

# Ancient Agriculture

by G. W. B. HUNTINGFORD

IN the first volume of *ANTIQUITY* appear two papers, one by Dr R. C. C. Clay, dealing with the formation of lynchets<sup>1</sup>; the other, by Dr E. Cecil Curwen, containing a survey of prehistoric agriculture in Britain.<sup>2</sup> These papers, which are of considerable interest to the farmer as well as to the archaeologist, have suggested the following remarks, which I was unable to put on paper before as some of my books were in England.

It may be as well to note first of all the statements on which this paper will comment. Dr Curwen says that Early Iron Age and Romano-British ploughs had ploughshares consisting of a plain metal point fitted to the share-beam—such a plough merely scratches a groove (p. 268); lynchets were not formed intentionally (p. 273); a plough described by Pliny which turned a furrow did away with the need of cross-ploughing (p. 280); manuring is implied by rectangular fields with lynchets, and no visible evidence of two- or three-field rotation of crops (p. 286). In Dr Clay's paper, lynchets are defined as ploughed ground of which the natural slope has been altered by ploughing, which alteration was effected by ploughing the lower furrow only, bringing the plough back idle. This mode of ploughing flattened the slope, a slope being unsuitable for growing corn in a damp climate—the climate of Britain being damper in prehistoric times than it is now. (Pp. 57–59).

## I. THE PLOUGH

The essential feature of the plough is that it turns a furrow by inverting the soil, whereas the cultivator or horse-hoe for working after the crop is sown merely stirs the soil without inverting it. Dr Curwen describes Early Iron Age and Romano-British ploughshares as consisting of a simple metal point<sup>3</sup> which, he thinks, merely scratched a groove in the soil (pp. 268, 280). To this failure to turn over the soil he considers that we are to ascribe the need for cross-ploughing

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<sup>1</sup> 'Some Prehistoric Ways', *ANTIQUITY*, 1927, I, 54–65.

<sup>2</sup> 'Prehistoric Agriculture in Britain', *Ib.*, I, 261–89.

<sup>3</sup> Our 'bar-point' share.

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advocated by Roman agricultural writers.<sup>4</sup> This, as I shall endeavour to show, is not so. Further, I believe Dr Curwen to be mistaken in his idea of the ancient plough ; for, among other things, practical experience has shown me that no amount of cultivating, *i.e.* stirring the soil without inverting it, will produce a lynchet or terrace.

Till 1760, practically the whole of the plough was universally made of wood, and there is reason to believe that the shape of the plough changed but little during centuries of use.<sup>5</sup> The most detailed account we possess of a Roman plough is Vergil's, which runs as follows :—

Continuo in silvis magna vi flexa domatur  
In burim, et curvi formam accipit ulmus aratri.  
Huic ab stirpe pedes temo protentus in octo,  
Binae aures, duplici aptantur dentalia dorso.  
Caeditur et tilia ante iugo levis, altaque fagus,  
Stivaque, quae currus a tergo torqueat imos :  
Et suspensa focis explorat robora fumus.

[In the first place, an elm is bent forcibly in the woods to the shape of a plough-body (*buris*), and takes the form of the crooked plough. From the base of this extends the beam (*temo*) for eight feet, and joined to it are two mould-boards (*aures*) and slades (*dentalia*) with double back. Beforehand, too, is cut the light lime for the yoke, and the tall beach for the stilt (*stiva*), which turns the bottom of the fore-carriage (*currus*)<sup>6</sup> from behind : the wood is hung in the chimney to be seasoned by the smoke].<sup>7</sup>

To illustrate this plough, I append tracings from Martyn<sup>8</sup> of two Italian ploughs in use in the 18th century, with another drawing of an old plough formerly used in Sussex. (Figs. 1, 2, 3).

Now, as regards the work done by the Roman plough, we have Vergil's express statement that

Pingue solum primis extemplo a mensibus anni  
Fortes invertant tauri, glaebasque iacentis  
Pulverulenta coquat maturis solibus aestas.<sup>9</sup>

<sup>4</sup> e.g. Vergil ; Varro, R.R. I, XXIX, 2 ; and cf. Festus, s.v. Offringi, p. 523 (ed. Dacier, Valpy's ed., London, 1826).

<sup>5</sup> Fream, *Elements of Agriculture*, ed. 10, p. 47. Fream is also mistaken, I think, in supposing that the old ploughs did not invert the soil.

<sup>6</sup> I understand 'currus' as a wheeled forecarriage on the strength of Servius' comment. See Conington in loc ; see also Pliny, XVIII, §18, 48.

<sup>7</sup> Verg., *Georg.*, I, 169-175.

<sup>8</sup> 'The Georgicks of Virgil', by John Martyn, F.R.S., ed. 5 (Oxford 1827), p. 40. Figs. 1, 2, 3.

<sup>9</sup> Verg., *Georg.*, I, 64.

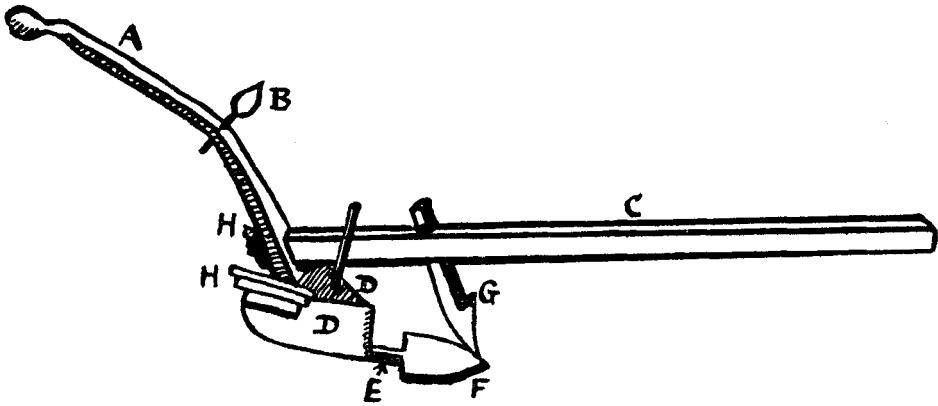


FIG. 1. EIGHTEENTH-CENTURY ITALIAN PLOUGH. (Martyn)

A, Buris. B, Stiva. C, Temo. D, Aures. E, Dentale. F, Vomer. G, Culter. H, Tabellae

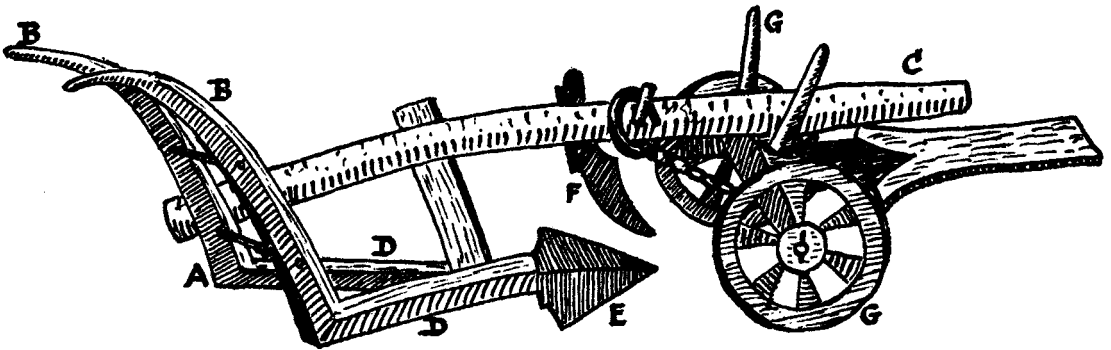


FIG. 2. EIGHTEENTH-CENTURY MANTUAN PLOUGH. (Martyn)

A, Buris. B, Stiva. C, Temo. D, Aures and dentale. E, Vomer. F, Culter. G, Currus

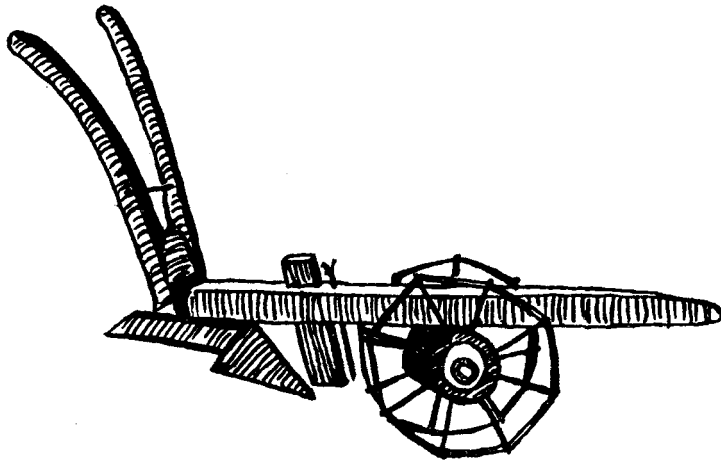


FIG. 3. OLD SUSSEX PLOUGH. (Reliquary)

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(Right from the beginning of the year the strong bullocks should turn over the rich soil, that dusty summer with its hot suns may bake the clods as they lie [upturned]). We learn from other sources something of the nature of ploughed furrows. 'Qua aratrum vomere lacunam striam fecit, sulcus vocatur. Quod est inter duos sulcos elata terra dicitur porca, quod ea seges frumentum porricit'.<sup>10</sup> [Where the plough makes with its share a hollow furrow, the result is called sulcus (furrow). The raised earth between two furrows is called porca (ridge), because there the corn produces its crop]. And again, 'Porca est inter duos sulcos terra eminens',<sup>11</sup> (porca is the raised ground between two furrows); which is further defined by Columella, 'Liras rustici vocant easdem porcas cum sic aratum est ut inter duos latius distantes sulcos

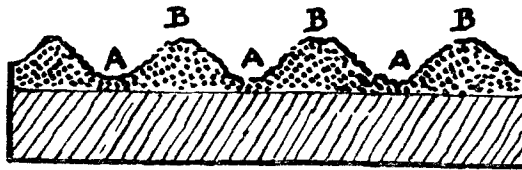


FIG. 4. DIAGRAM OF FURROWS.      AA, Sulcus ; BB, Porcae

medius cumulus siccam sedem frumentis praebeat',<sup>12</sup> (the country people call these same 'porcae' liras when the land is so ploughed that a heap of earth mid-way between two wide furrows offers a dry bed for the crop). This result (fig. 4), can only be obtained by using a plough which turns a furrow. Such a seed-bed was produced, so Varro tells us, 'cum tabellis additis ad vomerem',<sup>13</sup> (with boards added to the share), *i.e.* not to the actual share, but to the mould-boards proper (fig. 1). The use of a coulter, too, even if not with every plough, implies the inversion of the soil, particularly as Pliny says 'culter vocatur, praedensam, priusquam proscindatur, terram secans, futurisque sulcis vestigia praescribens incisuris, quas resupinus<sup>14</sup> in

<sup>10</sup> Varro, R.R., I, 29, §3. Ed. Goetz (Teubner).

<sup>11</sup> Festus, p. 319, s.v. Imporcitor. The porcae described above must not be confused with others 'aquae derivandae gratia' (ib. p. 611), which were open drains.

<sup>12</sup> R.R. II, 4, 8.

<sup>13</sup> R.R. I, 29, §2.

<sup>14</sup> Taking 'resupinus' proleptically.

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arando mordeat vomer',<sup>15</sup> (that which cuts the heavy ground before the first ploughing is called a coulter, marking out a line for the future furrows by cutting into the ground, into which cutting the share penetrates turned back in ploughing). There is no other reasonable explanation of the term *porca* than that shown in fig. 4; and the statements of Varro, Vergil, Columella, Pliny, and Festus sufficiently indicate that the ground was actually turned over, not merely scratched. The only alternative is to suppose that every second furrow was left unploughed, which is absurd, and could not possibly have prompted Varro's etymology of *porca*, 'quod ea seges frumentum porricit';<sup>16</sup> nor does this sanction White and Riddle's definition of *porca* as a 'balk'.

Dr Curwen considers (p. 280) that a plough which turns a furrow does away with the need for cross-ploughing. But, apart from the fact that the Roman plough did turn a furrow, we need not suppose that the terms *proscindere*=first ploughing, *offringere*=second or cross-ploughing ('to plough against'), and *lirare*=third ploughing (after or at the same time as sowing), need be taken at any period of Roman agriculture otherwise than literally: husbandry is the most conservative of all arts. And, though these methods are not now practised in England, the same procedure is adopted in maize-growing countries. Thus, in Kenya, our normal procedure is, where conditions permit, to plough and cross-plough, with possibly a third ploughing; the seed, too, is often planted behind the plough, and immediately harrowed in. And our ploughs are infinitely superior to anything the Romans devised. When the plough is drawn by oxen (whether the team be of two or fourteen) a cross-ploughing is often necessary because an ox-team does not plough as straight a furrow as a horse-team, and there are generally places which the plough has missed in the first ploughing. Further, the damper the climate, the worse the weeds, and one ploughing is often not enough to cover the weeds properly. Therefore, I maintain that the type of ox-drawn plough<sup>17</sup> used—provided it turns a furrow—cannot be said to affect the need for cross-ploughing.

'Ploughshares of the Early Iron Age and Roman period are not

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<sup>15</sup> N.H. XVIII, §18, 48. And Pliny's words 'Latitudo vomeris cespites versat' (loc. cit.) are conclusive.

<sup>16</sup> The probable etymology of 'porca' is *porcus*, and the literal meaning 'little pig'.

<sup>17</sup> Only when a tractor is used is one ploughing sufficient under normal tropical conditions.

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uncommon, and consist of a simple metal point designed to fit on to the share-beam, without any device for undercutting and turning over the sods. Such a plough simply scratches a groove in the soil'. (Curwen, p. 268). But the discovery of metal shares only does not necessarily mean that the ploughs they belonged to did not possess other parts made of wood which could turn over the sods. The Roman plough was made of wood, and wooden mould-boards were used in Britain as late as 1830;<sup>18</sup> and in the Sussex plough already referred to even the coulter is made of wood.<sup>19</sup> Hence we may reasonably infer that people who had the intelligence to make an iron share, had also sufficient intelligence to provide their ploughs with some means of inverting the soil; for inversion is absolutely necessary in levelling a slope; and we may conclude that the mould-boards, together with the rest of the ploughs, have perished. A drawing in a MS of Caedmon's *Paraphrase* shows that the 'Vergilian' or Italian type of plough was used in England from early modern times; this plough has a mould-board. (Fig. 5).

When we approach the problem of ploughs of earlier periods than the Iron Age, we are on far less sure ground. That ploughs of a sort were used is quite clear; not so clear, whether they ploughed a furrow or scratched a groove.

The ploughs figured in the rock-carvings from the Maritime Alps<sup>20</sup> appear to possess a wooden bar which was driven through the ground (fig. 6), like the ancient Egyptian plough (fig. 7)<sup>21</sup> which, we know, merely scratched a groove in the soil. On some of the megalithic remains near Carnac in Brittany are sculptured figures which M. le Rouzic believes to be ploughs ('hache-charrue'). Examples from the Dolmen des Marchands and the tumulus of Mané-er-H'roëk at Locmariaker are shown in figs. 8 and 9.<sup>22</sup> These things, if they do represent ploughs, can have done no better work than the Alpine and Egyptian implements. My contention, however, that the ploughs which worked in the Early Iron Age fields had mould-boards, does not apply to ploughs of the Neolithic, Copper and Bronze Ages.

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<sup>18</sup> Fream, loc. cit., 47.

<sup>19</sup> *Reliquary*, N.S. XI, 219.

<sup>20</sup> M. C. Burkitt, *Our Early Ancestors*, plate 28, fig. 1.

<sup>21</sup> After Wilkinson, *Ancient Egyptians*, abridged ed., 1854, II, fig. 359.

<sup>22</sup> Z. le Rouzic and C. Keller, *Locmariaker : La Table des Marchands*. (Nancy, 1910). My own copies of these are at present inaccessible to me; figs. 8 and 9 are therefore after Le Rouzic.

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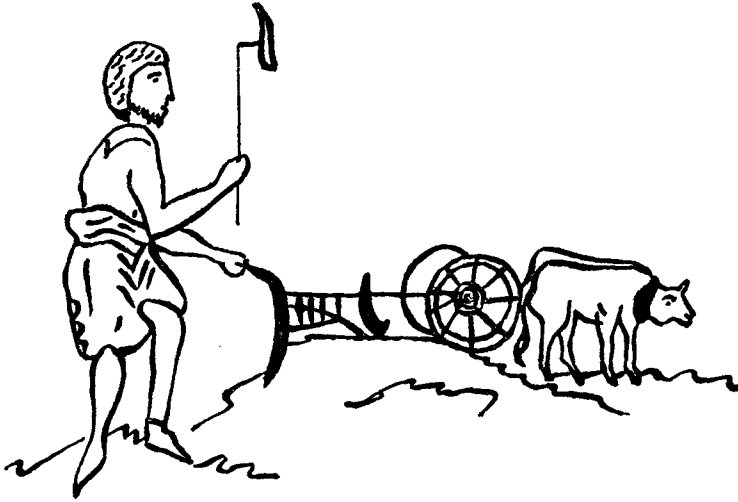


FIG. 5. 'VERGILIAN' TYPE OF PLOUGH. (Caedmon's 'Paraphrase')

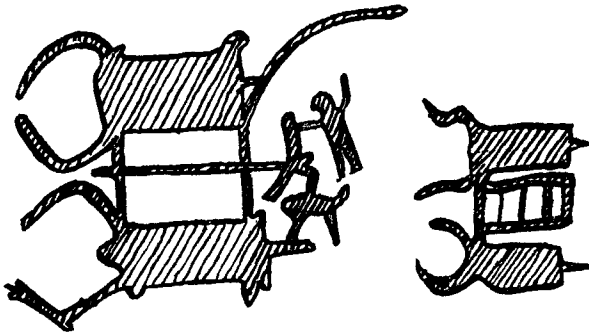


FIG. 6. PREHISTORIC PLOUGH AND HARROW. (Burkitt)  
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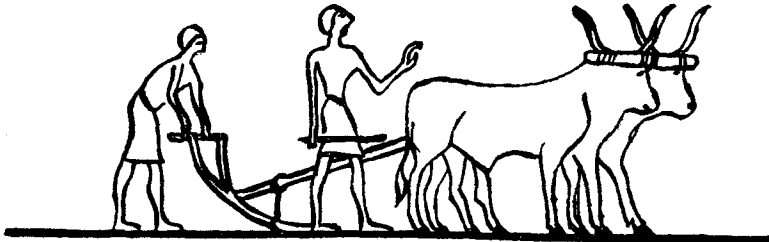


FIG. 7. ANCIENT EGYPTIAN PLOUGH. (Wilkinson)

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### 2. THE HARROW

The plough implies the use of an implement to break the clods and render the land fit for seeding. The simplest and most primitive form of harrow was doubtless the 'bush-harrow'; though in the passage in Vergil,

Rastris glaebas qui frangit inertes,  
Vimineasque trahit crates,<sup>23</sup>

there is some doubt as to the interpretation of 'crates', which some consider means 'bush-harrow' (the 'arbuteae crates' of l. 166), while others take it to mean 'osier hurdles'.<sup>24</sup> In any case, a bush-harrow is a most ineffectual implement, as I have proved from using one; and even primitive man would soon devise something better. Martyn's interpretation of 'crates' as 'hurdles' suggests that the rectangular implement with four cross-bars in Burkitt, plate 28, fig. 1 (fig. 6 *ante*)—which he does not mention in the text—may be a heavy hurdle used as a harrow.<sup>25</sup> On the other hand, it might conceivably (though perhaps with less probability) be regarded as a very early form of drag-harrow, with wooden teeth set in the beams, like the Roman irpex, 'Genus rastrorum ferreorum, quod plures habent dentes ad extirpandas herbas in agris'.<sup>26</sup> The shape is not mentioned; such harrows are generally triangular, and with iron or wooden teeth do quite good work. In the earliest representation known to me of this type of harrow (14th century), four transverse bars have teeth as well as the frame.<sup>27</sup>

### 3. LYNCHETS OR TERRACES

The formation of lynchets, or as we now call them, terraces, is one of the objects of a coffee-planter in cultivating his plantation (Fig. 10). I grant that our terraces are only a fraction of the width of the Celtic lynchets, but the method employed, and the result, are the same; and as Dr Clay says (p. 57) they can be formed only by ploughing the lower furrow, so that all the soil is turned down-hill, bringing back the

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<sup>23</sup> Georg. 1, 95.

<sup>24</sup> So Martyn.

<sup>25</sup> Incidentally, one of the men in fig. 6 appears to be twisting an ox's tail, a common method in Africa of inducing a lazy ox to move.

<sup>26</sup> Festus, p. 339, s.v. Irpices. 'A kind of iron rake with many teeth for tearing out weeds in the fields'.

<sup>27</sup> In a 'Shepherd's Calendar', in the Brit. Mus.; figured in Ditchfield, *Old Village Life*, p. 137.



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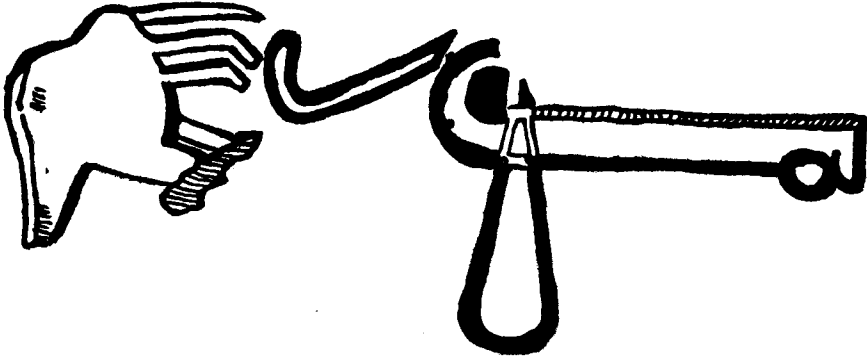


FIG. 8. CARVING OF PLOUGH, 'DOLMEN DES MARCHANDS'. (Le Rouzic)

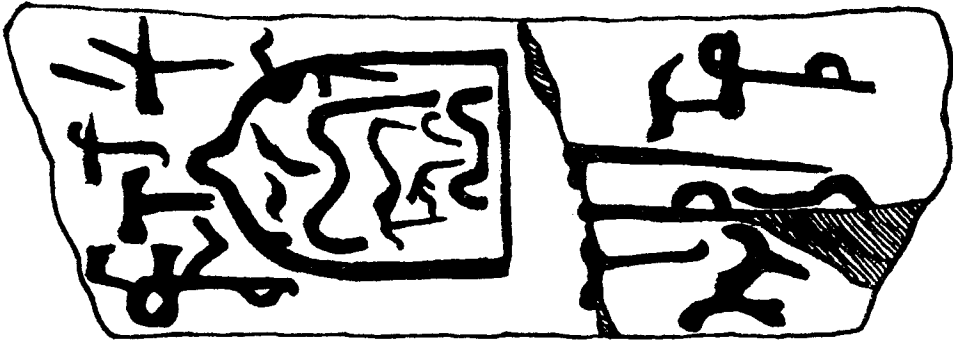


FIG. 9. CARVINGS OF PLOUGHS, MANÈ-ER-H'ROËK. (Le Rouzic)

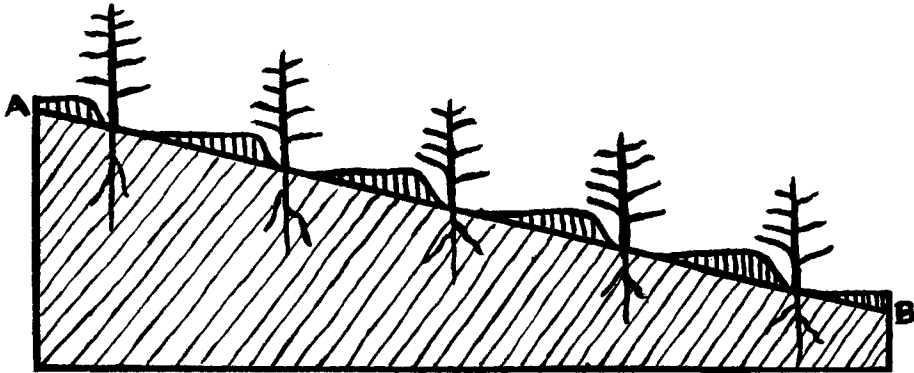


FIG. 10. TERRACES, KENYA COFFEE PLANTATION  
A-B, natural slope

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plough idle instead of ploughing the upper furrow. Nowadays we use a 'one-way' or 'hillside' plough, which has a reversible share held in place by a catch; at the end of each furrow the share is swung under the plough into position for the next furrow.

Our 'lynchets', on a slope such as shown in fig. 10, have a negative lynchet 2 ft. high; this can be produced in about two years by 3 to 4 ploughings a year, the level strip being disc-harrowed after each ploughing. On a rough estimate, one might put the formation of a Celtic lynchet 10 ft. high and 200 ft. wide at about 40 years, if it received two ploughings a year; if it was only ploughed once a year the time would be longer. Once a coffee terrace has been properly formed, it does not need to be ploughed with a 'one-way' plough every time, as an ordinary plough will preserve the proper level. So prehistoric man probably did not find it necessary to plough the lower furrow only every time, once his lynchet was established.

Our object in levelling the slope by terracing is to stop soil-wash, the worst thing in nature with which the planter has to contend; and I can see no other reason for the ancient lynchets. The mere fact that ground is sloping does not make it unsuitable for growing corn in wet climates, as Dr Clay says (p. 58). For in East Africa, native fields of maize, millet, and the short-stalked *eleusine coracana*, are often found on very steep slopes; and as long as they are prepared by hand (with 'hoes') the soil washes very little in comparison with ploughed land. It is when the plough comes into use that soil-wash starts; hence the necessity of flattening the slope. The formation of lynchets therefore implies that soil-wash occurred, and that they were deliberately formed to prevent it.<sup>28</sup>

### 4. MANURING AND ROTATION

It is not quite clear what Dr Curwen means by his statement that there is 'no visible evidence of two-field or three-field rotation of crops' (p. 286), for a number of fields side by side need not imply any sort of rotation. Even if the Britons marled their land with chalk,<sup>29</sup> and the Welsh spread wood-ash on their fields,<sup>30</sup> there are no grounds for supposing that they had any sort of rotation; for 'the Romans

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<sup>28</sup> Dr Curwen considers that lynchets were not formed intentionally (p. 273).

<sup>29</sup> Pliny, N.H. xvii, §6, 4, seq.

<sup>30</sup> *Mabinogion*; quoted by Curwen, p. 287.

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seem to have had some glimpses of rotation of crops ; but it does not appear that any system of agriculture founded upon this knowledge was in general use among them'.<sup>31</sup>

Perhaps something can be learnt in this connexion from native agricultural methods in Africa ; and the following account of Nandi<sup>32</sup> agriculture will perhaps suggest methods which may have been practised by the more primitive of the early inhabitants of Britain. The Nandi when preparing new ground for eleusine corn, break up the turf with hoes. The turf is then collected into small heaps, and fired, and left to smoulder till the grass is burnt out.<sup>33</sup> The heaps of burnt earth are then scattered over the ground, dug in with hoes, and a tilth is prepared for the seed. The usual method of planting is to have a little of everything in the same patch—eleusine, millet, maize, beans, and sweet potatoes. Next year the stubble is dug over, and maize and millet planted, but not eleusine ; for the Nandi consider that the ground must be pared and burnt every year for this crop. So fresh ground is prepared. After four or five years the patch is abandoned, and new ground taken up. The cultivated fields are communal, and each man's holding is a strip separated from the next holding by a narrow path.

We have here no rotation, but some idea of the manurial value of wood-ash. The idea of leaving a patch of cultivated land after a few years is due, not so much to a recognition of the benefit derived from fallowing, as to the repressed nomadic instincts of the Nandi, for they frequently move house as well. The natives in this part of the world have not attained to the plough because a small area only need be cultivated to support a family, and each man grows his own food. The plough is the production of harder climates where a larger area is needed under primitive methods of tillage than can conveniently be prepared by hand.

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<sup>31</sup> Daubeny, *Lectures on Roman Husbandry*, p. 124, quoted by Conington, *Vergil* (Bibl. Class.), I, 159.

<sup>32</sup> I take the Nandi as an example although they are a pastoral tribe, because their agricultural system (borrowed from the Bantu Kavirondo) is very well defined ; and because I am much better acquainted with their methods than with those of other tribes.

<sup>33</sup> The old-fashioned process of paring and burning formerly practised in England.