The PLOUGH IN SCOTLAND

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The evolution of the plough is one of the most important aspects of agricultural history. In Scotland this subject is of especial interest on account of the survival until recent times of three distinct types of tilling implement; the spade, the ard and the plough, representing three successive stages of development in agricultural methods.

In those crofting areas where the spade has been the principal implement of tillage until modern times, we can distinguish two distinct tools: the ordinary spade, sometimes somewhat modified, and the characteristic and much discussed *cas-chrom* (crooked spade), which is peculiar to north-west Scotland. This latter was in use in the Outer Hebrides until very recent times,‡ although it has slowly given way to the plough. Thus in South Uist in 1794, Heron reported that the plough was used in the coastal machair, whilst the crooked or ordinary spade was used in "declivities and narrow summits".[1] In the parishes of Uig and Lochs in Lewis it was still the exclusive means of tillage in 1811, being used for potatoes and corn.[2] In Skye it was used quite extensively together with the ordinary spade (*cas-dhireach*) by poor people, unable to purchase a plough.[3] It was also widely used in many of the mainland parishes of Sutherland, Ross and Inverness-shire, from which, however, it has now disappeared almost entirely.[4] In Wester Ross, for example, it was retained for tilling reclaimed peat-bog.[5]

The *cas-chrom* is made from a naturally curved piece of oak or ash, to the end of which another piece of wood somewhat flattened is fastened with iron hoops, almost at right angles. This corresponds to the head of the plough, and at the tip of it is attached an iron sock, rectangular in section. Sometimes

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‡ Geddes reports seeing it used in Rodel, Harris, in 1919, but it certainly survived longer in the Uists and Benbecula—Geddes 1955 p. 61; cf. plates 4a in Shaw 1955, and 79 (opposite p. 71) in Quigley 1936, both relating to South Uist.

the implement was made from a single piece of wood, conveniently shaped and with the sock at one end. The shaft of the *cas-chrom*—see fig. 1—is between 5 feet 9 inches and 6 feet long, whilst the separate head may be between 2 feet 6 inches and 2 feet 10 inches long and 4 inches broad.[6] Both types of crooked spade are to be found in the Highland Folk Museum in Kingussie, but the specimen made in one piece lacks a sock, having been found under a thick layer of peat.

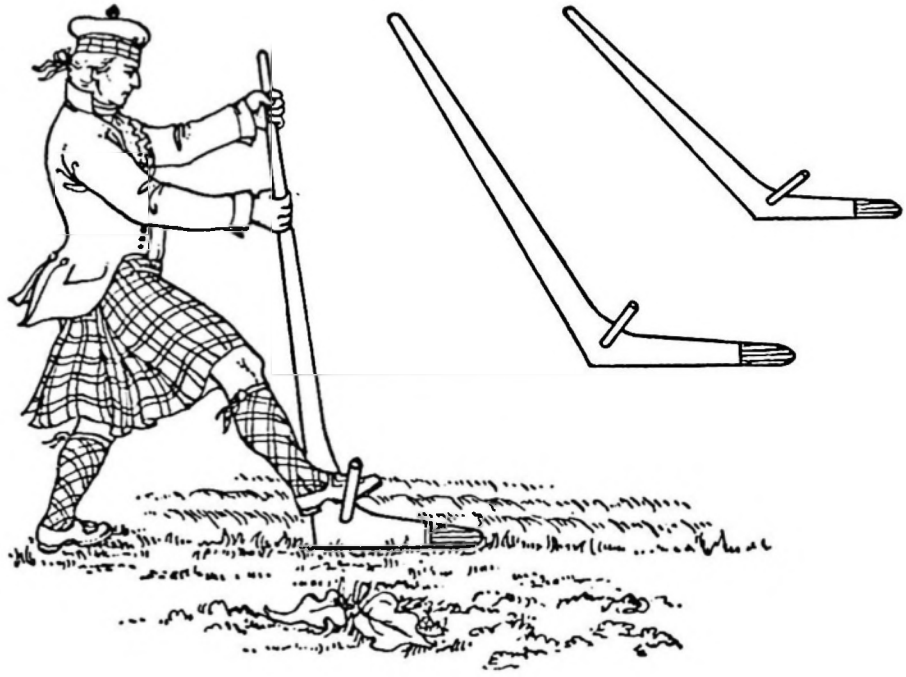

FIG. 1.—*Cas-chrom* (after Macdonald, 1811).

To use the *cas-chrom* the worker places his right foot on the wooden peg which is fixed where the shaft joins the head. Holding the shaft firm with both hands he drives the head into the earth with two jerks,* turns the clod from right to left, and takes another step backwards, continuing to work in that direction.[7] In this manner twelve labourers could dig an acre a day, and the result would be as satisfactory as if the area had been covered twice with an ordinary plough. If the ristle or sickle plough [8] was used (see p. 81) the work would be completed somewhat more quickly, and only ten men would be needed to cover an acre a day. It would prove twice as expensive as a ploughing team of four horses. But the *cas-chrom*

* Robertson says the action is done with "one bend of the body"—1808 p. 102.

could be used in boggy country where a horse would be unable to go, as well as in stony ground, where it could lever stones up to 200 lb. in weight out of the ground. The *cas-chrom* also has an efficiency superior to the ordinary spade, with which implement ten or twelve men could only cover 2/3 acre a day: as far as the quality of the work went, Macdonald considered it twice as effective as an ordinary spade.[9] The characteristic use for the *cas-chrom* in the Hebrides, was in setting up lazy beds (*feannagan*) on which were cultivated potatoes, corn and oats.[10]

A certain similarity may be noted between the *cas-chrom* and the so-called breast-plough, which was found in both England and Scotland from the eighteenth century.[11] In its north English and Scottish form this implement is bow-shaped.[12] The two tools differ very sharply in their uses, however, since the breast-plough was not used for tillage, but only for swiddening. This agricultural technique, widely used in the eighteenth century, consists in taking off the surface of the ground with the breast-plough, and then burning it—hence its alternative designation of "paring and burning".[13]

Although a connection between the plough and the *cas-chrom* is generally postulated, it is very difficult to determine its precise character. Certainly a naturally curved piece of wood formed from the branch and main stem of a tree is the main element of many old types of plough, as for example many Scandinavian ards, but there are greater differences in the way in which these two types of implement are used. The *cas-chrom* is used in a backwards movement like a spade, and the earth is placed on the left side of the worker, whilst with a plough the movement is forwards, and the ridge is to the right.

Although not so widely noticed by travellers and others, the use of a spade as an instrument of tillage is certainly no less important. This was common in much of the Highland area, in the Hebrides, Orkney and Shetland, and even as far south as Dunbartonshire.[14] This implement, the *cas-dhireach*, has a single step, usually but not invariably, on the right-hand side thus enabling the worker to use his right foot as with the crooked spade. Several diggers (or "delvers"), each armed with the implement, worked together as a team. Thus Ure writes of Dunbartonshire in 1794:

"It is the common practice for eight or ten men and women to assemble with their spades, for the purpose of digging a piece of ground, and it is amazing with what speed they accomplish their work. They begin at the lower extremity of the ground and form

themselves into a row, at a convenient distance from one another; they cut, with their spades, a line into the ground, nine or ten inches deep, and then with one united effort throw over, at once, a furrow or piece of ground, about eighteen or twenty feet in length, and about eight or ten inches in breadth".[15]

The *cas-dhireach*, which is about 6 feet long, was used in Sutherland for digging lazy beds for barley, whilst in Shetland it was more commonly used for potatoes until very recently.[16] It was especially useful for inaccessible small plots of arable land, as well as steep fields.[17] In some of the remoter regions such as St. Kilda,[18] the Pentland Firth Island of Stroma,[19] and Mid- and South Yell in the Shetlands,[20] the spade was the exclusive means of tillage, and even in Lerwick in 1792 almost all the small farms were dug by spade.[21]

The use of the spade by a digging team is also reported from Vestlandet in Norway,[22] and a similar use is probably referred to by Young when he wrote that there was not a single plough in the whole village of Tuorist in Co. Kerry, Ireland, and added: "All the tillage is by the Irish loy; ten men dig an acre a day, that has been stirred before".[23] Similarly team-digging is found in many parts of the world where the digging-stick is still used, such as Abyssinia, Guinea and the Andes. It is interesting that the spades in those regions of north-western Europe where tillage by spade has survived are often rather similar to the digging-stick. This is particularly true of Faeroese and Irish spades, which are long and narrow, and sometimes lack a step.*

It would seem that spade-tillage has been common throughout north-west Europe,[24] and it may be postulated that this practice in its turn was based on the earlier use of the digging-stick. One reason for the survival of the spade for tillage is the heavy rainfall which may have prevented the ard from being more widely used. At the same time it must be admitted that the plough has long been in use in this area, permitting a wide degree of local variation. On the other hand there is no evidence that the hoe was used here as the principal implement of tillage, but this need not necessarily mean that it has not been used as an auxiliary implement in the region.[25]

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The most primitive form of plough, the ard, which lacks a mouldboard, and in contrast to the plough proper is symmetrical

* The lazy bed is also to be found in both Ireland and the Faeroes—see Bruun 1929 p. 183; Jirlow 1931 p. 115.

in shape, has only been found in two or three scattered places in Great Britain, and this leads us to conclude that it has played rather an insignificant role in British agriculture. The bronze model of an ard which was discovered in a Roman barrow in Sussex is clearly connected with the finds of similar models from the lower Rhine.[26] It is possible that this type may have been connected with the Roman invasions, and was not important in the indigenous British culture.

There are, however, two crooked pieces of wood found in Scotland which belong to a non-Roman type of ard. One of these pieces, excavated by Mrs Piggott at Milton Loch Crannog in Dumfriesshire [27] appears to be a head and stilt from an ard of the Døstrup type (i.e. a type found in Denmark, and dated to the middle of the first millenium B.C.).[28] It is dated to the second century A.D. The other piece is a beam of unknown date but from a similar ard-type and was found in the same county in Whitereed Moss north of Lochmaben.[29] The two finds thus conveniently complement each other.

It would seem that the Scots in prehistoric time used a type of ard which was borrowed from the south. The finds of small plough-socks in southern Scotland dated to the early centuries A.D.[30] would appear to confirm this early use of ards. There is indirect evidence for the use in Scotland (as in eastern England) of wooden-wheeled ploughs of the Danish Tømmerby or Villersø type, in which the sole of the plough is studded with pebbles to protect it from wear.[31] Finds of pebbles with the characteristic facets resulting from such use have been recorded from Roxburghshire, Wigtonshire and Aberdeenshire.[32] This hypothesis of Scottish archæologists remains unproved, however.

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It may be suggested that the distinctive types of plough found in the Scottish islands are themselves based upon the ard. This would certainly seem to be the case for the Shetland plough, which appears to have fallen out of use by the 1860's,[33] but of which type three examples are to be found in the National Museum of Antiquities of Scotland in Edinburgh.[34] In one of these, from the Lerwick collection—see fig. 2 (Lerwick)—the beam is made of three parts; the foremost piece is forked at the tip for the attachment of harness; the middle piece, at its hindmost end, is curved to form the support of the wedge-shaped third part, which is a sort of stilt connected with

the head. This is mortised from the front into the lower part of the stilt. A pole, fixed to the beam in front of the coulter acts as a handle, and this is strengthened by resting on an upright support fixed to the upper edge of the stilt. After the ridge is horizontally cut with a feathered and socketed ploughsock, the earth follows a rounded protrusion on the side of the head—in effect a sort of groundwrest—after which it is turned over by the two straight mouldboards, consisting of a lower and longer board acting as a continuation of the rudimentary groundwrest, and an upper and shorter board set at an angle to the direction followed in ploughing. Thus instead of turning over the earth with a straight or a rounded mouldboard, which is the method common to most of Eurasia, two separate mouldboards, set in different planes, are used.

Of the other two Shetland ploughs in the same museum, the specimen from Cunnisburgh (MP 81) is of the same type, whilst the other—see fig. 2 (Whalsay)—differs slightly in that the stilt continues up to the handle, and the beam is attached to this. We have, in addition, a contemporary illustration of the Shetland plough provided by Shirreff—see fig. 2 (Shetland, Shirreff). He portrays a plough not dissimilar to the existing museum specimens, although there is a more striking resemblance to the ard. The head and coulter are fixed to the lower part of an almost S-shaped beam, whilst the handle which connects with the centre of the beam is strengthened by an upright support attached to the beam, which itself has an iron brace on one side. The mouldboard appears to be in two pieces, although the illustration is not very clear on this point. The same type of plough was also general in Orkney in 1814.[35]

As for the origin of the Shetland plough, Leser has suggested a connection between this type of framed handle and similar ones in Scandinavia,[36] whilst Payne has suggested that the implement was borrowed thence during the Viking period.[37] Payne's theory may be accepted with a slight modification: there is no evidence for a plough with a mouldboard of this type in Scandinavia, but there is a similar type of ard, *krokard*, which is especially common in Norway (in particular in Vestlandet, in parts of eastern Norway and in Trøndelag),[38] as well as in parts of Sweden (particularly Västergötland).[39] The important feature in the construction of these ards is that the head is mortised into the curved beam, a detail which is repeated in the Shetland ploughs. On the other hand this type

of Norwegian ard lacks a coulter. The beam is shortened, and the implement is drawn by shafts. These improvements date

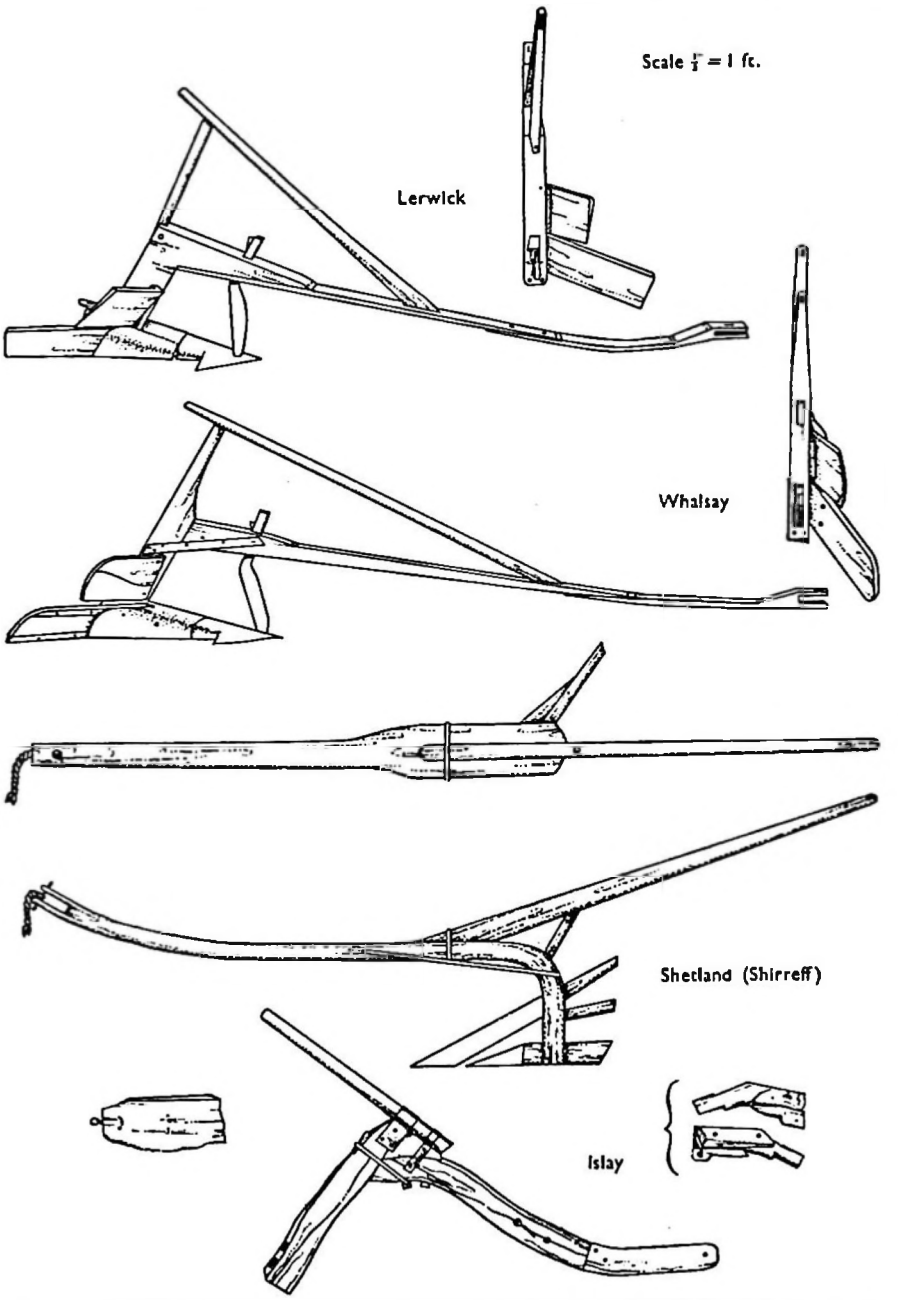

FIG. 2.—Types of Scottish ploughs including the Shetland plough from the Lerwick collection, MP 82; a Shetland variant from Whalsay, MP 585; another Shetland plough after Shirreff, 1814; and a Hebridean one from Islay, MP 388.

from the mediæval period. Yet since the Norwegians began to occupy the Scottish isles soon after 780, and founded there

a Norwegian earldom under Harald Haarfagr which retained a connection with Scandinavia until 1469, it would be natural to assume that the Viking colonists had ards with them. These may well have survived in Orkney until 1795, when it was reported,[40] that in some parishes there a type of plough was used which had a "stilt" without either a "groundwrest" or "earthboard". It is clear that the Norwegian ard must have preceded the plough with mouldboard imported from the Scottish mainland. Possibly the ard evolved into a one-sided plough with mouldboard through the influence of the oldest English and Scottish ploughs in the earlier Middle Ages.

Another plough-type is connected with the South Hebridean island of Islay [41]—see fig. 2 (Islay). As with the Shetland plough just described, the curved beam is made in three parts: firstly a foremost piece with a forked end by which the implement is drawn, secondly the main part of the beam, and finally a piece which is both a continuation of the beam and also acts as the stilt. The mouldboard has clearly been bound to the stilt, although it is now separate. One other piece has also assisted in turning the earth; unfortunately these loose parts are not now fixed to the main part of the plough, and hence the plough cannot be completely reconstructed. The handle is formed from a pole which is a continuation of the beam. The sock has been lost, but it is clear that the plough has lacked a coulter altogether. This implement must have been preceded in the field by a ristle.[42]

One further plough is preserved in the National Museum of Antiquities of Scotland [43]—see fig. 3 (Orkney)—which, if anything, is even more unusual than those described, and one might well doubt if the implement can be considered to be a plough at all, since the earth was turned over with a part that is toothed like a comb, rather similar to a harrow. This implement from Orkney was illustrated and described by G. Marwick in 1903 [44] and was locally known as a "sideplough" and "stilltie", but was called by that writer a "Roman plough". The beam was in three parts: the foremost part was forked like the implement from the Hebrides, and was called *kyollks* (jaws). The continuation was bow-shaped, curved to such an extent that it would rub against the ground, and thus acted as a foot: this was called *foregill*. The joint between the "foregill" and the third part of the beam, the *stang*, was covered by a wooden patch, the *nobe*. Between the poles was a coulter, *cooter*, and behind this a stilt, the *sewcher stang-post*, attached at

the top to the beam, and at the bottom to a small rounded wooden head, the *sewcher*, which according to Marwick was shaped like the head of a dogfish. Attached obliquely to the head was a *markal-pin* to which was fixed by two nails the sock, *sewcher soc*, made of a very insubstantial piece of thin metal plating. A wing, the *wing* or *sproll* on the "markal pin" was pierced by three vertical pins, called by Marwick *nether ski*, *millya ski* and *ivver ski*, the latter nearest the sock. An iron hasp in the shape of an eight, the *bridal*, joined the "sewcher stang" to the coulter. The 9-feet-long traces, *trauchle-soam*, were attached to the harness, *trauchle*, with a pin made of a sheep's bone, *trauchle pin*, pushed through a hole in the "kyollks". The plough * was drawn by one, two or four animals; instead of reins, a special man, *pirrin*, walked before the horse leading it.*

According to Marwick this plough was the normal type on the western part of the mainland about 1790. Then for the first time the Scots plough, *cupper*, was used. Yet the older type was thought to be warmer, and therefore better for the earth, than an iron-shod implement. The old type, according to Marwick, was still used in 1903 in Rackwick on Hoy, and a few decades earlier on Birsay. He also refers to various semi-magical rites accompanying the use of this plough, which we cannot, however, discuss in this present survey.

The three types of ploughs from the Scottish islands here described may well all be developments of the Norwegian ard, *krokard*, which may also have been used there, having been imported during the Viking age. Some of the alterations can be explained by the new milieu, especially by the shortage of timber which would necessitate the beam being made in three parts. Under the influence of the earlier British ploughs proper, the symmetrical ard evolved into a plough with a mouldboard on one side, and a coulter. Even this change must have taken place comparatively early to allow for the subsequent regional modifications. The Shetland plough is probably nearest the original. After 1700 the Orkney type was slowly replaced by the Scots plough, particularly by the lighter Scots plough which was common by about 1800. In Dunrossness, Shetland, the old island type nevertheless survived until 1864.[45] We must, however, point out that Marwick's theory that the Orkney plough was based on one used by the Romans is altogether inadmissible.

It is not quite clear what implement is intended by the

* This method was known in other parts such as Caithness—Sinclair 1795 p. 203.

designation *thrapple-plough* [46] used by authors writing of Caithness. This had a bowed beam, convex "ribbed" mouldboard

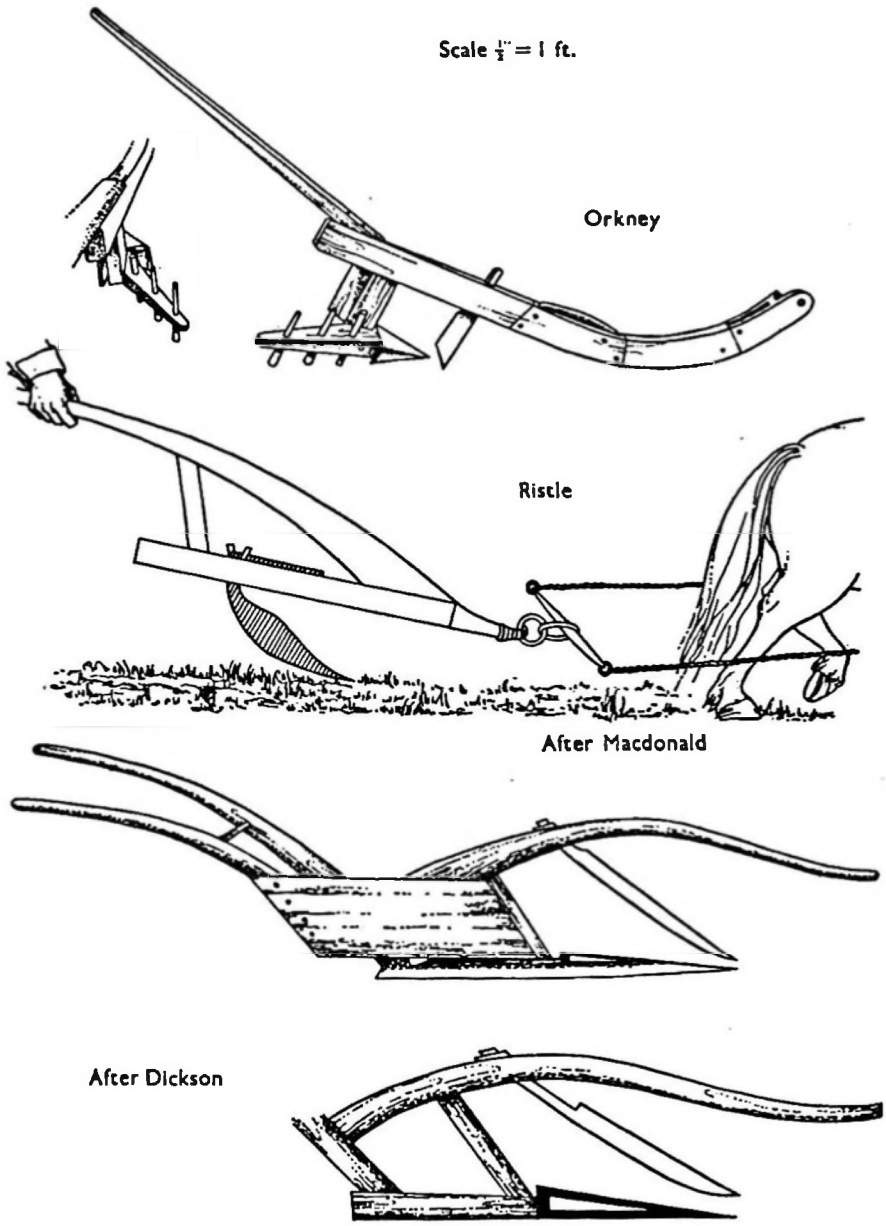

FIG. 3.—Types of Scottish ploughs including the Orkney type, Nat. Mus. of Scot. MP 564; the Ristle plough (after Macdonald, 1811); and the Old Scots plough (after Dickson, 1770).

and a handle protruding from the head, as well as an iron coulter and sock, feathered for grassy land and plain (without feather) for stony terrain. At the end of the beam was attached

a piece of wood and a raw leather thong, which served as the "muzzles" by which the plough was drawn and by four small horses or oxen, yoked abreast. One man held the handle, and another pressed on the beam, whilst a third preceded the draught animals, walking backwards. The single handle in particular is very reminiscent of the island plough described above.*

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Several writers discussing the husbandry of the Hebrides and the adjacent parts of the mainland describe a plough which they call the *ristleplough*, *sickleplough* or *ristle*.[47] This implement was drawn by a horse (or sometimes two horses) led by a man, whilst another man controlled it from the rear—see fig. 3 (Ristle). It had a "culter" in the form of a sickle. This cut a deep ridge in the ground, and thus prevented the plough which followed it from being hindered by roots. The implement was linked by Heron with Virgil's *Georgics* and the Romans, but it has clearly a much closer connection with the Vikings.[48] The word "ristle", which the *New English Dictionary* instances from 1703, 1808 and 1879, is correctly there linked with Old Norse *ristill*. The Norwegian word *ristel* and the Swedish *rist* were used during the nineteenth century to designate a special ristleplough, which went in front of the ordinary plough and which made the going for the latter somewhat easier; the implement was common to a large part of Scandinavia. Since the terminology, technique and use are the same for the Scottish and the Scandinavian tools, it would seem probable that the Vikings also brought this with them to the Hebrides, where it could, of course, even be combined with tillage with the *cas-chrom*. But in contrast to the ard, it seems to have been more or less confined to the Hebridean islands.

The combination of the ristleplough with the Norwegian ard, or with the plough which is a development of the ard, constituted an important improvement in Hebridean agriculture. For in this way it became possible to utilise land more or less covered with grass where the ard alone could only be used with extreme difficulty.

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The ploughs discussed hitherto have all had a very limited

* Henderson 1812*b* p. 55. This method of employing three men for ploughing seems to have been common throughout much of north Scotland.

geographical distribution, confined to the area subjected to Viking colonisation; whilst within this area tillage with spade or *cas-chrom* has continued side by side with the plough. In the rest of Scotland an agriculture based upon the use of the ard seems to have gained ground, but the precise extent of this is not known although it has clearly been replaced by the plough in recent times. It is only with the reports of the Board of Agriculture written between 1793 and 1816 in which the state of agriculture in the different counties is thoroughly described,[49] that we begin to get reliable information about the different implements used. In these reports there are constant references to the old Scots plough, which was said to be the only type in use in 1765,[50] but which by the 1790's was being replaced by more modern forms. Fortunately we are given a careful description of this older plough in Adam Dickson's *A treatise of Agriculture* (1770). At that time the implement was made of wood with an iron sock and coulter, and built round a rectangular but obliquely inclined frame consisting of a sheath, which sloped slightly backwards, the top part of which was mortised into the curved beam, 6 feet long, and the lower end of which formed an angle of 60 degrees with the head, which was about 20 inches long. The beam was mortised into the left handle, which was about 5 feet 4 inches long and was also inclined sharply backwards, and this in turn was mortised to the head.

The very generously proportioned coulter was also stuck into the beam. Seen from above—see fig. 3 (Dickson)—one can distinguish the symmetrical and rather lengthened sock, which was probably rounded and appears to have been nailed on to the head, as well as being socketed into it. The head and sock together were 3 feet 8 inches long. Apparently for reasons of economy the sock was not solid, but was in fact little more than a metal fret. A wrest, 26 inches long, was fixed at a sharp angle to the right-hand side of the head, and this acted as the lower part of the mouldboard. This was made of a rough plank or log, hollowed out with an axe, and pointed upwards towards the right handle. It was frequently curved outwards, that the earth might be turned over more efficiently, but it was more usually straight. When the mouldboard was curved in this way, it generally lacked a wrest. With this general type of plough there was always a shorter right handle, fixed to the wrest and mouldboard, whilst the handles were connected with each other by two cross-braces.

It is particularly interesting to note that according to Dickson the old Scots plough was a swing-plough, which "is raised out of the ground by pressing upon the handles, which raises the forepart of the plough." [51] On the other hand there was certainly to be found, albeit of more recent provenance, a Scots wheel-plough.[52] This latter had a normally curved mouldboard and feathered sock: that is to say an assymetrical sock with a wing (*feather*) protruding on one side.

Dickson himself constantly recommended an assymetrical sock with a feather on the right-hand side, although this was not a novelty. In stony terrain, however, the symmetrical sock was more satisfactory.

The harness was normally attached by an ordinary hook, but, strangely enough, even at that time there were several more developed forms of different thickness and breadth, which had not however been generally adopted.

Henry Home, Lord Kames, supplements Dickson's description of the old Scots plough in his *The Gentleman Farmer* (1776). He was born in 1696 in Berwickshire, a county in which this type of plough still survived in 1794.[53] According to Home the plough was large and heavy, some 13 feet in length, whilst the head and sock together measured 4 feet. The sock lacked both a fin and a feather. But the plough had its advantages: it turned over the soil very well and the long handles enabled the driver to control it easily. The long head took a firm grip of the ground, and the weight of the implement prevented stones from pushing it out of the furrow. One drawback, however, was that its weight demanded many oxen, since the head and the mouldboard were too long, and thus increased the friction. The mouldboard in particular was set at too sharp an angle to the sock, instead of gradually sweeping outwards. About 1800 it would seem that the mouldboard was becoming more commonly strengthened with a metal plate.[54]

The number of animals in the draught team seems to have varied in the 1790's from county to county. Thus in Aberdeenshire it was still drawn by eight to twelve oxen, yoked two and two, although the author of the report on that county thought this absurd since two horses would suffice in the light soil.[55] In Perthshire about 1780 it was customary to use four oxen and two horses, or four horses and two oxen [56] and this practice was reported from the Carse of Gowrie in 1794.[57] In Ross in 1810 six to eight animals were still used, indiscriminately mixed,[58] whilst in the two counties of Galloway (Kirkcudbright

and Wigtown) in the same year, although it was more usual to use four animals yoked abreast, six or eight might sometimes be used.[59] Four horses yoked abreast are also reported from Kirkcudbright in 1794,[60] Clackmannan in 1795,[61] Argyll in 1798,[62] and Stirlingshire in 1812,[63] whilst four horses yoked two and two were in use in Arran in 1807.[64] According to the *Encyclopædia Britannica* 1797, the traditional numbers in the ploughing team were six oxen and two horses in southern Scotland, and ten (and sometimes twelve) oxen in the north. There had been a gradual diminution in the number of animals, a tendency which started first in Berwickshire, but slowly became more general. This change began about 1745 according to Lord Kames.[65] The number used was clearly dependent on several factors, including the weight of the plough used and the social position of the landowner, as well as local custom. In Aberdeenshire there was a certain amount of competition in this matter on farms of more than a full ploughgate of land, to see who had the most oxen before the plough.[66]

The old plough not only required a number of men to control the team, but demanded extra labour on account of its clumsiness. Three men was the minimum required: one to lead the horses, one to hold the plough, and a third to clean the mouldboard and with his weight keep the head in the furrow.[67] About the 1790's the old Scots swingplough began to be replaced by more modern types, especially that of James Small.[68] Thus in East [69] and Midlothian,[70] Fife [71] and Moray [72] it had fallen out of use by 1794, in Kinross by 1797,[73] in Galloway by 1810 [74] and in Aberdeenshire by 1811.[75] On the other hand we have reports that it was in full use in Ayrshire until 1790,[76] in Glenisla and Glenesk in Angus,[77] the Outer Hebrides,[78] and in the inner Islands of Gigha and Islay [79] in 1794, as well as in Arran [80] in 1807. It was also retained for use in heavy clay-soils in Dunbartonshire,[81] Selkirk,[82] Roxburgh,[83] Dumfriesshire [84] and Peebles [85] in 1794, in Lanarkshire in 1798,[86] in Berwickshire [87] in 1809 and in Stirlingshire as late as 1812.[88]

The poorer tenants, who could not afford the more expensive ploughs even when these were widely used in their county, often had to make do with the old Scots plough.[89]

We may assume that the old Scots plough is identical with the old British rectangular plough, which was imported into England from across the Channel, and which is generally known in the scientific literature as the "Saxon" plough.

Originally it had a forecarriage, but in England the wheels were abandoned in the Middle Ages, and the type changed to a swing plough.

It may be noted in parenthesis that Scotland was one of the pioneer countries in the movement for agricultural improvement.[90] As early as 1723 the Society of Improvers in the Knowledge of Agriculture in Scotland was founded,[91] and several other societies with similar aims were founded in that century. It is probable that the small collection of four models now in the Science Museum in South Kensington is the result of the activity of such a society.*

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Whilst the collections of models do not seem to have exerted any real direct influence on the progress of agricultural improvement, the Scotsman James Small (*c.* 1740-93) did, on the other hand, play an important part in this movement with his plough constructed soon after 1767. According to Hamm all more recent improvements of the swingplough in England may be traced to his influence.[92] It is, however, also clear that Small's improvements are themselves based upon the well-known north-English plough, designated in the literature as the Rotherham plough, the centre of its manufacture being Rotherham in Yorkshire. The origin of this type has been the subject of much uncertain speculation.[93] It is known, however, that it was first patented by Stanyforth and Foljambe in 1730, and according to the specification it could plough three acres with the same power that was previously needed for two. It had a heel "fastened under the fore end of the land stilt or haine". The plough had no head, but moved forward on the lower end of the sheath, the left handle and the heel. "Two mould plates are fastened upon the shield-board [i.e. mould-board], one upon the upper edge and the other upon the lower edge thereof." [94] It is probable that the smiths based this plough on a type already known in Yorkshire. In 1653, Blith depicted a plough which he called the *plaine-plough*,[95] which seems to anticipate the Rotherham plough. According to Mill [96] one man and two horses would plough as much land with this

* One of these (1933: 222) is perhaps a Welsh plough, and another seems to be a swing plough with wooden mouldboard from Värmland, Sweden (1933: 176); a third (1933: 175) is probably a Scottish copy of a foot-plough with iron mouldboard and head, also from Värmland. Strangely enough an ard from Uppland, also in Sweden, completes the collection. The models show traces of having been numbered before 1865, but their style suggests that they are somewhat older, probably from about 1800.

implement as two men and six horses with the old wheelplough. This plough is basically a swingplough with a curved mouldboard, not reinforced with metal. The sock has a rudimentary feather, whilst a heel-wedge was fixed to the bottom of the left handle. The head is strengthened with an iron tip. The angle between sock and mouldboard is therefore rather slight.

The Rotherham plough soon reached Scotland. According to what appears to be a reliable account, Small returned to Berwickshire from a visit to England for the purpose of study in 1764, when on the advice of Renton of Lammerton he settled down as a blacksmith in Blackaddermount. That he was quickly successful is demonstrated by the fact that he was soon employing twenty or more carpenters and six to eight blacksmiths. He specialised in the manufacture of ploughs and these soon replaced the old Scottish plough with "straight timber mouldboard" and pointed sock.[97]

Probably the Rotherham type was already known in Scotland. Thus Lowe wrote in 1794 that in 1739 the products of a ploughsmith named Lummas or Lumbas were being imported into Scotland, but that his ploughs had been replaced by Small's.[98] According to Brown the Rotherham plough was introduced by a Mr. Lomax or Lummis to West Lothian in 1730.[99] By 1776 Small's so-called "chain-plough" was much thought of. This name is taken from a chain that was attached to the beam near the coulter. The draught was thus intended to be taken not by the beam but by the chain.[100] The head was small and short. One particular advantage according to Lord Kames was that the plough had clean lines and no sharp angles between the sock and the mouldboard.

In 1784 Small's plough was described in print in a manual written by himself.[101] In the preface he cited Lord Kames' approval of his plough, and stated this preference for the "twisted mouldboard" to the straight mouldboard of the earlier plough, but admitted that this was no novelty. In the same way he preferred a feathered sock to the spear-like one, which could, however, be convenient in stony fields, and the swingplough to the plough with forecarriage. Seen from beneath, his plough was very similar to the Rotherham model, but lacked the heel under the left handle; but his plough also had a rectangular frame. Later it was also furnished with a heel, and thus became even more similar to the Rotherham type.

Small's writing bears the imprint not only of his practical

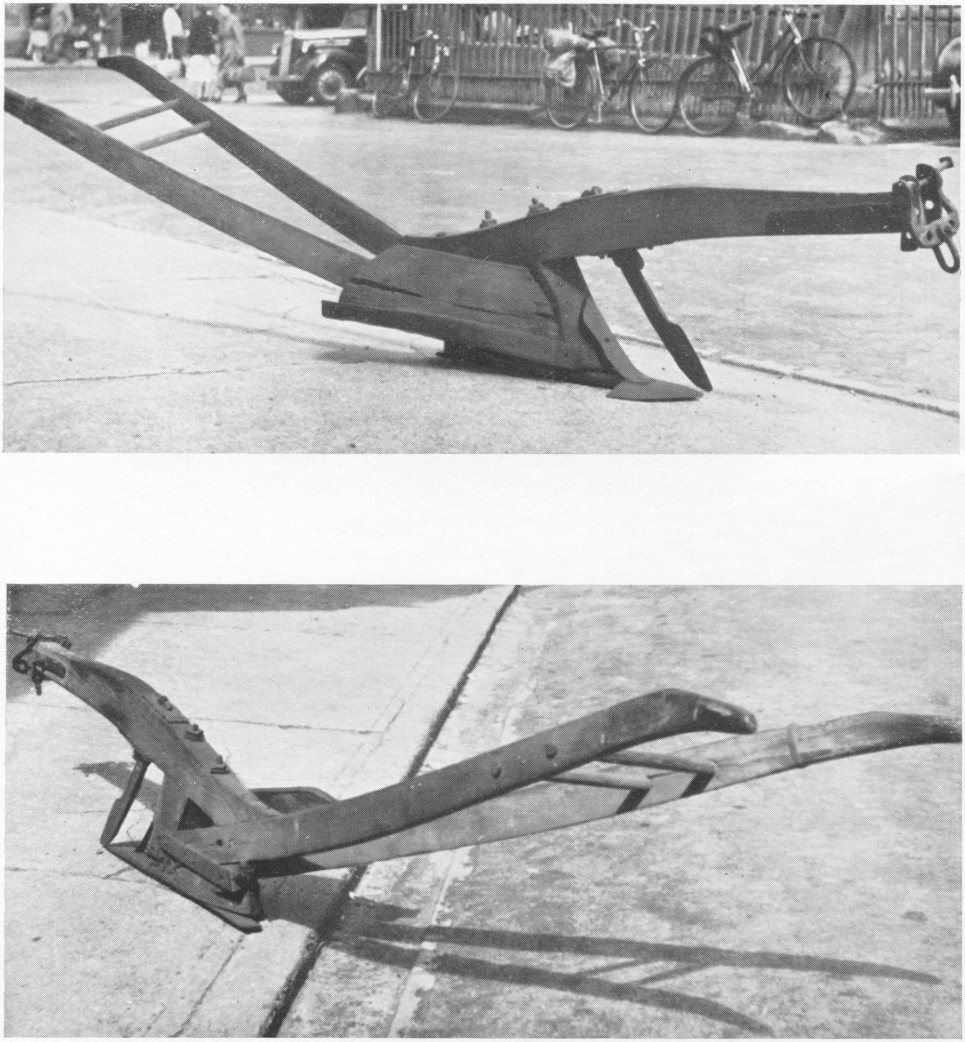

FIG. 4.—Inverness-shire Plough from the Fort William Museum

experience as a smith, but also of a scientific clarity of mind which made his work the classic account of the plough. Since he was not academically trained he could not base his design on mathematical calculations. This was done by James Bailey from Chillingham in Northumberland in his *Essay on the construction of the plough* (1795).

The popularity of Small's plough may be attributed in part to the recognition it received in the earlier reports to the Board of Agriculture and in part also to that in the article on "Agriculture" in the *Encyclopædia Britannica* in 1797, where the lack of a sharp angle between the sock and mouldboard was again praised, as also the fact that the implement only required two horses. The mouldboard at this time was often of cast-iron and the chain was occasionally replaced by an iron rod.[102] The way in which this type of plough penetrated most of Scotland is clear from the later county reports, where it is referred to by several names: "chainplough", "Small's plough" "common swing-plough" or the "improved Scottish plough". The extent and rapidity of its adoption is demonstrated by the fact that it was in general use in Dumfries,[103] West [104] and East Lothian,[105] and Fife [106] in 1794, in Midlothian the following year,[107] in Stirlingshire in 1796,[108] in Kinross in 1797 [109] and in Roxburgh in 1798,[110] in Peeblesshire in 1802 [111] and in Berwickshire in 1809,[112] in Aberdeenshire in 1811 [113] and in Angus by 1813.[114] In Galloway [115] and in Ross [116] the "better class" of farmer was using it by 1810, and only in Renfrewshire and in Shetland was it less general; in the former county "some" were using it in 1812,[117] and in Shetland "a few" in 1814.[118]

At the same time this plough began to be adopted abroad. In Germany it became known through Thaer; in Sweden in 1809 C. G. Stjernswärd founded that country's first factory for ploughs at Engeltofta in Skåne in which, with the help of Scottish smiths, he made ploughs of the Scottish type, especially Small's.

A good example of this type of plough is contained in the West Highland Museum in Fort William. This plough, from Inverness-shire and dated to the early nineteenth century—see fig. 4—has a wooden mouldboard and is shod with a wooden wrest reinforced by an iron band. The sock is feathered and is continued backwards as an iron support beneath the heel-wedge under the left handle.

Certainly here and there some ploughs were adopted that

differed somewhat from Small's. Thus in Aberdeenshire light ploughs were used which were a sort of transitional form between the Rotherham plough and the old Scots plough and which sometimes retained a "carved mould of wood".[119] In Moray there was a type in circulation constructed by Mr. Crichton of Edinburgh.[120] There is a mention from Kinross of a type of plough invented by Lady Stewart of Goodtrees which was already widespread in southern Scotland before Small's plough,[121] whilst in Islay, Gigha and Colonsay in 1811 Veitche's plough was the favourite.[122] From Ayrshire and Bute there are accounts of Wilkie's plough,[123] which was an improved version of that of James Small, as, indeed, were all late ploughs in Scotland.

In the reports from about 1800 there is frequent mention of the "drillplough", commonly called the "double mouldboard plough" or "ridging plough". This was often used for ridging up drills for turnips and for earthing potatoes. Like the ard it was symmetrical but it had two mouldboards, often hung on hinges and with a spear-shaped sock. Side by side with factory-produced drillploughs, there existed home-made ones, manufactured from old ploughs to which a piece of wood had been attached on the lee-side which acted as a second mouldboard.

Thus this implement, which was common from that time on, had no connection with the ard, but evolved from the plough by its being furnished with a mouldboard on the left side.[124]

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To round off the story, the principal change during the nineteenth century was in the substitution of iron for the original medium, wood. Small's earliest ploughs had a wooden mouldboard strengthened with a piece of metal plate, but he soon went over to the use of cast-iron. This material was gradually used for the whole plough, a development which had taken place by the mid-century. Some ploughs were furnished with a fore-carriage, others were swingploughs. After 1860 the horse was in some places replaced by the steam tractor, and, after 1900, the motor tractor.*

* Mention should be made of the sock with attached coulter from South Uist in the Hamburgisches Museum für Völkerkunde und Vorgeschichte, Hamburg (13.223.175). The sock is 29×14 cm. (11½×5½ in.) whilst the coulter which appears to be riveted, is 23 cm. long (9 in.). We are unable to explain this unusual implement—See fig. 5.

FIG. 5.—Sock and Coulter from South Uist from Hamburg Museum

1. Heron 1794 p. 26.
2. Macdonald 1811 p. 152.
3. Heron 1794 p. 33.
4. Macdonald 1811 p. 152.
5. Mackenzie 1810 p. 238.
6. Cf. Sinclair 1795 p. 152n; J. Robertson 1808 p. 102; Henderson 1812*a* p. 57.
7. Macdonald 1811 p. 151.
8. *vide infra.*
9. Macdonald 1811 p. 151.
10. Campbell 1944 p. 231.
11. Fussell 1933.
12. Examples of this type are to be found in the Castle Museum, York, and the Highland Folk Museum, Kingussie.
13. Ekwall 1955; for a discussion of the *cas-chrom* and the breast-plough see Kothe 1953.
14. E.g. Martin 1703 pp. 43, 286; Newte 1791 p. 410.
15. Ure 1794*a* pp. 39-40; the spade was primarily used in the Dunbartonshire parishes of Luss and Arrochar; see also Whyte and Macfarlan 1811 p. 71.
16. Henderson 1812*a* p. 57; Jamieson 1949 pp. 193-5.
17. Ure 1794*a* p. 40; Anon. 1898 p. 67.
18. Buchan 1727 p. 25.
19. Pennant 1771 p. 154.
20. *Statistical Account of Scotland* Vol. II (1791) p. 574.
21. *Ibid.* Vol. III (1792) p. 418.
22. Steinsnes 1945 p. 87.
23. Young 1892 p. 329.
24. Campbell 1944 p. 234.
25. According to Curwen the hoe-culture survived in Scotland—1946 p. 75.
26. Payne 1948 p. 97; Leser 1931 pp. 107-9.
27. C. M. Piggott 1955 pp. 143-4.
28. Glob 1951 pp. 36-41.
29. Now in Dumfries Museum.
30. S. Piggott 1955.
31. Glob 1951 pp. 71-3.
32. Corrie 1914 pp. 338-43; cf. Phillips 1938 p. 338 for similar material from North Lincolnshire, the East Riding of Yorkshire and the Sheffield region. We are indebted to Professor Piggott for drawing our attention to these finds.
33. Mitchell 1880 pp. 94-5.
34. Nat. Mus. Ant. Scot. nos. MP 81 from Cunnisburgh; MP 82 from the Lerwick collection; MP 585 from Whalsay.
35. Shirreff 1814*a* pp. 51-2.
36. Leser 1931 p. 161.
37. Payne 1948 pp. 87-8.
38. Stigum 1947.
39. Erixon 1948; Jirlow 1953, 1954.
40. Sinclair 1795 p. 226.
41. Nat. Mus. Ant. Scot. MP 388.
42. *vide infra.*

43. Nat. Mus. Ant. Scot. MP 564—this appears to be the self-same implement illustrated by Marwick in a lecture published in 1936.
44. Marwick 1936.
45. Mitchell 1880 p. 94.
46. Sinclair 1795 p. 204; *The New English Dictionary* gives the term *thripple-plough* and states that the word has an unknown origin.
47. Heron 1794 pp. 40, 69-70; J. Robertson 1808 p. 103; Macdonald 1811 pp. 156-7; Martin 1703 pp. 53-4; J. Smith 1798 p. 318.
48. Heron 1794 p. 69n.
49. Handley 1953 p. 174.
50. *Encyclopædia Britannica* 1797.
51. Dickson 1770 p. 169; see also J. Smith 1798 p. 59n.
52. The wheelplough is reported from Urie, Kincardineshire, by G. Robertson in 1813—1813 p. 235.
53. Lowe 1794 p. 37.
54. Ure 1794*a* p. 41.
55. Anderson 1794 p. 76.
56. J. Robertson 1799 p. 91.
57. Donaldson 1794*a* p. 19.
58. Mackenzie 1810 p. 146.
59. S. Smith 1810 p. 40.
60. Webster 1794 pp. 12-3.
61. Erskine 1795 p. 32.
62. J. Smith 1798 p. 67.
63. Graham 1812 pp. 107-9.
64. Headrick 1807 p. 316.
65. Home 1776 p. 121.
66. Anderson 1794 p. 76.
67. Mackenzie 1810 p. 250.
68. See Passmore 1930 p. 18, and *infra*.
69. Buchan-Hepburn 1794 p. 90; Somerville 1805 p. 66.
70. G. Robertson 1795 pp. 70-1.
71. Beatson 1794 p. 13; but cf. Thomson 1800 pp. 124-5.
72. Donaldson 1794*b* p. 22.
73. Ure 1797 p. 26.
74. S. Smith 1810 p. 100.
75. Keith 1811 p. 213.
76. Aiton 1811 p. 212.
77. Roger 1794 pp. 16-7.
78. Heron 1794 p. 14.
79. *Ibid.* pp. 49, 51.
80. Headrick 1807 p. 316.
81. Ure 1794*a* p. 41; but cf. Whyte and Macfarlan 1811 p. 70.
82. T. Johnston 1794*a* p. 34.
83. Ure 1794*b* p. 51; but there even in 1798—Douglas 1798 pp. 49-50.
84. B. Johnston 1794 p. 41.
85. T. Johnston 1794*b* p. 31; but also in 1802—Findlater 1802 p. 117.
86. Naismith 1798 p. 76.
87. Kerr 1809 pp. 51-2.
88. Graham 1812 pp. 107-9.
89. Thus reports from Wester Ross and Sutherland—Mackenzie 1810 p. 250; Henderson 1812*a* p. 56.

90. This is conveniently summarized in Handley 1953.
91. Dudgeon 1840 p. 61.
92. Hamm 1856 p. 215.
93. Fussell 1952 p. 65.
94. *Abridgements of specifications relating to agriculture—Division I 1618-1866* (London 1878).
95. Blith 1653 p. 211.
96. Mill 1762 plate IV p. 257.
97. Kerr 1809 p. 151.
98. Lowe 1794 p. 37.
99. Brown 1811 Vol. I p. 232.
100. Passmore 1930 p. 18.
101. Small 1784.
102. J. Robertson 1794 p. 50.
103. B. Johnston 1794 p. 41.
104. Trotter 1794 p. 18.
105. Buchan-Hepburn 1794 pp. 89-90.
106. Beatson 1794 p. 13.
107. G. Robertson 1795 pp. 70-1.
108. Belsches 1796 p. 39.
109. Ure 1797 p. 26.
110. Douglas 1798 pp. 49-50.
111. Findlater 1802 p. 117.
112. Kerr 1809 pp. 151-2.
113. Keith 1811 p. 213.
114. Headrick 1813 pp. 257-8.
115. S. Smith 1810 p. 100.
116. Mackenzie 1810 pp. 146, 250.
117. Wilson 1812 p. 86.
118. Shirreff 1814*b* p. 41.
119. Keith 1811 p. 292.
120. Donaldson 1794*b* p. 22.
121. Graham 1814 pp. 46-7.
122. Macdonald 1811 p. 153.
123. Aiton 1811 pp. 213-8, 723-5; Aiton 1816 pp. 158-64.
124. A plough of this type is to be found in the Angus Folk Museum.

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