much ploughing space,[26] and exceedingly diminutive oxen and horses had perforce to be taken into account. It is a highly specialized implement and, like the ' Hebridean plough ' (a different type), would have attained to greater proportions elsewhere.

In my opinion, it is unlikely that the Shetland plough had a much more extended distribution in Britain than the northern area of Viking settlement ; but it is very probable that the earliest ploughs of southern Britain did not differ much in essential form, however they may have varied in weight and size. It is obvious that the narrow plough-share found in Iron Age A and B settlements would not fit the share-beam necks of the two implements in the National Museum of Antiquities of Scotland, but it seems probable that they were designed for similarly horizontal share-beams. A selection of these shares drawn to the same scale, is shown in fig. 1, nos. 1-7 and 10-13.[27] I have managed to trace fourteen undoubted specimens and these are listed in the Appendix. They vary greatly in length. The three longest—12½, 13$\frac{8}{10}$ and 17¼ inches—are from 2 to 2¼ inches wide at the socket. Ten others range in length from about 3½ to 11½ inches and are 1¾ inches or less in width. The fact that the longest of these ten is also the narrowest suggests that the shorter ones are very much worn down. The general uniformity of socket length also supports this suggestion. The remaining, fourteenth, share, found at Frilford (fig. 1, no. 1) is of the Iron Age A phase, but appears to be different in shape from the rest, all of which attain their maximum width at the mouth of the socket. The Frilford specimen, which is rather worn, is 7½ inches long and attains its greatest width of 2⅛ inches at roughly half-way.

It is now necessary to consider what these shares have to tell us of the type of plough-frame to which they were attached. Dr. Curwen's generalized reference to ' the actual wooden parts of such ploughs '[28] is unsatisfactory. Apart from the fact that non-rectangular-frame ploughs of two distinct types have been found, the statement that the shares now under notice are 'relics of this type of plough' is rather misleading. One is led to suppose that the implements referred to used socketed shares of this kind. Actually, the share of the plough from Døstrup, which Dr. Curwen specifically mentions, is completely unlike our shares. It is a piece of maple wood 0.90 m. in length—over twice as long as the longest of our iron shares—and is secured in a hole in the rear of the plough-beam.[29] Again, another of ' the actual wooden parts of such ploughs ' is the implement from Dabergotz. This plough took a long-shanked, spear-like, wooden share which also was secured in the beam.[30] Both shares are completely different in type and material from the British ones under discussion.

Reference to fig. 1 and to the sizes of the share-sockets given in the Appendix makes it clear that the necks of the share-beams which took them must have been shaved down very considerably. That being so, it is also clear that if any of the

[25] *Ibid.*

[26] *Ibid.*, 192.

[27] One or two of these shares may date from the Romano-British period, but that is unimportant for my purpose. Their *type* is the important thing here. Acknowledgement of the kindness of the museum curators who sent me drawings and details of these and other plough-irons is made at the end of this paper.

[28] *Air Photography and the Evolution of the Corn-field*, 2nd ed., 13.

[29] Axel Steensberg, ' North West European Plough-types . . .', *Acta Archaeologica*, 1936, 252. It is now known that ploughs of this type were fitted with two shares. See *Postscript*, p. 109.

[30] Leser, *op. cit.*, 138 and Tafel 5.

share-beams had met the ground at as great an angle as that shown for the ploughs of the Alpine carvings its thinned neck would have snapped at the first serious obstacle in the soil. It is obvious that these shares could have been used satisfactorily only on a share-beam that entered the ground at a very low angle. Indeed, the length of the longer shares suggests an almost horizontal penetration if damage were to be avoided. This low angle of entry is perhaps important. It suggests to me that a hoe-like hacking of the soil was not desired, but that the undermining and turning of a furrow was intended. Apart from the fact that the variations in socket width may indicate variations in size and weight of the plough frame, the shares appear to have no more to tell us directly. Anything else I have to say about them is largely inference deriving from a knowledge of other, later, ploughs.

It is clear that to some writers *the* distinguishing characteristic as between plough and plough is the width of the share. It is supposed that a furrow-slice could not be undercut save by a broad one. In suggesting that even a very narrow share could in fact cut a narrow, shallow, furrow-slice as satisfactorily as a wider one could cut a wider, deeper, slice I do not wish to be flippant so much as to protest against habits like that of mentally projecting the average strong furrow of to-day back into the prehistoric scene. That furrows were turned even by the early narrow shares of the tanged type seems clear from what Steensberg says of another tanged wooden share from Borris, Jutland: 'the wearing-surface, which begins a little to the left of the point and turns over to the right half with a slight twist, bears clear evidence of the implement's having turned the narrow furrow-strip to the right, as a mould-board plough does'.[31]

Reference to fig. 1 will make it clear that from the earliest times for which we have evidence British plough-shares varied both in width and in shape. The widest of the Early Iron Age type shares are little narrower than the Romano-British share of Belgic type from Silchester (fig. 1, no. 16). Much greater variations in width and shape are met with in the Romano-British period and still greater in the Middle Ages. These last may be seen, though not too clearly, in MS. illuminations and are given solid reality in the varying prices of shares collected by Thorold Rogers from manorial accounts.[32] In these and later periods a very narrow type of share has been required and used. From Fitzherbert in 1523 onwards the agricultural writers made it quite clear that, traditionally, two main classes of plough-share—the spear and wing—were in general use.[33] A modern equivalent of the spear share is the 'bar-point', still made for stony soils. The choice of share was dictated by the nature of the ground and did not depend upon the plough type.[34] Fig. 2 a, b, shows both types of share in plan. Small's remark that 'the point of the spear share must not be straight with the landside because . . . it

[31] Axel Steensberg, *op. cit.*, 258.

[32] *History of Agriculture and Prices in England.*

[33] An example from the end of the 18th century: 'The dagger, whole and half-winged shares, are variously employed.' Vancouver: *General View of the Agriculture in the county of Cambridge* (1794), 217.

[34] 'If upon a stony land, or twichy woody Land, it must be narrower, and the more flinty the narrower; but if it be upon a gravelly it may increase in bredth, and so it may upon a clay, and more upon a mixed earth, and more upon a pure earth or sand, and most of all upon the Lay-turf': Blith, *The English Improver Improved* (1652), 193. Blith (p. 201) says of the share of the Hertfordshire wheel plough that it is 'exceeding narrow, and very strong, and running out to a very exceeding long small point.'

. . . would not raise up all the furrow '[35] shows that such shares were in fact expected to raise it.

All this suggests a way in which the narrow Iron Age shares could have been mounted so as to cut a wider furrow-slice than the width of the share itself would permit (fig. 2c). It will be noticed that the whole of the iron is little more than the

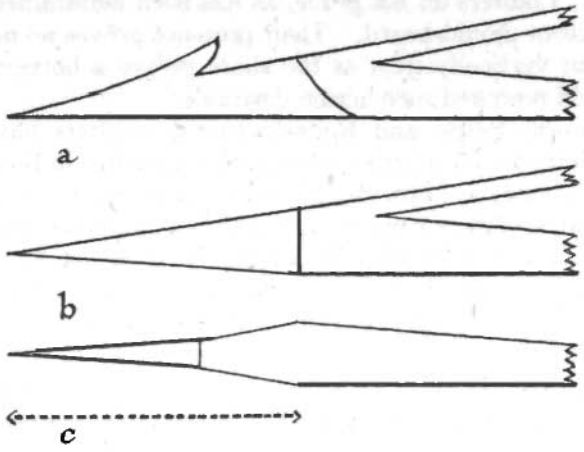


FIG. 2. a-b. 18TH-CENTURY WING AND SPEAR PLOUGH-SHARES (AFTER JAMES SMALL). c. EARLY IRON AGE SHARE ON WIDE SHARE-BEAM.

equivalent of the long point of the 18th century spear share (b) and that the unprotected remainder of the wedge-shaped end of its share-beam acts as does the wide blunt butt of the spear share and forces[36] its way under the furrow-slice. In other words, the effective furrow-opening length as indicated by the dotted line is part iron and part wood. Although the suggested arrangement depicts a share-beam as broad as those in (a) and (b), this is merely for the sake of clarity, and no indication of the width of Early Iron Age share-beams is intended. That it varied is evident from the shares themselves. Such a device as has been suggested would have been within the capacity of the veriest tyro in plough-wrighting. It would certainly have presented not the slightest difficulty to people as skilled in carpentry as the wooden objects from such sites as the Glastonbury lake village prove their makers to have been.

We now come to an important question: did the narrow-shared ploughs of the Early Iron Age use coulters? It is implied in most writings on the subject that they did not. The earth can be furrowed and the soil turned aside without

[35] James Small, *A Treatise on Ploughs and Wheel Carriages* (1784), 137. The land-side of a plough is the side against the unploughed land, the furrow-side is that to which the earth is turned. On the ordinary British plough these are on the ploughman's left and right respectively, but on all one-way ploughs the land-side in one furrow becomes the furrow-side in the next.

[36] Neither in tradition nor in modern practice does a plough-share undercut the whole width of the furrow-slice. Part is left uncut to be forced open, the slice pivoting the while upon that portion as open a hinge. Small maintained that a wing share should be as much as two or three inches narrower than the slice! Blith appears to be alone in believing that the full width should be cut.

the aid of a coulter, and this was and still is done in some climates and soils; but difficulties are experienced on moisture-retaining soils which also require a different agricultural technique. If, therefore, the belief that the Early Iron Age in Britain coincided with a deterioration in the climate is well-founded, it would not be unexpected to find the coulter adopted or devised. But before seeking evidence that the coulter was in fact used here in pre-Belgic[37] times, a word on the significance of the instrument is necessary. Coulters do *not* prove, as has been maintained, the presence of either plough-wheels or mould-board. Their presence proves no more than that the furrow-slice was cut vertically (just as the share proves a horizontal cut), because the nature of the soil rendered such action desirable.

As is well known, Belgic and Romano-British coulters have been found in Britain. Although they vary a little in detail, they all agree in their main characteristics. Dr. Curwen, however, illustrates[38] as one of them, indeed as representative of them, a coulter which differs completely from them all in every important respect. This coulter (fig. 3, no. 1, from Bigbury Camp, Kent) has a total length of about 16¾ inches. Its hook-shaped blade is 6 inches by a little over 2 inches at its broadest point. Its tang, 10¾ inches long, is very slight, being about 1 × ⅜ inches, tapering to ⅝ × ⅜. The coulter weighs one pound. Apart from this specimen, at least thirteen Iron Age C and Romano-British coulters have been found in this country. (fig. 3 and Appendix). Excluding two broken ones, they range in total length between 24¼ and 35 inches. Their blades, which are quite unlike the Bigbury example in shape, are much longer and broader, their massive tangs are mostly over twice as long and much thicker. Their weights are from seven to sixteen times as heavy. Why the small Bigbury coulter should have been selected as representative of these other massive implements, I cannot imagine; it is certain that it could have formed no part of the type of plough that Dr. Curwen attributes to the Belgae. Is it, after all, a Belgic coulter? If so, then the Belgae used ploughs of at least two kinds, greatly differing in weight and character. It would not be unreasonable to suppose that they did in fact do this. Nevertheless, the question of the origin of this coulter remains.

The circumstances of its discovery at Bigbury in 1895 are not too clearly stated by Boyd Dawkins in the *Archaeological Journal* for 1902. It appears that other objects found at the time included two narrow Iron Age A-B type shares (fig. 1, nos. 10-11). Boyd Dawkins illustrated these alongside the coulter in his paper and one is left to conclude that they were associated in his mind and in fact. This apparent association of the coulter with two narrow shares of Iron Age A-B type together with its complete dissimilarity in form, size and weight from all the other coulters are sufficient to make one disposed to accept it as a pre-Belgic specimen. But whatever its date, this coulter, like any other component of so complex an implement as a plough, can be made to yield one or two pieces of definite information. The first, proved by its length of 16¾ inches, is that the plough-beam to which it was attached

[37] The fact that *cwlltwr* in Welsh and *coulter* in English are derived from the Latin does not of necessity mean that the instrument arrived here with the Romans or even that they invented it. There had been plenty of knives of various materials in Britain in pre-Roman periods, nevertheless the Welsh *cyllell* shows that the Brythonic-speaking peoples adopted a new name for this familiar article during the occupation. The names of several parts of the human body, even of the body itself, were likewise taken over from Latin into Welsh, which shows the absurdity of finding too much in a name.

[38] *Proc. Prehist. Soc.*, iv (1938), 45, fig. 7, no. 3.

To face page 92

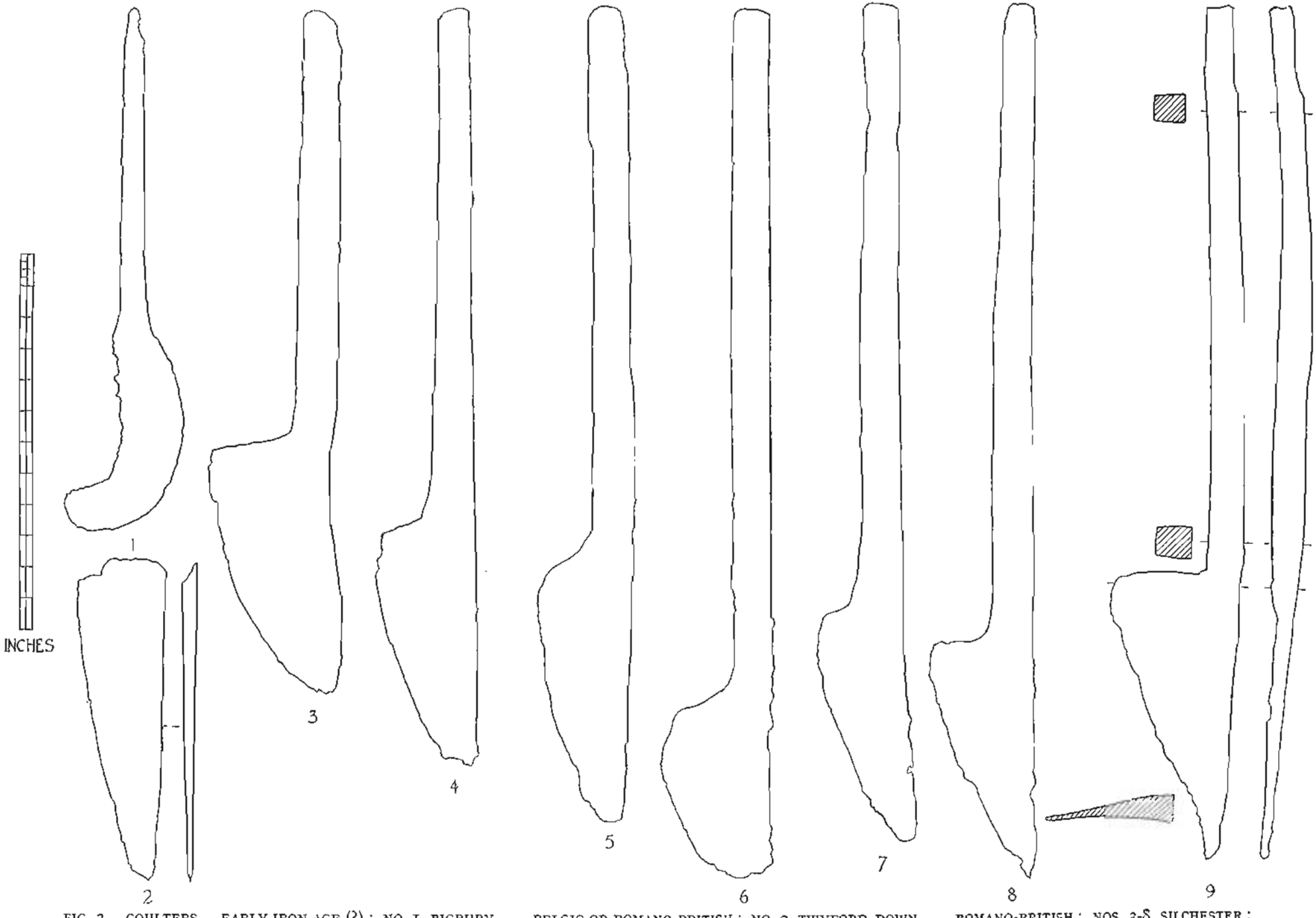


FIG. 3. COULTERS. EARLY IRON AGE (?) : NO. 1, BIGBURY. BELGIC OR ROMANO-BRITISH : NO. 2, TWYFORD DOWN. ROMANO-BRITISH : NOS. 3-8, SILCHESTER ; NO. 9, GREAT WITCOMBE. (ALL $\frac{1}{4}$.)

was very close to the ground, so close indeed that it is highly improbable that the plough had wheels. Secondly, the shape of the blade makes it clear that the coulter was fixed perpendicularly, since any forward rake would cause the blunt back of the point to obstruct the cut. The curious hook or sickle-like shape of the blade strongly suggests a very early design as though it were based upon cutting implements having a different function. Unlike it, the other coulter-blades (including the possibly Belgic example from Twyford Down, fig. 3, no. 2) already possess the form that has remained *essentially* unchanged down to our own day.

Having shown in some detail how the early narrow socketed shares could have opened wider furrows than might be supposed, and that some of them may have had the help of coulters, it only remains for me to indicate how, even with the simplest of plough-frames, those furrows could have been turned. Even supposing that the simple device used on the Shetland plough still lay far in the future, the share-beam itself could have turned the earth aside if the plough were held tilted to one side. Plate VII, *a* shows how the soil can be turned by the tilting of a flat share-beamed plough of primitive type.

So far in this paper, the only Iron Age A-B type share discussed is the well-known socketed spear-point type. There is, however, another type of share, here recognized in pre-Roman Britain for the first time.[39] Fig. 1, nos. 8-9 show two of six tanged plough-shares found at the Hunsbury Hill-fort, Northampton, and now in the Central Museum, Northampton. A seventh from the same site is in the British Museum.[40] The overall length of the three apparently unbroken specimens ranges from $15\frac{1}{2}$ to $16\frac{3}{8}$ inches, the present width of the blades varies from $1\frac{1}{2}$ to $2\frac{3}{8}$ inches. Leser[41] figures a similarly shaped share of the Roman period from Upper Bavaria. One can be reasonably certain of one constructional feature of the ploughs to which these tanged shares were fitted, that is that the share-beam or foot together with the share tang passed backwards through, and were wedged into, a mortise in the downward-sloping rear end of the plough-beam. In other words, these shares were used on a type of frame similar in essentials to the well-known plough from Døstrup, Jutland. As will be seen later, tanged shares continued in use in Britain in Romano-British times, but there is no evidence for their survival here in later periods. It is extremely unlikely that these tanged shares were used in conjunction with coulters.

§

Of the six assertions set forth at the beginning of this paper as being fundamental to Dr. Curwen's theory, all but nos. 4 and 6 have already been shown to be without foundation. The evidence brought forward to explain the characteristics of Celtic fields, when seen in its entirety and understood, does not explain them. Point no. 3, however, is not finished with. Dr. Curwen himself apparently abandons it in his later writings which take account of Iron Age C plough-irons, prehistoric strips whose furrow-length is from five to six hundred feet, and examples of Romano-British ridging. These things are not consistent with a belief that pre-Saxon

[39] Mr. Steensberg, to whom I submitted drawings of the two illustrated, agrees that they are tanged shares.

[40] *Arch. Journal*, xciii, 67, 74, Plates IV, B3; XIII, 11.

[41] *Op. cit.*, Tafel 5, Abb. *a*.

ploughs simply scratched a shallow groove in the earth. But the belief is not relinquished without a struggle. The Belgic users of these wider plough-shares, it is said, ' were at least partly of Teutonic origin '.[42] The suggestion seems to be that, although earlier than the Saxon conquest, these plough-irons and the work apparently to be associated with them are satisfactorily Teutonic and non-Celtic, and in effect testify to the beginnings of the conquest by the mighty Saxon plough. Some doubtful support for the idea is extorted from the word ' *plaumoratum* or some such name, for there are different readings, and it is at least possible that this is a corruption of a Teutonic word signifying " plough with wheels " '.[43]

I doubt if one should take these suggestions too seriously. It is very odd, to say the least, that such a Teutonized people as the Belgae are made out to be should have continued to speak a Celtic language ; but that is what the scanty evidence of personal and place names (and of Caesar and Strabo) tells us they did. *Plaumoratum* and its variants often crop up in writings on the plough. When thought to be of the origin and meaning mentioned above this word is sometimes contrasted with the most usual Welsh word for a plough, *aradr*, which is cognate with Latin *aratrum*. This little philological excursion is supposed to satisfy one that the Anglo-Saxon plough, like the *plau* etc., was a heavy wheeled implement and that the early Welsh *aradr* was a light two-ox southern European affair. Now, whatever the form, meaning, and derivation of the word originally used by Pliny, it can have *no* evidential value of the kind suggested for determining the sort of plough used by the Anglo-Saxons in Britain. The reason is simple : the word *plough* does not occur in Old English. According to the Oxford Dictionary, it is not found in Gothic either. O.E. used *sulh*, cognate with Latin *sulcus*, which means ' furrow ' as distinguished from the furrow-slice. The O.E. verb *erian* ' to plough ' is cognate with the Welsh *aredig*. Therefore, in advancing Meitzen's opinion that the word *plough* and its cognates in Teutonic languages strictly refer only to the broad-shared wheel-plough, Dr. Curwen is actually denying the use of such an implement to the Anglo-Saxons. It would appear that in any attempt to assign a poor plough to the Celts and a better one to the Anglo-Saxons, appeals to philology are likely to be as unhelpful as the appeal to a corrupt passage in Pliny.[44]

To return to harder facts, any suggestion that broad plough-shares were unknown in Britain until after the Anglo-Saxon settlement is amply refuted by the eight earlier examples shown in fig. 1, nos. 14-21. The distribution of these shares is not confined to southern Britain, and they vary in type and size. As mentioned before, the Romano-British share of Belgic type from Silchester, which appears to have escaped notice hitherto, is little wider than the widest Iron Age A-B shares. That the Belgic type shares were used in conjunction with the large coulters (fig. 3, nos. 2-9) seems probable since both occur at Silchester, and in view of the associations of the Twyford Down coulter-blade. This does not, however, preclude the probability that such coulters were used with certain others of the share forms figured. That they were used on some of the villas is indicated by the Great Witcombe specimen (fig. 3, no. 9), though the only share so far discovered on a villa in Britain (fig. 1, no. 17) was probably used without one.

[42] *Air Photography and the Evolution of the Corn-field* (1938), 15.

[43] *Ibid.*, 19 ; Pliny, *Nat. Hist.*, xviii, 48.

[44] *Carruca*, a more stable word, with its Celtic derivation, lends some support to a contrary argument.

The suggestion of Lt.-Col. J. B. P. Karslake that these large coulters were used on wheel ploughs of the Kent plough type[45] has met with a fair measure of agreement. The suggestion was based upon the fact that the length of the coulters presupposes plough-beams considerably elevated above the ground, and that their weight and the size of their tangs argues that the beams into which they were wedged were like those of the Kent plough, 4-5 inches square. Karslake argued that ' their size and form preclude their use in any form of plough-beam unsupported on wheels '. He then sought to strengthen his argument by pointing out that the hoards in which the coulters were found also contained ' holdfasts which would fit beams from 5 to 6 inches square ' and some iron bars corresponding in size to some used on the wheel-carriage of the Kent plough of modern times. Furthermore, the Great Chesterford hoard contained wheel-tyres 3 ft. 7 in. in diameter.

Karslake's complete argument will not bear close examination. To take his comparison of the Belgic and Kent ploughs first, the Silchester and Great Chesterford hoards contained a number of articles unconnected with ploughs, and one should therefore be very wary of assigning indeterminate objects to that implement. The holdfasts are too big to fit the Kent plough-beam at its greatest size, and it requires a special act of faith to believe that the Belgae could afford to use iron rods so liberally in the construction of their plough wheel-carriages when such use of iron where wood would serve appears to be neither documented nor illustrated even in the medieval period. Then again, the wheel-tyres mentioned by Karslake are surely fantastically large for use on any early plough. The Kent plough at its greatest size in the early 19th century had wheels 5 inches less in diameter.[46] The author's statement that the Kent share ' still retains the form of a spade as described by Pliny ' renders it necessary to point out that the Kent share in 1796 weighed 32 lb., was 20 inches long, and from $4\frac{1}{2}$ to 7 inches wide at the point.[47] In other respects also it was as unlike the Belgic shares as it could well be.

It was, of course, on the length and massiveness of the Romano-British coulters that Karslake based his argument in favour of wheels, thinking such to be necessary for the support of any plough-beam sufficiently elevated and massive to hold them. This view was contested by Mr. R. V. Lennard[48] who pointed out that a large coulter does not necessarily imply a wheel plough and referred to the ' large ' coulters depicted on swing ploughs in the Psalter of Eadwine, the Luttrell Psalter, and the Trinity College Piers Plowman. Whilst agreeing with Mr. Lennard's contention, I could wish that it had been based upon something more definite than ' large ' coulters whose actual size can never be known. The casual reader might take it for granted that they are provably as large as the Romano-British ones. These latter, excluding an apparently broken one, range in present length between $24\frac{1}{4}$ and 35 inches. Many of them are much worn down and one would not err greatly in considering their original length to have varied between 27 inches and one yard. An attempt to introduce a standard of measurement into the plough pictures referred to by Mr. Lennard, that is, an attempt to guess with some degree of accuracy, led me to

[45] *Antiquaries Journal*, xiii, 458-9.

[46] J. B. Passmore, *The English Plough* (1930), 71. The plough described by Pliny had *small* wheels.

[47] John Boys, *A General View of the Agriculture of the County of Kent* (1796), 46.

[48] ' From Roman Britain to Anglo-Saxon England ' in the *Dopsch Festschrift* (1938).

suppose that Mr. Lennard's test coulters might possibly have been 26, 23-24, and 30 inches respectively.[49]

Although agreeing that these long coulters do not *necessarily* imply wheels, I do not deny their presence. On the evidence, no one can deny it ; but what has not been realized is that this evidence permits of three interpretations. The great length of most, though not all, of the coulters in question does suggest a plough-beam lifted high above the ground. That is certain ; and is all that is certain. The first interpretation of this fact has been discussed above. A second interpretation is that the high beam could equally well have rested upon nothing but the yoke between the hindmost (or, in the case of long-yoking, the inmost) oxen. This yoke attachment appears to have been fairly general in antiquity. The height of the beam at the coulter would be governed by its own length, the height of its hinder end above the share-beam, and the height of the oxen at the shoulder. Lacking these necessary data, one can no more prove this interpretation than the first. It is, however, equally possible.

In favour of wheels it might be objected that to burden the oxen with the weight of the plough-beam would have been unthinkable. That this objection is unreal is easily shown : massive beams are present on many existing swing ploughs[50] which balance easily on their share-beams, or do so at the touch of the ploughman's hand on the plough-tail. Extended to the yoke, such beams could be as easily balanced as were the longer draught-poles of heavily laden ox carts.

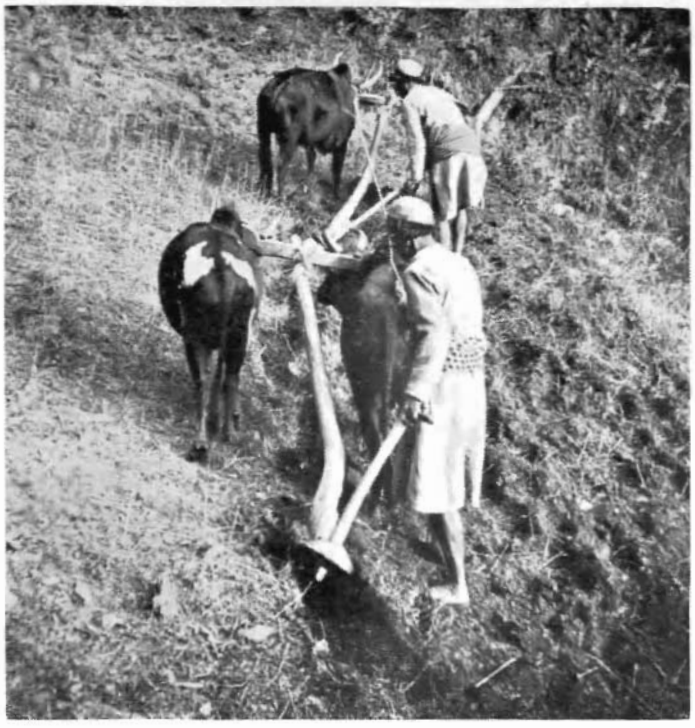
The third possible interpretation is that these coulters were used on a developed ' one-way ' plough. As on the Kent plough, this would necessitate some inches of coulter tang remaining *above* the beam to engage the rod which held it on alternate sides of the mortise every other ' bout '.[51] While such a plough requires an unusually long coulter, its length need not presuppose a high beam. That such shifting coulter devices were employed on one-way ploughs in the *first* centuries of our era is, however, doubtful and an examination of the Silchester coulters has convinced me that some of them at any rate, formed no part of such an implement.

The blades of these Silchester coulters were forged by beating out one face of the iron rod only. In technical language, the effect of this procedure was to give the cutting edge of the blades a 'knee' or 'set' to the landside. At the point of the cutting edge this ' set ' is almost as much as the thickness of the tang, and in some of the coulters it is slightly increased by an additional bias which brings the edge beyond the landside of the tang. Professor Hawkes, after a re-examination of it at the British Museum in 1946, has informed me that the Great Witcombe coulter also exhibits this feature. The significance of this is that the coulters were designed to bite as widely as possible to the landside of the plough only,

[49] The method adopted was to take the ploughmen depicted with the ploughs, assign to each the same height and limb measurements, and check the coulter lengths against them. The measurements of a colleague 5 ft. 10½ in. tall were used, and it is very likely that an unfair opportunity was accorded the pictured coulters to achieve lengths comparable to the Romano-British ones. Even so, they do not quite manage it. The same scale applied to ten other plough pictures showed their coulters to be generally shorter, sometimes much more so, than the Romano-British examples. The possibility of error is obvious ; but it is much less than if one indulged in uncontrolled guessing.

[50] e.g. a Gloucestershire swing plough in the National Museum of Wales collection has a beam 9 ft. 6 in. × 5 in. × 4 in., i.e. actually larger than some Kent beams.

[51] A shifting-coulter device operating *below* the beam on a plough of the Dark Ages is described below.

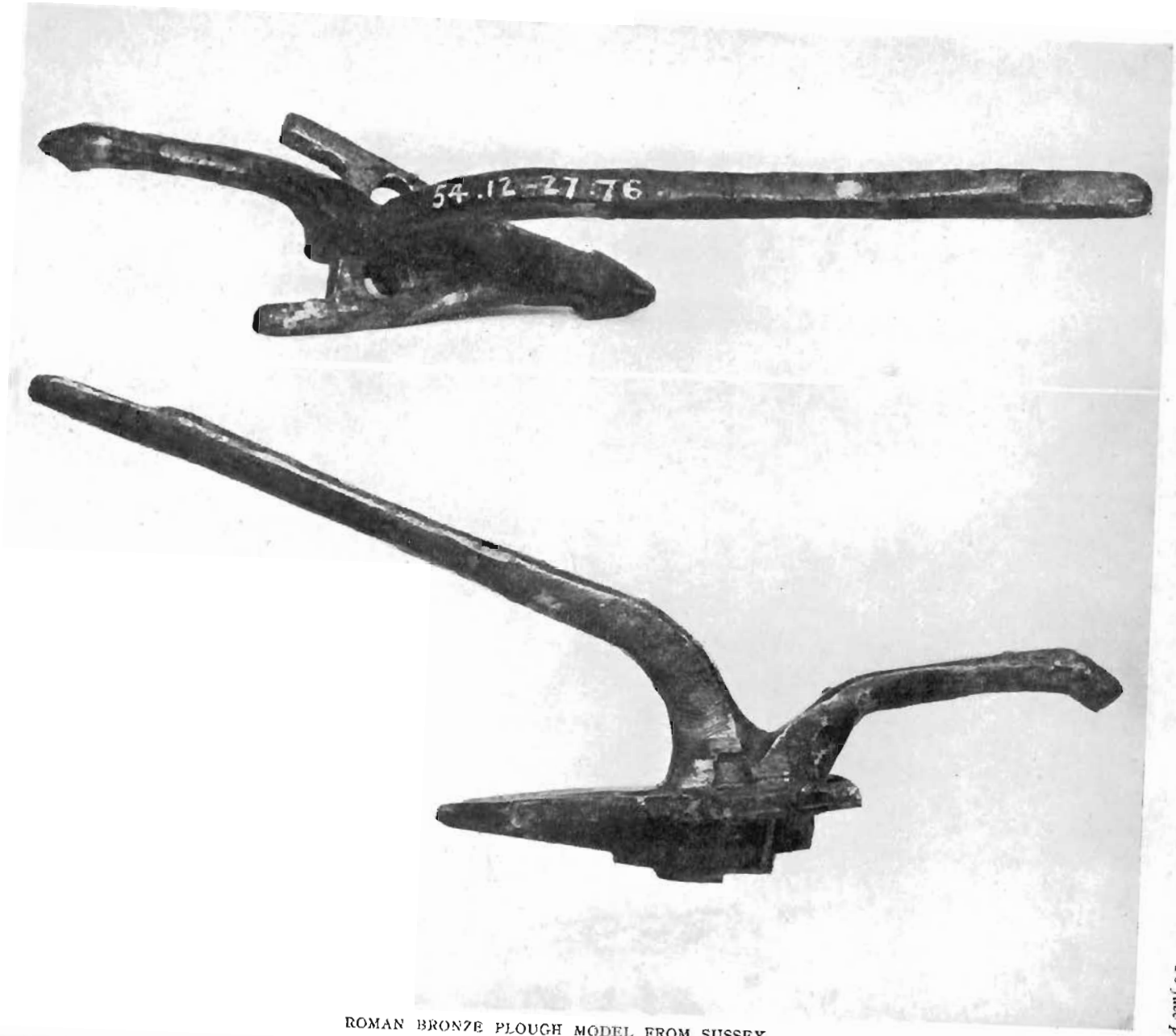


a

PLOUGHING IN THE HIMALAYAS.
Copyright 'Country Life'

b

OX-GOAD FROM TRAPRAIN LAW.
By courtesy of the Society of Antiquaries of Scotland.



ROMAN BRONZE PLOUGH MODEL FROM SUSSEX.
L. 3·7 in.
By courtesy of the Trustees of the British M

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and that the furrow-slice was consistently turned to the other side. In other words, the plough that used these coulters turned its furrows always and only to its right side as does the typical British plough of to-day. It follows that with them the fields were ploughed in ' lands ' or ' ridges '. The fixed furrow-side made this inevitable. Not fixed *mould-board*. Short of finding an actual plough the presence of a mould-board cannot be proved. A fixed ground-wrest—a different thing—may have been used ; it is difficult to believe that men habitually ploughed in ridges without it, and there is evidence (see below) that the ground-wrest was known in Roman Britain.

To sum up, all that can be said with confidence of the plough apparently to be associated with the Belgae is as follows : Its beam was more elevated than that of the generality of medieval ploughs ; but it cannot be determined whether it was supported by a wheel-carriage or by the ox-yoke. The varying widths of share suggest that the share-beam also varied. This together with the variation in coulter size and weight indicates that the plough itself may have been made in several sizes. Its wide-mouthed share would appear to be not well suited to very stony ground. The coulters are strong enough for use on the stiffest soils, and the appearance of the blades of those I have seen suggests that most of their length was actively engaged. It follows that even by modern standards they cut a strong furrow. The plough turned the furrow-slice to the right or ' furrow-side ' only, and in consequence those who used it ploughed in ' lands ' or ridges.

That is all that the evidence available at present allows one to say of the Belgic plough. Since through a series of misconceptions plough wheels have come to assume an undue importance in the minds of archaeologists, it is necessary to add that their absence—or lack of proof of their presence—in no way detracts from the implement's usefulness. Traditionally, swing ploughs have always been preferred to wheel ploughs on heavy wet soils. In the present writer's experience and observation they still do a better job on such soils, though few ploughmen of to-day have the skill or inclination to use them.

Of the six Romano-British shares illustrated (fig. 1, nos. 16–21) four, like the Belgic examples, are socketed while the sixth is a tanged type. One may hazard a guess that the share from Moorgate Street (no. 21) was used on a one-way plough. With more certainty one can point to its suitability for stony soils. A very similar share is shown on a Roman plough model of bronze in the British Museum (Plate VIII). It is said to have been found with other model tools in a Roman barrow in Sussex.[52] Like the well-known Roman model from Cologne[53] it has two fixed ground-wrests, but unlike it its share appears to be socketed and not tanged. On the whole the Sussex model is more like the one figured in Leser's Abb. 26, from the lower Rhineland. I can find no reason for doubting that similar ploughs were among those used in Britain. Wearing a share similar to that from Moorgate Street and held on the tilt as shown in Plate VIIa, such a plough could open and clear a practical furrow. Both sides of the implement are identical and it is clear that it could be used for one-way work. The underside of the sole is ridged as shown in Plate VIII, and this in itself strongly suggests that it (or rather its prototype) was so used. A ridged sole was present on the 18th-century *araire* of Provence and concerning it Duhamel du

[52] British Museum, *Guide to the Antiquities of Roman Britain*, 42.

[53] Leser, *op. cit.*, Abb. 25.

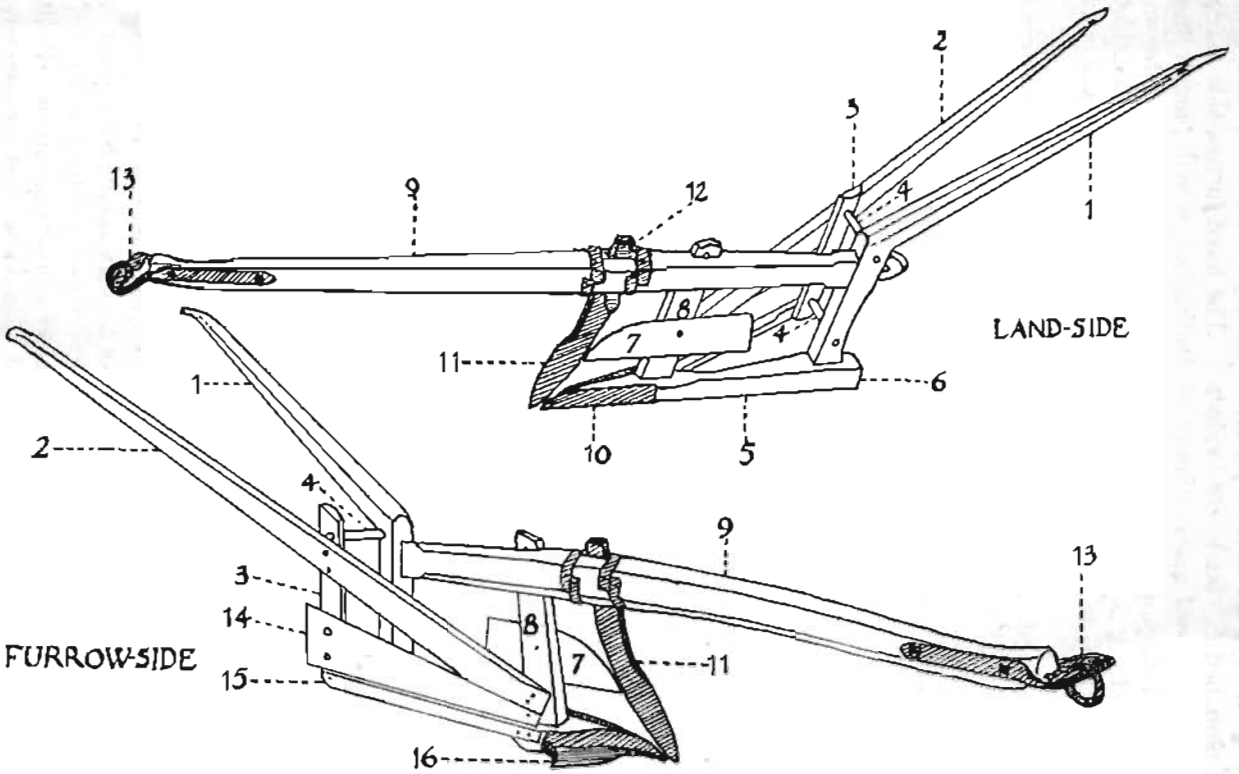


FIG. 4. THE PARTS OF A PLOUGH (IN THE NATIONAL MUSEUM OF WALES) OF LATE 18TH CENTURY TYPE. (THOSE SHADED ARE IRON, THE REST ARE WOOD.) 1. PLOUGH-TAIL (LAND HANDLE); 2. PLOUGH-STILT (RIGHT HANDLE); 3. DROCK; 4. ROUGH STAVES (PLOUGH SPINDLES); 5. SHARE-BEAM (CHIP, THROCK, SOLE, HEAD); 6. HEEL; 7. FEN-BOARD; 8. SHEATH (SHEET); 9. PLOUGH-BEAM; 10. PLOUGH-SHARE (SOCK); 11. COULTER; 12. COULTER-WEDGE; 13. HARE (EAR, COPSTOL); 14. MOULDBOARD (SHELBOARD); 15. GROUND-WREST (PLOUGH-REST, RICE); 16. WING OF PLOUGH-SHARE.

Monceau says ' it is certain . . . that the under part of the ground wrist being ridged, the plowman always rests it on one side which occasions the greatest part of the earth to be thrown one way '.[54] Assuming that ploughs of the type of our bronze model took shares like that from Moorgate Street, they would appear to have been about the same size as the *araire* referred to. This latter had a sole of from 3 to 4 feet long and a beam of 8 to 10 feet and was therefore no smaller than many a British swing plough of the late 18th or early 19th century. The chief importance of this model, however, is as evidence that the ground-wrest was known in Roman Britain.

As was said when discussing one type of the Hunsbury hill-fort shares, the mere fact of a share's having a tang tells us something of the construction of the plough that used it, and some French ploughs of the expected type provide close parallels to the tanged share from the Roman villa at Box, Wiltshire (no. 17). The aforementioned *araire* of Provence is one, and a plough from Gers, figured by Leser (Abb. 168) has a share even more like the Box example both in plan and side view. The Box share, it is true, terminates in an unusually long bar-point, the significance of which is that this particular iron was designed for use in stony, but previously tilled soil. It would not have been suitable for breaking up new ground. Again, but, this time without any doubt, it is the share of a one-way plough. One doubts very much that this share was used in conjunction with a coulter.

The remaining four shares of the period come from the then Brythonic region of southern Scotland and, in view of what has been assumed concerning the agricultural technique of the Brythons of the ' Highland Zone ' of Britain they are of great importance. The Blackburn Mill share[55] (no. 19), formed part of a hoard of tools and other objects deposited in a bronze cauldron. I am informed by Professor Gordon Childe that other plough fittings from the same hoard,[56] collected before the technique of iron preservation had been developed, are now unrecognizable fragments. The hoard is dated by a patera of the mid- or late 2nd century. The Eckford share (no. 18) also formed part of a hoard, which included an enamelled cheek-piece for a bridle, a bronze terret, linch pin and farrier's buttress, and is apparently of about the same period. Of these hoards, Mr. James Curle has said, ' Roman and Celtic influences are apparent, and it seems probable that in every case we are in the presence of objects which were in native hands '.[57] Since assumptions sometimes die hard, it is just as well that Traprain Law, which yielded the third of these shares (no. 20),[58] yielded also ox-goad tips (Plate VII, *b*),[59] thus proving the use of draught oxen on the site. It is, perhaps, necessary to emphasize that the goad is the instrument of the driver and not the drover ; useless to the pastoralist, it was almost indispensable to the agriculturist. Not quite indispensable, however, for the *geilwad*, the backwards-walking ox-driver, pulling with both hands on the yoke, often managed without it. It follows that while the absence of goad tips on a site need not mean the absence of the traction plough, their presence is an

54 *The Elements of Agriculture*, trans. P. Miller (1764), II, 7. Miller uses ' ground wrist ' to denote ' sole '.

55 *Proc. Soc. Antiq. Scot.*, lxvi, 315.

56 *Catalogue of the National Museum of Antiquities of Scotland* (1892), 160, D.W. 114-15.

57 *Proc. Soc. Antiq. Scot.*, lxvi, 314.

58 *Ibid.*, lviii, 255.

59 *Ibid.*, xlix, 189 ; lvi, 228. Goad tips have also been found at other places in the north and west, e.g. Newstead, Mumrills, Wroxeter, Glastonbury.

indication of it.[60] As to the date of the Traprain share Professor Gordon Childe tells me that it is not likely to be later than A.D. 200 nor earlier than 50. These shares are on the whole wider than the three known Belgic examples. The one from Eckford is the broadest early socketed share found in Britain, though a possibly sub-Roman share from Oxnam (Appendix, no. 27) which is in very bad condition, is very little narrower.

These plough-irons come from the region of the Votadini, one of the Brythonic tribes whose language during the Roman period was slowly changing into Welsh, and there can be no doubt that they were used by them. It is important to note that it is from this particular region and from later generations of this particular tribe and its immediate neighbours that the earliest literature and traditions preserved in Welsh derive. These facts do not accord with what has been assumed and inferred of the early agricultural technique of the ' Highland Zone ' of Britain in general and that of the Welsh in particular. An example of an inference here shown to be incorrect is Dr. Curwen's belief that the ox-drawn plough did not displace the caschrom or ' foot-plough ' among the Welsh until the fifth century of our era. Whatever the evidence upon which Dr. Curwen based his opinion, the mere antiquity of the word *aradr*, derived from Brythonic **arātron*,[61] should have been sufficient to discount it. It is, however, necessary to review the evidence for the caschrom in south-western Britain.

§

In his paper in *Antiquity*, i, Dr. Curwen drew attention to an old Breton plough in the Pitt-Rivers Museum at Farnham and said that it was nothing more than a caschrom adapted to animal traction. A large wooden implement from the Glastonbury lake village was also declared to be a foot-plough. Then a Welsh triad taken from the spurious ' third series ' which contains a reference to an ' arad arsang ' was quoted. This section of Dr. Curwen's paper, and his later treatment of the subject, being so well known, it is only necessary to remind the reader of two of the conclusions to which this evidence led him. They are ' that before the introduction of the ox-drawn plough into Wales cultivation was carried out with the caschrom and with mattocks ' and ' we should infer that the ox-drawn plough evicted the caschrom from Wales in about the fifth century of our era '.[62] In view of the fact that these conclusions have begun to find their way into the earlier chapters of school and other history books it is necessary to state plainly that they are completely worthless. First of all, what is meant by ' Wales in about the fifth century of our era ' ? Obviously, from the use he makes of the triad Dr. Curwen means the territory then inhabited by the Welsh people. This territory was a very

[60] It should be noted that the only ancient ox-yokes so far found in Great Britain were well into the ' Highland Zone '. One was found under six feet of peat in White Moss, Shapinsay, Orkney, another was taken from a moss near Lochnell, Argyllshire. See *Catalogue of the National Museum of Antiquities of Scotland*, 346, 348.

[61] Henry Lewis, *Datblygiad yr Iaith Gymraeg* (1931), 46. In a letter to the writer Professor Lewis has kindly supplemented the information in his book here referred to, and gives the derivation thus: Indo-European **arətrom* > Celtic * *aratron* > Brythonic * *aratron* > Welsh *aradr*.

[62] *Air Photography and the Evolution of the Corn-field* (1938), 24.

big slice of southern Britain, and its people, as we have seen, had used the traction-plough for a long time. Far longer indeed than the plough-shares of the northern tribes alone would permit us to say, as the antiquity and derivation of such Welsh words as those for plough, ploughshare, yoke and ox prove. These words owe nothing to Latin, and were current from Strathclyde to Cornwall. One could leave the question of the caschrom among the Welsh at that, were it not that one is reluctant to leave some thoroughbred ploughs disguised as caschroms and a literary forgery masquerading as tradition. And, of course, there is always someone ready to believe that under some environmental compulsion or other Cunedda and his people at the close of the fourth century might have left their ploughs in the North and betaken themselves to the caschrom and mattock in Gwynedd and Ceredigion.[63]

To those unfamiliar with the development of implements of tillage the sight of a caschrom and that Breton plough figured side by side[64] might well suggest that their relationship was as stated. However, the drawing of the Breton plough reveals that the implement is incomplete, that it is a part of a wheel plough. The row of pegs along the beam in front of the coulter proves this. Its function is two-fold ; firstly to provide a number of points at which the wheel-carriage can be linked to the beam by means of a tow-chain or shackle from the axle, secondly to provide a means of regulating the depth of the furrow. When the wheel-carriage is slid under the beam and hitched to the first peg the plough cuts to its full depth ; but if the shackle is transferred to the second peg the wheels are drawn further under the sloping beam which is thereby lifted higher. The further back the wheels are hitched to the pegs, the higher the beam is lifted and the shallower the furrow becomes. This device was common on wheel ploughs in several countries but has now been superseded by a toothed iron rack or by holes drilled in the beam. An illustration of a later Breton plough of this type, complete with its mould-board and wheels, and with identical combined tail and share-beam is given by Leser (322, Abb. 170).

The remainder of the parts of the plough-frame at Farnham are no more unique than the beam. The three sheaths can be paralleled in a picture in the Caedmon MS. The one-piece tail and share-beam (a feature apparently not found on the caschrom, by the way) is sometimes met with in old drawings. An early one is that of the so-called Saxon plough reproduced in Plate IX. A late 15th-century one from Denmark is reproduced by Steensberg.[65] The hand-grip on the tail that was thought to be a survival of the caschrom foot-peg has a distribution as wide as from England to China and is found in all periods.[66] It may be as well to add that a single-tail plough is in no way ' primitive '. There were plenty of them about in late 18th and early 19th century England,[67] sometimes a detachable second tail-cum-plough-staff was provided.

[63] After all, does not *The Cambridge Economic History of Europe*, I, 160-1, lend its authority to the belief that even ' well into the Middle Ages ' Wales was peopled by semi-nomadic pastoralists ? If historians paid even a little attention to Welsh legal and literary documents such nonsense would not find its way into standard works.

[64] *Antiquity*, i, 271.

[65] *Acta Archaeologica*, vii, 272, and *Fortid og Nutid*, xii, 34.

[66] See for a late English example Arthur Young, *General View of the Agriculture of the County of Essex* (1807), I, Plate 8.

[67] See, for example, the *General Views* for Cambridgeshire, Hertfordshire, Essex.

It is, I hope, unnecessary to deal similarly with the *incomplete* ' Cornish ' plough of a well-known type given unmerited publicity in *Antiquity*, viii, 204, but the so-called oak ' foot-plough, not unlike the caschrom ' found in the lake-village of Glastonbury must be glanced at, since it occasioned a belief that such an implement ' had apparently not disappeared from Somerset by the first century before Christ '.[68] I am afraid that the resemblance of the implement in question to a caschrom is a very slight one. At least I have not seen a caschrom handle, or a picture of one, like it either in shape or in size. Even without the customary share-beam it measures 8 ft. 3 in. Complete, this awkwardly shaped and weighty ' foot-plough ' would be almost 12 ft. long. It is impossible. If this object is in truth part of an implement of tillage, my guess is that it was, or was intended to be, a plough-beam not unlike that shown on the Roman plough model in Plate VIII.[69]

Why the dwellers in the Glastonbury lake village should be deemed to require a foot- or hand-plough at all puzzles me. Goad tips, one of iron and three of antler, were found there and are in themselves sufficient proof of the use of draught oxen. An extremely fine wheel and some turned wheel hubs prove the use of wheeled vehicles. Therefore the use of a foot-plough by the dwellers on this site can have been necessitated by one thing alone, namely the tilling of lands so rough, rocky, confined, or steep as not to admit a traction plough. And I shall be surprised to hear that such lands are to be found at Glastonbury.

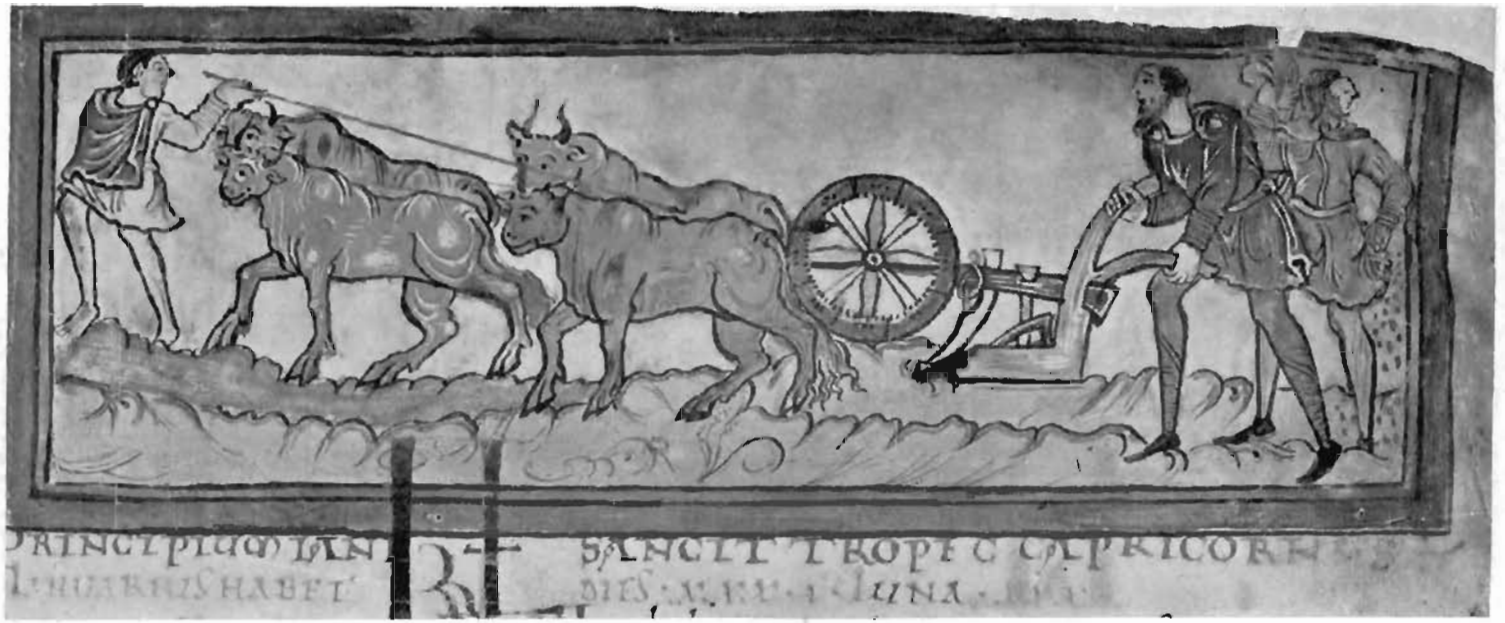
Little need be said of the Welsh triad, which has misled many people unfamiliar with Welsh literary problems. Long ago in his *History of Wales*, Sir J. E. Lloyd drew attention to the worthlessness of the ' third series ' of triads. Since then the researches of Professor G. J. Williams into the activities of the 18th-century literary forger, Iolo Morganwg, have proved them to be completely valueless to the historian. The antiquity of the vocabulary of traction ploughing among the Brythonic Celts has been pointed out already, and it is significant that no Welsh word for caschrom has survived. The ' arad arsang ' of the triad is a coinage of Iolo Morganwg's. *Arsang*, a genuine but rare word is a masculine noun meaning ' oppression ' or ' tyranny '. No such article as a foot-plough appears among the agricultural implements enumerated in the Welsh Laws. Mattock, spade and shovel, as indispensable then as they are to the countryman to-day, are of course listed ; but there is nowhere the slightest suggestion that any one of them was used instead of the plough. And where in Wales would a caschrom have been *needed* ? There was enough ploughable land for the needs of its population ; the country is not a larger Snowdonia.

§

We now come to nos. 4 and 6 in the chain of assumptions listed in the beginning of this paper, namely that Saxon ploughs used broad-bladed shares only and were drawn by eight-ox teams. These assumptions are so widely accepted as proven facts and as essential to the picture of the Saxon plough present in the minds of most archaeologists and historians that an examination of this historically important

[68] *Antiquity*, i, 271.

[69] The wooden implement in question is figured in Bulleid and Gray, *The Glastonbury Lake Village* (1911), I, fig. 131.



ONE-WAY PLOUGH FROM COTTONIAN MS. TIB. B.V. (PART I), FOL. 3.

By courtesy of the Trustees of the British Museum

To face page 103

implement is overdue. The Anglo-Saxons are generally credited with having introduced into Britain a large heavy wheel-plough with broad share and fixed mould-board. Its great weight and the tremendous furrow it turned necessitated its being drawn by eight oxen. Presumably the native breeds of oxen were too puny for the job and so, it is sometimes said, the Anglo-Saxons brought their own oxen too. As far as I am aware, no *proof* of the existence of this implement among the invaders, or their descendants for four centuries, has been offered, and the proof is long overdue.

Let us look at the evidence. We must pass by that of archaeology; there is none. Excavated sites of Anglo-Saxon settlement in England are very few in number, and their yield of agricultural implements is very poor. It appears that not one plough-share or coulter has been recorded. I cannot recall even a goad-tip. And no field of the Anglo-Saxon period seems to have been identified.

For the form and detail of the plough in question, the archaeologist usually refers one to illuminations in MSS., in particular to those in the Cottonian MSS. Tiberius B.V. and Julius A. VI, and those in the Caedmon MS. The dates usually assigned to these MSS. are, latter half of the 10th century, 11th century, and *c.* 1000. They are thus very late for our purpose, but an even more serious objection can be made to the Cottonian MSS., which from our particular point of view here, are in reality but one. The same pictures occur in both. It does not seriously decrease the evidential value of a series of pictures that they are copies of others or that both may be versions of still another series, provided that the originals are of the right period and provenience. It is the origin of these pictures that is open to doubt. Writing of the MS. Julius A. VI, Dr. E. G. Millar protests ' against the unqualified use of this MS. for illustrations of contemporary English life and customs '.[70] No archaeologist would make use of archaeological material the origin of which is as suspect or unknown as that of the plough pictures of these two MSS.

But let us for an uncritical moment assume, as is usually done, that these two plough pictures portray a genuine Anglo-Saxon plough. Plate IX reproduces the earlier of the two: does it depict the implement of which one has heard so much? It does not. It shows a wheel plough, somewhat remarkable for its shortness of beam and share-beam, considering that it is a rectangular-frame type. A slender piece of wood slants upwards from the back of the share towards the lower part of the plough-tail. This has usually been interpreted as a mould-board, but is quite definitely not so. In view of a curious attachment to the coulter, this slanting piece of wood is certainly a crotch for a ' shifting ear ' device to be attached to alternate sides of the share-beam every other furrow. The coulter attachment referred to seemingly consists of a stick and a link, possibly of withy or thong.[71] This link is hooked figure-of-eight fashion around a peg in the upper surface of the beam just in front of the coulter mortise. The larger lower loop of the 8 hangs slightly below the landside of the beam, and through it the stick is passed beneath the beam until it levers against the far edge. Next, the free end of the stick is forced

[70] E. G. Millar, *English Illuminated Manuscripts from the Xth to the XIIIth century* (1926), 20.

[71] A suitably shaped iron link would be best. A reconstruction of the device using a stout stick and a rope link showed that the ' give ' in the latter might allow the coulter to spring free on encountering a stone. Later coulter-shifting devices, somewhat similar in principle, all act against the coulter tang *above* the beam.

backwards against the inner face of the coulter-blade which in turn is pressed by the spring of the stick as far as possible to the landside. The coulter mortise is of course made much wider than the thickness of the coulter-tang, which is thereby allowed the necessary lateral play. The absence of wedges in this mortise will be noted in the illustration. The position of the coulter, before and after the stick is engaged with the blade, is shown in fig. 5 a. At the end of the furrow, the stick

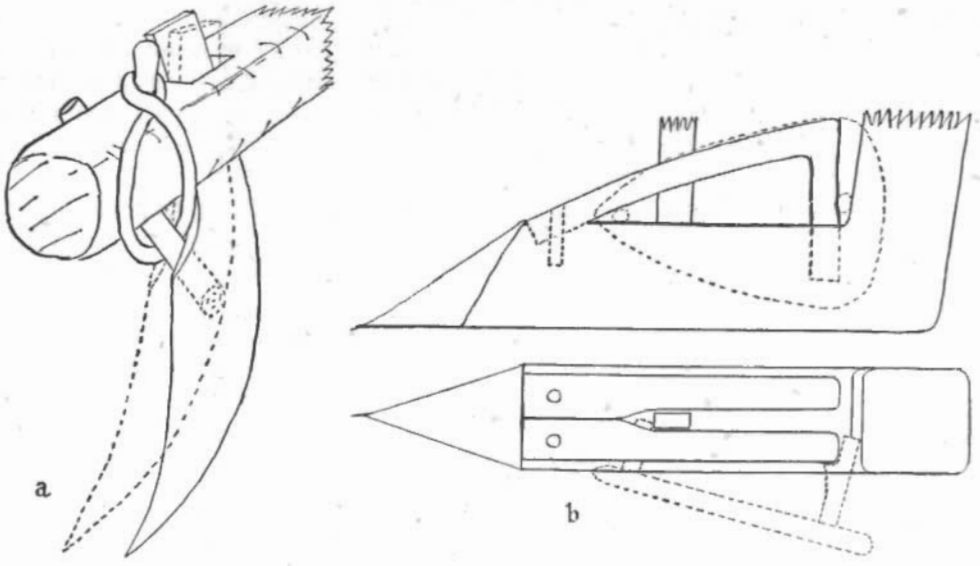


FIG. 5. a. COULTER-SHIFTING DEVICE. b. CROTCH AND SHIFTING EAR.

is slid forward off the coulter and withdrawn from the loop. The latter is swung over to the other side of the beam from which side the stick is now re-inserted and re-engaged with the other side of the coulter-blade. This forces the coulter to the opposite side of the beam. The ' ear ' is also changed over. What was formerly the furrow side of the plough is now its landside and the implement is ready to return and lay its next furrow in the same direction as the last one. It will by now be appreciated that once more we are dealing with a one-way plough. This example has the symmetrical double tail forking from a central post which is characteristic of developed implements of this type.

It is now necessary to elucidate the crotch to which the shifting ear is attached. My explanation may be checked by reference to the very clear engraving that accompanies Duhamel du Monceau's account of a French plough of the same nature but of different construction.[72] As the illustration clearly shows the crotch itself cannot act as a mould-board. The visible side—for there is another—being to landside of the sheath cannot make sufficient contact with the earth on the furrow

[72] *The Elements of Agriculture*, II, Pl. I, fig. 12, and pp. 23-25. The engraving is reproduced and a summary given by J. B. Passmore in *The English Plough*, Pl. IX, and p. 69. It is extraordinary that Passmore, who figures our plough from the other MS. as a Saxon implement, did not realize its type. The coulter-shifting device which should have provided a clue merely occasioned the odd remark (p. 5) that ' it [is] possible to see that the coulter is bound to the beam with a thong '.

side to turn it. Also, being wholly within the plane of the share-beam it cannot turn the earth on the landside side. The far side of the crotch not visible in the illustration is identical save that it passes to the other side of the sheath, and the same limitations apply to it. Fig. 5 b merely adds to what can be seen in Plate IX the usual plan of later examples. Little scope is provided, or needed, for the imagination. The front of the crotch butts against the back of the share and is pegged to the share-beam. Its backward-sloping arms terminate in standards which also peg into the share-beam. The function of this device is to support an 'ear' or small earth-board which is transferred from the one arm to the other at each furrow's end. Hence the term 'shifting-ear'. The ear itself is not shown in the MS. picture. This, of course, is quite in order since the coulter being set, or pressed out, towards the observer the ear *must* be on the far side of the plough. On this kind of implement, coulter-blade and ear are always set to opposite sides and exchange those sides at each furrow's end. It is vain to guess at the shape of the invisible ear. On much later ploughs, ears usually vary between triangular and torpedo shape. However, enough is shown of the crotch to indicate the probable method of attaching it. Fig. 5 b indicates in broken line a possible ear. The foremost peg would be pushed between crotch and share-beam, the hindermost peg, long enough to extend the ear well beyond the share-beam, would fit tightly between standard and ploughtail, its shoulder preventing the ear from being forced against the share-beam by the pressure of the furrow-slice. Vertical movement of the ear would be prevented by the front peg and horizontal movement by the hindmost. To pull the ear off one side of the crotch, turn it upside down, and attach it to the other side, would take no longer than to switch the coulter over. A final comment is necessary. The weak nature of the particular shifting-coulter device depicted and the type of ear used make it clear that this implement is unsuited to the traditional rôle of the Anglo-Saxon plough. To quote Duhamel du Monceau, 'these ploughs with movable ears being intended only for fields in good tilth, . . . are never used for breaking up lands'.

Then again, what of the plough-team depicted here? These four creatures do not form the powerful team of legend. Since no yokes are shown, one might presume a rope to the inner horns, but the Julius A, VI version shows the yokes. The driver does not take the position alongside or behind the team usual in medieval English practice. It is clear that if one *insists* that this picture depicts an Anglo-Saxon plough, the popular idea of that plough must be abandoned.

To turn to the third MS. mentioned, the Caedmon MS. It contains two plough pictures[73] each by a different artist of the Rheims school. Their value as illustrating the plough of the invading Saxons five hundred years earlier is decidedly open to question. At all events, they do not mirror its legendary excellencies. The first drawing shows a wheel plough with single tail and three thin sheaths. The small share is wingless. The share-beam is either a large block, triangular in plan, or is hidden by twin mould-boards like those on a late 18th-century ridging-plough. This latter alternative is almost impossible. Steensberg's interpretation of this part of the drawing differs from mine, but he cannot discover a mould-board. He describes the draught animals as 'a pair of pigs'; they may, possibly, be poorly

[73] Sir Israel Gollancz, *The Caedmon Manuscript of Anglo-Saxon Biblical Poetry* (1927), 54, 77.

drawn oxen, but they remain a pair and not eight. The second picture again shows a single-tailed wheel plough, with two thin sheaths this time, but again no mould-board. The share has a long slender spear-point like those of the Early Iron Age and no wing, and is impossibly placed in advance of the wheels. Two oxen pull it by means of neck ropes. No yoke is shown.

There are two other MSS. to which one is often referred for details of Saxon and English ploughs, namely Harley MS. 603 and Trinity College, Cambridge MS. R.17.1 (The Psalter of Eadwine, or The Canterbury Psalter). Millar[74] refers to the practice of drawing upon these MSS. for illustrations of contemporary Anglo-Saxon manners and customs as ' distinctly misleading '. There is a good reason for this warning : both MSS. are copies of the Utrecht Psalter. To disregard the warning is to make the great Saxon plough even more of a myth than it now appears to be. For example, in the second MS. (available in facsimile) folio 62b depicts a primitive plough of the same type as those shown in the rock engravings (Plate V). The only difference between them is that the one in the MS. has a coulter (actually it is one of Mr. R. V. Lennard's ' large ' coulters). The team consists of two oxen pulling on neck ropes. On folio 150b is another of the same type but without coulter, again drawn by two oxen. Folios 182 and 192 present similar coulterless one-tailed implements. Folio 249 shows a slightly more developed plough with coulter, drawn once again by two oxen in neck ropes. Not one of these ploughs has a mould-board.

That then is the evidence of the MS. illuminations to which one is referred. A plough depicted in a foreign MS. and copied or re-copied by a Saxon scribe does not acquire naturalization in the process. In any case, the implements and teams depicted are not those so confidently asserted to have occasioned an agricultural revolution in Britain.

Since neither archaeological nor pictorial evidence of the characteristics of the plough in question exists, one must turn to literary sources. My limited knowledge of Old English literature is freely admitted, but appeals to others well-versed in the subject have not resulted in any additions to the facts here presented. First of all there is an eighth-century riddle in the Exeter Book which refers unmistakably to the following plough parts : tail, coulter, share-beam and share. The words ' ond min swæð sweotol ' clearly indicate that a definite and cleared furrow is left by the plough ; but I cannot agree with Passmore[75] that the words ' fealleþ on sīdan þoet ic toþum tere ' indicates ' particularly ' the mould-board. If the earth could not be turned to one side except by the use of a board, then some such part would, of course, be indicated here ; but, as we have seen above and as Passmore himself knows, the tilting of the plough towards the furrow could by itself justify the plough's claim ' what I tear with my teeth falls to the side '. The first quotation given above indicates far more strongly the use of a ground-wrest ; but that is not a mould-board. The only lists of plough parts clearly named that I have been able to discover in Old English are those contained in the vocabularies.[76] One of the

[74] *Op. cit.*, 18.

[75] *The English Plough*, 4. It is difficult to accept part of the translation used by Passmore and quoted above. Cf. W. S. Mackie, *The Exeter Book*, II, 113 ; R. K. Gordon, *Anglo-Saxon Poetry*, 327.

[76] T. Wright, *A Volume of Vocabularies* ; R. P. Wülcker, *Anglo-Saxon and Old English Vocabularies* (1884).

8th century (Wulcker, no. 1) contains *scear*, *handle*, and *sulesreost*. That this last word meant *ground-wrest* is very doubtful since it is given as the equivalent of *dentalia*, which word in a 10th century list (Wulcker, no. IV) is glossed by *cipp*. *Cipp*, which still survives in dialect as *chip* or *chep* means the share-beam or sole only. It seems to me that the 10th-century *sule-reost uel proc* (Wulcker, no. VI) proves that share-beam only is meant, since that is the meaning of *throck* in modern dialect. It is certainly odd because, as we have seen, the equivalent of the ground-wrest would appear to have been known in Britain in Romano-British times. Confusion may have arisen through an attempt to equate O.E. and Latin names for parts that only approximate to each other on differing plough types. The only other part mentioned in vocabularies earlier than the 11th century is the plough-beam, but the coulter does not appear in them until that century. It is unnecessary to point out the limitations of these vocabularies, and the omission of the coulter in earlier lists does not, of course, mean that it was unknown. The omission of the mould-board is another matter; no word for it appears to be recorded in O.E., and even late medieval pictures, of whatever provenience, show it but rarely. Wrests and 'mould-strokers' are common enough. What appears to be the earliest mention of the true mould-board in English occurs in a French rhyming treatise by Walter de Bibelsworth who died between 1277 and 1283, where *l'eschuchoun* is glossed *the cheld-brede*.[77] This, of course, is the 'shield-board' of some English dialects. The well-known passage in the Colloquy of Aelfric[78] dealing with the duties of the ploughman does not refer to any plough parts other than share and coulter.

To sum up, Old English literary sources supply no evidence in support of the popular idea of the Saxon plough. They show that it made a proper furrow and perhaps cleared it by means of a ground-wrest, but neither mould-board nor wheels are mentioned.

There remain two other possible sources of information, or perhaps I should say inference. The first is the medieval English plough. The danger of using post-Norman materials to fill up a blank in the Anglo-Saxon period is obvious. In the first part of this paper a similar danger was present when comparisons were drawn between types of Iron Age and Romano-British shares and certain medieval and later ones; but then we had the concrete evidence of the early irons themselves before us. Similarly, when interpreting the prehistoric rock engravings the persistence for a thousand years of an identical plough-team organization in the Celtic countries of Britain could be demonstrated. But in attempting to reconstruct the ploughs of the Anglo-Saxon settlers by reference to those of the medieval English, there is no evidence whatsoever to act as a guide to the understanding and a check on the imagination. I have no intention of essaying such an awkward task. It can, however, be remarked that the 'well-known' Saxon plough (now at length much fainter in outline) is not that which is *typical* of either medieval England or Wales.[79] In both countries there was in that period a variety of wheel and swing ploughs and plough-team strengths. With regard to the latter, Mr. H. G. Richardson has shown that an exclusively eight-ox English team is a myth and that, while both

[77] Wright, *op. cit.*, 168–9.
[78] W. H. Stevenson, *Early Scholastic Colloquies*, 77.
[79] The writer hopes to publish shortly a study of the Welsh plough from the earliest times.

larger and smaller teams were and might be used, the normal English team consisted of four animals.[80] All the evidence that I have seen supports Mr. Richardson's conclusions. That a large wheel plough was the only, or even the most common, type in use in medieval England cannot be demonstrated from the evidence of MS. illuminations, manorial accounts, and literature. Of actual relics of English ploughs of the period, two coulters in the London Museum are all that I can trace[80a].

The only other source from which one might infer the kind of plough brought by the Anglo-Saxons to Britain are the early ploughs of their homeland. The only early ploughs so far discovered there are primitive crooked ploughs such as those from Walle in Hannover, Dabergotz in Brandenburg, and Papau in West Prussia. The supposed—but doubted—great antiquity of the implement from Walle has even led to a suggestion that it was from Germany that this type of plough made its way southwards to the Mediterranean.[81] Be that as it may, Germanic plough-irons, together with bronze models, down to the end of the Roman period, show no improvement on those of Britain. Neither do the ploughs of later Germany provide that evidence so difficult to gather from medieval England ; in fact even modern German ploughs include primitive types, like the Rhineland *Hunspflug*, which derive from the early ' spade ards ' (i.e. from ploughs similar to the Døstrup example). In short, there is no evidence to suggest that the invading Anglo-Saxons could have brought with them better ploughs or a more advanced ploughing technique than those already in Britain.

Summary

The evidence considered above leads to the following main conclusions :

The six assumptions which uphold Dr. Curwen's theory of the origins of the ' Celtic' field system and the strip system are without foundation.

Ploughs using the narrow spear shares of Iron Age A-B type could and probably did open proper furrows. It seems fairly probable that coulters were used when necessary with this type of share prior to the Roman invasion.

Tanged shares were used contemporaneously with the early socketed spear shares. It is therefore clear that ploughs differing in construction were used.

Belgic shares varied in breadth and were used in conjunction with large coulters. That Belgic ploughs had wheels is possible but cannot be proved. It is certain that some Belgic or Romano-British ploughs turned the furrow to one side only and were not one-way implements. It is probable that they had a fixed ground-wrest.

One-way ploughs with two fixed ground-wrests and large socketed shares of developed spear type, and others with tanged shares were also used in Roman Britain.

That the Brythonic Celts already possessed the traction plough when they arrived in Britain is certain. In the 1st and 2nd century A.D. they used, doubtless among other kinds, broad-bladed plough-shares. There is no evidence that either they or their descendants, the early Welsh, used hand- or foot-ploughs ; all the evidence points the other way.

[80] ' The Medieval Plough-team ', in *History*, xxvi, 287-296.

[80a] *London Museum Medieval Catalogue*, 123-4, with Pl. XXII.

[81] Dr. K. H. Jacob-Friesen, ' Der älteste Pflug der Welt ', in *Natur und Volk*, lxiv, 83-91.

At the end of the Roman period, the agricultural equipment of Britain south of the Antonine Wall included ploughs of various types and weights, both one-way and fixed furrow; socketed and tanged shares of different shapes and sizes; two types of coulter; ox-teams sufficiently variable in size and yoking for the needs of diverse soils and operations. Thus, beyond normal development of existing material, the future had only to contribute the true mould-board and the asymmetrical winged-share that is its complement. Even here, the first stage in the development of the one (i.e. the ground-wrest), and therefore the need for the other, was already present.

There is no evidence whatsoever that the Anglo-Saxons came to Britain already possessed of better agricultural equipment than they found here. The plough assigned to them in modern writings is a product of modern imagination.

Postscript. I have to acknowledge the generous help of many museum curators in the preparation of this paper, which was completed in 1946. For drawings and photographs of specimens in their custody at the time, I am greatly indebted to Professor Gordon Childe and Mr. R. B. K. Stevenson of the National Museum of Antiquities of Scotland, Mr. C. F. C. Hawkes of the British Museum, Mr. W. A. Smallcombe of the Reading Museum, Mr. A. J. Golding of the Maidstone Museum, Mr. R. U. Sayce and Dr. J. Wilfrid Jackson of the Manchester Museum, Mr. Reginald W. Brown of the Northampton Museum, Mr. R. J. C. Atkinson of the Ashmolean Museum, Mr. Raymond Smith of the Guildhall Museum, Mr. C. T. Mogridge of the Winchester Museum, Mr. E. J. Rudsdale of the Wisbech Museum, Mr. S. Priest of the Dartford Museum, Mr. H. F. Scott-Stokes of the Glastonbury Museum, and Dr. E. C. Curwen. I also received helpful information from Miss A. M. Cooper of the Sussex Archaeological Society, Mr. Axel Steensberg of the Danish Folk Museum, Mr. Hubert Collar of the Saffron Walden Museum, Professor E. C. Llewellyn, University College, Cardiff, and Captain B. Howard Cunnington of the Devizes Museum.

In conclusion, I should like to draw attention to the important paper recently published in Denmark by P. V. Glob (*Acta Archaeologica*, xvi, 93), in which the efficiency of Late Bronze and Early Iron Age ploughs is demonstrated. Dr. Glob also shows that those of the Døstrup type were fitted with two shares, one capable of a wide furrow, thus proving that contemporary cross-ploughing was not enforced by inadequate shares. Find-spots show that early ploughs were used on both light and heavy soils. See also *Acta Archaeologica*, xiii, 267.

Since I wrote the sentences on p. 85 (marked *) on the dating of the abandonment of the long yoke in Wales, Mr. Thomas Jones, of University College of Wales, Aberystwyth, has drawn my attention to a tradition recorded by Robert Vaughan of Hengwrt in 1652 that four-abreast yoking " was in use with us about six-score years ago ", i.e. about 1530 (*Cambrian Register*, ii, p. 476).

APPENDIX

PLOUGH-SHARES

IRON AGE A AND B TYPES

	County.	Provenience.	Dimensions in inches.	Reference.	Location.
1	Kent	Bigbury	$17\frac{1}{4} \times 2\frac{1}{2}$. Socket (interior) $1\frac{7}{8} \times 1$	Fig. 1, no. 12.	Maidstone Museum.
2	,,	,,	$13\frac{1}{2} \times 1\frac{7}{8}$. ,, ,, $1\frac{3}{4}$	Fig. 1, no. 10. *Arch. Journ.*, lx, 213-15, pl. II, fig. 4b.	Manchester Museum.
3	,,	,,	$12\frac{1}{4} \times 2\frac{1}{2}$. ,, ,, 2	Fig. 1, no. 11. *Arch. Journ.*, lix 213-15, pl. II fig. 4b.	Manchester Museum.
4	,,	Crayford	$3\frac{1}{2} \times 1\frac{1}{2}$. ,, ,, $1\frac{1}{4} \times \frac{13}{16}$	*Proc. Prehist. Soc.* (1938), 152, fig. 1 no. 3.	Dartford Museum.
5	Sussex	The Caburn	$4\frac{1}{2}$. ,, ,, $1\frac{1}{4}$ diameter	*Archaeologia*, xlvi, 467, 491, pl. lxxiv, fig. 4.	
6	,,	,,	$4\frac{3}{4} \times 1\frac{5}{8}$. ,, ,, $1\frac{3}{8} \times \frac{7}{8}$	Fig. 1, no. 2. *Sussex Arch. Colls.* lxviii, 10, fig. 15; *Proc. Prehist. Soc.* (1938), 45, fig. 7, no. 1.	Lewes Museum.
7	Berks.	Frilford	$7\frac{1}{2} \times 2\frac{1}{8}$. ,, ,, $1\frac{1}{4} \times 1$	Fig. 1, no. 1 *Oxoniensia*, iv 13, pl. v, c.	Ashmolean Museum.
8	Oxon	Bloxham	$11\frac{1}{2} \times 1\frac{1}{2}$. ,, ,, $1 \times \frac{3}{4}$	Fig. 1 no. 13. *Oxoniensia*, iii, 54, pl. viii, b.	Ashmolean Museum.
9	Dorset	Spettisbury Rings	$6\frac{1}{2} \times 1\frac{1}{4}$. ,, ,, $\frac{9}{10} \times \frac{7}{10}$	*Arch. Journ.*, xciv, 123, pl. vi, 1.	British Museum.
10	Northants.	Hunsbury	$5\frac{1}{2} \times 1\frac{3}{4}$.	Fig. 1, no. 6. *Arch. Journ.*, xcii, 66.	Northampton Museum.
11	,,	,,	$5\frac{1}{2} \times 1\frac{3}{4}$.	Fig. 1, no. 3. *Arch. Journ.*, xcii, 66.	Northampton Museum.
12	,,	,,	? $\times 1\frac{1}{2}$ (rusted into preceding).	Fig. 1, no. 4. *Arch. Journ.*, xcii 66.	Northampton Museum.
13	,,	,,	$4\frac{1}{2} \times 1\frac{1}{4}$.	Fig. 1, no. 5. *Arch. Journ.*, xcii, 66.	,,
14	,,	,,	$5\frac{1}{4} \times 1\frac{3}{4}$(?) (*broken*).	Fig. 1, no. 7. *Arch. Journ.*, xcii, 66.	,,
15	,,	,,	Blade $3\frac{1}{2} \times 1\frac{5}{8}$. Tang $1\frac{1}{2}$ *broken*.	*Arch. Journ.*, xciii, 67, pl. iv, b3.	,,
16	,,	,,	,, $3\frac{3}{8} \times 1\frac{5}{8}$. ,, $2\frac{5}{8}$ *broken*.	,, ,,	,,
17	,,	,,	,, $3 \times 1\frac{7}{8}$. ,, $7\frac{1}{2}$ *broken*.	,, ,,	,,
18	,,	,,	,, $5\frac{1}{2} \times 1\frac{3}{4}$. ,, 10.	,, ,,	,,
19	,,	,,	,, $4\frac{1}{2} \times 1\frac{1}{2}$. ,, $11\frac{5}{8}$.	Fig 1, no. 8 ,,	,,
20	,,	,,	,, $3\frac{1}{2} \times 2\frac{3}{4}$. ,, $13\frac{1}{2}$.	Fig 1, no. 9 ,,	,,
21	,,	,,	,, $3\frac{1}{2} \times 2\frac{4}{10}$. ,, $5\frac{9}{10}$ *broken*.	*Arch. Journ.*, xciii, 74, pl. xiii, 11	British Museum.

	County.	Provenience.	Dimensions in inches.	Reference.	Location.
22	Kent	Bigbury	$7\frac{1}{8} \times 4$. Socket (interior) $3\frac{1}{2} \times 1$.	Fig. 1, no. 14.	Maidstone Museum.
23	,,	,,	$6 \times 3\frac{3}{4}$. ,, ,, $3\frac{5}{16} \times 1$.	Fig. 1, no. 15. *Arch. Journ.*, lxxxix, 105, 108, pl. 1.	,,
24	Hants.	Silchester	$4\frac{7}{8} \times 2\frac{5}{8}$. ,, ,, $2\frac{1}{4} \times \frac{3}{4}$.	Fig. 1, no. 16.	Reading Museum.
25	Haddington	Traprain Law	$7\frac{5}{8} \times 3\frac{1}{16}$. ,, ,, $2\frac{9}{10} \times 1$.	Fig. 1, no. 20. *Proc. Soc. Antiq. Scot.*, lviii, 255, fig. 11, no. 1.	Nat. Mus. Antiq. Scotland.
26	Berwick	Blackburn Mill	6×4. ,, ,, $3\frac{1}{8} \times 1\frac{1}{8}$.	Fig. 1, no. 19. *Proc. Soc. Antiq. Scot.*, lxvi, 315, fig. 22, no. 58.	,,
27	Roxburgh	Eckford	$7\frac{3}{4} \times 4\frac{1}{8}$. ,, ,, $3\frac{1}{2} \times 1\frac{1}{8}$.	Fig. 1, no. 18. *Proc. Soc. Antiq. Scot.*, lxvi, 366, fig. 50, no. 7.	,,
28	,,	Oxnam, a cairn on Fala Farm. Possibly sub-Roman	$6\frac{1}{2} \times 4\frac{3}{4}$. ,, ,, $3\frac{1}{4}$.	*Trans. Berwickshire Naturalists' Club*, xxvii, 104.	,,
29	London	Moorgate Street	12×4. ,, ,, $2\frac{3}{4}$.	Fig. 1, no. 21. *Cat. Coll. of London Antiquities in the Guildhall Mus.* (1908), p. 53, pl. xix.	Guildhall Museum.
30	Wilts.	Box	$13 \times 3\frac{1}{4}$. Tang 10.	Fig. 1, no. 17. *Cat. Antiquities in the Museum . . . Devizes* (1934), 197, pl. lxxx.	Devizes Museum.

COULTERS

EARLY IRON AGE(?), BELGIC(?), AND ROMANO-BRITISH

	County.	Provenience.	Dimensions (in inches) and weight.	Reference.	Location.
1	Kent	Bigbury	Length overall $16\frac{3}{4}$. Blade $6\frac{1}{4} \times 2$. Wt. 1 lb. (Apparently associated with two Iron Age A-B type shares.)	Fig. 3, no. 1. *Arch. Journ.*, lix, 213-14, pl. ii, fig. 4a.	Manchester Museum.
2	Hants.	Twyford Down*	Blade only, $10\frac{1}{4} \times 2\frac{7}{8}$.	Fig. 3, no. 2. *Proc. Hants. Field Club & Arch. Soc.*, xiii, pt. 2, 190.	Winchester Museum.
3	,,	Silchester	Length overall $27\frac{7}{8}$. Blade $7\frac{1}{2} \times 3\frac{1}{2}$. Wt. 8 lb. 5 oz.	Fig. 3, no. 8. *Antiq. Journ.*, xiii, 455-63, pl. lxxviii; *Archaeologia*, liv, 144, lii, 742.	Reading Museum.
4	,,	,,	,, ,, $27\frac{1}{4}$. ,, $6\frac{1}{4} \times 3\frac{3}{8}$. ,, 9 lb.	Fig. 3, no. 6. ,,	,,
5	,,	,,	,, ,, $26\frac{1}{4}$. ,, $7\frac{1}{2} \times 2\frac{7}{8}$. ,, $8\frac{1}{2}$ lb.	Fig. 3, no. 7. ,,	,,
6	,,	,,	,, ,, $25\frac{7}{8}$. ,, 9×3. ,, $7\frac{1}{2}$ lb.	Fig. 3, no. 5. ,,	,,
7	,,	,,	,, ,, $24\frac{1}{2}$. ,, $8 \times 3\frac{1}{2}$. ,, $6\frac{3}{4}$ lb.	Fig. 3, no. 4. ,,	,,
8	,,	,,	,, ,, $21\frac{3}{4}$. ,, $8\frac{1}{2} \times 4$. ,, 7 lb. 2 oz.	Fig. 3, no. 3. ,,	,,
9-13	Essex	Great Chesterford	,, ,, 27-35. ,, 8-11 × $3\frac{1}{2}$-4. ,, 14-16 lb.	*Arch. Journ.*, xiii, 6, pl. 2.	Cambridge Museum.
14	Glos.	Great Witcombe	,, ,, $27\frac{1}{8}$. ,, $9\frac{1}{2} \times 4\frac{1}{2}$. ,, $7\frac{1}{2}$ lb.	Fig. 3, no. 9. *Antiquity*, ix, 339-41, pl. iv.	British Museum.
15	Northants.	'a field near Towcester'	,, ,, 30. ,, (broken) 9 × 4. Wt. 13 lb. 5 oz. (Possibly Romano-British.)		Wisbech Museum.
16	Provenience unknown		Length overall $23\frac{1}{4}$ (tang broken). Blade $9\frac{1}{8} \times 3\frac{1}{2}$. Wt. 11 lb. 1 oz. (Possibly Romano-British.)	*Antiquity*, ix, 340.	British Museum.

* Professor Hawkes tells me that no. 2 may have had associations indicating Romano-British and not Belgic age; further exploration of the site is hoped for.