



Bodleian Libraries

UNIVERSITY OF OXFORD

This book is part of the collection held by the Bodleian Libraries and scanned by Google, Inc. for the Google Books Library Project.

For more information see:

<http://www.bodleian.ox.ac.uk/dbooks>

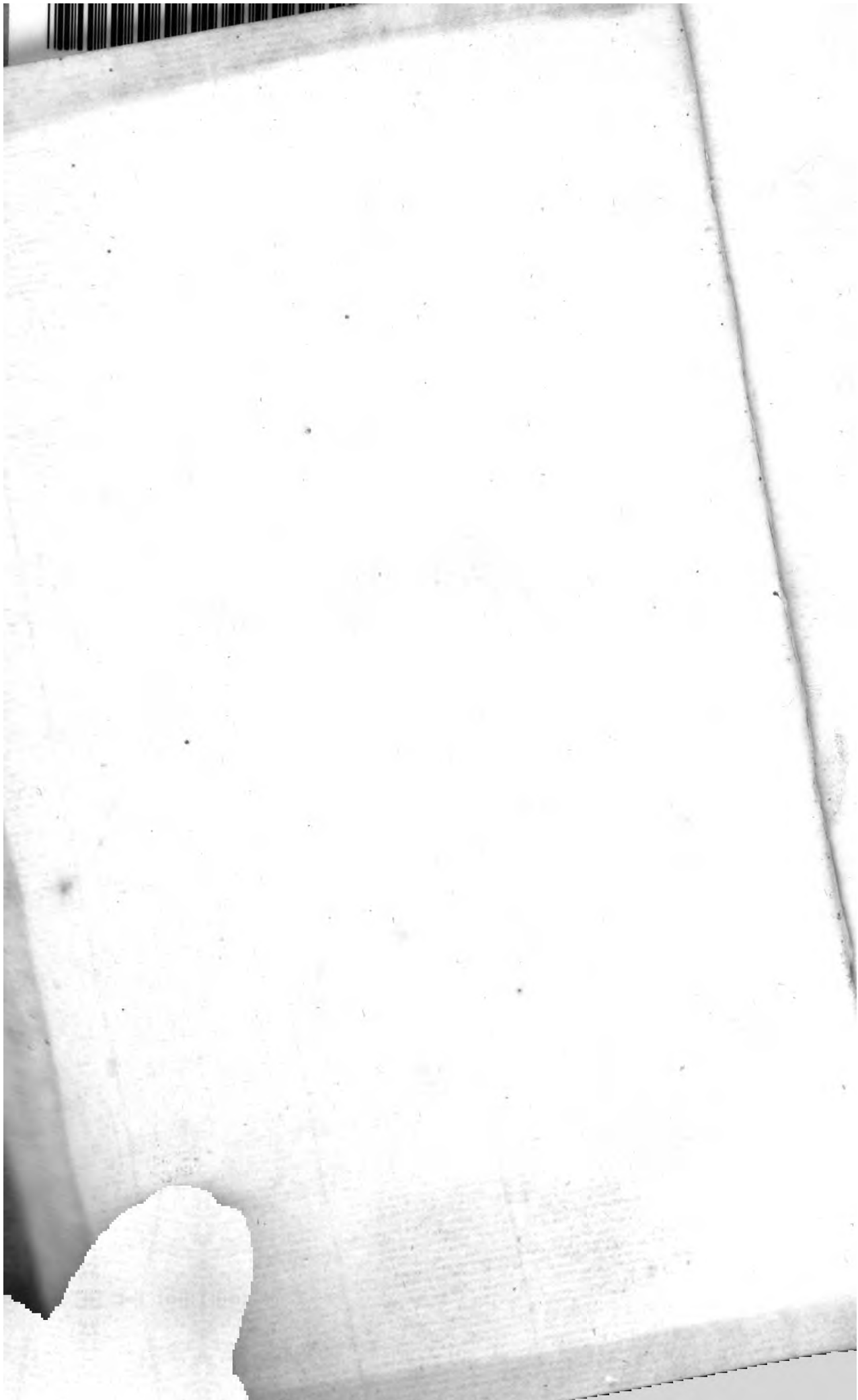


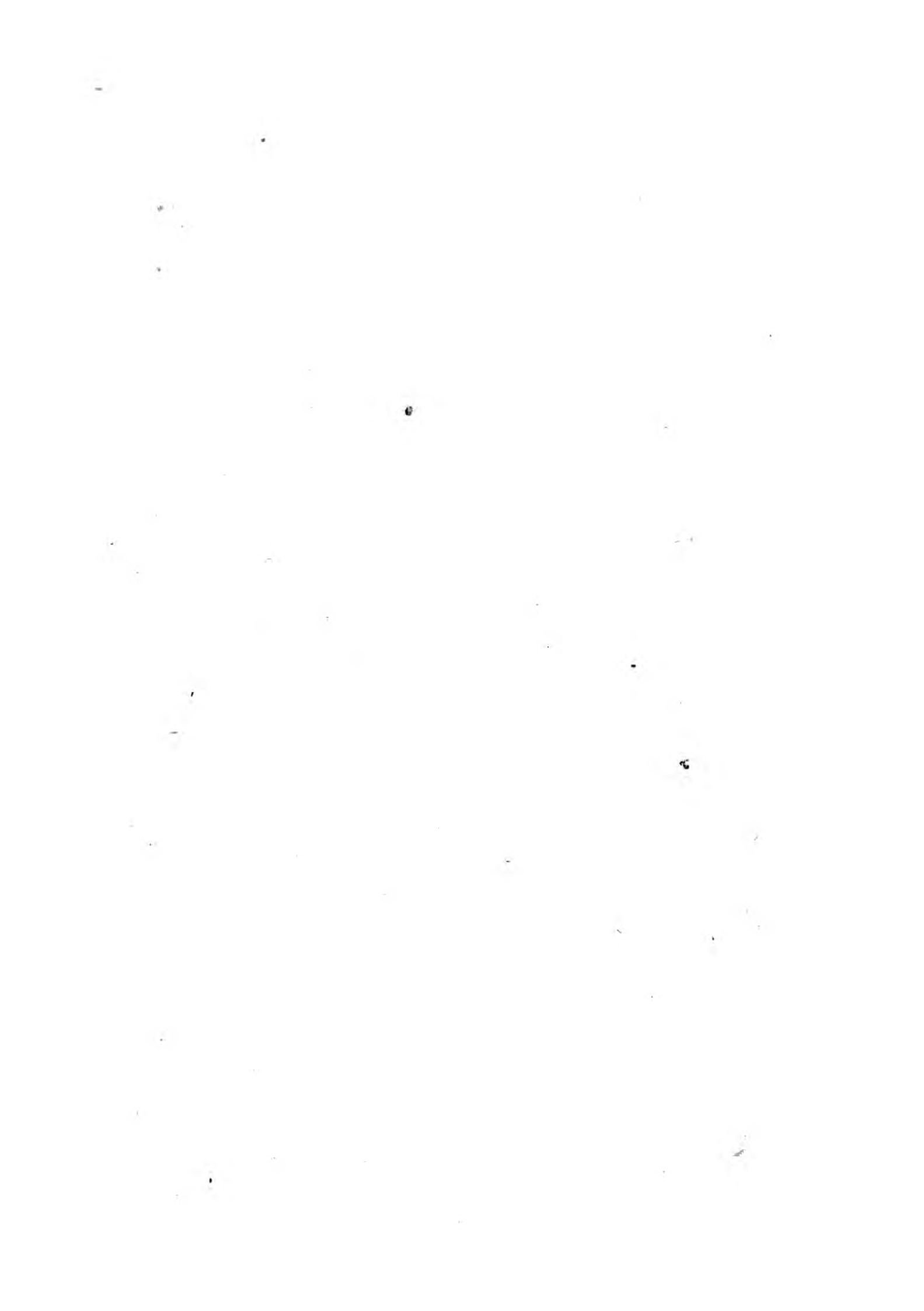
This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 2.0 UK: England & Wales (CC BY-NC-SA 2.0) licence.

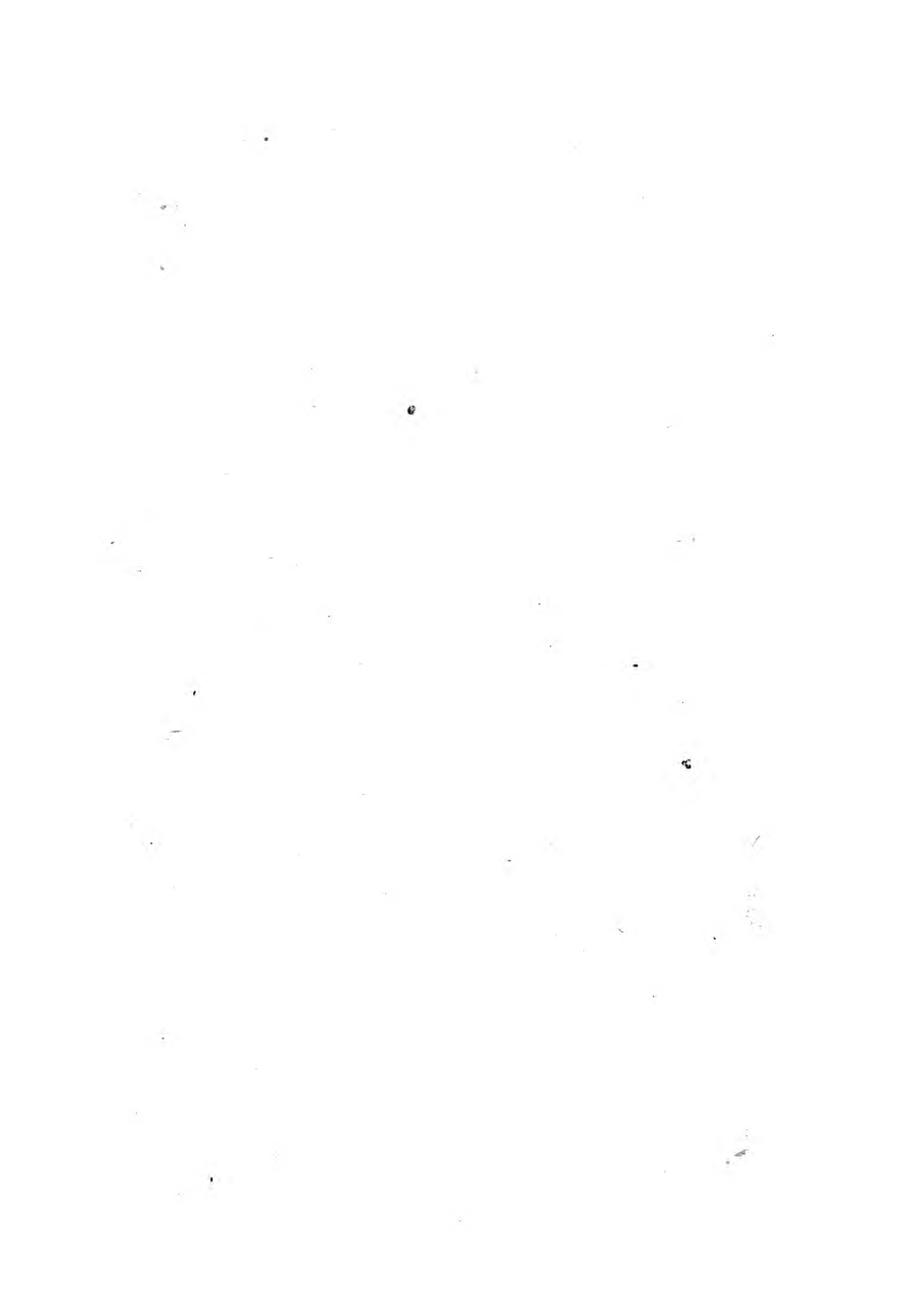
[Redacted]

P

[Redacted]



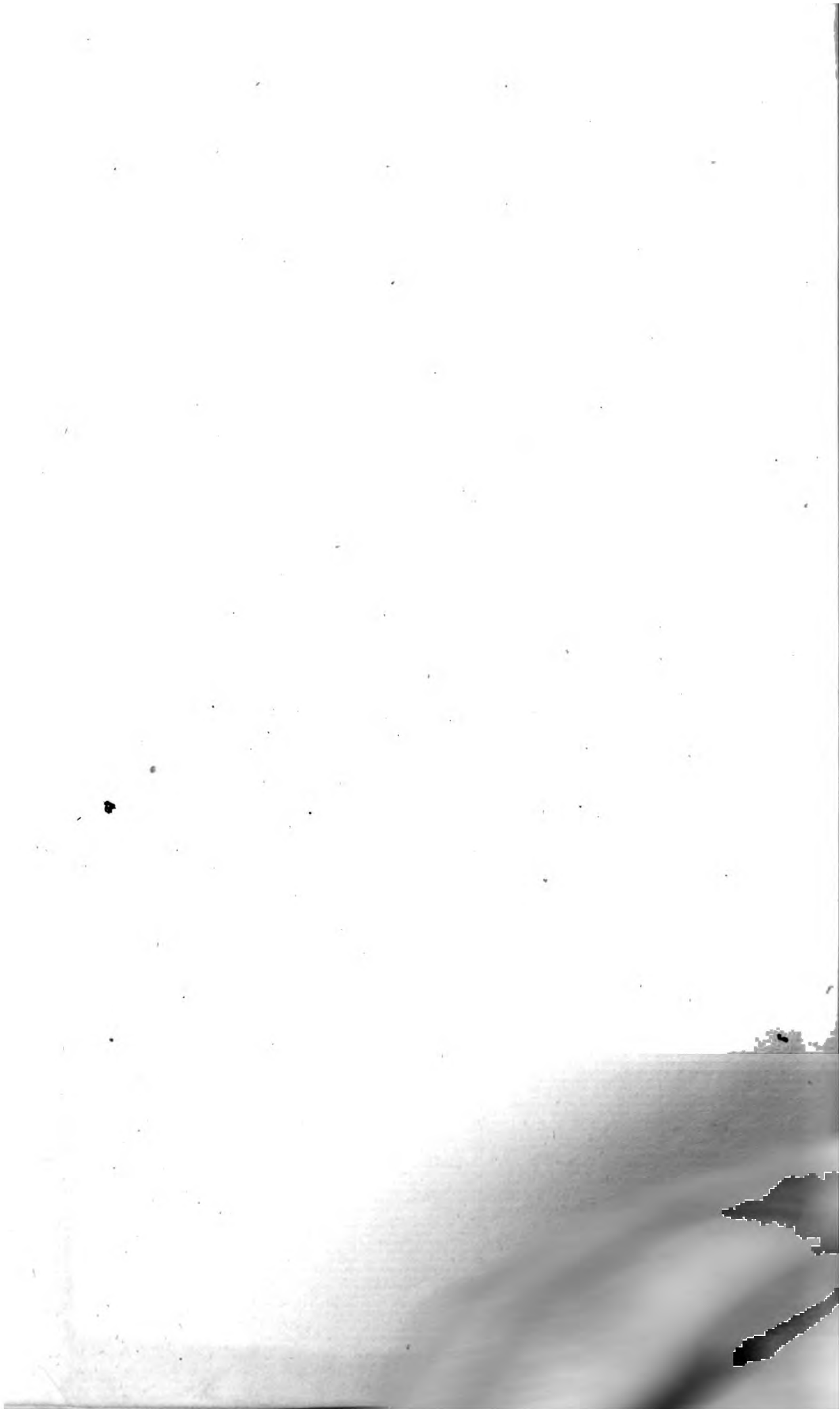






THE
H U S B A N D R Y
OF THE
A N C I E N T S.
V O L U M E II.

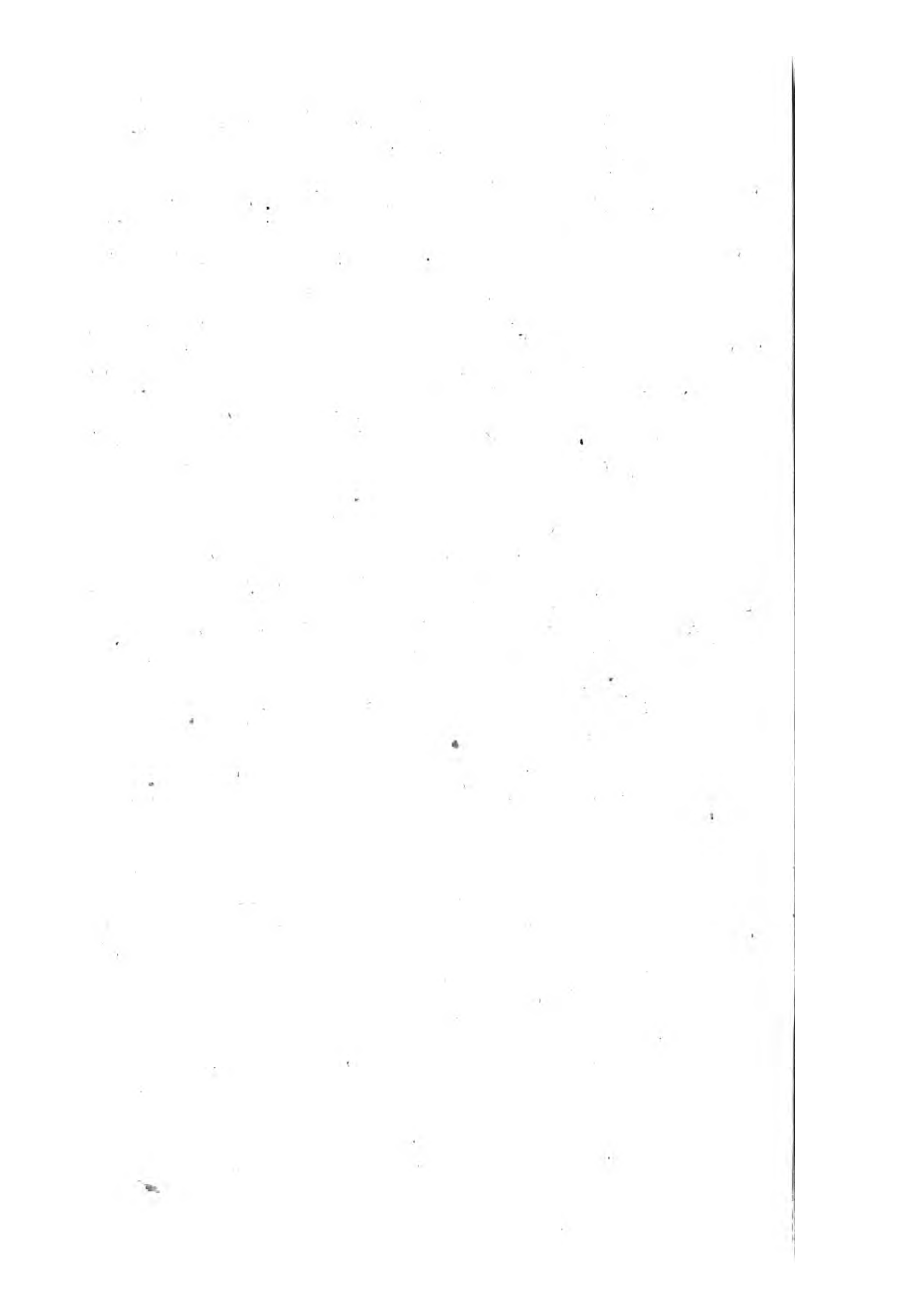






THE
H U S B A N D R Y
OF THE
A N C I E N T S.
V O L U M E II.





THE
H U S B A N D R Y
OF THE
A N C I E N T S.

IN TWO VOLUMES.

BY ADAM DICKSON, A.M.
LATE MINISTER OF WHITTINGHAM.

V O L U M E II.

EDINBURGH:

PRINTED FOR J. DICKSON, AND W. CREECH, EDINBURGH;
AND G. ROBINSON, AND T. CADEL, LONDON.

MDCCLXXXVIII.

19191.

e . 4.



C O N T E N T S.

V O L U M E II.

	Page
Chap. XXV. Of the seasons of sowing, and the manner of proportioning seed to the kind of land - -	1
Chap. XXVI. Of the choice of seed -	37
Chap. XXVII. Of the manner of destroying weeds, and the culture given to the growing corn - -	50
Chap. XXVIII. Of the crops raised by the ancients, of the price of corn, and the value and rent of lands -	89
Chap. XXIX. Of the culture of <i>triticum</i> and <i>far</i>	141
Chap. XXX. Of the culture of <i>hordeum</i> -	162
Chap. XXXI. Of the culture of the <i>legumina</i> , and particularly of the <i>faba</i> -	181
Chap. XXXII. Of the culture of the <i>medica</i> , and other things sown for green forage	211
Chap. XXXIII. Of the culture of the <i>rapa</i> and <i>napus</i> - - -	248
Chap. XXXIV. Of the culture of flax or lint (<i>Linum</i>) - -	265
Chap.	

	Page
Chap. XXXV. Of the culture of willows -	276
Chap. XXXVI. Of meadows - -	285
Chap. XXXVII. Of the fruitfulness of meadows, and of hay-making -	317
Chap. XXXVIII. Of inclosing - -	330
Chap. XXXIX. Of reaping - -	348
Chap. XL. Of threshing, or beating out corn	375
Chap. XLI. Of cleaning, or winnowing the corn	395
Chap. XLII. Of straw, and the uses made of it	405
Chap. XLIII. Of the manner of preserving corn	413
Chap. XLIV. Of the management of oxen	429

A
T R E A T I S E
O N
A N C I E N T A N D M O D E R N
H U S B A N D R Y.

C H A P. XXV.

*Of the Seasons of Sowing, and the Manner
of Proportioning Seed to the Kind of Land.*

IN Britain we have three seasons of sowing, autumn, spring, and summer. We sow wheat and rye in autumn; oats, pease, and beans, early in spring; and barley early in summer. Among the Romans there were two seasons for sowing; there was an autumnal seed-time, and

2 OF THE HUSBANDRY

there was a vernal feed-time. The autumnal feed-time continued from the vernal equinox to the winter solstice. It was seldom, however, that it began so early, or continued so late; Palladius allows it to continue only from the 19th February to the 8th of December. The spring or trimestrian feed-time, began as soon as the land was in a proper condition for being sown, and was finished in the month of March. To this last feed-time, as has already been observed, both from Cato and Columella, they had recourse in Italy only in cases of necessity. Pliny might likewise have been mentioned, who expresses himself almost in the words of Cato: ‘The trimestrian feed-time,’ says he, ‘may be used where it is very inconvenient to use the early one, and where the land is so rich, that it is fit for carrying crops every year successively *.’ Both Columella and Palladius mention particular soils and climates, in which it is proper to sow at that season. ‘There are cold and snowy places,’ says Columella, ‘where the summer is wet and without heats, in which the feed is very

* Trimestre, ubi sementem maturam facere non possis, et cujus crassitudo sit restibilis; Plin. Nat. Hist. lib. xviii. cap. xvii.

‘ very properly sown in this season *.’ ‘ The
 ‘ trimestrian sowing,’ says Palladius, ‘ agrees ve-
 ‘ ry well with cold and snowy places, where the
 ‘ quality of the summer is wet †.’ It is probable,
 that it is not the severity of the winter in those
 places, that makes the trimestrian seed-time pro-
 per for them, but rather, that it is the drought
 and heat of summer that render it improper in
 warmer climates. When the seed is sown in
 the autumn, before the drought and heat of the
 spring comes on, the corn is far advanced, the
 surface is covered, and the drought kept out;
 but when, in such a climate, the sowing is de-
 layed till after winter, the drought is allowed to
 penetrate, and the crop is endangered.

It has already been observed, that the autum-
 nal seed-time continued from the equinox to the
 solstice. Varro observes, that seed ought not to
 be sown before the equinox; ‘ for,’ says he, ‘ if
 ‘ the season is unfavourable, the seed putrifies ‡.’

There

* *Ea (trimestris satio) locis praegelidis ac nivosis, ubi
 aestas est humida et sine vaporibus, recte committur; Col.
 lib. ii. cap. ix.*

† *Trimestris satio locis frigidis et nivosis convenit, ubi
 qualitas aestatis humecta est; Pal. lib. i. tit. vi.*

‡ *Neque ante aequinoctium incipi oportere putant,
 quod,*

4 OF THE HUSBANDRY

There is a passage in Esdras that alludes to this, and supposes that seed may be corrupted both with rain, and with the want of rain *. By an experiment in the environs of Geneva, by M. Lullin de Chateavieux, in the month of July 1754, it appears, that the earth is sometimes so hot as to destroy the vegetative power of seed put into it, if the weather continues hot and dry for some time after. This might happen in Italy to seed sown before the equinox, if the weather continued dry. That the unfavourable season here mentioned by Varro, was a dry season, appears from a passage in Pliny, in which he observes, ‘That seed lying long in the ground, and not vegetating, is consumed †.’ Palladius mentions the sowing some lands about the equinox, but then they were lands that were in danger of being hurt by water, as appears from an expression that follows; ‘While the sky continues serene and clear ‡.’ Columella indeed expresses himself,

quod, si minus idoneae tempestates sint consecutae, putrescere semina soleant; Var. lib. 1. cap. xxxiv.

* Esdras viii. v. 43.

† Ne diu jacens atque non concipiens, evanescat; Plin. Nat. Hist. lib. xviii. cap. xxiv.

‡ Hoc mense uliginosis locis, aut exilibus, aut frigidis,
aut

self, as if he was of opinion that there was no danger arising from early sowing: 'I am not ignorant,' says he, 'that some ancient authors forbid to sow lands, except when sufficiently moistened with showers, which, if they come early, is most beneficial for the husbandman; but if, as it sometimes happens, the showers are late, the seed may be properly committed to the soil though it is dry, a thing which is frequently practised in some provinces, where the climate is of this kind. For that which is sown upon dry ground and harrowed, as if laid up in a granary, does not become corrupted; but, when a shower comes, the sowing of many days springs up in one *.' Pliny likewise

aut opacis, circa aequinoctium triticum et adonideum feruntur, dum serenitas constat; Pal. lib. x. tit. 11.

* Nec ignoro quosdam veteres auctores praecepisse, ne seminarentur agri, nisi cum terra pluviis permaduisset. Quod ego, si tempestive competat, magis conducere agricolae non dubito. Sed si, quod evenit nonnunquam, feri sunt imbres, quamvis sitienti solo recte semen committitur, idque etiam in quibusdam provinciis, ubi status coeli talis est, usurpatur. Nam quod sicco solo ingestum, et innocatum est, perinde ac si repositum in horreo non corrumpitur; atque ubi venit imber, multorum dierum fermentis uno die surgit; Col. lib. 11. cap. viii.

6 OF THE HUSBANDRY

wife mentions, as the opinion of some, that the seed should be sown before the setting [of the Pleiades, which was supposed to happen thirty-two days after the equinox: 'There are some,' says he, 'who order the seed to be sown before the setting of the Pleiades, in dry land and warm climates.' He agrees with Columella in the reason which he assigns; 'The seed is thereby,' he adds, 'preserved from corrupting moisture, and by the first shower is made to break forth in one day *.' But this is not to be considered as inconsistent with what Varro asserts; for seed sown in Italy before the equinox, on dry ground, may be in danger of losing its vegetative power, if the drought and heat shall continue, when seed sown thirty days after is not in any danger, as the heat then is not so great, and the rainy season nearer at hand. There is a maxim in Palladius that explains this matter:

* Sunt qui et ante Vergiliarum occasum feri jubeant, duntaxat in arida terra, calidisque provinciis. Custodiri enim semen, corrumpente humore, et a proximo imbri uno die erumpere; Plin. Nat. Hist. lib. xviii. cap. xxiv. It is probable, that an error has been committed in transcribing this passage; and that instead of *corrumpente humore*, it should be, as in Columella, *incorruptum ut horreo*.

ter: 'Although,' says he, 'lands, when sown, ought to be in a temperate situation, *neither too wet nor too dry*; yet if the drought continues long, seed harrowed in is better preserved in the fields than in the granary*.' From these passages compared together, it seems to have been the practice to delay for some time the sowing of the dry lands, expecting rain, but, if the rain was long in coming, to sow them, though dry, expecting that the drought and heat would not continue so long as to hurt the seed. Virgil gives a reason of a different kind for not sowing before the setting of the Pleiades: 'Ma-ny,' says he, 'sow before this time, but the crop, though bulky, is always deceitful†.' This some farmers have observed is often the case with the early sown wheat in Scotland. It is therefore very proper to attend to this matter, as the determining the proper season for sowing may be of the greatest importance.

As

* *Quamvis temperatis agris ferendum fit, tamen si siccitas longa est, semina locata tutius in agris, quam in horreis, servabuntur; Pal. lib. 1. tit. x.*

† *Multi ante occasum Maiæ coepere; sed illos Expectata seges vanis elusit aristis;*

Virg. Geo. I. l. 225.

2 OF THE HUSBANDRY

As it was reckoned improper to sow before the equinox, so it was likewise reckoned improper to sow after the solstice. Varro says that this should not be done unless in a case of necessity: He gives this reason; ‘The seed that is sown before the solstice springs up in seven days, that which is delayed till after, scarcely appears in forty*’. Pliny mentions the sowing about the time of the winter solstice as a thing reckoned improper by all husbandmen: ‘It is agreed,’ says he, ‘amongst all husbandmen, that seed ought not to be sown about the winter solstice:’ He gives as a reason what has already been mentioned from Varro, and calls it a good one †. Although it was supposed that the seed time continued till the winter solstice, yet Columella represents it as the opinion of the most

* Sexto intervallo ab aequinoctio autumnali incipere scribunt oportere ferere, usque ad diem xci. Post brumam, nisi quae necessaria causa coegerit, non ferere: Quod tantum intersit, ut ante brumam sata, septimo die: Quae a bruma sata, xl. die vix existant; Var. lib. 1. cap. xxxiv.

† Inter omnes autem convenit, circa brumam non ferendum esse, magno argumento; quoniam hiberna semina, cum ante brumam sata sint, septimo die erumpant: Si post brumam, vix quadragesimo; Plin. Nat. Hist. lib. xviii. cap. xxiv.

most skilful and prudent husbandmen, that no seed should be sown for fifteen days before. As in this passage there are several things that relate to the seed-time, I shall translate the whole of it: 'It pleases,' says he, 'our poet to direct, that neither *far* nor *triticum* should be sown before the setting of the Pleiades, which he thus expresses, *But if you cultivate your land for a crop of triticum or far, and insist only for a crop of full ears, let the Atlantides be set before, &c.* These set on the thirty-first day after the autumnal equinox, which happens on the 23d of September. From this it appears, that the seed-time for *triticum* continues for forty-six days from the setting of the Pleiades, which is on the 24th of October, to the time of the winter solstice. But the most skilful and prudent husbandmen do so observe this season, that for fifteen days before the day of the solstice, and for fifteen days after it, they neither plough land nor prune trees *.' Though Varro expressly says,

* Placet nostro poetae adonum, atque etiam triticum non ante seminare, quam occiderint Vergiliae; quod ipsum numeris sic edidit:

10 OF THE HUSBANDRY

says, that the sowing the seed continued till the winter solstice; yet there is a passage in his treatise,

*At si triticeam in messem, robustaque farra
Exercebis humnon, solisque instabis aristis,
Ante tibi Eoae Atlantides abscondantur.*

Abconduntur autem altero et trigesimo die post autumnale aequinoctium, quod fere conficitur nono Calend. Octobris; propter quod intelligi debet tritici satio dierum sex et quadraginta ab occasu Vergiliarum, qui fit ante diem ix. Calen. Novembris ad brumae tempora. Sic enim servant prudentes agricolae, ut quindecim diebus, priusquam conficiatur bruma, totidemque post eam confectam neque arent, neque vitem aut arborem putent; Col. lib. ii. cap. viii. I have used the freedom to translate the citation from Virgil a little different from the sense in which the commentators understand it: They suppose that Virgil, by the expression *solisque instabis aristis*, means the being determined upon a crop of bearded corn: By this, he is made either to exclude the unbearded *triticum*, in the direction he gives, or is guilty of a tautology or contradiction. Neither of the last two can be alledged, considering the accuracy of the author, and the completeness of the poem. Nor is there any reason to suppose the first, as none of the rustic writers make any difference between the time of sowing the bearded and unbearded *triticum*. The word *arista* commonly signifies the beard of corn, and this probably has led the commentators to imagine,

that

tife, in which he expreffes himfelf as if nothing of this kind was done for fifteen days before and after

that it here fignifies a bearded crop. But it may be obferved, that this word is frequently ufed by Virgil to fignify the ear of corn, as in line 226. in illustration of this very maxim, he fays; ‘Expectata feget vanis elufit ariftis. —The crop difappointed their expectation by empty ears.’ So likwife, in line 111. ‘Ne gravidis procumbat culmus ariftis.—That the ftems may not be lodged by heavy ears.’ Sometimes he puts it for the fruit of the corn, as in line 8. ‘Chaoniam pingui glandem mutavit arifta.—Changed the Chaonian acorns for nourifhing corn.’ Now, if we fuppofe the word to have the fame fignification here, then by *folis ariftis*, is meant grain in oppofition to ftraw, stubble, &c.; and the whole paffage may be thus tranflated: ‘If you have prepared your land for *triticum* or *far*, and infift upon a good crop of grain, without regard to ftraw, chaff, &c. then do not fow till after the fetting of the Pleiades. Many have fown before that time, but the crop, which they expected to be good from its appearance, deceived them by its empty ears, or shriveled grain.’ In this tranflation, *folis ariftis*, in the one place, is fet in oppofition to *vanis ariftis* in the other. It is true, indeed, that inftead of *vanis ariftis*, in feveral manufcripts we find *vanis avenis*. This, though probably not the true reading, is however countenanced by a paffage in Pliny, in which he fays, ‘That early fowing of barley,’ or, which is the fame thing, ‘That feed continuing

after it. Treating of the things that ought to be done between the setting of the Pleiades and the winter solstice, he says; ‘ Then new ditches ought to be digged, old ones cleaned, and vines pruned, which works may be continued during the fifteen days before and after the solstice, in which it is improper to do many other kinds of works. However, even then something may be very properly planted, as elms *.’

Some of the ancients had a regard to the moon as well as the sun, in determining the time of sowing. The Romans, indeed, had a regard to the moon in some cases, that shall afterwards be mentioned; but they do not seem to have had any regard, either to her place in the heavens, or her position with respect to the sun, in determining the time of sowing corn. Some
of

‘ continuing long in the ground without springing, occasions its being changed into oats.’ He says; ‘ *Sequentem causam habet imbecillitas feminis, si diutius retentum est terra, priusquam erumpat;*’ Plin. Nat. Hist. lib. xviii. cap. xvii.

* *Foffas novas fodere, veteres tergere, vineas arbutumque putare, dum in xv. diebus ante et post brumam, ut pleraque ne facias: Necnon tum aliquid recte feritur, ut ulmi;* Var. lib. i. cap. xxxv.

of the ancients, however, had a regard to her place in this matter. Pliny, after giving some directions about sowing, subjoins; To these Accius adds in Praxidicus, ‘ That seed should be
‘ sown when the moon is in Aries, Gemini, Leo,
‘ Libra, Aquarius, Zoroaster, after the sun has
‘ passed twelve parts of Scorpio, when the moon
‘ is in Taurus *.’

As the seed-time continued a considerable time, though finished fifteen days before the winter solstice, care was taken to sow the lands in the particular seasons most proper for them, according to their different situations. Directions about this are given by almost all the writers: Cato says; ‘ Wherever land is coldest and wet-
‘ est, there sow first. The warmest places ought
‘ to be delayed till the last of the seed-time †.’ The time that Virgil proposes is about the 20th
of

* Adjecit iis Accius in Praxidico, ut fereretur, cum luna esset in Ariete, Geminis, Leone, Libra, Aquario, Zoroastre sole duodecim partes Scorpionis transgresso, cum luna esset in Tauro; Plin. Nat. Hist. lib. xviii. cap. xxiv.

* Ubi quisque locus frigidissimus, aquosissimusque erit, ibi primum serito. In calidissimis locis sementim postremum fieri oportet; Cato, cap. xxxiv.

14 OF THE HUSBANDRY

of October. Columella allows that this is the proper time for dry land ; but in wet, low, and cold places, he recommends the beginning of that month as more proper *. In his kalendar, he gives the same general direction that Cato gives : ‘ Therefore,’ says he, ‘ upon the whole, ‘ we advise, that the places naturally cold should ‘ be first sown, and those that are warm should ‘ be last †.’ Pliny mentions it as a common practice to sow early in wet and cold places, and late in such as are dry and warm ; and he assigns very proper reasons for this. The reason he gives for sowing early in wet places is, that the rain may not putrify the seed : For sowing later in dry places, that the rains may soon come, lest the seed lying long without springing, should
be

* Nos quoque non ambigimus in agro temperato, et minime humido fementem sic fieri debere. Caeterum locis uliginosis, atque exilibus, aut frigidis, aut etiam opacis plerumque citra Calendas Octobris feminare convenire, dum sicca tellure licet, dum nubila pendent, ut prius convalescant radices frumentorum, quam hybernis imbribus, aut gelidiciis, pruinisve infestentur ; Col. lib. II. cap. VIII.

† Itaque in totum praecipimus, ut quisque natura locus frigidus erit, is primus conferatur ; ut quisque calidus, novissimus ; Col. lib. XI. cap. II.

be consumed. And afterwards, in the same chapter, he says, ‘ Some sow in cold places immediately after the autumnal equinox; in warm places later, that the corn may not become too luxuriant before the winter *.’ These directions we must always remember respect the autumnal seed-time only, and indeed a little attention to circumstances will convince us that they are most proper; for it may be observed, that the dry land was in greater danger from being early sown, and the wet land from being late sown. It is probable, that the low and wet lands in Italy, have generally as much moisture in them as to make the seed vegetate. These lands, therefore, they began to sow at the time of the equinox: for, though they might be sensible, that it would be better to delay for some weeks, for the reason mentioned by Virgil, yet might think themselves obliged to begin at that time, lest the season should be too far advanced before they could get all finished, and thereby
lose

* Sationem locis humidis celerius fieri ratio est, ne fermen imbre putrescat. Siccis ferius, ut pluviae sequantur; ne diu jacens atque non concipiens, evanescat.—Aliqui in frigidis ab aequinoctio autumni: In calidis ferius, ne ante hiemem luxurient; Plin. Nat. Hist. lib. xviii. cap. xxiv.

76 OF THE HUSBANDRY

lose more by being too late in the end of the season, than by being too early in the beginning of it. As the dry land was still in greater danger of losing the crop, by being early sown, though from another cause, they delayed the sowing of it, till the sowing of the wet land should be finished; and they did this, not only because the crop upon the dry land was in greater danger from being early sown, but also because it was in less danger from being late sown.

Palladius gives a very proper direction, both with respect to the autumnal and trimesian sowing, in a garden which may be applied to the corn fields: 'Although we propose,' says he, 'to determine the proper seasons of sowing, yet every one must carefully attend to the nature of the soil and climate. In cold places, the autumnal sowing should be earlier, and the spring sowing later: But in warm countries, the autumnal sowing should be later, and the spring sowing earlier.' He adds, with respect to the time of the moon; 'Whatever is to be sown, should be sown when the moon is increasing *.' But, although in autumn the wet
land

* Serendi tempora licet per menses certa signemus, tamen

land, with leſt danger, might be ſown early, and the dry land, with leſt danger, might be ſown late; yet, about the end of October, as Virgil expreſſly declares, was certainly the time moſt proper for both kinds; and it is on this account that this author particularly recommends to the husbandman to be very diligent in this work after it was begun; ‘ Plough naked, ſays he, ‘ ſow naked.’ We are not to imagine that Virgil means no more by this direction, than that the weather in the ſeed-time is commonly ſo warm, that it is proper for the husbandman to ſtrip in performing this work, but we are to conſider it as a direction to him to be active and diligent in ploughing and ſowing, when the ſeed-time comes. To engage him to this, he adds; ‘ The winter is an ‘ inactive ſeaſon; this is the time when the joy- ‘ ful husbandmen feaſt with each other, and en- ‘ joy the fruits of their labours; to this the ſo- ‘ cial winter invites them and diſſolves their ‘ cares.’

*men ſecundum loci et coeli naturam unusquiſque cuſto-
diat. Frigidis locis autumnalis ſatio celerior fiat, verna
vero tardior. Calidis autem regionibus, et autumnalis
ſerius fieri poteſt, et verna maturior. Quaecun-
que ſerenda ſunt, cum luna crefcit, ſeminentur; Pal. lib. 1. tit.
xxxiv.*

‘cares *.’ A better reason than this cannot be given for diligence in the feed-time, which immediately preceded the winter. As a further evidence of their diligence in that season, it may be observed, that it was the time of the severest labour for the ploughman. This appears from the directions given by Columella about feeding the oxen; ‘In the months,’ says he, ‘of November and December, during the feed-time, let the ox have as much as he will take †.’ Agreeable to this, the same author says, that all things in agriculture ought to be done strenuously, especially the sowing. To this, it is probable, ought to be applied a maxim mentioned by several of the writers, and which is introduced by Columella immediately after this passage: ‘It is,’ says he, ‘an old proverb among husbandmen; an early sowing sometimes deceives, a late sowing never, for the crop from it is always

* *Nudus ara, fere nudus: Hiems ignava colono.
Frigoribus parto agricolae plerumque fruuntur,
Mutuaque inter se laeti convivia curant:
Invitat genialis hiems, curasque resolvit.*

Vir. Geo. I. l. 299.

† *Novembri mense, ac Decembri, per sementem, quantum appetit bos, tantum praebendum est; Col. lib. vi. cap. III.*

‘ ways bad *.’ Pliny indeed mentions this maxim as observed by some, and applied to early sowing; ‘ There are some who hasten their sowing, and thus assert, an early sowing often disappoints our hopes, a late one always †.’

We may observe then, that the Romans were very exact in determining the seasons of sowing, according to the situation of the land; but they were still more exact in adapting to this the quantity of seed. I shall have occasion afterwards to mention the quantity of the different sorts of grain sown upon the *jugerum*, that which I propose to observe in this place, is their care in adapting the quantity of seed to their land, according to its different situations. With this view, they divided their land into rich, middling, and poor, stiff, and light, wet, and dry; with this view likewise, they attended to the season and the weather.

Cato

* Sed cum omnia in agricultura strenue facienda sint, tum maxime sementis. Vetus est agricolarum proverbium, maturam sationem saepe decipere solere, seram nunquam, quin mala sit; Col. lib. xi. cap. ii.

† Sunt qui properent, atque ita pronuncient, festinatam sementem saepe decipere, serotinam semper; Plin. Nat. Hist. lib. xviii. cap. xxiv.

Cato gives no particular direction about this, only in his account of the offices of the bailiff, he tells him, that he must not rob the corn fields, for this is an unfruitful thing*.' This direction Pliny explains, as if Cato meant that the bailiff should not spare seed: For, after mentioning that some were of opinion, that never less than five *modii* should be sown upon the *jugerum* of land, in whatever situation it is, he adds; 'To this refers that oracle, that ought to be very carefully attended to, do not rob the corn field of its fruits †.' This, as a general maxim, was much more proper in the Roman husbandry than in the British, for these two reasons: In the Roman husbandry they sowed much thinner than we do, as shall be shown afterwards; and, besides, when the corn was too thick, they could make it thinner in hoeing it, which

* *Segetem ne defruadet, nam id infelix est; Cat. cap. v.*

† *Huc pertinet oraculum; segetem ne defruges.* This word is different from the one used by Cato; but, that Pliny means that seed should not be spared, is evident from the manner in which he introduces the maxim: *Alit quinque non minus feri, pluresve praecipiant: Item in confito, aut clivoso, ut in macro.* *Huc pertinet; &c. Plin. Nat. Hist. lib. xviii. cap. xxiv.*

which we have no opportunity of doing in our common husbandry.

Varro mentions only two kinds of soils, which he calls fat and lean. Upon the first, he advises a little more to be sown than what was common, and, upon the last, a little less*.

Columella is more particular; he says, that the quantity of seed should be determined by the nature of the soil, the season of sowing, and the nature of the weather. He begins with the nature of the soil, and first divides soil into two kinds, a fat and a middling kind: He advises less to be sown upon the fat than the middling: ‘A *jugerum* of fat soil,’ says he, ‘commonly requires four *modii* of *triticum*, a *jugerum* of middling
‘ dling

* Seruntur fabae modii quatuor in jugero, tritici v. ordei vi. farris x. Sed nonnullis locis paulo amplius, aut minus. Si enim locus crassus, plus; si macer, minus; Var. lib. i. cap. XLIV.

The word that Varro uses, and which I have translated fat, is *crassus*, which implies not only fatness, but also grossness and weight, so that the soil upon which he directs the larger quantities of seed to be sown, was probably a rich stiff wet soil; as the soil which he calls *macer*, which he places in opposition to *crassus*, and which I have translated *lean*, was a poor light dry soil.

‘ dling kind five *.’ This seems to be contrary to what Varro directs in the passage already cited. But, it is probable, that the soils here mentioned by Columella, were of a different kind from those mentioned by Varro; that the one that Columella calls fat was a free rich soil, the kind which, when treating of soils, he represents as the most profitable of all others †; and, that the one mentioned by Varro, was the rich stiff soil, which Columella places next in value to the rich free soil ‡. These, though both fat soils, yet being, in other respects, different in their natures, would

* Jugerum agri pinguis plerumque modios tritici quatuor, mediocris quinque postulat; Col. lib. 11. cap. 1x. The word that Columella uses to express the fatness of this soil, is not *crassus*, the word used by Varro, but *pinguis*. From this we are led to infer, that the soil which he had in view, is the kind that, when treating of soils, he calls *pinguis et putris*. In Campania it was called *pulla*, and was commonly found only in that part of Italy.

† Idem pinguis ac putris, quia cum plurimum reddat, minimum postulat: Et quod postulat, exiguo labore atque impensa conficitur: Praestantissimum igitur tale solum jure dicatur; Col. lib. 11. cap. 11.

‡ Proximum deinde huic pinguius densum, quod impensam coloni, laboremque magno foetu renumeratur; Col. lib. 11. cap. 11.

would require different quantities of seed, as we find were given them by the Roman farmers.

Columella next divides soils into three sorts, fat, middling, and lean. After observing that the quantity of seed must be varied according to the situation of the land, the season, and weather, he adds; ‘ According to the situation of the land, ‘ as it is upon a plain or a hill, and according to ‘ the nature of the soil on these, as it is fat, ‘ middling, or lean *.’ Of this middling kind, he says, ‘ That if moderately stiff and moist, it ‘ should have more than five *modii* of seed,’ the quantity which he had before assigned to the middling kind of soil †. With respect to the fat and lean soils, he says; ‘ That if dry and easily ‘ reduced, they should have an equal quantity ‘ of seed, and less than the middling or stiff.’

He

* Nobis ne istam quidem, quam praediximus, mensuram semper placet fervari, quod eam variat aut loci, aut temporis, aut coeli conditio. Loci, cum vel in campis, vel collibus frumentum feritur, atque his vel pinguibus, vel mediocribus, vel macris; Col. lib. ii. cap. ix.

† Siliginis autem, vel tritici, si mediocriter cretosus uliginosusve ager est, etiam paulo plus, quam, ut prius jam dixi, quinque modis ad saturationem opus est; Col. lib. ii. cap. ix.

He assigns the reasons for giving a less quantity of seed to those than to the other: 'Unless,' says he, 'the seed is sown thin upon poor land, ' it affords a small and empty ear; and, altho' ' it is sown thin upon rich land, yet, when many stalks come from one root, the corn from ' the thin seed soon becomes thick *.

Pliny, in determining the quantity of seed that should be sown upon a *jugerum*, first divides land into two sorts, which he calls fat and free or light. Afterwards he is more particular, and divides it into three, a stiff clayey and wet soil, a free dry and rich soil, and a free dry and poor soil. In making the first division, he declares himself of the same opinion with Varro, that the fat soil should have more than ordinary, and the free light soil less †. In making the second division,

* At si ficus et resolutus locus, idemque vel pinguis, vel exilis est, quatuor; quoniam et e contrario macer tantundem seminis poscit. Nam nisi rare conferitur, vana, et minutam spicam facit. At ubi ex uno semine pluribus culmis fruticavit, etiam ex rara segete, densam facit; Col. lib. 11. cap. 1x.

† Pliny, after mentioning the quantities of different kinds of corn and pulse, commonly sown upon a *jugerum*, adds; 'Pinguis solo plus, gracili minus; Plin. Nat. Hist. lib.

vifion, he declares himfelf of the fame opinion with Columella, that the ftiff wet foil fhould have fix *modii*, and that the free dry foil, whether rich or poor, fhould have only four: ‘ There
 ‘ are other claffes,’ fays he, ‘ into which land
 ‘ may be divided, to adapt the proper quantity
 ‘ of feed to it. In ftiff clayey or wet foils, fix
 ‘ *modii* of wheat fhould be fown; in free foil,
 ‘ whether poor and dry, or rich and dry, four
 ‘ is fufficient.’ He affigns the fame reafons with Columella, for fowing lefs upon free foil, whether rich or poor, than upon wet clays; ‘ poor
 ‘ foil,’ fays he, ‘ unlefs it has the ftalks upon it
 ‘ thin, produces a fmall and empty ear; rich
 ‘ fields, from the root of one feed, fend forth
 ‘ many

lib. xviii. cap. xxiv. Although Pliny here ufes the word *pinguis*, the fame that Columella ufes, when he expreffes the beft kind of foil, and not *craffus*, the word ufed by Varro, yet it is certain that he does not mean the kind of foil that was called *pinguis et putris*; for this he mentions afterwards, and affigns to it the fmalleft quantity of feed, and befides, the kind which he here calls *pinguis*, he puts in oppofition to *gracilis*, which fignifies not a poor, but a free light foil.

‘ many stalks, and thus produce a thick crop
 ‘ from thin sowing *.’

But, in determining the quantity of seed proper for land, the ancients attended not only to the nature and situation of the soil, but also to the season and the weather. The seed was sown sometimes early in autumn, and sometimes immediately before winter. The general rule was to sow less in the beginning of the seed-time, and more in the end.

Theophrastus mentions this as the practice in Greece, and he assigns reasons for it: ‘ In the
 ‘ early seed-time,’ says he, ‘ the seed should be
 ‘ thin sown; in the late seed-time, it should be
 ‘ thick

* Est et alia distinctio: In denso, aut cretoso, aut uliginoso, solo tritici, aut siliginis modios sex. In soluta terra nuda, et sicca, et laeta, quatuor. Macies enim foli, nisi rarum culmum habeat, spicam minutam facit et inanem: Pinguis arva ex uno semine fruticem numerosum fundunt, densamque segetem e raro semine emittunt; Plin. Nat. Hist. lib xviii. cap. xxiv. It is probable, that instead of *terra nuda*, the true reading is *terra macra*, which would make the passage clear and distinct; or, if *terra nuda* is the true reading, we are not to understand by it land free from trees, as the expression seems to import, but what some farmers call a bare field, that is, a field which, when laid off, bears little or no grass.

‘ thick sown. The one does not take deep root,
 ‘ the other roots well, and sends forth many
 ‘ shoots *.’

Columella, after observing that, in determining the quantity of seed proper for land, a regard was to be paid to the situation of the land, to the season and weather, adds, ‘ A regard is
 ‘ paid to the season, according as the seed is sown
 ‘ in the autumn, or in the beginning of winter.
 ‘ For the first of the seed-time allows the seed to
 ‘ be thin sown, the latter part of it requires the
 ‘ seed to be sown thicker †.’ Pliny, indeed, gives a direction, that seems to be directly opposite to this: ‘ In the early seed-time,’ says he, ‘ the
 ‘ seed ought to be thick sown; in the late seed-
 ‘ time, it ought to be thin sown.’ He assigns reasons for this direction; the reason he gives for sowing thick in the beginning of the season is, ‘ That the seed lying long in the ground
 ‘ without

* *Matura sementa rara solo mandari semina jubent, ferotina autem densa; altera enim radicem abunde concipere nequeunt, altera optime radicanur et germine multiplici disperguntur; Theo. de caus. plant. lib. III. cap. xxv.*

† *Temporis, cum autumno, aut etiam ingruente hieme frumenta jacimus. Nam prima sementis rarius serere permittit, novissima spiffius postulat; Col. lib. II. cap. IX.*

‘ without vegetating, some of it may be destroy-
 ‘ ed; and therefore, that allowance is to be
 ‘ made for this in sowing:’ And the reason he
 gives for thin sowing in the end of the season is,
 ‘ That the land having sufficient moisture, all
 ‘ the feeds vegetate, and the crop is thereby in
 ‘ danger of being destroyed by being too thick*.’

It is evident from these reasons, that the kind of land that Pliny advises to be thick sown in the beginning of the seed-time, and thin sown in the end of it, is dry land, in such a situation, that if the drought should continue for some time, a part of the seed would be destroyed. Columella, on the other hand, in the directions he gives about this, supposes the land to be sown in such a situation, as to make the whole feed vegetate. In the beginning of the seed-time, it was proper to sow thin, because the corn had time to tiller or stool before winter; in the latter part of the season it was proper to sow thicker, because the corn had not this advantage.

But, in determining the quantity of seed, the Romans also attended to the weather at the time
 of

* *Itemque festinata satatione densum spargi semen, quia tarde concipiat; serotina rarum, quia densitate nimia necetur; Plin. Nat. Hist. lib. xviii. cap. xxiv.*

of sowing. This is mentioned by Columella; he says, 'That when the weather is rainy, the seed should be sown thinner, as in the first of the seed-time; that when it is dry, the seed should be sown thicker, as at the end of the seed-time *.' This explains to us Pliny's reason for sowing more in the beginning of the season, and less in the end; and shows, that he means dry land in the first, and land sufficiently moist in the last.

There is another thing mentioned by Columella on this subject; 'Among other things,' says he, 'we ought not to be ignorant, that a field planted with trees, takes a fifth part more seed than a field that is free and open †.' I have had occasion already to observe, that the corn fields in ancient Italy, were sometimes planted with olives or trees, for the support of vines in rows; the rows at sixty feet distance, and the trees at forty feet distance the one from the

* Nam prima sementis rarius ferere permittit, novissima spissius pustulat. Coeli, cum aut pluvium, aut siccum est; nam illud idem, quod prima sementis, hoc quod ultima desiderat; Col. lib. 11. cap. 1x.

† Inter caetera quoque non ignorare debemus, quintam partem semenis amplius occupare agrum consitum arbuto, quam vacuum, et apertum; Col. lib. 11. cap. 1x.

the other in the rows. These are the trees which Columella probably had in view in this passage; but how a field should take one fifth more feed because planted in this manner, it is not easy to show. The Commentators offer a conjecture not very much to the purpose; they suppose, that land of the best kind being set with trees by the shade and roots of the trees is rendered something worse, and becomes of that kind that needs more feed. But this conjecture will not satisfy a farmer, who, on this very account, would rather sow less feed. The want of air occasioned by the trees renders this absolutely necessary. I am persuaded, that an error has some way or other crept into the text, though the inquisitive commentators have not been able to find it out; and that, instead of one-fifth more feed, Columella intended to inform us, that a field in this situation takes one-fifth less feed. The rows of trees in the field may be supposed to have taken up a fifth part, especially when it is considered, that the vines in an *arbutum* needed culture, which made it necessary to leave a proper tract for the vine-dressers along every row*.

Before

* I should not have ventured so much as to alledge that

an

Before we leave this article, it may not be improper to observe, that it was supposed that the same land sometimes took more seed and sometimes less. From this Pliny says, that the superstitious husbandman had the first omen of the nature of his crop: 'When the land received the seed greedily,' says he, 'it is thought to be

an error had crept into all the copies of Columella, as none of the commentators seem to be sensible of it, were it not that there is a passage in Pliny, in which it is supposed, that a less quantity of seed is sown upon a field set with trees, than upon an open field: 'Therefore,' says he, 'between four and six *modii* should be sown, the precise quantity to be determined according to the nature of the soil. Some however advise, that never less, or rather more, should be sown, and even this quantity likewise upon land *set with trees*, or that is on a declivity, or is poor.—Ergo inter quatuor et sex modios pro natura soli; alii quinque non minus feri, pluresve praeicipiunt: Item in *confito*, aut *clivoso*, aut in *macro*;' Plin. Nat. Hist. lib. xviii. cap. xxiv. Here it may be observed, that land set with trees is ranked with land on a declivity and poor land, upon both of which a smaller quantity of seed was sown than upon the champaign strong and rich land. Besides, from the manner in which he expresses himself, it is evident, that all of these were the kinds of soil upon which the smallest quantity of seed was sown.

‘ be hungry, and to confume it *.’ I have heard some farmers in this country assert the same thing, that sometimes their fields take more, and sometimes less seed, although they intended to give them the same quantity, and sow with all

* *Certum terras alias plus feminis recipere, alias minus. Religiosumque inde primum colonis augurium; cum avidius accipiat, esurire creditur, et comesse semen; Plin. Nat. Hist. lib. xviii. cap. xxiv.* It is probable, that Pliny has taken this from Theophrastus, who expresses himself in this manner; ‘ As it is commonly said, that the same field takes sometimes more and sometimes less seed, it is reckoned a very unlucky omen when it takes more; for it is imagined that the earth is hungry, and immediately eats up the seed.—*Quanquam dici solet, alias plus, alias minus feminis eandem recipere segetem, infaustoque augurio capiant, cum plus receperit; terram enim esurire et esitare protinus semen existimant.*’ But to this he adds; ‘ But this is a foolish reason; for, if the seed is inspected, and the field attentively considered, with respect to the nature of the soil, and the situation that exposes it to the sun and wind, it will not be difficult to account for the differences that happen.—*Sed haec ratio stulte fortasse affertur. Semina vero si contempleris, et praecipue loca ipsa scrutaris, una cum solo positionem quoque animadvertendo, quae ad flatus, solesque sit, accommodatius sane differentias colliges;*’ *Th. de hist. plant. lib. viii. cap. vi.*

all the exactness in their power; and this they, as well as the Roman farmers, consider as a bad sign. When land is wet or soft, and the sower does not attend to this circumstance, his step will be a little shorter than usual, and consequently he will give the field more seed. This, it is probable, is the reason of the difference between one season and another; and, if this is the case, land taking more seed, may be justly considered as a bad omen; for every farmer knows, that a wet seed-time, or sowing land wet, is a thing most dangerous to the crop.

The care of the Romans in the particulars mentioned in this chapter, we may observe, was remarkable: They were careful in determining the time of sowing, and in adapting the quantity of seed to the land; they sowed their wet lands before their dry lands, because, upon the wet lands the seed sooner vegetated, and thereby was in less danger of being destroyed by drought and heat; and because these lands were in greater danger of being hurt by rain in autumn, and thereby rendered unfit for being ploughed and sown. They sowed the greatest quantity of seed upon the stiff wet lands; because, the seed being ploughed in, was covered

deep, and the land being raised in clods, prevented the whole seed thus covered from coming up. Upon the light lands, whether rich or poor, they sowed a smaller quantity; because, the whole seed in these lands came up; besides, upon the rich land, the plants tiller or stool, by which a thin sowing produces a thick enough crop; and, upon the poor lands, unless the crop is thin, the ear is short, and the grain small. In the beginning of the seed-time, they sowed thinner than they sowed the same kind of land in the end of it, provided there was as much sap in the ground as make the seed vegetate; because, before the winter, the plants had time to stool, and thereby make the crop thick enough. But, if the land was dry, they sowed more seed in the beginning of the seed-time than in the end; because, when the seed lay long in the ground without vegetating, some of it was destroyed. With respect to these things, our practices in Britain are far from being so exact: Our most intelligent farmers attend indeed to the situation of their lands, and sow them sooner or later, according as they expect the weather to be wet or dry after the seed-time, a matter of very great importance, which is not
so

so generally attended to as it ought, nor so carefully, even by the best of our farmers, as was done by the Romans. But our care in adapting the quantity of seed to the ground, falls still farther short of theirs: We have only one general maxim, and that is to sow less or more, as the land is rich and clean, or poor and foul. Every British farmer, however, capable of giving attention to things, must be convinced of the propriety of the practices of the Roman farmers; and, perhaps, may receive some benefit from attending to them, and in imitating them as far as circumstances will allow. There is one thing proper to be considered, in which their practice differed greatly from ours; they sowed a smaller quantity upon the light poor lands, than upon the rich wet clays; whereas, we commonly sow a larger quantity. This difference naturally arises from the different methods of culture used. Our poor light lands are commonly full of weeds; and hence it becomes necessary to sow a large quantity of seed, to prevent the weeds from destroying the crop: But, in the Roman husbandry, this kind of land being fallowed for every crop, few weeds came

up

up with the seed, and these few were destroyed by the hoe and in weeding; the seed therefore might be sown as thin as the nature of the soil would allow. Were the poor light land in Britain managed after the manner of the Roman husbandry, it would certainly require much less seed than under its present management.

CHAP.

C H A P. XXVI.

Of the Choice of Seed.

IT is natural to suppose, that much depends upon the goodness of seed. The choice of seed is therefore a matter to which all farmers ought particularly to attend. In Britain, the rent of some farms is paid in corn, and it is mentioned as an old custom, that the tenant made choice of the corn for seed, before the landlord had a title to choose for his rent. Among the several nations that have practised agriculture, none seem to have given greater attention to this matter than the Romans.

Varro recommends in general, that seed be not old or mixed, or adulterated with any other kind that has a resemblance. He divides seed into two kinds; the first kind, that which is already provided, and of which the farmer is to
make

make a choice ; the second kind, that which the farmer is to gather or reap for himself. Then, with respect to the first kind, that which the farmer is to make choice of, he says, ‘ it should
 ‘ not be parched with age, nor mixed, nor adulterated with any kind that resembles it.’
 He adds, as a reason against using old seed,
 ‘ Age has such an influence upon some kinds
 ‘ as to change their nature ; for some say, that
 ‘ old brocoli seed sown produces turnip, and also
 ‘ that old turnip seed produces brocoli *.’ With respect to the age of seed, Pliny says, ‘ That
 ‘ of one year old is best, of two years old worse,
 ‘ of three worst of all, and, beyond that, it is barren †.’ By seed of one year old he means
 feed

* *Primigenia femina dedit natura, reliqua invenit experientia coloni. Num prima, quae sine colono, priusquam fata, nata ; secunda, quae ex his collecta, neque priusquam fata nata. Prima femina videre oportet, ne vetustate sint exsucta, aut ne sint admista, aut ne propter similitudinem sint adulterina. Semen vetus tantum valet in quibusdam rebus, ut naturam commutet: Nam ex femine brassicae vetere fato nasci aiunt rapa, et contra ex raporum brassicam ; Var. lib. i. cap. xl.*

† *Semen optimum anniculum, bimum deterius, trimum pessimum, ultra sterile ; Plin. Nat. Hist. lib. xviii. cap.*

seed of the immediately preceding crop, and so of the others. For it is not to be supposed, that he intended to assert, that seed of a year old is better than new seed. Palladius mentions among the established maxims, that seed should not be above one year old *. It appears, however, that, in the great famine in Egypt in the time of Joseph, corn was used for seed older than any of that mentioned by Pliny: After the Egyptians, in the first years of the famine, had spent all their money, and afterwards had sold their cattle, they are represented as selling their lands for seed to sow them. As the famine lasted seven years, this seed must have been seven years old †. Theophrastus mentions a thing still more extraordinary: After observing that the preservation of corn depends on the place where it is laid up, adds, ‘ Agreeable to this, it is asserted, that,

cap. xxiv. This Pliny has probably taken from Theophrastus, who says; ‘ Ad exortum autem, universamque sementem, semen anniculum optimum putatur; bimum deterius, et trimum: Quod autem ultra, sterile ferme est;’ Theo. de hist. plant. lib. viii. cap. xi.

* Semina pulsquam annicula esse non debent, ne vetustate corrupta non prodeant; Pal. lib. i. tit. vi.

† Gen. XLVII. 23.

‘ that, in a particular place of Cappadocia, called
 ‘ *Petra*, corn for forty years preserves its fruit-
 ‘ fulness, and is fit for seed *.’

The best of the crop ought certainly to be set apart for seed : This was the practice of the Roman farmer ; he is directed to choose the best grain, and for this purpose to separate this when in the *area* †. ‘ Whatever crop,’ says Varro, ‘ is heaviest and best, it is proper to separate the ears in the *area*, that good seed may be got ‡.’ Columella likewise directs the farmer to consider and choose what is most proper for seed; immediately after the corn is cut down, and while it is in the *area* : ‘ Besides,’ says he, ‘ I think it adviseable, that, when the corn is cut down, and while it is in the *area*, we ought
 ‘ to

* *Quamobrem Cappadociae loco quodam Petra vocato, vel quadragenos annos foecunda, et ad sementem percommoda durare proditum est; Theo. de hist. plant. lib. viii. cap. xi.*

† The *area* was a place made in the fields, in which the corn, when it was sufficiently dried, after being cut, was beat out and cleaned.

‡ *Quae seges grandissima atque optima fuerit, seorsum in aream fecerni oportet spicas, ut semen optimum habeat; Var. lib. i. cap. lxi.*

‘ to consider what is proper for seed. For, as
 ‘ Celsus says, where the crop is middling, the
 ‘ best ears ought to be gathered and laid up for
 ‘ seed. On the other hand, when a larger crop
 ‘ is produced, the grain, when threshed, ought
 ‘ to be cleaned by a sieve, and that which falls
 ‘ to the bottom, on account of its bigness and
 ‘ weight, ought always to be reserved for seed.’
 To engage the farmer to this, he adds: ‘ For
 ‘ this is most advantageous, because, although
 ‘ corn degenerates more quickly in wet soils,
 ‘ yet this happens even in those that are dry,
 ‘ unless such care is taken. It is true, indeed,
 ‘ that plump grain is not always produced by
 ‘ plump seed; however, it is as certain, that it
 ‘ never can be produced by such seed as is poor
 ‘ and shrivelled *.’ Pliny directs, that the hea-
 viest

* Illud deinceps praecipendum habeo, ut demessis fe-
 getibus jam in area futuro semini consulamus. Nam
 quod ait Celsus, ubi mediocris est fructus, optimam quan-
 quam spicam legere oportet, separatimque ex ea semen
 reponere: Cum rursus amplior messis provenerit, quid-
 quid exeretur, capisterio expurgandum erit, et semper
 quod propter magnitudinem ac pondus in imo subsederit,
 ad semen reservandum. Nam id plurimum prodest, quia

viest grain be used for seed: 'That,' says he,
 'which falls to the lowest part of the *area*, ought
 'to be reserved for seed; for this is best, be-
 'cause it is heaviest, nor is there a better way
 'to distinguish it.' To understand our author's
 meaning in this passage, it is necessary to ob-
 serve, that the *area* was made high in the mid-
 dle, and lower at the sides, and that to clean
 the corn, it was commonly thrown from one
 side to another cross the wind; by this, the hea-
 viest seed flying farthest, would naturally fall
 into the lowest part of the *area*. To this direc-
 tion, Pliny adds a thing which, probably, may
 be of importance: 'Such ears as have intervals,
 'in which there is no grain, should be rejected*.'

Virgil

quamvis celerius locis humidis, tamen etiam siccis fru-
 menta degenerant, nisi cura talis adhibeatur. Neque e-
 nim dubium est, ex robusto femine posse fieri non robus-
 tum: Quod vero protinus exile natum sit, nunquam ro-
 bur accipere manifestum est; Col. lib. II. cap. IX.

* Quod in ima area subsedit, ad semen reservandum
 est. Id enim optimum, quoniam gravissimum: Neque
 alio modo utilius discernitur. Quae, spica per intervalla
 semina habebit, abjicietur; Plin. Nat. Hist. lib. XVIII. cap.
 XXIV.

Virgil mentions the choosing the heaviest and largest grain for seed, as a thing absolutely necessary: He adds, as the reason that no other thing can prevent the grain from degenerating; ‘ I have seen,’ says he, ‘ some, immediately before sowing, prepare the seed with a mixture of nitre, and amurca *, to make the grain larger in the husks, that are often fallacious; and, although these have been moistened over a slow fire to quicken their growth, carefully gathered and examined with much labour; yet I have seen them degenerate; and this will always happen, unless human industry every year pick out the largest grain †.’

That the farmer, in choosing seed, might not be deceived by the colour of the skin, he is directed

* Amurca was made of the dregs or lees of oil; Var. lib. 1. cap. LXIV.

† *Semina vidi equidem multos medicare ferentes,
Et nitro prius, et nigra perfundere amurca,
Grandior ut foetus filiquis fallacibus esset:
Et quamvis igni exiguo properata maderent.
Vidi lecta diu, et multo spectata labore
Degenerare tamen, ni vis humana quotannis
Maxima quaeque manu legeret.*

Vir. Geo. I. l. 193.

directed to break the grain, and that kind was reckoned best that had the same red colour in the inside as in the outside. ‘ If red grain,’ says Columella, ‘ when cut, has the same colour within, there is no doubt that it is sound: But this kind, when it is on the outside whitish, and appears white within, ought to be considered as light and false: In this, the *filigo*, so much desired by husbandmen, should not deceive us, for it is only degenerated *tritium*, and, although it excels in fairness, yet it is deficient in weight*.’ Pliny says the same thing with respect to the colour of grain: ‘ The best grain,’ says he, ‘ for seed, is the red, and, when broken with the teeth, has the same colour; that kind is worse, that is whiter within than it is without †.’

It

* *Granum autem rutilum si, cum diffusum est, eundem colorem interiorem habet, integrum esse non dubitamus. Quod extrinsecus albidum, intus etiam conspicitur candidum, leve ac vanum intelligi debet. Nec nos tanquam optabilis agricolis fallat filigo. Nam hoc tritici vitium est, et quamvis candore praestet, pondere tamen vincitur; Col. lib. ii. cap. ix.*

† *Optimum granum quod rubet, et dentibus fractum, eundem habet colorem: Deterius, cui plus intus alibi est; Plin. Nat. Hist. lib. xviii. cap. xxiv.*

It seems, that changing seed was in use among the Romans : For Pliny forbids to bring seed from cold soils to warm, or from early soils to late ; observing, at the same time, that some, from a false care, choosed seed from an opposite soil *.

In Britain, we find some advantage from a change of seed. By bringing seed from cold to warm soils, a hardy plant is brought into a warmer climate, and generally thrives well, if the climate affords rain enough for it. By bringing seed from early to late soils, an early, tho' tender plant, is brought into a late climate. This allows the sowing to be delayed for some time, which is of very great consequence, if thereby the land is in better order : But this advantage is confined to the spring seed-time. In the autumnal seed-time, which is the sowing that Pliny alludes to, the delaying the sowing for some days, has a contrary effect to the one mentioned : By such a delay, the land becomes rather in a worse condition for being sown than
in

* Non transferendum est ex frigidis locis semen in calida, neque ex praecocibus in serotina ; idque in contrarium praecepere quidam falsa diligentia : id.

48 OF THE HUSBANDRY

reason for making a choice of seed *. And, as this made it necessary for them to be careful in the choice of seed; so likewise it prevented them from bringing seed from a cold to a warm soil. It is true, indeed, that the greatness of the crop, arising from such a change, may, in some places, overbalance the deficiency of the grain; but then, it is to be observed, that, in the Roman husbandry, land was seldom sown, except when in such order, as to give reason to expect a good crop; and, therefore, in the choice of seed, they had reason to keep in view chiefly the goodness of the grain, and, consequently, never brought seed from cold to warm soils.

I shall conclude this article, with mentioning a particular way by which the Egyptians choosed their seed: Palladius mentions this upon the authority of some of the Greek writers: ‘The
‘Greeks,’ says he, ‘assert, that the Egyptians
‘tried in this manner which of the kinds of
‘seeds they intended to sow would have an in-
‘crease: In the month of June, they prepared
‘ a

* *Locis humidis semina citius quam ficcis degenerant; quare subinde succurrat electio; Pal. lib. 1. tit. vi.*

a bed in a moist and well reduced soil, and
 having made divisions in it, they sowed in
 these all the seeds of the different kinds of
 corn and pulse: Afterwards, at the rising of
 the Dog-star, which, among the Romans, is
 reckoned to be on the 19th of July, they ex-
 amined what seeds the rising star consumed,
 and what were preserved safe; they rejected
 those kinds that were consumed, and provided
 for their seed the kinds that were preserved,
 being persuaded, that this scorching star, by
 the destruction or safety of the seeds in the
 ground at that season, discovered which kinds
 next year would be hurt, and which would
 produce a good crop *.

VOL. II.

G

CHAP.

* Graeci afferunt Ægyptios hoc more proventum futuri
 cujusque feminis experiri. Aream brevem loco subacto
 et humido nunc excolunt, et in ea divisis spatiis omnia
 frumenti vel leguminum semina spargunt. Deinde in
 ortu caniculæ, qui apud Romanos quartodecimo Calen-
 darum Augustarum die tenetur, explorant quæ semina or-
 tum sidus exurat, quæ illaesa custodiat. His abstinent,
 illa procurant; quia indicium noxæ aut beneficii, per
 annum futurum generi unicuique, sidus aridus præsentis
 exitio vel salute præmisit; Pal. lib. vii. tit. ix.

C H A P. XXVII.

*Of the Manner of Destroying Weeds, and
the Culture given to the growing Corn.*

WHEN we consider how frequently, in the ancient husbandry, the land was fallowed, how frequently, and at what seasons the fallow was ploughed, we are apt to imagine, that there would be very little necessity for weeding; and yet the care of the Roman farmers in this article, seems to exceed their care in every other thing.

There were two operations used by them to destroy weeds: One of them is called *sarculatio* or *sarritio*, and the other *runcatio*. The last of these seems to have been performed in the same manner as weeding with us: Men went amongst the corn, and either cut the weeds with a hook, or pulled them up with the hand. The last of these,

these, it is probable, was most commonly done; for Pliny observes, ‘ That weeding frees the roots of the corn from confinement, and separates the growing corn from the turff or grafs *.’ In the performance of this work, Columella gives a very proper caution, ‘ That it be not done while the corn is in the flower, but either before or after †.’ Varro directs that it be done soon after the vernal equinox ‡; and Columella, in his kalander, mentions the beginning of May as a proper time for it ||. Not only wheat and barley, but also some kinds of pulse, were weeded. Columella mentions the *tritium*, *siligo*, *sesamum*, *ervum*, *cicera*, *lens*, and *cicer* as weeded §. And Pliny mentions *siligo*,
far,

* Runcatio, cum seges in articulo est, evulsis inutilibus herbis, frugum radicem vindicat, segetemque discernit a cespite; Plin. Nat. Hist. lib. xviii. cap. xxi.

† Subjungenda deinde est farritioni runcatio, curandumque ne florentem segetem tangamus: Sed aut antea, aut mox cum defloruerit; Col. lib. ii. cap. xii.

‡ Secundo intervallo inter vernum æquinoctium, et vergiliarum exortum hæc fieri debent, Segetes runcari, &c.; Var. lib. i. cap. xxx.

|| Cal. Maiis, &c. — per tres dies runcandæ segetes sunt; Col. lib. xi. cap. ii.

§ Col. lib. ii. cap. xiii.

far, triticum, semen hordeum, and cicer *. The practice of going amongst the growing corn for the purpose of weeding, in the modern husbandry, is justly condemned by intelligent farmers as hurtful to the crop; and it is reckoned good husbandry to manage in such a manner, as to render this practice unnecessary. In the ancient husbandry, the corn, as has already been shown, was sown in such a manner, as to allow weeders to go amongst it without doing any damage.

The *sarculatio* or *farritio*, seems to have been an operation that resembles hoeing; and there were two sorts of it: By the one, the surface was not only stirred, but the earth was also heaped up around the plants in such a manner as sometimes to cover them: By the other, the surface was only stirred, and, to distinguish it from the former, was called plain smooth *sarculing* †. This word, therefore, may very properly

* Plin. Nat. Hist. lib. xviii. cap. xxi.

† Pluribus tamen farriri placet; sed neque eodem modo, neque iisdem temporibus usque quaque fieri. Nam in agris ficcis et apricis, simulac primum farritionem pati queant fegetes, debere eas permota terra adobruui, ut fruticare possint. Quod ipsum ante hiemem fieri oportere, deinde

perly be translated by *hoeing*, as by hoeing, sometimes the one of these is done, and sometimes the other.

Mr Tull says, that some modern authors show a profound ignorance, in translating *farritio* *hoeing*. Before Mr Tull introduced the hoe-plough into England, there was certainly an instrument called a *hoe*; and, when this instrument was used in the culture of any crop, the operation was called *hoeing*. Now, though it may be true what Mr Tull says, that the English hoe, at the first invention of it, seems to be designed rather to scrape chimneys than to till the ground, yet still the operation of this instrument in stirring the surface, and in raising earth around or over plants, is the thing that conveys the idea of *hoeing*. And, as the *farritio* of the ancients was an operation that produced the same effects, the word certainly is not improperly translated *hoeing*. Mr Tull is of opinion, that the farcling of the ancients was nothing more than harrowing, that

deinde post hiemem iterari. In locis autem frigidis et palustribus plerumque transacta hieme farriri, nec adobri, sed plana farritione terram permoveri; Col. lib. ii. cap. xii.

that the farcling that covered or heaped the earth around plants, was harrowing across the earths of the furrows made at the seed-furrow; and that the plain farcling was harrowing along the earths of the furrows. He observes, that the corn was sown and then ploughed in, by which the greatest part of the seed rose in the hollows betwixt the furrows; and, consequently, when harrowed across, the high pieces would be levelled, and the earth heaped on the corn. But this is only a conjecture, and, at the same time, seems to be inconsistent with a variety of passages which we find in the rustic writers.

When Mr Tull mentions the culture given by the Roman farmers to the *medica*, to render it the more ridiculous, he says, that a team of oxen was employed a long time in harrowing. But in this he happens to be mistaken; for the *occatio* of the Roman farmer, which was the operation of the *rastrum*, was performed, not by oxen, but by manual labour, as has already been shown. To the passages that have been cited on this subject, the direction given by Pliny may be added: 'Whoever,' says he, 'hoes,' or harrows, as Mr Tull will have it, 'must take
' care

‘ care not to dig under the roots of the corn *.’
 A direction most ridiculous, if we suppose it given to a man harrowing at random with a team of oxen. Besides, it may be observed, that, although the land, after the seed was sown, was allowed sometimes to remain without being harrowed, yet the common practice was to harrow after the seed was sown. Columella says; ‘ After you have sown your seeds, you must harrow in what you have sown †.’ When giving directions about the sowing of beans, he says, ‘ That they must be first sown, then the field must be ploughed, formed into ridges, and *harrowed*, that so they may be the deeper covered ‡.’ Pliny says; ‘ After the second ploughing, harrowing follows, where necessarily, either by a *crates* or *rastrum*; and, after
 ‘ the

* Qui sarnet, caveat ne frumenti radices suffodiat; Plin. Nat. Hist. lib. xviii. cap. xxi.

† Sementi facta innocare oportet, quod sparseris; Col. lib. xi. cap. ii.

‡ Prius tamen jaciemus semina, deinde profcindemus terram, profcissamque in liram revocabimus, occabimusque quo altius largiore humo contegatur; Col. lib. ii. cap. x.

‘ the seed is sown, a second harrowing *.’ To these may be added a passage in Virgil : ‘ What shall I say of him, who, immediately after sowing, persecutes his lands, and breaks down the lumps of barren earth †? Now, if the lands were harrowed, after being sown, the harrowing across afterwards would not have such an effect as Mr Tull supposes, it would not cover the young plants of corn, which one of the kinds of farcling actually did.

But there is another thing mentioned by Columella, that seems inconsistent with Mr Tull’s conjecture, and that is the farcling of beans : He directs, that they be three times farclied †; and that they be three inches high when first farclied. This happened in the end of January; for Columella, in his kalander for January, says, ‘ The bean also requires the same culture, if now
‘ its

* Aratione per transversum iterata, occatio sequitur, ubi res poscit, crate vel rastro; et fato semine iteratio; Plin. Nat. Hist. lib. xviii. cap. xx.

† Quid dicam, jacto qui semine cominus arva
Insequitur, cumulosque ruit male pinguis arenae?
Vir. Geo. I. l. 104.

‡ Adeoque fabam farriendam censeo, ut exillimem debere ter farriri; Col. lib. ii. cap. xii.

‘ its stalk be grown up to the height of four
 ‘ fingers; for it is not expedient to farcle it before
 ‘ this, while it is too tender *.’ Now, before
 beans could be farcled for the third time, they
 would be so tall, that drawing harrows at ran-
 dom, either along or across, must certainly have
 destroyed them.

Columella, in his culture of the garden, al-
 ways recommends weeding (*runcatio*) when the
 plants are thick sown and not transplanted:
 ‘ Mustard,’ says he, ‘ and coriander, likewise
 ‘ rocket and ozymum, are allowed to remain in
 ‘ their place as sown, nor do they require any
 ‘ other culture than being dunged and weeded †.’
 But, when the plants are set in rows, or at a
 distance, he always recommends *hoeing* (*farritio*.)
 Treating of the culture of garlick, he di-
 rects, that they shall be planted on the top of
 small stiches, at the distance of three inches,

VOL. II.

H

and

* Sed et faba eandem culturam exigit, si jam coliculus
 ejus in quatuor digitos altitudinis creverit. Nam prius
 farrivisse nimium teneram non expedit; Col. lib. xi. cap. ii.

† Sinapi atque coriandrum, nec minus eruca et oci-
 mum, ita uti fata sunt, sua sede immota permanent. Ne-
 que est eorum cultus alius, quam ut stercoreta runcentur;
 Col. lib. xi. cap. iii.

and then adds: 'The furrows of the stiches
 ' are at a half foot distance from each other ;
 ' then, when the plants have put forth the third
 ' leaf, they must be hoed (*sarriantur* *).' In
 another place; 'The cole, when it has four
 ' leaves, ought to be transplanted; but its root
 ' must first be anointed with liquid dung, and
 ' wrapped round with three fillets of sea-weed;
 ' and, in this situation, put into the ground.
 ' This makes it moisten more easily in boiling,
 ' and preserves the green colour without nitre.
 ' But, in cold and rainy climates, the best time
 ' for planting it is after the thirteenth of April.
 ' As soon as the set plants have taken root, they
 ' ought to receive as much dunging and hoeing
 ' as the gardener can afford, and the oftener
 ' that these are done, they become the larger †.'

It

* *Sulci hiarum inter se distent semipedali spatio. De-
 inde cum ternas fibras emiserunt spicae, sarriantur; Col.
 lib. xi. cap. iii.*

† *Brassica cum vi. foliorum erit, transferri debet, ita
 ut radia ejus liquido fimo prius illita, et involuta tribus
 algae taeniolis pangatur; haec enim res efficit, ut in coc-
 tura celerius madescat et viridem colorem sine nitro con-
 servet. Est autem frigidis et pluviis regionibus positio e-*

jus

It is needless to cite any more passages to this purpose: This practice of the Roman gardeners is the same with the practice of ours, and is sufficient to give us an idea of what is meant by *farritio*, an idea very different from that of harrowing at random over a field.

The last thing of this kind I shall take notice of, is, that farcling is represented as a tedious operation, that the first farcling of corn is represented as taking twice as much labour as the second, and some kinds of crops much more than others. ‘Four or five *modii* of *tritium*,’ says Columella, ‘take two days labour of the farcler, when first farcler, and one when they are farcler a second time. Four or five *modii* of beans are farcler with one and one-half days labour, a second time with one, and a third time with one. Six *sextarii* of *sesamum* are farcler with four days labour, and farcler a second time with two*.’ It can scarcely be supposed,

jus optima post Idus Aprilis; cujus depressae plantae cum tenuerint, quantum olitoris ratio patitur, saepius farrita et stercorata melius convalescit; Col. lib. xi. cap. iiii.

* *Tritici modii quatuor, vel quinque, bubulcorum operas occupant quatuor, occatoris 1, farritoris duas primum,*

supposed, that there could be this difference in the labour, betwixt harrowing across and harrowing along; or such a difference between harrowing one kind of crop and harrowing another; in itself can it be supposed, that a *jugerum* of any crop would take four days of a team of oxen to harrow it. But, if sardling was like hand-hoeing, we can easily suppose that there would be this difference, between hoeing the earth round plants, and simple stirring the earth to destroy weeds: we can easily suppose that one crop would take more time to sarcle it than another, according to the manner in which it was sown, and the stirring a *jugerum* would, in some cases, take the time of a labourer.

There is a passage in Pliny, that seems to settle all dispute; for he mentions *terram sarclantem* as a kind of digging: When treating

terram sarclantem sarriantur. A little below:
terram sarclantem in vervacto duas operas bubulorum requirit, et residui unam. Qucantur sesquialtera operas, terram sarriantur una opera, et residui unam. Sesami sextarii sex, tri-
 bus, et residui unam, requiritur, requiritur operis quatuor,
 et residui unam, sarriantur terram duabus; Col. lib.

ing of this operation, he says, ' Beans are not
 ' to be farcled till they have three leaves ; even
 ' then, it is better to clean them by a light far-
 ' cling, than to dig them * ;' plainly intimating,
 that there was another kind of farcling, differ-
 ent from light farcling, which was a kind of
 digging.

From these observations then, it seems proba-
 ble, that the ancient farcling was an operation
 that had a resemblance to the modern hand-hoe-
 ing, and not the same with harrowing, as Mr
 Tull asserts it was. And I have insisted the
 longer on this, that so all doubt may be remo-
 ved about the nature of an operation, in which
 the Roman farmers are very worthy of our i-
 mitation. It has already been shown, that the
 seed was sown in such a manner as to rise in
 rows, with wide intervals, so that this culture
 was given without any difficulty, and without
 doing any damage to the growing corn. By
 what kind of instrument this operation of far-
 cling was performed, is uncertain : It is proba-
 ble,

* Faba vero non antequam trium foliorum. Tunc
 quoque levi farculo purgare verius, quam fodere; Plin.
 Nat. Hist. lib. xviii. cap. xxvi.

ble, that it was different from the English hoe, and that it was a kind of narrow rake with the teeth thick set; or an instrument with two very broad teeth or horns, set very wide and sloping. An instrument such as either of these, would, I imagine, answer the purposes of farcling much better than any scraping instrument like our hoe.

The corn seems commonly to have been farclied twice. Cato advises this to be done*: And Varro, when recommending to the farmer to try experiments, observed, that some had farclied a second and a third time, and, it is probable, with success †.

As Columella mentions two kinds of farcling, so he directs that each of them, in their turn, be applied to the growing corn: He directs, that corn be first farclied in the month of January; and that, at this farcling, the earth be heaped up about the plants, and even made to cover them; and that, some time afterwards, they be farclied a second time, before the corn puts forth the stalk, so as to discover the knobs, not as at first, but that the ground be only stirred

* *Frumenta face bis farrias; Cat. cap. xxxvii.*

† *Ut fecerunt ii, in farriendo iterum, et tertio; Var. lib. i. cap. xviii.*

red and moved, with what he calls even, plain, and smooth farcling: ‘ Upon the whole,’ says he, ‘ as I have already said, the winter farcling ‘ is very advantageously performed after the winter solstice, in the month of January, when the ‘ weather is serene and dry, and there is no ‘ frost. This ought to be observed, that the ‘ roots of the corn may not be hurt, but rather ‘ covered, and the earth heaped over them, so ‘ that the plants may spread themselves over the ‘ ground. It is an advantage to have this done ‘ at the first farcling, but a disadvantage at the ‘ second; for, when the corn ceases to tiller, it ‘ rots, if covered with earth. Nothing more is ‘ necessary, therefore, at the second farcling, ‘ than to stir the earth equally; and this ought ‘ to be done within twenty days after the vernal equinox, before the corn put forth the ‘ stalk, so as to discover the knobs; for, if done ‘ later in the season, it is hurt by the summer ‘ drought and heats that immediately follow *.’

He

* *Atque in totum, sicut ante jam diximus, hiberna farritio plurimum juvat diebus serenis ac ficcis post brumam confectam mense Januario, si gelidicia non sunt. Ea porro sic debet fieri, ne radices fatorum laedantur, et ut potius ado-*

He says likewise, that the time when corn is to
 farclod for the first time, must be determined
 according to the situation of the land: 'In dry
 ' and warm soils,' says he, 'as soon as the corn
 ' will allow farclod, the earth should be moved
 ' in such a manner as to cover it, that so it may
 ' become more bushy; this first farclod should
 ' be performed before winter, and there should
 ' be a second after it. But in cold and wet lands,
 ' for the most part, the winter should be over be-
 ' fore the corn is farclod, neither should it be co-
 ' vered, but the earth moved by a plain farclod.
 ' However, in many countries, I have found
 ' that winter farclod is very advantageous, when-
 ' ever the dryness and warmth of the season al-
 ' lows *.' Varro gives the same directions a-
 bout

adobruantur, cumulisque exaggerentur, ut latius se frutex
 humi diffundat. Id prima farritione fecisse proderit, se-
 cunda oberit, quia cum pullulare desit frumentum, pu-
 trefcit si adobrutum est. Nihil itaque amplius in itera-
 tione, quam remoliri terra debet equaliter: Eamque
 transacto aequinoctio verno statim peragi oportet, intra
 dies viginti, antequam seges in articulum eat, quoniam
 serius farrita corumpitur insequentibus aestivis siccitatibus,
 et caloribus; Col. lib. 11. cap. xii.

* Nam in agris siccis et apricis, simul ac primum farritionem

about the time of farcling. The general direction is to farcle between the coming of the zephires and the vernal equinox *. But, if the lands are dry, he advises that this be done between the winter solstice and the zephires †. Columella observes, that it is absolutely necessary that the land be dry when barley is farcled, and that, though wheat may be farcled while the land is moist, yet that it is much better to perform this operation when the land is dry, as this has a tendency to prevent the rubigo ‡.

VOL. II.

I

Pliny,

tionem pati queant segetes, debere eas permota terra adobruī, ut fruticare possint. Quod ipsum ante hiemem fieri oportere, deinde post hiemem iterari. In locis autem frigidis et palustribus plerumque transacta hieme farriri, nec adobruī, sed plana farritione terram permoveri. Multis tamen nos regionibus aptam esse hiemalem farritionem comperimus, duntaxat ubi et siccitas coeli, et tepores permittunt; Col. lib. II. cap. XII.

* In primo intervallo, inter Favonium et aequinoctium vernali, hæc fieri oportet. After mentioning several things, he adds, segetes farriri; Var. lib. I. cap. XXIX.

† Octavo intervallo inter brumam et Favonium hoc fieri oportet. De segetibus, si qua est aqua, deduci: Sin siccitates sunt, et terra teneritudinem habet, farriri; Var. lib. I. cap. XXXVI.

‡ At aliae segetes, quae vel humidæ moveri possunt,
melius

Pliny, when mentioning the season of farcling, says, that barley ought not to be farclcd except when the land is dry*.

Columella proposes to determine the time of farcling, not only from the season of the year, and situation of the land, but also from the situation of the crop: 'In those countries,' says he, 'where farcling is needed, the corn fields are not to be touched, even though the weather should allow, till the blade has covered the furrow. *Triticum* and *adoreum* may be very
' pro-

melius tamen siccae farriuntur: Quoniam sic tractatae non infestantur rubigine; hordeum vero nisi siccissimum tangi non debet; Col. lib. II. cap. XII.

* *Hordeum nisi siccum ne farrito; Plin. Nat. Hist. lib. XVIII. cap. XXVI.* The common copies in this passage, have *serito* in place of *farrito*: But it is evident, that *farrito* is the true reading. Pliny, in this place, is enumerating the works that should be performed between the blowing of *Favonius* and the vernal equinox. After several things, he mentions farcling, and, having given some directions about farcling far and beans, and observed, that corn is not to be touched for 15 days after flowering, he adds the passage under consideration, the meaning of which certainly is, 'that barley, as it ought not to be touched when in the flower, so likewise ought not to be farclcd except when the ground is dry.'

‘ properly farcled, when they begin to push the
 ‘ fourth blade, barley when it begins to push
 ‘ the fifth, and beans, and other legums, when
 ‘ they are four fingers or three inches above the
 ‘ ground *.’

The bean is the plant which he advises to be farcled a second and a third time, assuring us, that, when this is done, the crop is greatly increased, and such a small portion goes to the husk, that a quantity of them, when cleaned, will fill the *modius* almost as full as when in the pods †. As he determines the time when this operation should be begun, so he likewise determines the time when it should be finished, which

* In iis autem locis, ubi desideratur farratio, non ante sunt attingendae segetes, etiam si coeli status permittit, quam cum fata sulcos contexerint. Triticumque et adonion, cum quatuor fibras habere coeperint, ordeum cum quinque, faba et caetera legumina cum quatuor digitis a terra extiterint, recte farrantur; Col. lib. 11. cap. XII.

† Adeoque fabam farrandam cenfeo, ut existimem debere ter farriri; nam sic cultam comperimus non solum multiplicare fructum, sed exiguam portionem in volvulis habere, fresaeque ejus et expurgatae modium pene tam plenum esse, quam integrae, cum vix minuatur mensura detractis putaminibus; Col. lib. 11. cap. XII.

which is in twenty days after the vernal equinox, and before the stalk discovers the knob*.

The stirring the earth around the plants of corn, while growing, is no doubt beneficial. By this operation, the earth is enabled to admit more easily the air and the vegetable food contained in it; and, by it the dry roots of plants are enabled more easily to extend themselves. That the Roman farmers proposed such advantages as these from farcling, is evident from some passages in the rustic writers. Columella represents one effect of farcling to be, that the plants of corn by it are enabled to spread themselves along the ground †.

But,

* Eamque transacto aequinoctio verno statim peragi oportet intra dies viginti, antequam seges in articulum eat; Col. id.

† Ut latius se frutex humi diffundat; Col. lib. 11. cap. XII. A late translator of Columella, by the word *frutex*, understand: the stalk of the plant, which renders the author's meaning confused and uncertain. It is obvious, that *frutex* does not here signify the stalk of the plant, but the plant itself. The word commonly signifies a shrub or bush, and, when here used for the plant, conveys the idea of stalks or branches growing out of it. He uses the word *fruticare* in the same chapter, and applies it to the
grow-

But, though the Roman farmers, in farcling, might probably have these advantages in view, yet the destroying weeds seems to have been the chief design of this operation. This is evident from several passages in the rustic writers: Treating of this operation, Columella says, ‘ Nor do I think that this is to be done in
 ‘ every

growing corn, and his meaning is, that, by means of farcling, the growing corn is enabled to *bush* or put forth branches and stalks. In what manner a plant of corn spreads itself over the ground is known to every farmer; it does this when it pushes many stalks from the root, which is called *tillering* or *stooling*. That this is Columella’s meaning, is evident from a passage in Pliny: ‘ Rich fields,’ says he, ‘ send forth from one root or seed a bush of numerous stalks, and bring forth a thick crop from thin sowing.—*Pinguia arva ex uno semine fruticem numerosum fundunt, densamque segetem e raro semine emittunt;*’ Nat. Hist. lib. xviii. cap. xxiv. It appears then, that Columella considered farcling as useful for nourishing plants, and rendering them stronger and more fruitful. Pliny seems also to have been of the same opinion; ‘ Sarcling,’ says he, ‘ relaxes in the spring season, the sadness of the soil, hardened by the winter cold, and prepares it for the admitting the returning heats.—*Sarculatio induratam hiberno rigore foli triftitiam laxat temporibus vernis, novosque Soles admittit.*’ Plin. Nat. Hist. lib. xviii. cap. xxi.

70 OF THE HUSBANDRY

‘every country, but to be used according to
 ‘the custom of the inhabitants. For there are
 ‘some countries, such as Egypt and Africa,
 ‘that have peculiar advantages; in which the
 ‘husbandman never touches the corn fields from
 ‘the sowing till the reaping; for the temper of
 ‘the air, and the goodness of the soil are such,
 ‘that scarcely any herb comes up except from
 ‘the seed that is sown*.’ Having likewise
 observed, that it is improper to scarce lupines,
 lest, thereby, the root should be cut, he adds;
 ‘Which, though it should not happen, yet the
 ‘culture is needless, because a crop of lupines is
 ‘so far from being infested with weeds, that it
 ‘destroys them †.’ There is a passage in Pliny
 to the same purpose: After mentioning the dif-
 ferent kinds of culture given to corn after it is
 sown,

* Sed nec istud ubique fieri censemus; verum incolarum
 consuetudine uti. Sunt enim regionum propria munera,
 sicut Ægypti et Africae, quibus agricola post sementem,
 ante messem segetem non attingit, quoniam coeli condi-
 tio, et terrae bonitas ea est, ut vix ulla herba exeat, nisi ex
 semine jacto; Col. lib. II. cap. XII.

† Quod etiam si non fieret, supervacuum tamen esset
 cultus, cum sola haec res adeo non infestetur herbis, ut
 ipsa herbas perimat; Col. id.

sown, he adds; ‘ But in Bactria, Africa, and
 ‘ Cyrene, the goodness of the climate renders
 ‘ all these things unnecessary; and the corn does
 ‘ not return to the barn in less than nine months
 ‘ from the seed-time; for the drought restrains
 ‘ the weeds, while the corn is nourished by the
 ‘ evening dews*.’

To engage the farmer not to neglect these o-
 perations of weeding and farcling, by which the
 growth of weeds is discouraged, Columella says,
 that, if these are given up, the produce of the
 fields will be greatly diminished: ‘ In my opi-
 ‘ nion,’ says he, ‘ he is a very bad farmer who
 ‘ allows weeds to grow along with his corn;
 ‘ for the produce will be greatly lessened if weed-
 ‘ ing is neglected †.’

There is another kind of culture, besides
 weeding and farcling, which was given in some
 places

* At in Bactris, Africa, Cyrene, omnia haec superva-
 cua facit indulgentia coeli; et a semente non nisi nonis
 mensibus in aream redeunt: Quia siccitas coercet herbas,
 fruges nocturno tactas rore nutriens; Plin. Nat. Hist. lib.
 xviii. cap. xxi.

† Sed mihi videtur pessimi agricolae, committere, ut
 fatis herba proveniat. Frugibus enim plurimum detra-
 hitur, si relinquitur runcatio; Col. lib. ii. cap. xii.

places to growing corn, and which is mentioned by Pliny, and has a resemblance to the modern horse-hoeing: He informs us by what accident it was introduced; 'We must not omit,' says he, 'a particular method of ploughing, at this time practised in Italy beyond the Po, and introduced by the injuries of war: The Salassi, when they ravaged the lands lying under the Alps, tried likewise to destroy the panic and millet that had just come above ground; finding that the situation of the crop prevented them from destroying it in the ordinary way, they ploughed the fields; but the crop at harvest being double of what it used to be, taught the farmer to plough amongst the corn, a practice which is called *artrare*, that is, *aratrare*, as I suppose it was first called *.' That ploughing amongst the growing corn, as described here by Pliny, was a common practice, appears from the manner in which he expresses himself; he says, 'A manner of ploughing at this time:'

But

* It is probable, that Pliny was of opinion that this operation was first called *aratrare*, from the nature of it. This word, as we may reasonably suppose, being compounded of *arare* and *inter*, and therefore signifies both to plough between and among.

But this appears likewise from what he adds :
 ‘ This operation was performed, either when the
 ‘ stalk was beginning to appear, or when the
 ‘ plant had put forth two or three leaves *.’
 That this accident should have happened to the
 panic and millet, rather than any other corn or
 pulse, is easily accounted for ; the panic and
 millet are spring corn. Virgil says, that the
 time of sowing was when the sun entered into
 Taurus † ; which, at that time, was about the
 seventeenth of April. Columella says, that they
 cannot be sown before the spring, because they
 thrive best in warm weather. They may be

VOL. II.

K

sown

* Non omittemus unam etiamnum arandi rationem, in
 Transpadana Italia bellorum injuria excogitam. Sallasti
 cum subiectos Alpibus depopularentur agros, panicum mi-
 liumque jam excrefcens tentavere. Postquam respuebat
 natura, inararunt. At illae messes multiplicatae docuere,
 quod nunc vocant artrare, id est, aratrare, ut credo tunc
 dictum. Hoc fit vel incipiente culmo, cum jam is bi-
 na ternave emiserit folia ; Plin. Nat. Hist. lib. xviii. cap.
 xx.

† ——— Et milio venit annua cura :

Candidus auratis aperit cum cornibus annum

Taurus.

Vir. Geo. I. l. 216.

sown very properly in the end of March *; but this is only in warm and dry soils, as is evident; for Palladius, who, in his kalander for March, says, ‘ In warm and dry countries we sow panic and millet †:’ And, in his kalander for May, he says, ‘ In the month of May we sow panic and millet in cold and wet grounds ‡.’ Pliny himself mentions the same season, and adds; ‘ Likewise that the barley may be ripe before they be sown ||.’ Now, it is natural to suppose, that this eruption of the Salassi, mentioned by Pliny, was in the beginning of summer; at which time the other crops would be arrived near to maturity, and therefore might be easily destroyed by the cattle they had along with them: But the panic and millet, at this season, would

* *Ante ver feri non possunt, quoniam teporibus maxime laetantur; ultima tamen parte Martii mensis commodissime terrae committuntur; Col. lib. ii. cap. ix.*

† *Calidis et siccis regionibus panicum feremus et milium; Pal. lib. iv. cap. iii.*

‡ *Maio mense locis frigidis et humectis panicum feremus et milium; lib. vi. cap. i.*

|| Having mentioned some days before the 19th of May, he says; ‘ *Extremo autem hoc tempore panici milique satio est; justum est hoc feri maturato hordeo;*’ *Plin. Nat. Hist. lib. xviii. cap. xxvi.*

would not be far advanced; and hence Pliny says of them, 'That they were only come up.' When they attempted to destroy them in the same way as they did the crops that were further advanced, they found that their situation, being but lately come up, rendered this impossible; and, therefore, Pliny says, 'That nature 'resisted the attempt;' in order, therefore, that they might destroy them effectually, as they imagined, they ploughed the fields; the consequence of which was, that the crop was much better than usual. This operation of ploughing down the corn to destroy it, was no doubt performed in a great hurry; the fields would not be clean ploughed, but the furrows would be made at a distance from each other, and plants of corn would be left in rows between them; these remaining plants, nourished by the ploughing, produced such a crop as introduced the practice of ploughing the fields of millet and panic, when the plants had put forth two or three leaves.

There were some other kinds of culture given to the corn while growing, besides those that have been mentioned. Virgil directs to pasture upon the corn when it appears too luxuriant; and

and he fixes the particular season for this ;
 ‘ What commendation,’ says he, ‘ shall I give
 ‘ him, who, lest his corn should lodge, pastures
 ‘ it while young, as soon as the blade equals the
 ‘ furrow *.’ Pliny recommends to comb the
 corn in this situation before it is pastured, and
 afterwards to farcle †. The design of combing
 seems to have been to pull out some of the plants
 where they were too thick ; and the farcling
 after the pasturing seems very proper, as the
 surface, battered by the feet of the cattle, would
 be thereby opened.

Virgil likewise advises the watering of grow-
 ing corn when the ground is dry : After men-
 tioning the breaking of clods after sowing, he
 adds : ‘ Then brings down the waters of a river
 ‘ upon the sown corn. And, when the field is
 ‘ parched

* Quid, qui, ne gravidis procumbat culmus aristis,
 Luxuriam segetem tenera depascit in herba,
 Cum primum sulcos aequant fata?

Vir. Geo. I. l. 111.

† Sunt genera terrae, quarum ubertas pecunari sege-
 tem in herba cogat. Cratis et hoc genus, dentatae stilis
 ferreis. Eademque nihilominus et depascuntur. Quae de-
 pascita sunt, sarculo iterum excitari necessarium ; Plin.
 Nat. Hist. lib. xviii. cap. xxi.

‘ parched and the plants dying, conveys the wa-
 ‘ ter from the brow of a hill in channels; the
 ‘ water, in falling, makes a murmuring noise
 ‘ over the small stones, and refreshes the parched
 ‘ fields with its streams *.’ Pliny mentions this
 practice as very successful upon some particular
 fields in the Fabian district of the lands of Sul-
 mo in Italy; He observes, as very surprising,
 ‘ That the water destroyed the weeds and nou-
 ‘ rished the corn, and that watering served in
 ‘ the place of farcling †.’

The pasturing sheep upon a field of wheat,
 that promises to be too luxuriant a crop, is a
 practice of modern times: Whether or no it is
 a proper one, may indeed be disputed: The wa-
 tering corn fields is seldom necessary in a nor-
 thern climate, and tho’ useful cannot be done in
 many

* *Deinde satis fluvium inducit, rivofque fequentes?*

Et cum exustus ager morientibus aestuat herbis,

Ecce, fupercilio clivofî tramitis undam

Elicit: illa cadens raucum per levia murmur

Saxa ciet, fcatebrisque arentia temperat arva.

Vir. Geo. I. l. 106.

† *Asperiora vina rigari utique cupiunt in Sulmonenfi
 Italiae agro, pago Fabiano, ubi et arva rigant: Mirum-
 que, herbae aqua illa necantur, fruges aluntur, et riguus
 pro farculo est; Plin. Nat. Hist. lib. xvii. cap. xxvi.*

OF THE HUSBANDRY

... but the combing and fardling corn, particularly the last, are certainly advantageous, and are in use in all places. This practice, which is the Roman husbandry, is certainly worthy of our imitation; whether it can be exercised to great advantage with us as it was with them, is uncertain: The hand-hoeing of corn, which, as has already been observed, is of the same nature with fardling, has been tried with success, and on rich land, is found to be a great improvement: But there is an objection that will be made, to make it this, which is, that the labour is not enough in such work, and, therefore, that it must become very expensive. To answer this objection, this cost the labourers, and to compare the expence it will cost with what it may be supposed to cost in the husbandry of the country, will be found to be unobjectionable.

... which are nearly equal to one hundred and twenty. Columella says, are equal to many plough-labourers*: These six labourers

... *agrum salignum posse agrum ducen-*

labourers were employed chiefly in the corn fields; for, when there were trees planted in the fields for the support of vines, the same author says, upon the authority of Sæfarna, ‘ That three additional labourers were necessary *.’ Now, as there was only one yoke of oxen in the plough and no driver, there were no less than six extraordinary labourers in every farm where there were two ploughs, which is four or rather five more than are necessary upon a farm of the same extent in Britain, supposing the land of the same quality as the land in Italy, and the same quantity in fallow that was common in the Roman husbandry. There are very few farms of one hundred acres, or of two ploughs, that require two extraordinary labourers, one is commonly sufficient, in place of six employed by the Roman farmers.

We are not to imagine, however, that *sarcling* was the only kind of labour performed by the extraordinary labourers in the Roman husbandry,

ducentorum jugerum subigi duobus jugis boum, totidemque bubulcis, et sex mediastinis; Col. lib. II. cap. XIII.

* Si tamen vacet arboribus: At si sit arbustum, eundem modum Sæfarna tribus hominibus adjectis affueverat probe satis excoli; Col. lib. II. cap. XIII.

bandry, more than is performed by our labourers in a farm in Britain: If so, this must appear a very expensive operation, and not to be attempted by us without great caution. But it appears, that the extraordinary labourers in a Roman farm had a great deal of work besides farcling.

Harrowing, a part of the work of the British ploughman, was performed by the common labourers in the Roman husbandry: And, it is evident, that this must have taken up a considerable time, as it was performed by manual labour, and as the land was harrowed, not only after the seed was sown, or immediately before, as has already been mentioned, but also after some of the ploughings given in fallowing. Virgil mentions harrowings, by which the land was prepared for the seed; and Pliny mentions harrowing as sometimes necessary after the second ploughing of the fallow, as was observed in the last chapter.

These labourers were likewise employed in cutting down and threshing corn, in cutting green forage for the cattle, in cutting and making hay, and other things required to be done in the farm: For although, upon extraordinary occasions,

occasions, as in the time of the vintage, and of the hay and corn harvests, the farmer had recourse to extraordinary labourers, as with us, yet it is natural to suppose, that the ordinary labourers in the farm would also be employed in these works*.

Columella gives an account of the number of days labour that the farcling a *jugerum* of the different crops takes; and from this we may suppose, that, in a farm of two hundred *jugera*, about two hundred and eighty days of a labourer were employed in farcling. On such a farm, it is probable, that there were sown about sixty *jugera* with wheat, and fifty with pulse of different kinds. Now,

60

* Omnes agri coluntur hominibus servis aut liberis, aut utrisque. Liberis, aut cum ipsi colunt, ut plerique pauperuli cum sua progenie: Aut mercenariis, cum conducticiis liberorum operis res majores, ut vindemias, ac foenicicia administrant; iique quos obaeratos nostri vocitarunt, et etiam nunc sunt in Asia, atque Ægypto, et in Illyrico complures. De quibus universis hoc dico: Gravia loca, utilius esse mercenariis colere, quam servis, et in salubribus quoque locis opera rustica majora, ut sunt in condendis fructibus vindemiae, aut messis; Varro, lib. 1. cap. xvii.

82 OF THE HUSBANDRY

60 <i>jugera</i> of wheat, at three days each,	
makes - - -	180
50 <i>jugera</i> of pulse, at two days each,	
makes * - - -	100
	280
Besides, there may be allowed for weed-	
ing the above 110 <i>jugera</i> , about	80
Columella allows for rainy weather and	
holy days - - -	45
And for days of rest † - - -	30
	435

From this state it appears, that one labourer was not sufficient for farcling and weeding the corn upon a farm of two hundred *jugera*.

It is not to be imagined, that, in a farm in Britain, we can have extraordinary labourers for

* Some of the crops of pulse required no farcling; but then a *jugerum* of some of the other kinds required six days, and of some others three and four; so that two days for a *jugerum* of each may be the proper medium.

† *Pluviales quoque et feriarum computantur, quibus non aratur, dies quinque et XL. Item peracta sementi, quibus requiescunt, dies xxx; Col. lib. II. cap. XIII*

for this purpose of fardling only; as they can be employed in it only for a part of the year. But then, to make an attempt to give the corn this culture, some extraordinary labourers may be engaged, provided they can be employed usefully through the whole year. Let us inquire then, whether or not, upon the supposition that there are two extraordinary labourers added to a farm of one hundred acres, these labourers may be usefully employed in all seasons: And of this, I think, there can be doubt, provided the raising and consuming of hay and turnip become more frequent.

Immediately after harvest, these additional labourers may be employed in threshing, thatching of stacks, and the other extraordinary work that that season requires, which, when delayed too long, occasion very great loss. In the end of November and in December, before the frost sets in, or the land becomes very wet, they may be employed in hoeing the wheat that is ready for receiving this culture, and in making and cleaning drains, opening water-furrows, and the like works, which, though very beneficial, are too much neglected by the generality of farmers. When prevented by frost from
working

working in the fields, they may be employed in threshing, and may assist in carrying out dung. In the spring, the wheat may receive the second hoeing; after this the beans, pease, and oats, may be hoe'd, and, last of all, the barley. When the hoeing of the barley is finished, they may be employed in weeding till such time as the hay-harvest comes on; and, from that time, every person knows there is sufficient employment for them till the end of the corn harvest. Thus sufficient employment may be found for these labourers through the whole season, without having recourse to extraordinary improvements and inclosing, which yet are so necessary in many places.

I observe, that, in order to employ these labourers in useful work through the whole year, it is necessary that the raising and consuming of hay and turnip become more frequent. When I made this observation, I had in my view not only employment for these labourers, in hoeing the turnip, and cutting and making the hay, but also their being able, with very little assistance, to supply the cattle upon the farm with fodder, and thereby prevent the farmer from being obliged to accommodate the threshing of
his

his corn to this; which, under the present management, in many places he is obliged to do, and which is often a very great inconvenience to him. When there is plenty of hay and turnip, and, in consequence of proper improvement, less straw than there is at present, in proportion to the corn, there is no necessity to thresh the corn regularly at stated times; this may be done when most convenient for the labourers, and, consequently, when not necessarily employed in the fields.

But this is not all; there is a thing of greater importance yet to be inquired into. Let us suppose that these extraordinary labourers may be usefully employed when they are not hoeing. Let us suppose that the other work in which they are employed is advantageous, is even of more value than the expence of their labour, the principal question still remains undetermined: Whether or not will the expence of their labour in hoeing be balanced by the benefit which the crop may naturally be supposed to receive from this culture? To determine this point in a satisfying manner, is indeed difficult; nothing, it is true, can be more easy than to make a calculation of the additional value of the
 crop

crop by this culture, and make this do more than balance the additional expence. Calculations of this kind are very common; but they are not more common than deceitful: The articles of profit and expence are imaginary, all regulated by the fancy of the author; for it is absolutely impossible for any person to determine how much any additional culture will better a crop, unless from repeated experience: One may indeed, from established principles, determine, as in this case, that the crop will be bettered by hoeing; but how much it will be bettered, whether the advantage will do more than balance the expence, cannot, upon any good ground, be asserted. As this culture of hoeing was, however, given by the Roman farmer, as it seems to have been a general practice, it is natural to suppose, that it was found to be beneficial upon the whole, that is, that the benefit which the crop received from it did more than balance the expence: It is natural to suppose likewise, that it will be as advantageous in Britain, provided the expence of labour is no greater with us than with them, and the crops, upon the whole, not much larger. The first of these appears from an inquiry already made. The other

other we shall endeavour to show afterwards. If then, we have any confidence in the knowledge of the Roman farmers, we should be engaged, after their example, to try this culture, and to have servants on purpose for it. It is necessary, however, to observe, that all experiments of this kind should be tried at first only on good land: This is what Columella very wisely directs with respect to experiments in general: ‘Therefore,’ says he, ‘a variety of experiments ought by no means to be neglected, and these may be attempted with the greater boldness on good soil, because on this the returns never fail to answer both the trouble and expence †.’ The reason of this, with respect to any additional culture given to land is obvious; additional culture is supposed to increase the produce in a certain proportion on every kind of land. Let us suppose, for example, that hoeing a field may increase the produce one-tenth, if the field produces with the ordinary culture

ten

† Itaque nusquam experimentorum varietas omit-
tenda est. Longeque etiam in pingui solo magis auden-
dum, quoniam nec laborem nec sumptum frustratur effec-
tus; Col. lib. 1. cap. iv.

ten bolls, the additional increase by the hoeing is one boll; but, if the field, with the ordinary culture, produces only five bolls, then the additional culture by hoeing is only two firlots: So that this additional labour may produce more than the expence, and be a real profit on the one, and may produce less than the expence, and be a real loss, upon the other.

CHAP.

C H A P. XXVIII.

Of the Crops raised by the Ancients, of the Price of Corn, and the Value and Rent of Lands.

VERY remarkable things are mentioned of the fertility of some lands in ancient times. In Palestine, there are lands which, it is said, produced an hundred after one sowing. Isaac, when at Gerar, in the land of the Philistines, is said to have sowed and to have received an hundred fold *. That this was not a very uncommon thing, may very properly be inferred from one of the parables in the Gospel: ‘When good seed is sown upon good ground, it is said to bring forth in some places thirty, in others forty, in others sixty, and in others even an hundred fold †.’ It may likewise be inferred

* Genesis, ch. xxvi. v. 12.

† Και αλλο επισειν εις την γην την καλην. και ειδα καρπον

inferred from this passage, that a crop upon good land was not reckoned extraordinary, if the seed did not produce thirty fold; for this is the smallest crop mentioned, which probably would not have been done, had a lesser crop upon such land been reckoned a good one.

In the lands upon the banks of the Sybaris, about Garada in Syria, and Byzacium in Africa, it was not uncommon, as Varro informs us, to reap an hundred after one sown *.' This last place is mentioned by Pliny, who says, that in it sometimes one hundred and fifty after one are reaped; that from it there were sent to Augustus, by his factor, near 400 stalks all from one grain; and to Nero 340 stalks †.

Some

αναβλινοντα και αυξανοντα. και εφερειν, εν τριακοιτα, και εν εξηκοιτα, και εν εκατον; Mark chap. iv. 8.

* In Sybaritano dicunt etiam cum centesimo redire solum; in Syria ad Garada, et in Africa ad Byzacium item ex modio nasci centum; Var. de re. rust. lib. i. cap. XLIV.

† Triticum nihil est fertilius: Hoc ei natura tribuit, quoniam eo maxime alebat hominem: Utpote cum e modio, si sit aptum solum, quale in Byzacio Africae campo, centeni quinquageni modii reddantur. Misit ex eo loco Divo Augusto procurator ejus ex uno grano (vix credibile dictu)

qua-

Some fields about Leontinum, and other places of Sicily, likewise the whole of Baetica and Egypt, are represented as giving returns of an hundred after one *. The lands about Babylon, too, are represented as rendered so fertile by the waters of the Tigris and Euphrates, as to produce to the slothful husbandman fifty after one, but

quadraginta paucis minus germina, extantque de ea re epistolae. Misit et Neroni similiter cccclx. stipulas ex uno grano; Plin. Nat. Hist. lib. xviii. cap. x. In another place, when treating of soils, Pliny mentions some things of this fertile field, so extraordinary, that it will not be amiss to relate them: After observing, that there are some fields that cannot be ploughed after rain, he adds: 'On the other hand, I have seen the fruitful field of Byzacium in Africa, that in corn produces 150 after one; which, when dry, the stoutest oxen cannot plough, after rain opened up by a share drawn by a wretched ass on the one side, and an old woman on the other. — Contra, in Byzacio Africae illum centena quinquagena fruge fertilem campum, nullis cum siccus est, arabilem tauris, post imbres vili asello, et a parte altera jugi anu vomerem trahente, vidimus scindi;' Plin. Nat. Hist. lib. xvii. cap. v.

* Cum centesimo quidem et Leontini Siciliae campi fundunt, aliique, et tota Baetica et in primis Ægyptus; Id. lib. xviii. cap. x.

but to the diligent husbandman one hundred and fifty *.

These crops appear to have been very remarkable; but it is impossible to judge of them without the knowledge of other circumstances. Besides, as the authors by whom they are mentioned, represent them as extraordinary, they are not to be reckoned upon in judging of the fertility of lands in general.

It appears from a passage in Varro, that it was common, in his time, for a *jugerum* to produce, in some parts of Italy, 50 *modii* of wheat, and in others 75 *modii*. As the passage is of importance in determining the kind of crops which the lands of Italy produced at a certain period, it will not be improper to translate the whole of it: 'There are sown,' says he, 'on a *jugerum*, four *modii* of beans, five of *triticum*, six of barley, and ten of *far*: In some places

a

* Sic quoque cum quinquagesimo foenere messes reddit exilitas soli; verum diligentioribus cum centesimo quinquagesimo; id. lib. xviii. cap. xvii.

Et negligentius quidem colentibus, quinquagesimo cum foenere messes redduntur; diligentius vero cum centesimo quinquagesimo; Theoph. de hist. plant. lib. viii. cap. vii.

a little more, in others a little less: If the soil
 is strong and rich, more; if it is poor, less.
 So that you should observe what quantity is
 sown in the country, that you may sow what
 the climate and soil require, so as to reap ten
 after one, as in some places, or fifteen, as in
 others; such as in Tuscany and some other
 parts of Italy *.' From this passage, we may
 observe, that five *modii* of wheat were commonly
 sown on a *jugerum*; and that, although the
 quantity was varied according to circumstances,
 yet this variation was but small; Varro says, ' a
 little more or less.' As it was upon poor land
 that less than five *modii* were sown, we may con-
 clude, that no less than five would be sown upon
 the land that produced ten or fifteen after one.
 Upon the supposition then, that five *modii* were
 sown, the *jugerum*, when there were ten after
 one, produced fifty *modii*; and when there were
 fifteen

* Seruntur fabae modii quatuor in jugero, tritici v. or-
 dei vi. farris x. Sed nonnullis locis paulo amplius, aut
 minus; Si enim locus crassus, plus: si macer, minus.
 Quare observabis quantum in ea regione consuetudo est
 ferendi; ut tantum facias, quantum valet regio, ac ge-
 nus terrae; et ex eodem semine aliubi, cum decimo redeat,
 aliubi cum quintodecimo, ut in Hetruria, et locis ali-
 quot in Italia; Var. lib. i. cap. XLIV.

fifteen after one, it produced 75 *modii*. This is at the rate of 21.4 bushels, and 32.1 bushels, upon the English acre, of 25.6 firlots, and 38.4 firlots, upon the Scots acre.

As we have from Varro an account of the produce of the lands in Italy, so we have from Cicero, his contemporary, an account of the produce of the lands in Sicily: In his oration against Verres, governor of Sicily, accused of oppression in raising the tenths, he takes occasion to mention both the sowing and produce. He expresses himself in this manner: ‘ In the lands
 ‘ of Leontinum, a *medimnum* of *triticum* may be
 ‘ considered as the ordinary and just quantity
 ‘ sown upon a *jugerum*. Let us suppose that the
 ‘ lands are well cultivated, and produce eight;
 ‘ or rather, that all circumstances are favourable,
 ‘ and that they produce ten: When this
 ‘ happens, the tenth is equal to the quantity
 ‘ sown; that is, whatever is the number of *juga*
 ‘ *gera*, the same number of *medimna* is due for
 ‘ the tenths.’ A little after, he adds: ‘ But a
 ‘ *medimnum* is all that ought to be given to the
 ‘ collector of the tenths for a *jugerum*, when the
 ‘ land produces (which seldom happens) ten af-
 ‘ ter

‘ter one sown*.’ A *medimnum* was equal to six *modii* †: When this quantity then was sown on the *jugerum* at ten after one, the produce would be sixty *modii*; and sixty *modii* on a *jugerum* are at the rate of 25.7 bushels on the English acre, and 30.7 firlots on the Scots acre. We have no doubt better crops than this sometimes in Britain; however, it must be reckoned a very good one, when it is considered, that the whole of the wheat lands in the Leontian fields are taken into the account, amounting to 36000 *jugera*, and that the farmers were greatly oppressed.

The

* In jugero agri Leontini medimnum fere tritici fertur, perpetua, atque aequabili fatione. Ager efficit cum octavo bene ut agatur: Verum ut omnes Dii adjuvent, cum decumo. Quod si quando accidit, tum fit, ut tantum decumae sit, quantum severis: Hoc est, ut, quot jugera sunt sata, totidem medimna decumae debeantur.—Medimnum autem ex jugero decumano dari poterat, cum ager, id quod perraro evenit, cum decumo extulisset; Cic. or. accus. in C. Verrem. or. VIII. Although Cicero mentions 10 after one as an extraordinary crop, yet, when we consider the design of the oration, we have reason to conclude that he would not have allowed it in his calculation, if it had not been common.

† Agri Leontini decumae anno tertio venierunt tritici medimnis xxxvi. millibus, hoc est, tritici mod. ccxvi. millibus; id.

The ordinary crops in Italy, in the time of Columella, were very different from those mentioned by Varro and Cicero. It appears, that, before his time, the landholders in Italy, had become so careless about the culture of their estates, that many vineyards had gone to ruin; and it was become a general opinion, that land laid out in vineyards was of less value to the proprietor than land of the same quality laid out in any other way. For this reason, before he began to treat of the culture of vines, he thought it necessary to demonstrate, that well cultivated vineyards were very profitable: In doing this, he takes occasion to compare the value of the produce of vineyards with the value of other crops, and expresses himself in this manner: ‘ The increase that we had in our fields at Cere-
 ‘ tanum seems to be prodigious;’ he mentions this increase, and then adds: ‘ When meadows,
 ‘ and pasture, and woods, if they produce 100
 ‘ *sestertii* by the *jugerum*, are thought to answer
 ‘ very well to the proprietor; and, as for fields
 ‘ in corn, we can scarcely remember when, over
 ‘ the greatest part of Italy, they produced four
 ‘ after one sown*.

There

* Nam illa videntur prodigialiter in nostris Ceretanis
 acci-

land, to receive 4 *per cent.* for the price: According to an account given by the younger Pliny, a purchase of 500000 *nummi* paid 20000 *nummi* a-year *. At this rate, the rent of middling

no pains in their choice of proper land for them: 'At this time,' says he, 'men think it of no importance what kind of soil they plant, nay they even make choice of the worst part of their fields, as if that soil was most proper for this plant which is fit to carry no other crop.—*Jam illud a principio nihil referre censent, quem locum conferant; immo etiam feligunt deterrimam partem agrorum, tanquam sola sit huic stirpi maxime terra idonea, quae nihil aliud ferre possit;*' Col. *ibid.* When he thus condemns those that plant bad land with vines, the land that he proposes to purchase for this purpose must be considered as middling at least.

* *Nam pro quingentis millibus nummum, quae in alimenta ingenuorum ingenuarumque promiseram, agrum ex meis longe pluris actori publico mancipavi: Eundem vectigali imposta recepi, tricena millia annua daturus;* Plin. *ep. lib. vii. ep. 18.* As the rate of interest in the time of Columella was 6 *per cent.* the receiving only, 4 *per cent.* for a purchase, may perhaps be thought too little. But then, it must be observed, that this 6 *per cent.* was not what we call legal interest. The Romans seem never to have determined the real value of the use of money, so that the rate of interest among them was always fluctuating. In the first ages of the commonwealth, mo-

dling corn land, in the time of Columella, was 40 *sest.* a *jugerum*, which are equal to 3.34 *modii*, at 12 *sest.* for the *modius*.

Having the rent and produce of corn land with the price of corn in the time of Columella, we may find out the rent of land in the time of Varro. Suppose 100 *jugera* cultivated and sown in the manner mentioned by Columella, and which produces at the rate of five after one: The annual produce of these in wheat, besides main-

neyed men were allowed to make the most of their money by loans: This produced grievances, which were redressed, without any law made to regulate interest; so that, in a short time, matters went on as formerly. At last, however, laws were made, prohibiting the taking any interest; These produced the severest usury; for the borrower was obliged to pay not only for the use of the money borrowed, but also for the risk of the lender. When the custom of taking interest became common at any time, the risk was thereby lessened, and, in consequence of this, the rate or premium was lessened likewise. However, as the state sometimes adhered to the custom in opposition to the law, and at other times adhered to the law in opposition to the custom, the creditor was always in some danger; and, therefore, 4 *per cent.* from a purchase of land, might be reckoned preferable to 6 *per cent.* from a debtor.

maintaining the necessary oxen, will be 1075 *modii*; from these deducting seed and rent, amounting to 549 *modii*, there remain for the expence of management 526 *modii*, which is at the rate of 5.26 *modii* for each *jugerum**. When the expence of raising crops is ascertained by a fixed

* The crops upon a farm of 100 *jugera*, according to Columella, were as follow: 25 *jugera* of winter wheat, 15 of spring wheat, and 25 of pulse. 25 *jugera* of pulse, are certainly more than sufficient for the maintenance of two oxen, all that were necessary for ploughing a farm of this extent. When Columella mentions 25 *jugera*, he certainly supposes that there were other cattle on the farm besides the labouring oxen. Let us suppose, however, that 20 *jugera* were necessary for this purpose, and that the remaining 5 were equal in value to 3 *jugera* of wheat. Upon these suppositions, the accompt stands thus.

43 <i>jugera</i> of wheat, at 5 <i>modii</i> , and 5 after	
one	1075
From this to be deducted	
Seed	215
Rent being 40 <i>sest.</i> to make which, at 12 <i>sest.</i>	
<i>per modius</i>	334
	<hr/>
	549
	<hr/>
Remains for expence of 100 <i>jugera</i>	526
Which gives for each <i>jugerum</i>	5.26

OF THE ANCIENTS. 109

for the *modius*, which may be considered as a middling price in the time of Varro, gives

52.465

To check this account, let us suppose a farm of this kind let to a politor. This is the kind of land in which he would receive a fifth. See chap. II.

The produce the same as before	-	2250
To be deducted		
The politor's share one fifth	-	450
Seed as before	-	225
Interest of stock, at 6 per cent.	57.6	
Repair of stock	-	42.4
		<hr/>
		100
		<hr/>
		775
		<hr/>
		14.75

The stock on such a farm may be valued in wheat, as follows.

2 oxen	-	220
2 ploughs	-	40
1 cart	-	125
1 crates, with rakes, hoes, &c.	-	25
Seed	-	275
Maintenance of oxen	-	275
		<hr/>
Value of rent	-	960
		The

52.465 *sest.* for a *jugerum*. In this view, it appears, that the rent of land in Italy had fallen

CON-

The interest of this sum, at 6 *per cent.* is 57.6, and one tenth of the first four articles, the only ones liable to decay, may be considered as sufficient to keep them in repair: This does not amount to 42.4, the quantity stated.

As a further check, let us suppose the farm, in the time of Columella, let to a *politor*. It cannot indeed be supposed, that land that produced so poor a crop could be let upon any of the terms mentioned by Cato. If he received the same quantity as in the other case, the account will stand thus.

Produce as before	-	-	-	1075
To be deducted				
The <i>politor's</i> share as before	-	-	-	450
Seed as before	-	-	-	215
Interest and repair of stock	-	-	-	100
				<hr/>
				765
				<hr/>
Rent nearly the same as before	-	-	-	310

Further to try the method taken to find out the rent of land in the time of Varro, let the expence already determined be used to find out the rent of the best kind of land, that produced fifteen after one. In a farm of this kind, 15 *jugera* may be considered as sufficient for the
 oxen,

OF THE ANCIENTS. 111

considerably from the time of Varro to the time of Columella. But this will appear still in a more

open, and the remaining 10 equal to 6 *jugera* of wheat. The account then stands thus:

46 <i>jugera</i> of wheat, at 5 <i>modii</i> , and 15 <i>af-</i>	
ter 1	3450
To be deducted	
Seed	230
Expence as before	526
	756
	26.94

Suppose this land let to a politor. In the best kind he sometimes got only $\frac{1}{7}$ by the basket: This, allowing $\frac{1}{10}$ for the expence of threshing and cleaning, is about $\frac{10}{77}$ by the *modius*. See ch. 11.: The account then stands thus.

Produce as before	3450
To be deducted	
$\frac{10}{77}$ to the politor	460
Seed as before	230
Interest and repair of stock	100
	790
Rent nearly as before	26.60
	All

more striking light, if we consider, that the value of money, from its great increase, had greatly fallen during that period. In comparing the rents of land in different times, the rent ought not to be expressed in money, the value of which is constantly changing, but in grain, which is always of the same value in affording nourishment to mankind. In this view, the fall of rents must appear most remarkable. In the time of Varro, the *jugerum* paid 14.99 *modii*; in the time of Columella only 3.34 *modii*, not a fourth part.

It has already been observed, that, in the time of Varro, the highest price given for wheat was at the rate of L. 1 : 0 : 8 $\frac{3}{4}$ for the quarter. This price must appear very small to every person who considers the riches which the Romans at that time were possessed of, and the luxury to which they arrived; both of which, in every nation, must have an effect upon the price of corn, as well as of other things.

The riches of the state appears from some account which we have of the treasury*. Paulus
Æmilius

All these things agreeing so nearly, afford an evidence, that the expence and rents stated cannot be far from the truth.

* There are so many various readings of the passages
in

There is a great difference between the crops mentioned by Varro, and this one mentioned by

accidisse.—Cum prata, et pascua, et fylvae se centenos sestertios in singula jugera efficiant, optime domino consulere videantur: Nam frumenta majore quidem parte Italiae quando cum quarto responderint, vix meminisse possumus; Col. lib. III. cap. III. I had occasion to cite this passage before, and observed, that some of the commentators are of opinion, that instead of *cum quarto responderint*, it should be *cum quarto decimo*. As an authority for this, they cite the passage in Varro that has been above mentioned: But a very little attention should have discovered to these learned gentlemen, that what Varro says, is no reason for amending this passage in Columella. For Varro, as appears from the passage itself, mentions a large crop on some particular lands; whereas, Columella mentions a small crop on the ordinary lands of Italy in general; and much smaller too than formerly upon the same lands. Besides, if we consider Columella's design in this passage, and his manner of expressing himself, it will appear plain, that lands in corn were not so valuable in his time to the proprietor, as meadows, pasture, and trees. But, upon the supposition that Columella asserts, that land in corn produces nearly at the rate of fourteen after one, the value of corn land would have been much greater than that of the other kinds mentioned; and much greater too than it appears to have been from the price that he puts upon the land for vine-

by Columella. Perhaps, indeed, the ordinary crops over the whole of Italy, in the time of Varro,

yards. A late translator of Columella supposes, that by *cum quarto*, his author meant the fourth part of the sum mentioned immediately before. I am not so well acquainted with the classics, as to determine whether this phrase *cum quarto responderint*, can properly be rendered *returned one fourth*: But, supposing that it may, yet it is probable, that this is not the meaning of it; for, in this case, the profit of corn land to the proprietor would have been no more than 25 *sestertii* by the *jugerum*, which is not much more than one-half of the yearly value, which Columella supposes, from the price he puts upon the land which he proposes to turn into a vineyard. That it was the kind of corn land he had mentioned, of which he gives the price, is very probable. It was not good meadows or pastures, for these produced 100 *sestertii* to the proprietor by the *jugerum*, and therefore may be justly supposed to have sold at near 2000 *sestertii*, which is double the sum that Columella states. Every other kind of land, except corn land, either is not fit for a vineyard, or would take great expence in preparing. It is certain, that the phrase may be very properly translated *four after one sown*: In this sense, not only Varro and Pliny, but Cicero also, use expressions of the same kind. ‘*Ut ex eodem semine ali-*
‘*ubi cum decimo redeat;*’ Var. lib. cap. XLIV.—‘*Cum*
‘*centesimo quidem et Leontini Siciliae campi fundunt;*’
Plin. Nat. Hist. lib. XVIII. cap. x. ‘*Medimnum autem*
‘*ex*

Varro, were not so great as he has represented; yet, when we consider, that, in some places, the crop was at the rate of fifteen after one, and that Varro seems to mention these crops as in the power of every farmer, we may well suppose that, even taking the bad land into the account, there would not be less than ten after one over Italy in general. On the other hand, though Columella, in the account he gives of the produce of the corn fields of Italy, is arguing for the superior value of vineyards; yet, as he asserts that he does not remember when they amounted to so much as four after one, we may reckon that they did not exceed this quantity. However, it must not be forgot, that he says, not over the whole of Italy, but over the greatest part of it; so that he must be considered as excepting Tuscany and Campania, the most fertile parts: Had he taken these into the account, he would probably have made the returns five after one, in place of four. However,

in

ex jugero decumano dari poterat, cum ager, id quod perraro evenit, cum decumo extulisset; Cic. or. in C. Verrem or. viii. If the phrase is taken in this sense, what Columella asserts, agrees perfectly well with the price which he puts upon this kind of land.

in this view of the matter, it must appear, that agriculture had greatly declined from the time of Varro to the time of Columella, and that the corn fields did not, in general, produce above the half of what they had done formerly. Even in the time of Varro, agriculture seems to have been much upon the decline; for he complains, that it was found necessary to bring corn from Africa and Sardinia; and wine from Choa and Chia; because the proprietors of land had crept within the walls of the city, and having abandoned the hook and plough, choosed rather to employ themselves in the theatre and circus, than in the corn fields and vineyards*. But, after his time, luxury increased still to a higher pitch; and agriculture was still more neglected. The great men of Rome, trusting to their revenues from the provinces, neglected the culture of their estates in Italy; in consequence of which, the husbandmen became idle and rapacious,

* Igitur quod nunc intra murum fere patres familiae correpserunt, relictis falce et aratro; et manus movere maluerunt in teatro et circo, quam in segetibus ac vineis, frumentum locamus, qui nobis advehat, qui saturi sumus ex Africa et Sardinia; et navibus vindemiam condimus ex insula Choa et Chia; Var. lib. ii. praef.

elous, and agriculture went to destruction: Or, perhaps, in want of money to answer the demands of luxury, raised all they could by oppression, without any regard to futurity; in consequence of which, the farmers would become both unwilling and incapable to cultivate their farms in a proper manner. To such a situation were things reduced, that Columella thought it necessary to begin his treatise, with proving that the earth had still the same principles of fertility as formerly, and that its barrenness was owing to the ignorance and negligence of those by whom it was cultivated. As this was the case, it is no wonder that the crops of corn were much worse in the time of Columella, than they had been in the time of Varro. And, if we consider that these bad crops would take the same expence to raise them that was taken by the good crops, on the same lands, it must appear, that there was a very remarkable decrease of corn in Italy, and, in consequence of this, the price raised to a great height.

But we have more positive evidence of the decline of agriculture in Italy, than the difference of the crops in the time of Varro and in the time of Columella: The younger Pliny, in

a passage already cited, informs us, that, in his time, from this cause, particularly an estate which he proposed to purchase, had fallen in its value from five million of *sesterces* to three. And, from the manner in which Pliny expresses himself, it appears, that this five million of *sesterces* was not an imaginary value arising from rents raised to an exorbitant height, but the value arising from a moderate and certain rent: So that the great falling of the price, was principally owing to the decline of agriculture*.

In these two periods, we have an account, not only of the produce of the corn lands, but also of the price of corn, and of some other things, which it is of importance to attend to, as they suggest some useful reflections. In the time of Varro, wheat was commonly sold from $2\frac{1}{2}$ to 4 *sestertii per modius*; which is from 12 s. $6\frac{1}{2}$ d to L. 1 : 0 : $8\frac{3}{4}$ per quarter. For this, we have the authority of Cicero, in his oration against Verres, which has already been mentioned:

‘ Have

* Calvino Rufo, lib. III. ep. XIX. The phrase used by Pliny, *communi temporis iniquitate*, certainly means bad management in agriculture, because he makes it the cause of there being worse crops, and, consequently, the land of less value.

‘Have not you,’ says he, ‘carelessly sold the
 ‘tenths, when they amounted to 15000 *modii*,
 ‘that is, to 37500 *sest.*? And the profit to the
 ‘collector amounted to 6800, which is, to
 ‘17000 *sest.*’ This is at the rate of $2\frac{1}{4}$ *sest.* for
 the *modius*. In another place, he says: ‘For
 ‘the *modius* is estimated by law at three *sest.*’
 And in another passage: ‘But I charge him
 ‘with this, that, when the *modius* in Sicily was
 ‘at two *sest.* as his letters sent to you declare,
 ‘and the highest price at three *sest.* as has al-
 ‘ready been clearly shown, both from the tes-
 ‘timony of all concerned, and also from the
 ‘records of the husbandmen, then he exacted
 ‘from them three *denarii* for each *modius**.’ In
 another passage, he mentions two kinds of corn
 at

* Itane dissolute decumas vendidisti, ut cum modium
 xv millibus venissent, medimnum M. M. M. hoc est H. S.
 xlv. lucri decumano darentur?—Est enim modius lege
 iii aestimatus.—Hoc reprehendo quod, cum in Sicilia
 ii modius esset, ut istius epistola ad te missa declarat, sum-
 mum ternis, id-quod ex testimoniis omnibus, et tabulis a-
 ratorum, planum factum antea est; tum iste pro tritici mo-
 diis singulis ternos ab aratoribus denarios exegit; Cic. or.
 in Verrem or. viii.

at different prices; the tithe corn at three *sest.* for the *modius*, and the *frumentum imperatum* at four *sest.* *.

In the time of Columella, at least in the time of Pliny, who wrote soon after him, the ordinary price of wheat was at 12 *sest.* for the *modius*; which is at the rate of L. 3 : 2 : $2\frac{1}{4}$ for the quarter, and of L. 1 : 11 : $9\frac{3}{4}$ for the boll.

In the time of Columella, we have likewise the price and rent of middling corn land. In his account of the expence of a vineyard, he states seven *jugera* at 7000 *sest.* which is 1000 *sest.* for one †. It was common in purchasing
land

* Ex fenatus-consulto, et ex lege Terentia, et Cassia frumentaria. Emundi duo genera fuerunt; unum alterarum decumarum; alterum quod praeterea civitatibus aequaliter esset distributum. Illius decumani tantum quantum ex primis decumis fuisset; hujus imperati tritici modii DCCC millia. Pretium autem constitutum decumano in modios singulos H. S. III.; imperato H. S. IIII.; Cicero, *ibid.*

† Col. lib. III. cap. III. That the land which Columella proposes to purchase for a vineyard, was arable land, has already been shown: That it was at least middling, is evident from the manner in which he treats the subject. He mentions, as one reason amongst others for vineyards not being profitable, that husbandmen were at

Æmilius having overcome Perseus, is said to have brought into it L. 1,916,666 : 13 : 4 *. Before the third Punic war, when Sextus Julius and Lucius Aurelius were consuls, there was in the treasury, of gold, 16,810 pound weight, equal to L. 455,971 : 5 : 0; of silver, 22,070 pound weight, equal to L. 59,864 : 17 : 6; and of coined money L. 52,378 : 6 : 8; in all L. 568,214 : 9 : 2 †. When Caesar first entered Rome, in the beginning of the civil war, he took out of the treasury 25,000 pound weight of gold, L. 678,125; of silver, 35,000 pound weight, L. 94,937 : 10 : 0; and of coined money, L. 333,333 : 6 : 8; which
 three

in which the Roman treasury is mentioned, that we cannot be absolutely certain of the particular sums. Those that are here cited, are explained according to the opinion of the best critics, and particularly Doctor Arbuthnot.

* Intulit Æmilius Paulus, Perseo victo, e Macedonica præda H. S. MCCC.; Plin. Nat. Hist. lib. XXXII. cap. XVII. Another copy has *ter millies*, which is L. 2,500,000. The sum must have been considerable to produce the effect attributed to it by Pliny, for he adds: 'A quo tempore populus Romanus tributum pendere desit.'

† Auri in aerario populi Romani fuere Sex. Julio, L. Aurelio cons. septem annis ante bellum Punicum tertium, pondo XVI. DCCCX. argenti XXII. LXX. et in numerato LXII. LXXXIV. CCCC.; Plin. id.

three fums amount to L. 1,106,395:16:8 *. Afterwards, he brought at once into the treasury, 6,500 talents, L. 12,593,750 †.

We will be able to form a more perfect idea of the riches of the Romans, by observing the estates of particular persons: Crassus had a landed estate valued at L. 1,666,666:13:4: The same person used to say, that no man could be reckoned rich who had not an annual income sufficient to pay a legion, which cannot be reckoned at less than L. 80,000 ‡. It would require indeed a great revenue to support an expence in every thing in proportion to such a number of servants: His house was valued at L. 50,000, and

* C. Caesar primo introitu urbis in civili bello, suo ex aerario protulit laterum aureorum xxv.m. argenteorum xxxv. et in numerato, n. s. cccc; Plin. Nat. Hist. lib. xxxiiii. cap. xviii.

† Plutarch in Caesare.

‡ Ex eadem gente M. Crassus negabat locupletem esse, nisi qui reditu annuo legionem tueri posset. In agris suis sestertium mm. possedit. A legion consisted of 5,500 infantry and 300 cavalry, reckoning every foot soldier at a *denarius* in the day, and each dragoon with his horse at three *denarii*, the pay of the private men would amount to L. 77,866:13:4; if this is added to the pay of the officers, the whole cannot be reckoned at less than L. 80,000.

and ten pillars in the front at L. 833:6:8*. It is said, that a private man, C. Caecilius Isidorus, after having lost much in the civil war, left by will effects that may be justly valued at L. 1,047,160 †. Demetrius, a libertus of Pompey, is said to have possessed 4,000 talents, L. 775,000.

* Cn. Domitius L. Crasso collegae suo altercatione orta objecit, quod columnas Hymettias in porticu domus haberet. Quem continuo Crassus, quanti ipse domum suam aestimaret, interrogavit. Atque ut respondit, sexagies sest.: Quanto ergo eam, inquit, minoris fore existimas, si decem arbusculas inde succidero: Ipso tricies sestertio, ait Domitius. Tunc Crassus: Uter igitur luxuriosior est? Egone, qui decem columnas centum millibus nummum emi; Val. Maximus, lib. ix. ex. 4:

† C. Caecilius Claudius Isidorus testamento suo edixit, quamvis multa civili bello perdidisset, tamen relinquere fervorum quatuor millia centum xvi.; juga boum tria millia sexcenta, reliqui pecoris cc. quinquaginta septem millia; in enumerato n. s. dc.; Plin. Nat. Hist. lib. xxxiii. cap. x.

4116 slaves may be valued at L. 60 each	L. 246960
3600 yoke of oxen, at L. 12 each	- 43200
257000 lesser cattle, at L. 1 each	- 257000
Money	- 500000
	<hr/>
	L. 1,047,160

L. 775,000 *. And Lentulus the augur no less L. 3,333,333 : 6 : 8. Cicero certainly possessed a very considerable estate; he acknowledges that he had in Asia L. 18,333 : 6 : 8 †; his town house was valued at L. 16,666 : 13 : 4; and his country house at L. 6,041 : 13 : 4; both greatly under-rated ‡. P. Clodius, who was slain by Milo, possessed a house for which he payed L. 123,333 : 6 : 8. No wonder that Pliny should represent this as a princely madness ||. Apicius was worth more than L. 916,671 : 13 : 4; for, after having spent in his kitchen, L. 833,333 : 6 : 8, and squandered away in rioting immense grants and pensions, he was at last obliged, by the pressure of his debts, to look into his affairs, and, finding that he had a reversion of
of

* Plutarch in Pompeio.

† Ad h. s. bis et vicies in cistophoro in Asia habeo; Cic. ep. ad Atticum, lib. 11.

‡ Nobis superficiem aedium Consules de consilii sententia aestimarunt h. s. vicies; Cic. ep. lib. 1v. ep. 11. Domum Rabirianam Neapoli, quam tu jam dimensam, et exaedificatam animo habebas, M. Fortinus emit h. s. ccccccxxx. lib. 1. ep. vi.

|| P. Clodius, quem Milo occidit, tertium centies et quadragies octies domo empta habitaverit: Quod equidem non secus, ac regum insaniam, miror; Plin. Nat. Hist. lib. xxxvi. cap. xv.

of no more than L. 83,333 : 6 : 8, he considered his being confined to this as no better than starving, and therefore put an end to his life by poison*.

The superfluous furniture belonging to M. Scaurus, that was burned at Tusculanum, was valued at L. 833,332 : 13 : 4 †; what a prodigious sum must his whole estate have been valued at?

Great gifts and bribes may be considered as signs of great riches. Caesar presented Servilia, the mother of Brutus, with a pearl valued at L. 50,000 †. Paulus the consul was bribed by
Caesar

* Cum festertium millies in culinam congefisset, cum tot congiaria principum, et ingens copitolii veftigal fingulis commiffationibus exorbiffet; aere alieno oppreffus, rationes fuas tunc primum coactus inſpexit, ſuper futurum ſibi feſtertium centies computavit; et velut in ultima fame victurus, ſi feſtertio centies vixiffet, veneno vitam finivit; Seneca, conſolat. ad Helvium.

† Sed et reliquus apparatus, tantus Attalica veſte, tabulis pictis, caeteroque choragio fuit, ut in Tuſculanam villam reportatis quae ſuperfluebant quotidiani uſus deliciis, incenſa villa ab iratis ſerviſ, concremaretur ad n. s. millies; Plin. Nat. Hiſt. lib. xxxvi. cap. xv.

‡ Ante alias dilexit M. Bruti matrem Serviliam; cui et proximo ſuo conſulatu ſexagies n. s. margaritam mercatus eſt; Suet. in Caefare, cap. 50.

Caesar with the sum of L. 58,333 : 6 : 8, and was afterwards brought over to his party by the sum of L. 300,000 *. Gabinius was accused of getting in all no less than L. 2,000,000. And the *ambitus* or price of each of the tribes, at the elections, at last amounted to L. 83,333 : 6 : 8 ; there were thirty-five tribes, so that the sum paid to the whole was no less than L. 2,916,666 : 13 : 4 ; suppose only a majority bought, the sum would amount to L. 1,500,000. This occasioned a great demand for money, which sometimes raised the interest from 4 to 8 *per cent*.

Great debts, as Doctor Arbuthnot observes, being the effect of great credit, are indications of great riches. Curio contracted a debt to the amount of L. 500,000 †. Before Caesar had been in any public office, he was in debt 1,300 talents, or L. 251,875 ; Crassus was his surety for 830 talents, or L. 160,812 : 10 : 0 ‡. Milo, already

* Plutarch in Caesare.

† *Consimilis mutatio in domum Curionum extitit: Siquidem forum nostrum et patris gravissimum supercilium, et filii sexcenties sestertium aeris alieni aspexit, contractum famosa injuria nobilium juvenum ; Val. Max. lib. ix. sect. 6.*

‡ Plutarch in Caesare.

already mentioned, contracted debts to the amount of L. 583,333 : 13 : 4; this indeed Pliny mentions as a thing most extraordinary *. Antony owed, at the Ides of March, the sum of L. 333,333 : 6 : 8, which he paid before the Kalends of April †.

Great sums given for shows and entertainments, and high prices given for things the value of which depends entirely on taste, are likewise marks of great riches, as well as of great luxury. Lucullus's suppers in the Apollo amounted to L. 1,666 : 13 : 4 †. Horace makes honourable mention of one Tigellius a singer, who could spend L. 8,333 : 6 : 8 in five days ‖. But, what is still more extraordinary, a son of Æsop the tragedian was pleased to swallow, at one

* Milonem sestertium septingenties aeris alieni debuisse, inter prodigia animi humani duco; Plin. Nat. Hist. lib. xxxvi. cap. xv.

† Quadringenties n. s. quod Idibus Martiis Antonius debebat, ante Calendas Aprilis debere desit; Cicer. phil. secundo.

‡ Plutarch in Lucul.

‖ ———Decies centena dedisses

Huic parco paucis contento, quinque diebus

Nil erit in loculis.

Hor. Satir. lib. 1. sat. III.

one draught, to the value of this sum*. The same gentleman used to buy singing birds, at a great price, to increase the expence of his suppers †. Fat birds, such as thrushes, black birds, &c. were sold at 2 s. and sometimes 5,000 of them were sold in a year from one farm ‡. Peafowls were sold at L. 1 : 13 : 4; an egg was sold at 3 s. 4 d. : A farm sometimes produced as many of these fowls as to sell at L. 500 ||. A pair of fine doves were commonly sold at the same

* Filius Æsopi detractam ex aure Metellae
(Scilicet ut decies solidum exforberet) aceto
Diluit insignem baccam.

Hor. Sat. lib. ii. sat. iii.

† Huic nimirum magis Æsopus tragicus in adoptionem dare filium suum, quam bonorum suorum haereditatem relinquere debuit; non solum perditae, sed etiam furiosae luxuriae juvenem. Quem constat cantu commendabiles aviculas immanibus emptas pretiis, in coena pro ficedulis ponere; Val. Max. lib. ix. sec. 2.

‡ Atque in hac villa qui est ornithon, ex eo uno quinque millia scio venisse turdorum denariis ternis; Var. lib. iii. cap. ii.

|| De pavonibus nostra memoria, inquit, greges haberi coepti, et venire magno. Ex iis M. Aufidius Lurco supra sexagena millia a nummum in anno dicitur capere. — Ita ut ova eorum denariis veneant quinque, ipsi facile quinquagenis; Var. lib. iii. cap. vi.

same price with a peacock, L. 1 : 13 : 4: If very pretty, they were much higher in the price, no less than L. 8 : 6 : 8. L. Anius, a Roman knight, refused to sell a pair under L. 13 : 6 : 8 *. Some kinds of fishes were very highly valued among the Romans in the time of Varro. Hortensius, whom Varro used frequently to visit, would sooner have parted with a pair of his best coach-mules than with a bearded mullus †. Herrius's fish-ponds, on account of the quantity of fish, were sold for L. 33,333 : 6 : 8 ‡: Lucullus's likewise at the same price ||.

Purple cloth seems to have been very high priced. A pound of wool of the Tyrian double die

* Parentes eorum Romae, si sunt formosi, bono colore, integri, boni feminis, paria singula vulgo veneunt ducentis numis, nec non eximia singulis millibus numum, quas nuper mercator tanti emere vellet a L. Axio equite Rom. minoris quadringentis denariis daturum negavit; Var. lib. iii. cap. vii.

† Celerius voluntate Hortensii ex equili educeres rhedarias, ut tibi haberes, mulas, quam e piscina barbatum mullum; Var. lib. iii. cap. xvii.

‡ Hujus villam intra quam modicum quadragies piscinae vendiderunt; Plin. Nat. Hist. lib. ix. cap. lv.

|| Quadragies n. s. piscinae a defuncto illo veniere pisces; id. lib. ix. cap. liv.

die was fold for L. 33 : 6 : 8. Some wore gowns of this; and carpets of it, for covering the couches upon which they reclined at table, were very common*. At Babylon, these were wrought into pictures of various colours; and, when brought to Rome, were fold for L. 6666 : 13 : 4 †.

Learned slaves fold at a very great price. Calvinus Labinus, imagining that he could gain the character of a learned man by having a learned equipage, purchased several of these, none of them under L. 833 : 13 : 4 †.—Stage-players, however, fold at a much higher rate.

No

* Huic successit dibaplia Tyria, quae in libras denariis mille non poterat emi. Hac P. Lentulus Spinther Aedilis Curulis primus in praetexta usus improbabatur: Qua purpura, quis non jam, inquit, tricliniaria facit? Plin. lib. ix. cap. xxxix.

† Colores diversos picturae intexere Babilon maxime celebravit, et nomen imposuit.—Metellus Scipio tricliniaria Babylonica sestertium octingentis millibus venisse jam tunc, posuit in Catonis criminibus; Plin lib. viii. cap. xlviii.

‡ Ut grammaticos haberet analectas cum dixisset Sabinus, centenis millibus sibi constare singulos servos; Seneca, ep. xxvii. ad Lucilium.

No wonder; for Roscius gained annually no less than L. 4,166 : 13 : 4*.

I have had occasion already to mention the price and rent of land, which were far from being high when compared with these in modern times; but, as a mark of great riches and luxury, ground within the city of Rome sold at a most extravagant rate. The ground upon which Caesar built his Forum cost, according to Suetonius, L. 833,333 : 13 : 4 †. Doctor Arbuthnot is of opinion, that, of this ground, there were not above five acres ‡; so that it cost at the rate of L. 166,666 : 13 : 4 for the acre, which, at 4 per cent. makes an yearly rent of L. 6,666 : 13 : 4.

From these it appears, that the Romans were richer, and had arrived at a higher degree of luxury, than any nation at present in Europe.

There

* Quippe cum jam apud majores Roscius histrio H. S. D. annua meritaſſe prodatur; Plin. Nat. Hiſt. lib. VII. cap. XXXIX.

† Forum de manubiis inchoavit: Cujus area super H. S. millies conſtitit; Suet. in Caefare.

‡ And indeed, comparing it with *Nero's Forum*, it could not take up two acres, but allowing it five; Arbuth. Tables; Diſſertation of Roman money affairs, ch. VIII.

There is, indeed, a distinction properly made betwixt absolute and relative riches. The absolute riches of any state consists in the quantity of money and commodities belonging to it : the relative riches, in the proportion of these to the number of inhabitants. Although Rome, in the first sense, was no doubt richer than any city in Europe, yet it is doubted by some, whether it was so in the second. The large sums in the treasury, and the great estates of individuals, are evidences only of the absolute riches of Rome : For, although there might be a small proportion to the number of citizens, yet, as its empire was large, and the revenues great, large sums would be brought into the treasury, and some persons have opportunity of acquiring large estates. But, then, the great variety and value of the commodities possessed by the Roman citizens, and particularly of the means of luxury ; the high prices of these, and the fortunes acquired by singers and players, with the high rate of interest ; are evidences of the relative as well as the absolute riches of that city.

Considering, then, that Rome, in the time of Varro, greatly exceeds Britain at present in
riches

riches and luxury, it must appear surprising, that the price of corn was much lower, not one-fourth part of the present prices. It may not be improper to inquire into the cause of this, as a matter of very great importance.

There are two things that seem to have had great influence in preventing the price of corn from rising to a great height—the attention given by the Romans to agriculture, and the nature of their luxury.

Varro, indeed, asserts that country affairs were much more neglected in his time than in former times: However, farming continued still to be a respectable business. The proprietors of land, from their education, were capable of giving proper direction in all the branches of agriculture, and were also proper judges of all rustic labour: Hence it was that the crops in Italy, as has already been observed, continued to be good. Besides, it is natural to suppose, that very essential improvements would be introduced into the provinces, by persons so well acquainted with husbandry; and that many of the provinces, having little trade and few manufactures to exhaust the produce of the lands,

would

would annually afford large quantities of corn for the supply of the inhabitants of Rome.

As the attention given by the Romans to agriculture raised plenty of corn both in Italy and the provinces, so the nature of their luxury prevented, in some measure, both the decrease of the quantity, and the increase of the demand. In modern times, luxury both lessens the quantity of corn, and increases the demand. Among other things, it consists in the consumpt of animal food, and in the increase of horses. The consumpt of animal food prevents the culture of corn, and the increase of horses increases the demand for it; and it is by these, as well as by the increase of riches and currency, that the price of corn in modern times has been greatly raised. Animal food seems not to have been so generally used by the Romans as in Britain. The luxury of their tables consisted chiefly of dishes of rare birds and fishes, reared and purchased at great expence, by which the culture of corn was but little discouraged, and its consumpt little increased. But there is not any thing in which the modern luxury in Britain differs more from the luxury of the Romans, than

than in the number of horses used. The Romans seem to have had few horses of any kind. Their cavalry were far from being so numerous, in proportion to their infantry, as they are in modern times. In the account which we have of the effects of any person, neither horses nor mules are mentioned; which would have been done, had there been many of them. The labour amongst them was performed by oxen, which are maintained at much less expence than horses; and the quantity of them bred naturally kept low the price of beef, the only kind of animal food used by the common people.

Soon after the time of Varro, the price of corn seems to have been greatly raised. From his time to the time of Pliny, which was about 70 years, corn rose from $2\frac{1}{2}$ and 3 *sestertii* for the *modius*, to 12 and upwards. In no country in Europe has the price of corn been raised near so much in so short time.

In Scotland, wheat, more than 150 years ago, was valued at 12s. 6d. for the boll*. This, according

* The commission appointed by the Parliament of Scotland for the plantation of Kirks, &c. in the years
1617

according to the weight of the money at that time, is nearly at the rate of 14 s. 5 d. *. But this valuation, at 12 s. 6 d. was either too low, or the price must have been considerably raised not many years after. The Parliament, in the acts relating to the exportation of corn, must be supposed to have determined exactly according to the prices; and not to have encouraged, or even allowed exportation, when corn was at a high

1617 and 1621, valued corn, when there were equal quantities of wheat, barley, and oats, at L. 100 Scots the chalders; which, in the proportion that the prices of these different kinds of grain bore to each, is in sterling money as follows: Wheat at 12 s. 6 d. barley at 10 s. 6 d. and oats at 8 s. 4 d. for the boll.

* In the 1597, it is enacted, that the ounce of silver, 11 pennie fine, shall stand at 50 s. Scots; Jam. VI. Par. xv. act 253. At present, the silver coin is at the rate of 11 oz. 2 dwt. fine silver, and 18 dwt. Alloy in the pound. If the silver current in the year 1597, had been in the same proportion of fine silver to Alloy, the ounce, at the rate mentioned in the act of Parliament, would have been equal to $55\frac{1}{2}$ s. Scots. An ounce of coined silver at present is equal to 64 s. so that $55\frac{1}{2}$ s. in the 1597, is of the same value with 64 s. at present. In this proportion, 12 s. 6 d. Sterling, the price of a boll of wheat at that time, is at the rate of 14 s. 5 d. of our present money.

high price. In 1663, wheat was allowed to be exported when at or under 20 s. the boll; and barley when at or under 13 s. 4 d. *. In 1669, for the further encouragement of exportation, all the duties formerly paid were taken off †. And in 1695, a bounty, at the rate of $6\frac{2}{3}$ d. *per* boll, was appointed to be given for all corn exported, when at or under the same prices ‡. When exportation, then, was not only allowed, but also encouraged at these prices, it cannot be supposed, that, at that time, they were reckoned very high.

The price of wheat, when at L. 2 : 10 : 0 *per* quarter, in England, or at L. 1 : 3 : 0 *per* boll in Scotland, is at present reckoned high.

It must be observed, however, that, in the beginning of this century, some years after the bounty was given for exportation, the prices of corn fell considerably, and continued low, at an average, till about the year 1706.

The

* Char. II. Par. 1. Sess. 3. act 12.

† Char. II. Par. 11. Sess. 1. act 14.

‡ Will. III. Par. 1. Sess. 5. act 32.

The falling of the prices in the beginning of this century, was certainly owing to the encouragement, which, by the bounty on exportation, was given to agriculture; and it seems to be no less certain, that the sudden and rapid change made in the situation of the country, and manners of the people, has been the occasion of the great rise of prices in late years. This rise, though it appears to be considerable, is however but trifling, when compared with the rise in Rome, from the time of Varro to the time of Pliny: The rise of the price of corn among the Romans, in that period, seems to have been owing, not so much to the increase of riches and luxury, as to the decline of agriculture; which, as has already been observed, was very remarkable. As the encouragement given in Britain to agriculture, by the bounty on exportation, lowered the price soon after it commenced, so the improvements made in many counties of late years, have prevented the prices from rising to the height, that the increase of trade, luxury, currency, and taxes, and the other changes in the situation of the country, and
manners

manners of the people, would otherwise have produced. In every county there is still room for further improvements, in many they are scarcely begun. While farmers are in an independent flourishing condition, it may be expected, that real improvements will be further extended: But, when rents are raised to such a height, as to distress and discourage the farmer; when landholders, in consequence of this, farm large tracts of land themselves, then Britain will teach posterity, as the Roman state teaches the present age, this important lesson: *That agriculture declines as well as other arts; and that this must happen whenever it falls into the hands of persons who either, from their education, cannot acquire a proper knowledge of it, or, from their station, cannot give proper attention to it; that, in consequence of this, the price of provisions must rise, and continue high, till such time as the decline of trade and manufactures, and the decrease of riches, reduce the demand so low, as to be fully answered by the scanty crops produced.*

All are agreed, that the grain which we call wheat, is the *triticum* of the Romans: But it is
not

not so certain what is the modern grain which they called *far*: There is a kind very common in Germany, called *spelt*, that seems to have the nearest resemblance to it*.

Colu-

* Some of the commentators on Pliny alledge, that the chief distinction between *far* and *triticum* consists in this, that the ear of the *far* is bearded, and that the ear of the *triticum* is smooth. Pliny, treating of corn, says: ‘Vulgatissima, far, quod adonum veteres appellavere, figo, triticum’ Dalechampius, on this passage, says: ‘Haec peritiores sic distinguunt, triticum mutica spica est; adonum sive far, aristata.’ These are thus distinguished by the skilful; ‘The *triticum* has a smooth ear, and the *far* a bearded one.’ Pliny, in another passage, says: ‘Far sine arista est.’ Upon this passage, the same commentator thus expresses himself: ‘In Ægypto, non alibi; in Italia triticum muticum est, far aristas habet. — In Egypt, no where else. In Italy the *triticum* is bare, and the *far* has beards;’ See notes on Plin. Nat. Hist. cap. viii. and x. Had this learned gentleman, and the skilful persons he mentions, been a little more attentive, they would have observed passages, from which it appears, that there were in Italy kinds both of *far* and *triticum* that are bearded. Varro says: ‘The ear of barley or *triticum*, which is not mutilated, has these three parts,

Columella mentions three kinds of *triticum*; the best he calls *robus*, which, he says, excelled the

‘ parts, the grain, the husk, and the beard; and likewise,
 ‘ when the ear first appears, it has a hofe. That which
 ‘ is the inner solid part is called the grain, the case that in-
 ‘ closes the grain is called the husk, and that which, like
 ‘ a long small needle, is stretched out from the husk, is
 ‘ called beard: So that the husk is the case of the grain,
 ‘ and the beard is the crown.—Spica ea, quae mutilata
 ‘ non est, in ordeo, et tritico, tria habet continentia, gra-
 ‘ num, glumam, ariftam; et etiam primitus spica cum o-
 ‘ ritur, vaginam. Granum dictum, quod est intimum fo-
 ‘ lidum; gluma, qui est folliculus ejus. Arifta, quae ut
 ‘ acus tenuis longa eminet e gluma. Proinde ut grani
 ‘ theca fit gluma; et apex arifta;’ Var. lib. i. cap. XLVIII.
 To this, that Varro may not appear to stand single, I shall
 add a passage from Pliny: ‘ The fruit,’ says he, ‘ of all
 ‘ the things we sow, is either contained in ears, and forti-
 ‘ fied with a quadruple rampart of beards, as the fruit of
 ‘ the *triticum* and *hordeum* is;’ or, &c.—Omnium fato-
 ‘ rum fructus, aut spicis continetur, ut tritici, hordei; mu-
 ‘ niturque vallo ariftarum quadruplici;’ Plin. Nat. Hist.
 lib. xviii. cap. vii. From these passages, it is evident,
 that the *triticum* is bearded, at least that some kinds of it
 are so. That *far* is bearded likewise, appears from ano-
 ther passage in Pliny: ‘ It is proper,’ says he, ‘ that *far*,
 ‘ because

the others, both in weight and brightness: The second he calls *filigo*, which he says is deficient in

‘ because it is bruised out with difficulty, should be laid
 ‘ up with its *palea*, and is freed only from the straw and
 ‘ beards.—Far, quia difficulter excutitur, convenit cum
 ‘ palea sua condi; et stipula tantum, et arstis liberatur;’
 Plin. Nat. Hist. lib. xviii. cap. xxx.

As it is evident from these passages, that the difference between *far* and *triticum* does not consist in the one being bearded and the other smooth, it may not be amiss to inquire, whether there is a near resemblance between the ancient *far* and modern *spelt*.

M. Lullin de Chateauvieux made use of spelt in one of his experiments, and thus describes it: ‘ Birds having
 ‘ made great havock in the preceding years upon the
 ‘ wheat sown on this field; to prevent this accident, I
 ‘ sowed it with another species of grain called spelt (*e-*
 ‘ *pautre*) which, in many places, is used instead of wheat:
 ‘ It is a grain very commonly sown in Germany. The
 ‘ spelt which I sowed is, however, of a species a little dif-
 ‘ ferent. Both kinds have the grain shut up in double
 ‘ cases very thick; the outer one is not easily opened,
 ‘ so that birds cannot easily get at the grain.—Les
 ‘ oiseaux avoient fait les années precedentes beaucoup de
 ‘ degâts au froment que j’avois semé dans ce même ter-
 ‘ rein; en sorte que pour éviter cet accident, j’y semai
 ‘ une

in weight: The third kind he says is a spring wheat, of the nature of the *siligo*; he adds, that
it

‘ une autre espece de grain appellé epautre, qui tient lieu
‘ de bled en plusieurs endroits: C’est un grain que l’on
‘ semé assez généralement en Allemagne. L’epautre que
‘ je femai est d’une espece un peu différente. L’une et
‘ l’autre ont le grain renfermé dans des capsules doubles
‘ tres epaisses, et dont l’extérieure ne s’ouvre pas aisément,
‘ de sorte que les oiseaux n’en peuvent pas faire sortir le
‘ grain;’ Cult. des Terres par M. Duhamel, T. iv. p.
294.

This kind of grain is likewise mentioned by Crescenzio and Vincenzo Tanara. Crescenzio says: ‘ Spelt is well
‘ known: There are different kinds of it; one is heavier
‘ and better, another is lighter and worse.—It is sown in
‘ the same seasons with wheat, and in the same manner;
‘ but two baskets are sown on the *jugerum*, whereas one
‘ of wheat is sufficient.—*Spelta nota est ejus quidem*
‘ *diversitates sunt: Quia quaedam est gravior, et haec me-*
‘ *lior; quaedam vero levior, et haec deterior est.—Et his*
‘ *temporibus feritur quibus frumentum, et eodem modo;*
‘ *sed duae corbes in jugerum feruntur, cum ex frumento*
‘ *corbis una sufficiat;’* Cres. lib. III. cap. de Spelta. Vin-
cenzio Tanaro says; ‘ It is the *zea* of the Greeks.—When
‘ sown, a double quantity of seed is required, because, be-
‘ ing covered with many coats, it quickly fills the hand
‘ and

it is very useful to the farmer, when, by any accident, he is prevented from sowing in the autumn.

‘and measure with its grossness, though there are few grains.’

La spelta chiamata ancor zea, come fu’ detto
Speltam Romani, zeam dixere pelafgi
Cui tribuunt primos hordea farque gradus.

‘Sicome vuole il doppio peu sementa, perche essendo coperta di molte toniche, empio il pugno presto, e con la grossezza la misura ma con pochi grani;’ Vin. Tan. lib. vi. p. 473.

Both these authors treat likewise of *farro*. Crescenzio says, ‘It resembles spelt, but grosser in the blade and grain; it is sown in the same season with *tritium* and spelt, and one basket is sufficient for a *jugerum*.—Farro est simile speltae; sed est grossior in herba et grano; feritur tempore tritici et speltae, et corbis una jugerum complet;’ Cres. lib. iii. cap. de Farre. Vincenzo Tanara says: ‘Our rustics know three kinds, called *farro*, *farrone*, and *farriola*. *Farro* is commonly given to horses and work cattle in the blade, on account of its grossness.’ After mentioning the uses made of the other kinds in the kitchen, he adds: ‘The gross kind, grinded into flour, makes very good bread, more used indeed by the Romans than by us; and, because it was necessary to pound it, to make it part from the husk, in which it is produced

tumn. The other kinds, he tells us, are not profitable; and are cultivated only by those who

‘ produced and preserved, and because the bakers were
 ‘ the persons that pounded it, hence they were called in
 ‘ the Latin language *pistores*. *Far* was called *adoreum*, be-
 ‘ cause, with this grain the ancients sacrificed to their i-
 ‘ dols.—Lo conoscono di tre specie i nostri rustici farro,
 ‘ farrone, fariola. Farro per lo piu si data cavalli, e
 ‘ giumenti in biada per la suo grossezza—del farro grosso
 ‘ ancora ridotto in farina sene fa affai buon pane, costima-
 ‘ to affai piu da Romani, che da noi, e per che bisognava
 ‘ peotarlo per farlo uscire da quelle spolie evenasce, e si
 ‘ conserva; e per che quelli, che pestavano erono i for-
 ‘ nari percio furono chiamati *pistores* in Latino. Chia-
 ‘ masi il farro *adoreum* per che con questa biada gli antichi
 ‘ sacrificavano a loro idoli;’ Vin. Tan. lib. vi. p. 442.
 It appears from these passages, that, in Italy, in the time
 of Crescenzo and Vincenzo Tanara, *far* and spelt were
 reckoned of the same kind of grain, and that all the dif-
 ference consisted in this, that *far* had a grosser grain and
 blade, and more easily parted from the husk, so as to be
 sown without it. It is probable, that they are the two
 sorts of spelt mentioned by M. Lullin, and which he says
 were somewhat different the one from the other.

It is probable, that *far* was the general name given by
 the Romans to grain of a particular class, and that *zea*,
alica, *tiphe*, &c. were names given to the different species
 of this; perhaps some of them in different countries to

who value themselves upon having a great variety.

C H A P.

the same kind of grain : Pliny frequently mentions these, sometimes he represents *far* and *zea* as different ; and sometimes he gives the names of *far*, *alica*, and *zea*, to the same grain : ‘ The kinds of corn,’ says he, ‘ are not ‘ the same every where ; neither where they are the same ‘ have they the same names. The most common are *far*, ‘ which the ancients called *adoreum*, *filigo*, and *triticum* : ‘ These are common to very many countries : *Arinca* pro- ‘ perly belongs to Gaul, though there is also plenty of it ‘ in Italy ; *zea*, *olyra*, *tiphe*, are peculiar to Egypt, Syria, ‘ Cilicia, Asia, and Greece. In Egypt they make flour ‘ of their own *triticum*, but much inferior to that which ‘ is made in Italy. Those who use *zea* in this manner, ‘ have no *far*.—Frumenti genera non eadem ubique : ‘ Nec, ubi eadem sunt, iisdem nominibus. Vulgatif- ‘ sima *far*, quod *adoreum* veteres appellavere, *filigo*, tri- ‘ ticum. Haec plurimis terris communia. *Arinca* Gal- ‘ liarum propria, copiosa et Italiae est. Ægypto autem ‘ ac Syriae, Ciliciaeque et Asiae, ac Graeciae peculiare, ‘ *zea*, *olyra*, *tiphe*. Ægyptus similaginem conficit e triti- ‘ co suo, nequaquam Italiae parem. Qui *zea* utuntur, ‘ non habent *far* ;’ Plin. Nat. Hist. lib. xviii. cap. viii.

In this passage, Pliny represents *zea* and *far* as different ; but, in another, he gives both names to the same grain : ‘ Let us describe,’ says he, ‘ the manner of making *alica*, ‘ the most excellent and wholesome food : This, the best ‘ of

' of all corn, belongs without doubt to Italy. It is raised
 ' indeed likewise in Egypt, but truly despicable. In Ita-
 ' ly we have it in many places, as in the lands about Ve-
 ' rona and Pisa, but the best kind in Campania.' Then
 follows the description of that remarkable field in Cam-
 pania, which has already been taken notice of. (See chap.
 vi.) In giving an account of the crops that this field
 was in use to carry, he says: ' It is sown every year,
 ' once with panic, and twice with *far*.' Now, one of the
 crops of *far* was certainly the *alica*, which he had said
 he was going to describe, and of which the best kind was
 produced in Campania: After finishing his description of
 this field, he adds, or it may be said rather, returns to
 his subject, and says: '*Alica* is made of *zea*, which we
 ' have called *semen*. The grain is bruised in a wooden
 ' mortar, &c.—Sed inter prima dicatur et alicae ratio,
 ' praestantissimae saluberrimaeque: Quae palma frugum
 ' indubitata Italiam contingit. Fit sine dubio et in
 ' Aegypto, sed admodum spernenda. In Italia vero plu-
 ' ribus locis, sicut Veronensi Pisanoque agro; in Cam-
 ' pania tamen laudatissima. Campus est—Scribitur toto
 ' anno, panico semel, bis farre.—Alica fit e zea, quam
 ' semen appellavimus. Tunditur granum ejus in pila lig-
 ' nea,' &c.; Plin. Nat. Hist. lib. xviii. cap. xi. *Alica*,
 properly speaking, was a kind of flour, as appears from
 the description which Pliny gives of the way of making
 it. However, this name is also given to the grain of
 which it was made. Thus Pliny mentions *alica* amongst
 the spring corn: ' Some,' says he, ' call these spring corn,
 ' millet, panic, lens, cicer, and *alica*.—Aliqui verna, mi-
 ' lium,

‘lium, panicum, lentem, cicer, alicam appellant;’ id. lib. xviii. cap. vii. It appears from these passages, that the same kind of grain is called by Pliny sometimes *alica*, sometimes *zea*, and even sometimes *far*. It is probable, that the particular grain which he had in view, is the kind of *far* which Columella calls *alicastrum* or *halicastrum*; for, besides the name, which seems to be derived from *alica*, it may be observed, that this kind of *far* is called *semen* by Columella, as the *zea*, according to Pliny, was called in Campania. It may be observed likewise, that, as Pliny asserts that the *alica* is a spring corn, and the most excellent of all others, so Columella gives this very account of the *alicastrum*; he calls it a trimestrian corn, and says that it excels all others both in weight and goodness. ‘Adorei autem plerumque vidimus in usu genera quatuor.—Semen trimestre, quod dicitur halicastrum, idque pondere, et bonitate est praecipuum;’ Col. lib. ii. cap. vi.

As the *alica* and *zea* then of the ancients, were reckoned of the same class with *far*; and, as Vincenzo Tanara says, that the modern spelt is the same with the ancient *zea*, we may conclude, that the several kinds of spelt, at present cultivated, belong also to the same class, tho’ Crescenzio and Vincenzo Tanara treat of *far* and spelt as different: And if there is a kind of this grain, that is grosser than the others, produces grosser leaves, and more easily parts from the husk, there can be no doubt that this is the kind called *far* by these Italian authors, and also by Palladius.

C H A P. XXIX.

Of the Culture of Triticum and Far.

WHEAT is the principal grain cultivated in modern times; but, with greater propriety, it may be said to have been the principal grain cultivated by the Romans. Almost all the other things raised in their corn fields had a relation to the culture of wheat, and were designed for food to the labourers and labouring cattle.

The rustic writers mention two kinds of wheat; the one was called *triticum*, and the other *semen adonum*, or *far*. I do not observe, in the description of the several kinds of wheat sown in Britain, any kind that answers the description given of the Roman *far*. There are several things mentioned, by which it was distinguished from the *triticum*; particularly, we may observe, that the *triticum*, like our wheat, was separated
in

in threshing from the husk or chaff; but that this stuck so close to the *far*, that it was not separated in threshing, but was sown along with it. Columella gives this as a reason why *far* was reckoned more proper for wet land than *triticum*. Treating of wet land, he says, ‘Up-
 ‘ on such kind of land it is better to sow *adoreum*
 ‘ *reum* than *triticum*; because it has a strong
 ‘ and durable husk, by which it is secured a-
 ‘ gainst a long-continued moisture*.’ Pliny
 says expressly, that *far* was sown with the husk.
 ‘ In the *area*,’ says he, ‘ *triticum* and *filigo* and
 ‘ *hordeum* are separated from the chaff, so are
 ‘ sown quite clean as when grinded, because
 ‘ they are not toasted. On the contrary, *far*,
 ‘ millet, and panic cannot be thoroughly clean-
 ‘ ed, unless they are toasted; therefore they are
 ‘ sown rough with their husks: And *far*, that is
 ‘ intended for feed, is preserved in its chaff, and
 ‘ not toasted †.’ It was for this reason that a
 larger

* Magis apte tamen in ejusmodi agris adoreum, quam triticum, feritur: quoniam folliculum, quo continetur, firmum et durabilem adversus longioris temporis humorem habet; Col. lib. ii. cap. viii.

† In area exteruntur triticum, et filigo, et hordeum.

Sic

larger quantity of *far* was sown upon a field than of *triticum*. This almost all the rustic writers mention. ‘There are,’ says Varro, ‘sown upon a *jugerum*, four *modii* of beans, five of *triticum*, six of barley, and ten of *far**.’ ‘When land is rich,’ says Columella, ‘a *jugerum* requires four *modii* of *triticum*; when middling, it requires five: But, of *adoreum*, a *jugerum* of the first kind requires nine *modii*; of the last, ten †.’ ‘It is proper,’ says Pliny, ‘to sow upon a *jugerum* five *modii* of *triticum* or *siligo*, ten of *far* or *semen* ‡.’ Palladius, indeed, says, that the same quantity of both

kinds

Sic et feruntur pura, qualiter moluntur, quia tosta non sunt. E diverso far, milium, panicum purgari, nisi tosta, non sunt;—itaque haec cum suis folliculis feruntur cruda. Et far in vaginulis suis servant ad fatus, atque non torrent; Plin. Nat. Hist. lib. xviii. cap. vii.

* Seruntur fabae modii iiii in jugero, tritici v, ordei vi, farris x; Var. lib. i. cap. xliv.

† Jugerum agri pinguis plerumque modios tritici quatuor, mediocris quinque postulat: adorei modios novem, si est laetum solum; si mediocre, decem desiderat; Col. lib. ii. cap. ix.

‡ Serere in jugera temperato solo justum est tritici aut filiginis modios v. farris, aut seminis x; Plin. Nat. Hist. lib. xviii. cap. xxiv.

kinds was sown upon the *jugerum*. 'We sow,' says he, 'upon a *jugerum* of middling land five *modii* of *triticum*, and as many of *adoreum*.' In another place, he says, 'In the month of November we sow *triticum* and *far* in the proper quantities, and ordinary seed-time. Five *modii* of either are sufficient for a *jugerum* *.' But what is here said by Palladius may be considered as a confirmation of what has been observed with respect to the difference betwixt the *far* and *triticum*. Before his time, it is probable that some easier method than had been used in the time of Pliny was found out for separating *far* from the husk or chaff; and that it was become the custom to sow it pure, as the *triticum* was sown. This is the more probable, as we find that Crescenzio, who treats of *far* as cultivated

* In mediocris agri jugero v tritici modios, et adorei totidem conferemus; Pal. lib. x. tit. III. In some copies, the words *et adorei totidem* are omitted: This some consider as the true reading. But, if the matter is to be determined by a parallel passage, the ordinary reading is certainly the true one; for in this author we find the following passage: 'Novembri mense triticum seremus et far, satione legitima, ac semente solenni. Jugerum utriusque seminis modis quinque tenebitur;' Pal. lib. XII. tit. I.

cultivated in Italy in his time, directs that the same quantity of it be sown on the *jugerum* as was sown of *triticum*. When treating of *frumentum*, which word he seems to confine to the *triticum*, he says, ‘One basket of seed is sufficient for a *jugerum* ;’ and, when treating of *far*, expresses himself in the same manner *.

Pliny mentions some other things, in which the *far* and *triticum* differ the one from the other. He says, that *far* has six knobs in the ‘stalk, and *triticum* only four †.’ He likewise observes, that *far* is the hardiest of all grain, and best stands the winter ; that it does well enough on the coldest and least reduced soils, as also on the warm and dry ; that it was the food of the Romans in the first ages, as is evident from its being used in the religious rites ‡. On the other hand, he says that the *triticum* re-

quires

* In jugero fementis corbis una sufficiet ; Cref. lib. III. De Frumento.

Corbis una jugerum complet ; Cref. lib. III. De Farre.

† Genicula autem sunt tritico quaterna, farri sena, hordeo octona ; Plin. Nat. Hist. lib. XVIII. cap. VII.

‡ Ex omni genere durissimum far, et contra hyemes firmissimum ; patitur frigidissimos locos, et minus subactos,

quires most nourishment of any grain * : But, to balance this, he represents it as the most fruitful of all; and of this gives some instances, which have already been mentioned †.

Some of the commentators on Pliny alledge, that the chief distinction betwixt *far* and *triticum* consists in this, that the ear of the *far* is bearded, and that the ear of the *triticum* is smooth. Pliny, treating of corn, says, ‘Vulgarissima far, quod adorum veteres appellaverunt, filigo, triticum.’ Dalechampius, on this passage, says, ‘Haec peritiores sic distinguunt, triticum mutica spica est; adorum, sive far, aristata;—these are thus distinguished by the skilful; the *triticum* has a smooth ear, and the *far* a bearded one.’ Pliny, in another passage, says, ‘Far sine arista est.’ Upon this passage, the same commentator thus expresses himself:

‘ In

vel aestuosos, sitientesque. Primus antiquis Latio cibus, magno argumento in adorum donis, sicuti diximus; Plin. Nat. Hist. lib. xviii. cap. viii.

* Tritici femine avidius nullum est, nec quod plus alimenti trahat; Plin. Nat. Hist. lib. xviii. cap. viii.

† Tritico nihil fertilius; hoc ei natura tribuit, quoniam eo maxime alebat hominem; Plin. Nat. Hist. lib. xviii. cap. x.

‘In Ægypto, non alibi : in Italia triticum muticum est, far aristas habet ;’—‘In Egypt nowhere else. In Italy the *triticum* is bare, and the *far* has beards*.’ Had this learned gentleman, and the skilful persons he mentions, been a little more attentive, they would have observed passages, from which it appears, that there were in Italy kinds both of the *far* and *triticum* that were bearded. Varro says, ‘The ear of barley or *triticum*, which is not mutilated, has these three parts, the grain, the husk, and the beard ; and likewise, when the ear first appears, it has a hofe. That which is the inner solid part is called the grain ; the case that incloses the grain is called the husk ; and that which, like a long small needle, is stretched out from the husk, is called the beard ; so that the husk is the case of the grain, and the beard is the crown †.’ To this, that Varro may

* See notes on Plin. Nat. Hist. lib. viiii. cap. x.

† Spica ea, quae mutilata non est, in ordeo, et *triticum* tria habet continentia, granum, glumam, aristam : et etiam primitus spica cum oritur, vaginam. Granum dictum, quod est intimum solidum ; gluma, qui est folliculus ejus. Arista, quae ut acus tenuis longa eminent e gluma. Proinde ut grani theca sit gluma, et apex arista ; Var. lib. i. cap. XLVIII.

may not appear to stand single, I shall add a passage from Pliny: 'The fruit,' says he, 'of all the things we sow, is either contained in ears, and fortified with a quadruple rampart of beards, as the fruit of the *triticum* and *hordeum* is, or,' * &c. From these passages it is evident, that the *triticum* is bearded, at least that some kinds of it are so. That *far* is bearded, likewise, appears from another passage in Pliny: 'It is proper,' says he, 'that *far*, because it is bruised out with difficulty, should be laid up with its *palea*, and is freed only from the straw and beards †.'

Columella mentions three kinds of *triticum*. The best he calls *robis*, which he says excelled the others both in weight and brightness. The second he calls *siligo*, which he says is deficient in weight. The third kind, he says, is a spring wheat,

* *Omnium satorum fructus, aut spicis continetur, ut tritici, hordei; muniturque vallo aristarum quadruplici; Plin. Nat. Hist. lib. xviii. cap. vii.*

† *Far, quia difficulter excutitur, convenit cum palea sua cedi; et stipula tantum, et aristis liberatur; Plin. Nat. Hist. lib. xviii. cap. xxx.* The *palea* was the short straw, that in reaping was cut off with the ear: This appears from a passage in Varro.

wheat, of the nature of the *filigo*: He adds, that it is very useful to the farmer, when, by any accident, he is prevented from sowing in the autumn. The other kinds, he tells us, are not profitable, and are cultivated only by those who value themselves upon having a great variety.

Of *far*, Columella mentions three kinds likewise. The first he calls *clusinum*, which is of a bright white colour: The second he calls *vennaculum*, of which he says there are two sorts, the one red and the other white: The third is a spring wheat; he calls it *halicastrum*, and says that it excels the others in goodness and weight. He adds, that it is necessary to have all these kinds both of *triticum* and *far*, as it seldom happens that a farm is so situated, that one kind is proper for every part of it; there being, almost in every farm, both wet and dry lands*.

Almost

* Tritici genera complura cognovimus; verum ex his maxime ferendum est, quod robus dicitur: quoniam et pondere, et nitore praestet. Secunda conditio est habenda filiginis, cujus species in pane praecipua pondere deficitur. Tertium erit trimestre, cujus usus agricolis gratissimus: nam ubi propter aquas, aliamve causam matura ratio est omissa, praesidium ab hoc petitur. Id genus est filiginis. Reliquae tritici species, nisi si quos multiplex
varietas

Almost all the rustic writers agree in this, that *far* is most proper for wet clay land, and *triticum* for dry land. ‘In wet red clays,’ says Cato, ‘sow *far*: In dry, clean, and open lands, ‘sow *triticum* *.’ ‘Therefore,’ says Varro, ‘skilful husbandmen in their wet lands sow *far* ‘rather than *triticum* †.’ Columella says, ‘that ‘*triticum* thrives best on dry land, and that *far* ‘is less hurt by wetness ‡.’

Though

varietas frugum, et inanis dilectat gloria, supervacuae sunt. Adorei autem plerumque vidimus in usu genera quatuor: Far quod appellatur clusinum candoris nitidi; far, quod vocatur veannuculum, rutilum, atque alterum candidum, sed utrumque majoris ponderis, quam clusinum: semen trimestre, quod dicitur halicastrum, idque pondere, et bonitate est praecipuum. Sed haec genera tritici, et adorei, propterea custodienda sunt agricolis, quod raro quisquam ager ita situs est, ut uno semine contenti esse possimus, interveniente parte aliqua vel uliginosa, vel arida; Col. lib. Cat. cap. II. cap. VI.

* In creta, et uligine, et rubrica, et agro qui aquosus erit, semen adorem potissimum serito; quae loca sicca et non herbosa erunt, aperta ab umbra, ibi triticum serito; Cato, cap. XXXIV.

† Itaque periti in loco humidioris far adorem potius serunt, quam triticum; Var. lib. I. cap. IX.

‡ Triticum autem sicco loco melius coalescit. Adorem minus infestatur humore; Col. lib. II. cap. VI.

Though *triticum*, in general, is represented as best adapted to dry soils, yet that kind of it called *filigo* is mentioned as proper enough for wet lands. Columella joins it with *far*, when he says, ‘Wet and stiff clays do well enough for *filigo* and *far* *.’ He observes, that *filigo* is the whitest kind of the *triticum*, but inferior in weight; that it answers very well in a wet seed-time, and is proper for land over which water is in danger of running. He adds, that it may be got with very little difficulty, as *triticum*, when sown upon land that lies low and wet, after the fourth crop, is turned into it †. Pliny likewise observes, that the *filigo* is proper for
 wet

* *Denfa cretosaque et uliginosa humus, filiginem et far adorem non incommode alit; Col. lib. 11. cap. 1x.*

† Directing how to judge of the goodness of grain by the colour, he adds: ‘*Nec nos tanquam optabilis agricolis fallat filigo: nam hoc tritici vitium est, et quamvis candore praestet, pondere tamen vincitur. Verum in humido statu coeli recte provenit; et ideo locis manantibus magis apta est. Nec tamen ea longe nobis, aut magna difficultate requirenda est: nam omne triticum solo uliginoso post tertiam sationem convertitur in filiginem;*’ *Col. lib. 11. cap. 1x.*

wet lands ; and he mentions some soils on which it is turned into *triticum* *.

I had occasion already to show at what season wheat was sown, and what care was taken by the Romans to sow early or late in the autumn or spring, according to the situation of the land and climate. There was sown from four to six *modii* of *triticum* upon the *jugerum*, and from eight to ten *modii* of *far*. The quantity, as I observed in a former chapter, was with great exactness adapted to the soil, season, weather, and climate. In this chapter I took occasion to observe, that *far* was sown in the husk ; and that this is the reason why a much greater quantity of it was sown upon a *jugerum* than of *triticum*.

Land was commonly prepared for a crop of wheat by a fallow. I had occasion to observe, when treating of fallowing, that the Romans seldom sowed any corn, or even pulse, but up-
on

* Siliginem proprie dixerim tritici delicias : candor est, et sine virtute, et sine pondere, conveniens humidis tractibus, quales Italiae sunt, et Galliae comatae. Sed et trans Alpes in Allobrogum tantum Meminorumque agro pertinax : In caeteris ibi partibus biennio in triticum transit ; Plin. Nat. Hist. lib. xviii. cap. viii.

on land that had been fallowed; and that all the directions about ploughing, given by the several writers, relate to the fallow. However, wheat was sometimes sown upon land that had carried a crop of pulse: For this we have the authority of Virgil. ‘Allow,’ says he, your lands to lie fallow after every crop, and the light soil to harden by resting; or, changing the ordinary seed-time, you may sow the yellow *far* upon the fields from whence you have reaped the rich pulse with the bruised pods, green vetches, and the brittle stalks and rattling haum of the bitter lupine*.’ Pliny mentions with approbation these directions given by Virgil: ‘Virgil,’ says he, ‘advises to let the corn fields rest every other year; and this without doubt is most proper, if the extent of the farm allows it: But, if the situation of the farm refuses, *far* ought to be sown upon the fields from whence has been taken a
‘ crop

* Aut ibi flava feres mutato fidere farra,
Unde prius laetum filiqua quaffante legumen,
Aut tenuis foetus viciae, tristisque lupini
Sustulerit fragiles calamos, silvamque sonantem:

Virg. Georg. I. l. 73.

‘ crop of lupines, vetches, beans, or other things
 ‘ which enrich land *.’ It is proper to observe,
 that Pliny supposes, that the crops after which
far may be sown, are such as better and not
 hurt the land that carries them. Some of the
 particulars mentioned were sown for green fo-
 rage to the cattle on the farm, and were cut in
 the month of May, after which the land was
 immediately ploughed. In this case, these crops,
 if they do not better land, cannot be said to do
 much harm to it, and therefore may be suppo-
 sed to leave it in a proper condition for a crop
 of wheat. However, that it may be still in a
 better condition, Virgil directs the ordinary sea-
 son of sowing to be changed; that is, that the
 sowing of wheat after a crop of pulse be delayed
 till the spring. Every intelligent farmer knows,
 that by this the land would be in a better situ-
 ation for receiving the seed, and less hurt by
 carrying the crop.

Pliny

* Virgilius alternis cessare arva suadet; et hoc, si pati-
 antur ruris spatia, utilissimum procul dubio est. Quod si
 neget conditio, *far* ferendum, unde et lupinum, aut vicia,
 aut faba sublata sint, et quae terram faciant laetiores;
 Plin. Nat. Hist. lib. xviii. cap. xxi.

Pliny is the only person who mentions the sowing of wheat after a crop of turnip or radish. But the land upon which he mentions this as done, is of the very best kind: 'Upon the land,' says he, 'that we have called *tenera*, after barley, millet may be sown, after the millet radish, after the radish barley again, or *triticum* *.'

The fallow for wheat was very well prepared: If the land was light, it got two ploughings, besides the seed-furrow; if it was stiff, it got three, sometimes four, and sometimes more. The rule was to give it as many as were necessary to reduce it to powder: For this purpose, the second ploughing was commonly across, and, when necessary, was attended with harrowings. Sometimes the land was ploughed immediately before it was sown; and sometimes it was sown and the seed ploughed in. These things I had occasion to explain in the chapters in which fallowing and sowing are treated of.

The

* Si fuerit illa terra, quam appellavimus teneram, poterit sublato hordeo millium feri; eo condito rapa; his sublatis, hordeum vel triticum; Plin. Nat. Hist. lib. xviii. cap. xxiii.

The time of fowing, as has already been observed, was from the first of October to the fifteenth day before the winter solstice; and that the seed was sown sooner or later, according to the situation of the land, and nature of the season.

The land, after being sown, was commonly harrowed; when the corn came up, it was twice hoed, once in winter, and once in spring: After this, it was weeded before it was cut down. The good land, in the time of Varro, produced from ten to fifteen after one sown, and the ordinary land, in the time of Columella, not above four.

Columella mentions the number of days work that a *jugerum* of wheat requires, from the first ploughing to the reaping: 'Four or five *modii*,' says he, (which was the quantity sown upon a *jugerum*) 'require four days work of the ploughman, one of the harrower, two of the hoer, when first hoed, and one when hoed a second time, one of the weeder, and one and one-half of the reaper; in all ten and one-half days work *.'

In

* Tritici modii quatuor, vel quinque, bubulcorum operas

In Britain, we prepare land for wheat in the same manner that the ancient Romans did. We sometimes sow upon fallow, and sometimes upon land that has carried a crop of pulse or a crop of clover. We cannot, however, boast of the same attention in adapting the kind of wheat and time of sowing to the soil and climate. Wheat is the only, at least it is the principal grain that we sow in autumn. In that season, the work of the farmer does not render it necessary for him to hurry over the sowing, as he may be very advantageously employed in other operations, particularly following the land intended for spring barley, and laying up the other fields intended for spring corn, in such a manner as best to secure them from being hurt by the winter rains: Therefore he has it in his power to sow his wheat in the season most proper for it. This is a matter certainly worthy of the farmer's attention, and may turn out very much to his advantage. But the adapting the
kind

peras occupant quatuor, occatoris unam, farritoris duas primum, et unam cum iterum sarriuntur, runcatoris unam, messoris unam et dimidiam. In totum summa operarum decem et dimidia; Col. lib. II. cap. XIII.

kind of seed to the different soils and climates in this kingdom, it is probable, is still of greater importance. In the northern counties of this island, we have very few kinds of wheat kept separate; almost in every field of wheat, we find a variety of kinds mixed together. As the farmers, in some of the southern counties, are at some pains to keep separate from each other the several kinds which they cultivate, it would certainly tend greatly to the improvement of agriculture, to inquire into the nature of the different soils in these southern counties, and get seed from such as may reasonably be supposed most proper for the soils in the northern counties. A few trials would soon inform us what kinds are most proper; and, once possessed of these, by proper care in picking the best for seed, and in the preparation of the land, and culture of the crop, possibly these good kinds may be preserved, so as to make it unnecessary to renew them.

It has been observed, that *far* was always sown by the Romans upon their wet and strong lands. This practice no doubt was established, because, from experience, they found that it
suc-

succeeded better on such lands than *triticum*. Our lands in Britain are certainly much wetter and stronger than in any part of Italy; which makes it probable, that this grain would succeed still better with us than it did with them. Would some persons then take the trouble to bring into Britain some of the kinds of spelt cultivated in Germany, and sow it in place of wheat upon our wet clay lands, it is probable, that they would introduce a very considerable improvement in husbandry: For, it is probable, that the crops produced would be much larger than ordinary; and, although it might not please the taste so well when made by itself into bread, yet might answer very well when mixed with wheat-flour, as well as serve equally well for the several purposes in the kitchen.

It is observed by Columella, that the kind of wheat which he calls trimestrian, was very useful to the farmer, when, by any accident, he was prevented from sowing in autumn. Accidents of this kind frequently happen in Britain, particularly in the northern parts of it: The seasons in this island are so variable, that they cannot be depended upon: It sometimes happens,

pens, that autumns, for a course of years, are so wet, that few farmers sow with wheat all the fields which they intended for that crop, and still fewer that sow them in so good a condition as they wish for: This has made some attempt to sow in spring; but, having none but the ordinary kind of wheat, this practice does not succeed, except when the summer season is very favourable. However, if we had a kind of wheat that comes sooner to perfection, we might expect that the spring sowing would be more successful. The trimestrian *tritium* and *far*, mentioned by the Roman authors, was certainly of this kind; for these authors distinguish them from the others, and represent them as useful to the farmer; because, when sown in spring, they come as soon to perfection as the other kinds, when sown in autumn. Corn, which, when sown in Italy in March, comes to perfection in three months, may be expected, in the warm soils of even the northern parts of Britain, to be ready for cutting in less than six. If so, the harvest of the spring sowing would, in this case, be as early as the harvest of the autumnal sowing. The trimestrian *siligo*, and
hali-

balic astrum far, were of this kind; and, it is probable, that they are still cultivated in some places on the Continent, or in Sicily. The introducing them into Britain, it is probable, for the reasons mentioned, would be of great benefit to the farmer, and of no less advantage to the kingdom.

C H A P. XXX.

Of the Culture of Hordeum.

BARLEY, in Britain, is the grain next in quality to wheat, and, in the northern parts of the island, much more common. In some places bread is made of it; but it is principally used for making ale and spirits. In Italy, in the time of the Romans, it was but little cultivated, at least far from being so common as wheat. When Columella represents what quantity of land a yoke of oxen is sufficient to cultivate, he does not so much as mention barley, but supposes that only wheat and pulse are sown*.

The ancient inhabitants of Spain and Gaul, made the same use of barley that we now do in
Britain.

* Quae nos ratio docet, sufficere posse jugum boum tritici centum viginti quinque modis, totidemque leguminum; Col. lib. II. cap. XIII.

Britain. ‘The western nations,’ says Pliny, ‘get drunk by steeping corn. In Gaul and Spain, there are several kinds of this liquor, which have different names, but are made in the same way. It is said, that in Spain they keep good a considerable time *.’ In another place, he says; ‘of the same (corn) a liquor is made, *zythum* in Egypt, *coelia* and *ceria* in Spain, *cervisia*, and other kinds, in Gaul and the other provinces, with the foam of which the women make a wash for their faces †.’ That these liquors were made in the same manner as ale, appears from another passage in the same author: ‘The inhabitants,’ says he, ‘of Gaul and Spain, having made a liquor of corn in what manner I have already mentioned, use the foam of it thickened for ferment; for which reason, their bread is lighter than any other.’

* Est et occidentis populis sua ebrietas, fruge madida; pluribus modis per Gallias Hispaniasque, nominibus aliis, sed ratione eadem. Hispaniae jam et vetustatem ferre ea genera docuerunt: Plin. Nat. Hist. lib. xiv. cap. xxii.

† Ex iisdem fiunt et potus, zyphum in Ægypto, coelia et ceria in Hispania, cervisia et plura genera in Gallia, aliis provinciis, quorum omnium spuma cutem foeminarum in facie nutrit; Plin. Nat. Hist. lib. xxii. cap. xxv.

‘ other *.’ It is probable, that, in France and Spain, vineyards were not so frequent in the time of Pliny as they are now; and that the inhabitants were therefore obliged to give greater attention to the making of ale.

Pliny gives a description of the *hordeum* of the ancients, from which it is evident, that it is of the same kind with our barley: He says, that it differs from other grain in this respect, that, from the one end of the seed comes the root, and from the other the blade; and that the end from whence the root comes is the larger of the two †. This is likewise true with respect to our barley; but then it must be observed, that the plant or eye is in the large end of the grain, which, when growing, is fixed to the ear, and that when springing to the blade, it goes up between the skin or husk, and breaks out at the other end. Oats come up in the same manner; but

* Galliae et Hispaniae frumento in potum resoluto, quibus diximus generibus, spuma ita concreta pro fermento utuntur. Qua de causa levior illis, quam caeteris, panis est; Plin. Nat. Hist. lib. xviii. cap. vii.

† Ex hordeo alterum caput grani in radicem exit, alterum in herbam, quae et prior floret. Radicem crassior pars grani fundit, tenuior florem; Plin. Nat. Hist. lib. xviii. cap. vii.

but Pliny does not take notice of them, as they were not considered as grain: He says likewise, that the stalk of the *hordeum* has eight knobs or knots, and that all these are formed before the ear appears*. Likewise, that, like wheat, it comes up with a blade, and has one too on the top of the stalk; but that the blade of the barley is rougher than that of the wheat †. He observes, that there are these other distinctions between the *hordeum* and *triticum*, that, in the ear, the *triticum* is covered with many coats; but that the *hordeum* is almost bare; that the *triticum* has a longer stalk, and the *hordeum* a rougher and sharper beard ‡. That some kinds have only two rows of grain in the ear, and others as many as five ||. From this description, it is ob-

vious,

* *Genicula autem sunt tritico quaterno, farri sena, hordeo octona. Sed non ante supra dictum geniculorum numerum conceptus est spicae; id.*

† *Folium quaedam ab radice mittunt, quaedam a cacumine. Frumentum vero, et hordeum vitiaque, et quidquid in stipula est, in cacumine unum folium habet. Sed hordeo scabra sunt, caeteris levia; id.*

‡ *Tunicae frumento plures. Hordeum maxime nudum.—Calamus altior frumento, quam hordeo: Arista mordacior hordeo; id.*

|| *Spicae quaedam binos ordines habent, quaedam plures usque ad senos; id.*

vious, that the *hordeum* of the ancients is the same with our barley.

Pliny mentions a variety of kinds, that differ from each other in the shape and colour of the grain: 'Some differences,' says he, 'in the grain itself, being longer and lighter, or shorter, or rounder, whiter, blacker, or of a purple kind. This last is not good for making *polenta*, as the white is least able to resist storms*.'

Columella, though he considers wheat and pulse as the principal things cultivated in a corn farm, yet gives some account of the culture of barley: He mentions two kinds of it that were sown in Italy; the one called *hexastichum* or *catherinum*, the other called *distichum* or *galaticum*. Treating of the first of these, he says: 'It is next in value to wheat, better even than wheat for food to cattle, and more wholesome than bad wheat for food to men; nor is there any thing more proper for supplying the wants of men in times of scarcity: It is sown on a
' free

* Grano ipsi aliquot differentiae, longius, leviusque, aut brevius, aut rotundius, candidius, nigrius, vel cui purpura est. Ultimo ad polentam; contra tempestates condido maxima infirmitas; Plin. Nat. Hist. lib. xviii. cap. vii.

' free and dry soil, and upon land either very
 ' rich and strong, or very poor. It is reckoned
 ' a most severe crop; for which reason it is sown
 ' either upon very rich land, the superabundant
 ' fruitfulness of which nothing can destroy; or
 ' upon poor land, that is fit for no other crop:
 ' It ought to be sown upon the second furrow
 ' after the equinox, about the middle of the
 ' seed-time, if the soil is in good heart; sooner,
 ' if the soil is poor, at the rate of five *modii* to
 ' the *jugerum*. It is reaped much sooner than
 ' any other corn, even when but a little ripen-
 ' ed: For, having a brittle stalk, and no chaff
 ' to cover the grain, it is easily shaken out; for
 ' the same reasons, it is more easily threshed than
 ' any other corn. After it, the land should be
 ' fallowed, if not well dunged, to drive out all
 ' the bad qualities it has acquired *.' Palladius
 likewise

* Proximus est his frumentis usus hordei, quod rustici
 hexastichum, quidam etiam cantherinum appellant: Quo-
 niam et alia animalia, quae ruri sunt, melius quam triti-
 cum, et hominem salubrius quam malum triticum pascit.
 Nec aliud in egenis rebus magis inopiam defendit. Seri-
 tur soluta siccaque terra, et vel praevalida vel exili, quia
 constat arva segetibus ejus macescere; propter quod pin-
 guissimo agro, cujus nimis viribus noceri non possit, aut

macro;

likewise mentions this kind of barley : He says ;
 ‘ In a poor foil it may be sown in September,
 ‘ at the rate of five *modii* to the *jugerum* ; and
 ‘ that the land, after it, must be allowed to rest,
 ‘ or be well dunged *.’ He says further ; that
 ‘ it may be sown likewise in October, and that
 ‘ the land must either be poor and dry, or very
 ‘ rich †.’

‘ The

macro, cui nihil aliud, committitur. Altero fulco femi-
 nari debet, post aequinoctium, media fere fementi, si lae-
 to solo ; si gracili, maturius. Jugerum quinque modii
 occupabant. Idque ubi paullum maturuerit, festinantius,
 quam ullum aliud frumentum demetendum erit. Nam et
 fragili culmo, et nulla vestitum palea granum ejus celeriter
 decidit ; iisdemque de causis facilius teritur, quam caete-
 ra. Sed cum ejus messem sustuleris, optimum est novalia
 pati anno cessare : Si minus, stercore saturare, et omni vi-
 rus, quod adhuc inest terrae, propulsare ; Col. lib. II. cap.
 IX.

* Nunc gracili solo ordeum seritur cantherinum modiiis
 v. per jugerum. Post host genus agros cessare patieris,
 nisi forte laetamen aspergas ; Pal. lib. x. Sepr. tit. IV.

† Hoc etiam mense seremus ordeum, quod dicitur can-
 therinum. Seritur macra et sicca terra, vel multum pin-
 gui. Nam, quia hoc femine macescunt arva, pingui vin-
 citur agro : Alteri non habet quod amplius nocere possit,
 cum propter macritatem semen aliud ferre non valeat.
 Laeto agro non est ferendum ; Pal. lib. XI. Oct. lit. I.

‘ The other kind of barley, called *distichum* or ‘ *Galaticum*,’ Columella says, ‘ is very heavy and ‘ white ; and, when mixed with wheat, makes ‘ an excellent household bread. It is sown in ‘ rich and cold soils in the month of March, or ‘ better in the middle of January, if the season ‘ allows, at the rate of five *modii* to the *jugerum**.’ Palladius likewise mentions it : He says ; ‘ It is ‘ heavy and white ; if the winter is favourable, ‘ it may be sown in temperate places in the mid- ‘ dle of January.’ He differs from Columella in the quantity sown ; for he says, that eight *modii* should be sown on the *jugerum* †. He mentions it in another place, and says ; ‘ It may be ‘ sown

* *Alterum quoque genus ordei est, quod alii distichum, Galaticum nonnulli vocant, ponderis et candoris eximii, adeo ut tritico mistum egregia cibaria familiae praebeat. Seritur quam pinguissimis, sed frigidis locis circa Martium mensem. Melius tamen respondet, si clementia hiemis permittit, cum seminatur circa Idus Januarias. Jugerum sex modios postulat ; Col. lib. II. cap. IX.*

† *Si clemens fuerit hiems, ordeum Galaticum, quod grave et candidum est, circa Idus Januarias seramus locis temperatis. Octo modiis jugerum complebitur ; Pal. lib. II. tit. IV.*

‘ sown in cold places in the end of February, or
 ‘ the beginning of March *.

Cato mentions barley in the general : He puts it in the class of those crops that are hurtful to land †. He directs, that it be sown either upon new ground, or such as is so rich, that it may be sown and carry a crop every year ‡.

When Columella mentions barley in the general, without distinguishing the different kinds, he says it ought to be sown on dry land : ‘ Bar-
 ‘ ley,’ says he, ‘ will not grow, but upon soil
 ‘ that is well pulverized and dry. It will have
 ‘ no mediocrity of soil, but either very rich or
 ‘ very poor ; and, if sown upon wet land, it
 ‘ dies ||.’

Palla-

* Etiam nunc ordeum Galaticum, quod grave et candidum est, feritur locis frigidis circa Martias Calendas ; Pal. lib. III. tit. VIII.

† Hordeum, foenum Graecum, ervum, haec omnia segetem exfugunt ; Cat. cap. XXXVII.

‡ Hordeum qui locus novus erit, aut qui restibilis fieri poterit, ferito ; Cat. cap. XXXV.

|| Ordeum nisi solutum et ficcum locum non patitur. — Hoc nullam mediocritatem postulat : Nam vel pinguiissima, vel macerrima humo jacitur. — Hoc si lutoso commiseris, emoritur ; Col. lib. II. cap. IX.

Palladius too mentions, among the general maxims, ‘ That barley delights in an open and dry soil, and, if sown upon a wet soil, dies *.’

Virgil gives no directions about the culture of barley; he mentions only the time of sowing, which is from the equinox to the winter solstice: ‘ When the sun in *Libra*,’ says he, ‘ makes the days and nights equal, then sow barley, even towards the distant showers of the impracticable winter solstice †.’

Varro

* *Ordeum* agro soluto delectatur, et sicco: Nam si in lutofo spargatur, moritur; Pal. lib. 1. tit vi.

† *Libra* die somnique pares ubi fecerit horas,
Et medium luci atque umbris jam dividet orbem;
Exercete viri Tauros, serite hordea campis,
Usque sub extremum brumae intractabilis imbrem:

Vir. Geo. I. v. 208.

This passage seems not to be understood by the generality of the commentators: They explain the words *usque sub extremum brumae intractabilis imbrem*, as meaning, ‘ to the very last shower of the winter;’ that is, *even to the end of the rainy season*. This is in some measure inconsistent with what is said by the other writers, that barley does not thrive but upon dry land: For every farmer knows, that any kind of seed that delights in a dry soil, must be sown in a dry season, and the land put into such

Varro does no more than mention the quantity sown upon a *jugerum*, which he says is six *modii*.

Pliny

a situation, as to defend it against rain. But this explication of the words, seems also to be inconsistent with what immediately follows them: 'This is the time like-
' wife,' says he, 'for sowing flax and poppie, while the
' ground is dry and the weather fair.'

Nec non et lini segetem, et Cereale papaver
Tempus humo tegere, et jamdudum incumbere aratris,
Dum sicca tellure licet, dum nubila pendent.

V. 212.

That, by the expressions *dum sicca tellure licet, dum nubila pendent*, we are to understand, 'before the wet season
' comes on,' is evident from a passage in Columella, who
cites this passage from Virgil, and applies it to sowing
early in the season: 'Caeterum locis uliginosis, atque
' exilibus, aut frigidis, aut etiam opacis plerumque citra
' Calendas Octobris feminare convenire, dum sicca tellure
' licet, dum nubila pendent;' Col. lib. II. cap. VIII.

Some of the commentators, to render the two passages
consistent, explain the last, as if Virgil directed these crops
to be sown, not in the early and dry season, but in the
best and most serene days of the late and rainy season:
[But, besides that this is contrary to the explication given
of the words by Columella, it may be observed, that, after
the

Pliny says, that barley may be sown the earliest of all corn, and that there were particular seasons

the rainy season is come on, though there may be fair days, yet it cannot properly be said 'while the land is dry.—Dum ficca tellure licet;' as Virgil expressly says. That the commentators have mistaken Virgil's meaning in these passages, I cannot doubt; and they seem to have been led into the mistake, from the idea which they affix to the word *extremus*. Mr Martyn indeed confesses, that he is unable to explain what Virgil means by the last shower of the *bruma*; and, indeed, this expression is unintelligible, unless the *bruma* is here put for winter in general: 'To the last shower of the winter,' is easily understood, and is a very proper expression, as there are commonly many showers in winter, and there may be one on the very last day of it: But it is improper to say the last shower of the *bruma*, because the *bruma* is not a season, but a particular day in the winter season: The word *extremus*, when it expresses distance, either of time or place, does not always signify the most distant of any other, but at a great distance: Thus Horace mentions the sending away in a ship to the distant lands of Numidia,

Me vel extremos Numidarum in agros

Classe releget.

Hor. Carm. lib. III. ode XI.

In this passage, the expression 'in extremos agros Numidarum,' does not signify the most distant of these lands; because

seasons for each kind *. That it is the tenderest
of

because it is improper to say, that one is sent in a ship to these; but it signifies lands far distant. If we understand the word *extremus* in this sense, in the passage of Virgil under consideration, then it may be rendered; ‘Sow barley even to the approach of the rainy season, that is, far distant as the impracticable *bruma*.’ And the meaning is, that barley may be sown as long as the weather is dry, though this should continue even to the winter solstice. Virgil’s manner of expressing himself will appear very proper, when we consider, that he allows the season for sowing barley to begin more early than the season for sowing wheat, and, consequently, at a greater distance from the *bruma*; and that he allows it to continue even to the *bruma*, provided the weather is fair; though it was the general opinion that it ought to end fifteen days before. That the ancients did not understand Virgil, as allowing barley to be sown at or after the *bruma*, appears from some passages in Pliny: ‘Virgil,’ says he, ‘requires *tritium* and *far* to be sown from the setting of the *Vergiliae*; barley between the autumnal equinox and the *bruma*.’ And, afterwards, he says; ‘All agree that nothing ought to be sown at the *bruma*.—Virgilius *tritium* et *far* a *Vergiliarum* occasu feri jubet, *hordeum* inter *aequinoctium* autumni et *brumam*.—Inter omnes autem convenit circa *brumam* ferendum non esse;’ Plin. Nat. Hist. lib. xviii. cap. xxiv.

* Primum ex omnibus frumentis feritur hordeum. Dabimus

of all corn, and that it ought not to be sown, but upon dry, free, and good land; that it is the least liable to accidents after it is grown up, as it is reaped before the rubigo attacks the *triticum*; for which reason, very prudent husbandmen sow *triticum* only for provision for their own families; that it is a common saying, that barley is sown in the *sack*, because it makes so quick a return, and is most fertile: That the kind that is reaped at Carthago in Spain in April, is sown in the same month at Celtiberia, and gives two crops in one year: That all kinds of it are reaped earlier than any other corn, as soon as it begins to ripen, because the grain is supported by a brittle stalk, and contained within very slender chaff*. In another place, he says:

bimus et dies ferendi cuique generi; Plin. Nat. Hist. lib. XVIII. cap. VII.

* *Hordeum frugum omnium mollissimum est: Seri non vult, nisi in sicca et soluta terra, ac nisi laeta.*—*Hordeum ex omni frumento minime calamitosum, quia ante tollitur, quam triticum occupet rubigo. Itaque sapientes agricolae triticum cibariis tantum ferunt. Hordeum sarculo feri dicunt, propterea celerrime redit; fertilissimumque, quod in Hispaniae Carthagine Aprili mense collectum est, hoc feritur eodem mense in Celtiberia, eodemque*

says: ' That it is reaped in time to have millet
 ' or panic sown after it, to be reaped in the
 ' same season; and that a common sign of the
 ' one being fit to be reaped, and the season come
 ' for sowing the other, is the shining of the
 ' glow-worm in the fields *.' Pliny further
 says, with respect to barley, that it was used in
 the most ancient times for food, as appears from
 the Athenian customs, upon the authority of
 Menander, and from the name given to Gladi-
 ators, who were called *Hordearii* †. The pre-
 sent manner of living, he adds afterwards, has
 condemned the bread made of barley, that was
 used

*demque anno bis nascitur. Rapitur omne a prima statim
 maturitate festinantius, quam caetera. Fragili enim sti-
 pula et tenuissima palea granum continetur; Plin. Nat.
 Hist. lib. xviii. cap. vii.*

* *Iustum est hoc feri maturato hordeo; atque etiam
 in eodem arvo, estque signum illius maturitati et ho-
 rum sationi commune, lucentes vespere per arva cicin-
 delae; Plin. Nat. Hist. lib. xviii. cap. xxvi.*

† *Antiquissimum in cibis hordeum, sicut Atheniensium
 ritu Menandro auctore apparet; et gladiatorum cogno-
 mine, qui hordearii vocabantur; Plin. Nat. Hist. lib.
 xviii. cap. vii.*

used by our ancestors, and given it for the entertainment of quadrupeds*.

Barley, as well as wheat, was harrowed and hoed. Columella, in reckoning the number of days work that a *jugerum* takes, mentions both these operations. ‘Five *modii* of barley,’ says he, ‘take three days work of the ploughman, one of the harrower, and one and a half of the hoer †.’ Pliny mentions barley among the crops that should be weeded; and he adds, that it should be hoed twice as well as wheat and beans ‡.

Barley was sometimes sown in the autumn for pasture, or green forage for cattle during the winter. ‘Farrago,’ says Columella, ‘should be sown upon land that has carried a crop that season, very well dunged, and twice ploughed. The

* Panem ex hordeo antiquis usitatum vita damnavit, quadrupedumque fere cibus est; Plin. Nat. Hist. lib. xviii. cap. vii.

† Hordei modii quinque bubulci operas tres exigunt, occatoriam unam, farritoriam unam et dimidiam; Col. lib. ii. cap. xiii.

‡ Siliginem, far, triticum, semen, hordeum, occato, farrito, runcato,—triticum, hordeum, semen, fabam, bis farrire melius; Plin. Nat. Hist. lib. xviii. cap. xxi.

‘ The best kind of this is got by sowing ten *mo-*
 ‘ *dii* of *cantherinum* barley upon a *jugerum*, about
 ‘ the autumnal equinox, when showers are im-
 ‘ mediately expected; that so, being watered as
 ‘ soon as sown, it may come up immediately,
 ‘ and be secured against the violence of the win-
 ‘ ter: For, when other kinds of fodder fail by
 ‘ reason of the cold, this, if cut, affords very
 ‘ good meat for the oxen and other cattle, and,
 ‘ if it is frequently pastured, lasts till the month
 ‘ of May, or, if it is sowed from the beginning
 ‘ of March, it will carry a crop of corn *.’
 Palladius likewise mentions this, and gives the
 same directions †.

In

* Faraginem in restibili stercoretissimo loco, et altero
 fulco ferere convenit. Ea fit optima cum cantherini or-
 dei decem modiis jugerum obseritur circa aequinoctium
 autumnale, sed impendentibus pluviis, ut confita, rigata-
 que imbribus, celeriter prodeat, et confirmetur ante hie-
 mis violentiam. Nam frigoribus cum alia pabula defecce-
 runt, ea bubus caeterisque pecudibus optime defecta prae-
 betur, et si depascere saepius voles, usque in mensem Mai-
 um sufficit. Quod si etiam semen voles ex ea percipere,
 a kalend. Martijis pecora depellenda, ab omni noxa defen-
 denda est, ut sit idonea frugibus; Col. lib. ii. cap. xi.

† Farrago etiam loco restibili stercoreto seritur: orde
 cantherini

In Britain, we cultivate two kinds of barley. The one has two rows of grain in the ear, the other has six; but the grain very wide set. Of the kind with two rows there are several sorts, one of which is a winter barley. This kind of corn is considered in general as a bad forager, and is therefore commonly sown upon well pulverised soil. The land intended for it seldom gets less than three ploughings, whether it is fallowed, or has carried a crop the year immediately preceding; and the land found most proper for it is a rich dry soil. The winter barley does well enough on wet clays, when the season is favourable for ploughing, and the land in proper order for sowing: But, in general, we do not find it so severe a crop as it is represented by the ancient rustic writers. Were our lands made as clean as the lands were made in the Roman husbandry; were they in their nature as light, and as well reduced by ploughing,

so

cantherini jugero x modios spargimus circa aequinoctium, ut ante hiemem convalescat. Si depasci saepius velis, usque in Maium mensem ejus pastura sufficiet; quod si ex ea semen etiam redigere, usque ad Martias calendas, et dehinc pecora prohibebis; Pal. lib. x. tit. viii.

so as to give the barley crop the advantage of searching every part of the soil; perhaps we would find it as severe as they represent it, especially if sown in autumn, or very early in spring.

CHAP.

C H A P. XXXI.

Of the Culture of the Legumina, and particularly of the Faba.

IN Britain we cultivate several different kinds of pulse: the chief of these are pease and beans. The Romans had still a greater variety. Columella mentions these following; *lupinum*, *phaselus* or *phaseolus*, *pisum*, *faba*, *lens*, *sesamum*, *cicerula*, and *cicer* *. These were sown principally for food to the labouring cattle, and for this purpose both the straw and seed were used. Some of them, in times of scarcity, were used likewise for food to the labouring servants and slaves: The principal of them was the *faba*. But what kind of pulse this is, or whether it is any of those at present cultivated in Europe, is uncertain. However, considering how beneficial

* Col. lib. II. cap. VII. et X.

ficial it is represented by the rustic writers, it can scarcely be supposed to have been lost. All the learned commentators seem to be of opinion, that it is not the pulse called at present *faba* by the botanists. It may not be amiss to attend a little to the description of it given us, as well as to the manner of cultivating it represented to us by the rustic writers. From this we will at least observe, which of the pulse cultivated at present has the nearest resemblance to it.

Pliny is more particular than any of the others in his description of the *faba*; and I shall endeavour to collect all that he has written on the subject. He says, it is very long in coming up after it is sown, much longer than corn or any other kind of pulse, from fifteen to twenty days. It comes up in a leaf, and then puts forth the stem, which is not divided by knots. The other pulse branch out from the stem, which it does not: it is the only one of all the pulse that has a single stem. Like the others, it has many leaves, and these round. It is very long, from the time it begins to flower, before the flowering is finished; no less than forty days: Not one particular flower stems so long, but as one begins

begins to wither, another begins to blow; nor the whole crop like corn equally. The seed is perfected in forty days from the flowering, and the pods are formed upon each side of the stalk alternately*. When mentioning the time of sowing, he says, that the straw of the autumnal sowing is better than the whole crop of the spring sowing; and then adds, ‘for the pods and stems are good fodder for cattle †.’ He says likewise, that it is one of those that has long pods,
and

* Erumpit a primo fatu hordeum die septimo; legumina quarto, vel cum tardissime, septimo: faba a xv ad xx.—Fabae in folia exeunt, ac deinde caulem emittunt, nullis distinctum internodiis. Reliqua legumina furculosa sunt.—Leguminum unicaulis faba sola.—Multiplicia (*folia*) contra fabae.—Folium fabae rotundum.—Legumina diutius florent.—Sed diutissime faba xl diebus. Non autem singuli scapi tamdiu, quoniam alio deficiente alius incipit: nec tota seges, sicut frumenti, pariter.—Frumenta maturantur cum plurimum diebus quadraginta; item faba.—In faba leguminibusque, alternis lateribus filiquantur; Plin. Nat. Hist. lib. xviii. cap.

viii.

† Sed major pars malunt fabalia maturae sationis, quam tremistrem fructum. Ejus namque filiquae, caulesque gratissimo sunt pabulo pecori; Ibid. lib. xviii. cap. xii.

and of a breadth according to the shape of the grain*.

Theophrastus mentions several of the same qualities of the *faba*, to which may be added these following; that it puts forth many leaves on all sides, carries fruit very near to the earth, and is the only one of the *legums* that has its stalk perfectly erect †.

There is no plant in Britain, cultivated either in our fields or gardens, that answers this description so nearly as the small bean, which, of all beans, is the most common ‡.

Pliny

* *Siliquae rotundae ciceri, caeteris leguminum longae, et ad figuram feminis latae; Plin. Nat. Hist. lib. xviii. cap. xii.*

† *Faba inter legumina magis rubiginem sentit; tum quia folia multa undique gerit.—Adde quia fructum terrae proximiozem gerit; Theoph. De Caul. Plant. lib. iv. cap. xv.*

Faba inter legumina sola potissimum erecto caule constat; Theoph. de Hist. Plant. lib. viii. cap. iiii.

‡ Pliny, however, says a thing of the *faba* that must not be concealed. ‘One *scapus*,’ says he, ‘has been found loaded with an hundred beans.—Inventus est jam et *scapus unus centum fabis onustus;*’ Plin. Nat. Hist. lib. xviii. cap. x.—*Scapus* is commonly used to signify the

stalk

Pliny likewise asserts, with respect to the *fabā*, that it is the most useful of the legums; he assigns

stalk of the fruit of any tree or plant. In this sense it is used by Pliny, and applied to the *fabā* in a passage already cited. After saying that it continues forty days in the flower, he adds, ‘Non autem singuli scapi tamdiu.’ *Scapus* here plainly signifies the stalk of the flower or pod. If one of these has been found to contain one hundred seeds, neither the small bean, nor any pulse cultivated at present in Britain, is the *fabā* of the ancients. But this word is sometimes used to signify the stem that grows from the root: In this sense it is used by Varro. He says, ‘The *vicia* is so called, from its winding about; because it has tendrils like the vine, by which it warps itself to and again round the *scapus* of the lupine.—*Vicia dicta a vinciendo, quod item capreolos habet, ut vitis, quibus cum sursum versus serpit ad scapum lupini,*’ &c. Var. lib. i. cap. xxxi.—Pliny himself likewise uses the word in this sense. Treating of a particular kind of bean that grows in Egypt, he says, ‘The length of the *scapus* is four cubits, and of very great thickness; the reed is soft, without knobs; the head is like that of a poppy of a reddish colour; in it not above thirty beans.—Longitudo scapo quatuor cubitorum est, amplissima crassitudo: nec genicula habet, molli calamo: simile caput papaveri, colore roseo. In eo fabae non supra tricenas;’ Plin. Nat. Hist. lib. xviii. cap. xii.—We cannot suppose, that, by *scapus* in this passage, we are to understand the

signs a reason for saying so: 'For of it,' says he, 'bread is made *.' In another place, when treating of the turnip, he says: 'If a proper order is observed, it ought to be mentioned next to corn, at least next to the *fabæ* †.'

Some of the commentators make a distinction between the *faselus* and *faseolus*; and alledge, that the *faselus* is what we now call the bean; and that the *faseolus* is the kidney or French bean. But there are several passages in the rustic writers, from which it appears, that these were different names given to the same pulse; or, if there were two, that they were of the same species, which seems to have been rather the French than the common bean ‡.

With

stalk of the fruit, but the stalk of the plant itself. If, then, in the passage under consideration, Pliny by *scapus* means the stalk of the bean, what he says may be very properly applied to the small bean, as stalks of it are sometimes found loaded with upwards of an hundred.

* Sequitur natura leguminum, inter quae maximus honos fabae; quippe ex qua tentatus fit etiam panis; Plin. Nat. Hist. lib. xviii. cap. xii.

† Si iustus ordo fiat, a frumento protinus aut certe faba dicendis; lib. xviii. cap. xiii.

‡ Columella, when treating of the culture of the different

With respect to the culture of the *faba*, Cato does no more than mention it amongst the crops that

ferent sorts of pulse, mentions one of these only, the *faselus*; and he says that no more than four *modii* are sown upon the *jugerum*: ‘Ab hoc recte faselus terrae mandabitur, vel in vervecto, vel melius pingui et restibili agro. Nec amplius quatuor modiis jugerum obseritur;’ Col. lib. II. cap. X. When giving an account of the number of days work that the different sorts of corn and pulse require, he mentions only the other, the *faseolus*; and, it may be observed, that he says, the same number of *modii* are sown upon the *jugerum*: ‘Faseoli modii quatuor obruuntur,’ &c. Col. lib. II. cap. XIII. ‘Jugerum agri —recipit faseoli modios quatuor;’ lib. XI. cap. II. One, from this, is led to imagine, that these are two names for the same plant, or two ways of spelling the same word. Columella likewise informs us, that, in the end of September, the *faseolus* is sown for eating; but that, when intended for feed, it is better to delay the sowing till the end of October. ‘Milium et panicum hoc tempore demetitur, quo faseolus ad escam feritur: Nam ad percipiendum semen ultima parte Octobris circa Calendas Novembris melius obruitur;’ Col. lib. XI. cap. II. Palladius mentions the sowing of the *faselus* in the same months, for the same purposes: ‘Nunc quibus locis panicum metetur et milium. Tempore hoc faselus ad escam feratur;’ Pal. lib. X. Sepr. tit. XII. ‘Seremus fesamum usque ad Idus Octobres, et faselum;’ lib. XI. tit. I. We learn

that better land, and directs it to be sown on a strong soil*.

Varro

learn from Pliny, that this pulse was eaten green as the French beans are: 'The pods of the *faseoli*,' says he, 'are eaten with the grain.—Siliquae—faseolorum cum ipsis manduntur granis;' Plin. Nat. Hist. lib. xviii. cap. xii. It is well known, that the small bean is not eaten with the pod, as the French bean is; and therefore, it is probable, that both *faselus* and *faseolus*, were names given to this particular kind of pulse. However, as a further evidence, that the plants that got these names are not of the same kind with the common small bean, it may be observed, that neither of them were hoed. Columella, in giving an account of the culture of the *faseolus*, mentions only the ploughing, harrowing, and reaping: 'Faseoli modii quatuor obruuntur totidem operis, occantur una; metuntur una;' Col. lib. ii. cap. xiii. Pliny, when mentioning the crops that are both harrowed and hoed, says expressly, that the *faseolus* is only harrowed: 'Miliun, et panicum occatur, et farritur; non iteratur, non runcatur. Silicia et faseoli occantur tantum;' Plin. Nat. Hist. lib. xviii. cap. xxi. Now, there is no crop that is more improved by hoeing than the common small bean.

* Lupinum, faba, vicia, agrum stercorant; Cato, cap. xxxvii.

Fabam in locis validis non calamitosis serito; cap. xxxv.

Varro mentions only the quantity of seed sown upon the *jugerum*, which he says is four *modii*; and the time of sowing, which he says is about the end of October*.

Virgil directs that the *fabæ* be sown in spring, and that the seed be steeped in an infusion of nitre and *amurca*: ‘I have seen,’ says he, ‘many steep the seed, before sowing, in nitre and *amurca*, that so the fruit might grow larger in the deceitful pods †.’

Columella gives the following directions: ‘Land very rich naturally, or well dunged, is set apart for the bean; and, if this land has rested a year, and is situated in a valley, which receives sap from higher grounds, the seed should be sown on the firm soil, then ploughed in, ridged, and harrowed, that so the seed may be covered the deeper; for it is important, that

* Seruntur fabæ modii 1111 in jugero; Var. lib. 1. cap. XLIV.

Fabam optime feri in Vergiliarum occasu; cap. XXXIV.

† Vere fabis fatio. Vir. Geo. I. v. 215.

Semina vidi equidem multos medicare ferentes,

Et nitro prius, et nigra perfundere amurca,

Grandior ut foetus filiquis fallacibus esset.

Geo. I. v. 193.

' that the roots of the growing plants be wholly
 ' buried in the earth : But, if the land has car-
 ' ried a crop immediately before, let the straw
 ' be cut down, and twenty-four loads of dung
 ' spread on the *jugerum* ; after this, it may be
 ' treated like the land that has carried no crop
 ' the preceding year ; the seed first sown, then
 ' the land ploughed, ridged, and harrowed.
 ' However, there are some who think that beans
 ' ought not to be harrowed in cold countries,
 ' because the clods defend the young plants from
 ' the hoar frost, and shelter them when attacked
 ' by the cold. There are likewise some, who i-
 ' magine that a crop of beans serves in place of
 ' dung to the land ; the meaning of which, as I
 ' imagine, is, that land is not enriched by this
 ' crop, but less hurt by it than by any other ;
 ' for I am certain, that a field is fitter for corn
 ' when it has had no crop upon it the year pre-
 ' ceding, than when it has carried a crop of this
 ' pulse. According to Tremellius, four *modii*
 ' are sufficient for a *jugerum* ; but, in my opi-
 ' nion, six are necessary, if the soil is rich ; if
 ' middling, a little more. It ought never to be
 ' sown either upon poor land, nor that which
 ' exhales mists : Part of the seed should be sown
 ' in

‘ in the middle of the seed-time, and a part in
 ‘ the last of it, which is called the septimothial
 ‘ sowing : The early sowing is more common ;
 ‘ sometimes, however, the late sowing is the
 ‘ better : It is not good to sow after the winter
 ‘ solstice, and worst of all in the spring : Though
 ‘ there is likewise a spring bean, which ought
 ‘ to be sown in February, a fifth part more than
 ‘ of the early sown bean, but it has small stems
 ‘ and few pods ; on this account, it is common
 ‘ for the old husbandmen to say, that they would
 ‘ rather have the straw of the early sowing, than
 ‘ the crop of the late one. But, at whatever
 ‘ time of the year beans are sown, care must be
 ‘ taken that this be done on the fifteenth day of
 ‘ the moon, if she is not quite full ; if not on
 ‘ that day, it ought to be done on the fourteenth,
 ‘ while her light is increasing ; and this though
 ‘ it is not possible to cover the whole seed that is
 ‘ sown ; for beans receive no hurt from night
 ‘ dews, or indeed from any other thing, provi-
 ‘ ded they are defended from cattle and birds.
 ‘ The ancient husbandmen, and Virgil likewise,
 ‘ were of opinion, that they should be steeped in
 ‘ *amurca* or nitre before sowing, *that so they*
 ‘ *might produce plump fruit in the falacious pods ;*
 ‘ and

‘ and I have likewise found, that, thus prepared,
 ‘ their fruit is less subject to be hurt by the
 ‘ wevil *.’ The same author, in his Kalendar,
 says:

* Fabae pinguiſſimus locus, vel ſtercoratus deſtinatur, et ſi veteretum erit in valle ſitum, quod a ſuperiore parte ſuccum accipit, prius tamen jaciemus ſemina, deinde proſcindemus terram, proſciſſamque in liram revocabimus, occabimusque, quo altius largiore humo contegatur. Nam id plurimum refert, ut radices enatorum ſeminum penitus demerſae ſint. Sin autem proximae meſſis occupandum erit reſtibile, deſectis ſtramentis, quatuor et viginti vehes ſtercoris in jugerum diſponemus, diſſipabimusque. Et ſimiliter cum ſemen crudo ſolo ingeſſerimus, inarabimus, imporcatumque occabimus: Quamvis ſint, qui negent locis frigidis oportere occari fabam, quia extantes glebae a gelicidiis adhuc eam teneram vindicent, et aliquem teporem frigore laboranti praebeant. Sunt etiam, qui putent, in arvis hanc eandem vice ſtercoris fungi; quod ſic ego interpretor, ut exiſtmem, non ſationibus ejus pingueſcere humum, ſed minus hanc quam caetera ſemina vim terrae conſumere: Nam certum habeo frumentis utiliorem agrum eſſe, qui nihil, quam qui iſtam ſiliquam proximo anno tulerit. Jugerum agri, ut Tremellio, quatuor; ut nobis videtur, fabae ſex occupant modii, ſi ſolum pingue ſit; ſi mediocre, paullo amplius; eaque nec macrum, nec nebulofum locum patitur. Denſa tamen humo ſaepe comode reſpondet. Media ſementi pars feri, et pars ultima debet, quae ſeptimonialis ſatio dicitur. Tempeſtiva frequentius:

says : ‘ But this you must take particular notice
 ‘ of, that, on the day before the full moon, if
 ‘ not on that day, certainly on the day of the
 ‘ full moon, you must sow all the beans you in-
 ‘ tend in one day ; and, if defended from cattle
 ‘ and birds, you may afterwards plough them
 ‘ in ; and, if the course of the moon allows,
 ‘ you ought to have them harrowed before the
 ‘ thir-

quentius : Nonnunquam tamen fera melior est. Post
 brumam parum recte feritur, pessime vere ; quamvis sit
 etiam trimestris faba, quae mense Februario feratur, quin-
 ta parte amplius quam matura : Sed exiguas paleas, nec
 multam siliquam facit. Veteres itaque rusticos plerum-
 que dicentes audio, malle se matura fabalia quam fructum
 trimestrem. Sed quocumque tempore anni feretur, opera
 danda erit, ut quantum destinaverimus in sationem, tan-
 tum quinta-decima luna, si tamen ea non transcurreret eo
 die Solis radios, quod Graeci *προγεγοισ* vocant ; si minus,
 quarta-decima utique adhuc crescente lumine spargatur,
 etiam si confestim totum semen operiri non poterit. Ni-
 hil enim nocebitur ei nocturnis roribus aliisque ex causis,
 dum a pecore et avibus vindicetur. Priscis autem rusticis,
 nec minus Virgilio, prius amurca, vel nitro macerari eam,
 et ita feri placuit : *Lactior ut foetus siliquis fallacibus esset ;*
Et quamvis igni exigua proferata maderent. Nos quoque sic
 medicatam comperimus, cum ad maturitatem perducta
 sit, minus a curculione infestari ; Col. lib. II. cap. x.

' thirteenth of November in new land, or at
 ' least in land well dunged *.' This author says
 further, with respect to the culture of beans:
 ' There are many, who think that beans ought
 ' not to be hoed, because, when ripe, being pul-
 ' led up with the hand, they can be separated
 ' from the other herbs, which may be left for a
 ' crop of hay. Of this opinion is even Corne-
 ' lius Celsus, who enumerates this among the
 ' other advantages of this pulse, that the beans
 ' being reaped, a crop of hay may be got from
 ' the same place: But he appears to me to be a
 ' very bad farmer, who encourages weeds to
 ' grow amongst his corn; for, if the practice of
 ' destroying weeds is given up, our crops will
 ' be greatly lessened: Nor is it the sign of a
 ' wise husbandman, to be more desirous to raise
 ' fodder for cattle, than food for men; especi-
 ' ally when that may be got by the culture of
 ' mea-

* Sed et proprie hoc observabis, ut pridie, quam
 plenilunium sit; si minus, certe ipso plenilunio omnem,
 quam faturus es, fabam uno die spargas: Sed postea lice-
 bit ab avibus et pecore defensam obruas: Eamque, si ita
 competierit lunae cursus, ante Idus Novembris occatam
 habeas quam pinguiissimo et novo loco; si minus, quam
 stercoreatissimo; Col. lib. xi. cap. ii.

‘ meadows. So much indeed am I convinced,
 ‘ that the hoeing of beans is beneficial, that I
 ‘ am of opinion, they ought to be three times
 ‘ hoed; for I have found, that a crop thus cul-
 ‘ tivated, not only produces plentifully, but
 ‘ grows so little to the husk, that the *modius* is
 ‘ nearly as full after the beans are bruised and
 ‘ cleaned, as when entire, so that the measure
 ‘ is scarcely lessened by taking away the husks*.
 He says likewise, that beans ought to be hoed
 for

* *Fabam multi ne sarriendam quidem putant, quod et manibus, cum maturuerit, ducta secernatur a caetera runcatione, et inter natae herbae foeno reserventur: Cujus opinionis etiam Cornelius Celsus est, qui inter caeteras dotes leguminis hanc quoque enumerat, quod sublata faba foenum ex eodem loco secari posse dicat. Sed mihi videtur pessimi agricolae, committere, ut fatis herba proveniat: Frugibus enim plurimum detrahatur, si relinquitur runcatio. Neque enim est rustici prudentis magis pabulis studere pecudum, quam cibus hominum; cum praesertim liceat illa quoque cultu pratorum consequi: Adeoque fabam sarriendam censeo, ut existimem debere ter sarri: Nam sic cultam comperimus non solum multiplicare fructum, sed exiguam portionem in valvulis habere, fronsaeque ejus et expurgatae modium pene tam plenum esse, quam integrae, cum vix minuatur mensura detractis putaminibus; Col. lib. II. cap. XII.*

for the first time, when they are three inches above the ground *.

Palladius is not so particular in his account of the culture of this pulse as Columella: However, to what Columella says, he adds a few things: 'The Greeks,' says he, 'assert, that the seed which is steeped in capons blood, is not hurt by destructive weeds; that, if infused in water the day before sowing, it will spring the sooner; and that, if sprinkled with water that has nitre dissolved in it, it is more easily boiled †.'

Pliny,

* Sed et faba eandem culturam exigit, si jam coliculus ejus in quatuor digitos altitudinis creverit: Nam prius sarrivisse nimium teneram non expedit; Col. lib. xi. cap. ii.

† In hujus principio fabam spargimus, quae pinguissimum vel stercoreatum desiderat locum, vel vallem quam succus veniens a summitate, foecundet. Primo seritur, deinde profcinditur, et tunc sulcatur. Occanda est large, ut tegi plurimum possit. Aliqui locis frigidis dicunt in fabae satione glebas non esse frangendas, ut per eas gelidiorum tempore possint germina obumbrata defendi. Satione ejus generis, sicut opinio habet, non foecundatur terra, sed minus laeditur. Nam Columella dicit, agrum frumentis utiliore probari, qui anno superiore vacuus fuerit, quam qui calamos fabaceae messis eduxit. Pingue jugerum

Pliny, upon the authority of Cato says, 'that beans ought to be sown upon strong land *.' He says further; 'That in choosing land for them, though it has carried no crop the preceding year, yet a field that has been lately dunged should be pitched upon †.' He mentions the sowing them upon unploughed land, without any detriment to the crop, as a great saving ‡. He observes, that 'Virgil directs the
' feed

jugerum sex modii occupant; mediocre, amplius. Spisso bene provenit; macrum solum nebulosumque non patitur. Curandum est praecipue, ut luna xv. feratur, si adhuc ictum solis repercussa non sensit. Aliqui dicunt quartam decimam potius eligendam. Sanguine caponis Graeci afferunt fabae semina macerata herbis adversantibus non noceri; aqua pridie infusa citius nasci, nitrata aqua resperfa cocturam non habere difficilem; Pal. lib. xii. tit. i.

Faba autem, si bis farculetur, proficiet, et multum fructum et maximum afferet; ut ad mensuram modii complendi fresa propemodum sicut integra respondeat; lib. ii. tit. ix.

* In solo valido fabam; Plin. Nat. Hist. lib. xviii. cap. xvii.

† Item in novalibus, tametsi in illis fabam feri volunt, eandem ubicunque quam recentissime stercoreato solo; lib. xviii. cap. xxiii.

‡ At fabam et viciam non proficisso serere sine damno, compendium operae est; lib. xviii. cap. xx.

‘ seed to be steeped in nitre and *amurca*, promoting, that by this the fruit will be made larger.’ And to this, he adds: ‘ Some are of opinion, that steeping the seed, three days before sowing, in urine and water, makes them produce plentifully *.’ The quantity which he assigns to a *jugerum* is six *modii* †; and the time of sowing about the end of October. He observes, that Virgil’s direction to sow them in spring, is agreeable to the practice of the country around the Po, which practice he condemns ‡. And, although he does not expressly declare, that they ought to be sown immediately before the full moon, as Columella and Palladius do, yet

* Virgilius nitro et amurca perfundi jubet fabam: Six etiam grandescere promittit. Quidam vero, si triduo ante satum urina et aqua maceretur, praecipue adulescere putant; lib. xviii cap. xvii.

† Serere in jugero temperati soli justum est tritici aut filiginis modios v.—Fabae quintam partem amplius quam tritici; lib. xviii. cap. xxiv.

‡ Seritur ante Vergiliarum occasum leguminum prima, ut antecedit hiemem. Virgilius eam per ver feri jubet, Circumpadanae Italiae ritu. Sed major pars malunt fabalia maturae sationis, quam trimestrem fructum; lib. xviii. cap. xii.

yet he mentions this as the opinion of some*. He ranks them among the crops that are twice hoed, and not weeded: He gives, as a reason for not weeding them, that they get the better of weeds †: He says, the hoeing should be begun when they have shown the third leaf; and that it should be a light hoeing, and not a digging ‡. He adds, agreeable to what is asserted by Columella, that, when thrice hoed, there is a *modius* of beans bruised out from a *modius* of them entire ||. He ranks them, with Cato, amongst the crops that better land §: He says

ex-

* Having mentioned that the fall of the leaf is, to the unlearned husbandman, the sign that he should begin to sow, he adds: ‘Varro in fabae utique satu hanc observationem custodiri praecepit. Alii plena luna ferendum;’ lib. xviii. cap. xxv.

† Triticum, hordeum, semen, fabam bis farrire melius est.—Faba runcari non gestit; quoniam evincit herbas; lib. xviii. cap. xxi.

‡ Faba vero non antequam trium foliorum. Tunc quoque levi sarculo purgare verius, quam fodere; lib. xviii. cap. xxvi.

|| Ter quidem farritam modium fractae e modio solidae reddere; lib. xviii. cap. xvii.

§ Segetem stercorant fruges; lupinum, faba, vicia; lib. xvii. cap. ix.

Aut

expressly that they serve in place of dung ; but, in this case, he certainly supposes that the crop is ploughed in, for he immediately adds : ‘ Therefore, in Macedonia and Theffaly, as soon as they begin to flower, the fields are ploughed *.’

Now, from what is related by these writers, we may observe in what manner this pulse was cultivated. The farmer made choice of the strongest land for it ; and, if this was not very rich naturally, or in very good heart, it was well dunged : The seed was sown immediately before the full moon, in the end of October or beginning of November, at the rate of six *modii* to the *jugerum*. Some persons, before sowing, steeped the seed in *amurca* and nitre, and others in a mixture of urine and water : After the seed was sown, the land was ploughed as the fallow when it got the first furrow, and afterwards it was formed into ridges, so as to keep it dry through the winter, and allow the crop to be hoed. This operation was performed twice, and

Aut faba subolata sint, et quae terram faciant laetiozem ;
lib. xviii. cap. xxi.

* Solum, in quo sata est, laetificat stercoreis vice. Ideo circa Macedoniam, Theffaliamque, cum florere incipit, vertunt arva ; lib. xviii. cap. xii.

and sometimes thrice; and, if the land was not bettered by the crop, was universally allowed not to be much the worse.

There are a variety of things, which, according to these rustic writers, were regulated by the time of the moon; and, among others, the sowing of beans: In this no doubt there was much superstition; and this superstition naturally arose from their considering the moon as a goddess. Varro, in the beginning of his treatise, addresses himself, not to the muses as the poets do, but to the gods that preside over agriculture, and of these *Sol* and *Luna* hold the second place, because their seasons are observed when many seeds are sown, and many fruits laid up for preservation*. But there might be other reasons for this regard. The attentive farmers might observe, from experience, that their crops were more secure from certain accidents to which they were liable, by being sown at a particular time of the moon: They might observe, likewise, that seed sown at one time of the moon

came

* Secundo solem et lunam, quorum tempora observantur, cum quaedam feruntur et conduntur; Var. lib. 1. cap. 1.

came up sooner than when sown at another; and these may have been the reasons for the directions which they give.

That in attending to the time of the moon in sowing, they had the first of these in view, is evident from a variety of passages. Columella, after mentioning two different seasons for sowing vetches, and giving some directions about them, adds: 'Care must be taken not to sow them before the twenty-fifth day of the moon: 'If they are, I have found, from experience, 'that they will be greatly hurt by the snail*.' Pliny mentions several things, the sowing of which is regulated by the moon; amongst others, the vetch. He says, 'Lentiles are to be 'sown from the twenty-fifth day of the moon to 'the thirtieth. The vetch ought likewise to be 'sown on the same days of the moon; so it will 'be safe from the snail†.' Palladius, to the same purpose, treating of the culture of this pulse,

* *Observandum erit, ne ante quintam et vigesimam lunam terrae mandetur; aliter fatae fere limacem nocere comperimus; Col. lib. II. cap. XI.*

† *Lentem vero a vigesimo quinto ad trigessimum; viciam quoque iisdem lunae diebus. Ita demum sine limacibus fore; Plin. Nat. Hist. lib. XVIII. cap. XXV.*

pulse, says, ‘ Care must be taken not to sow it
 ‘ before the twenty-fifth day of the moon, be-
 ‘ cause, when sown before this, it is destroyed
 ‘ by snails *.’ That some insects may be enti-
 ced by the light of the moon to come abroad in
 the night, that in darkness keep in their holes ;
 and that some may be prevented by this light
 from coming abroad, that venture out when it
 is dark ; are things which, it must be acknow-
 ledged, are not improbable. Agreeable to this,
 it is asserted by Pliny, that the ant works in the
 night-time at the time of the full moon, and
 rests at the change †. Now, it is a thing well
 known, that many plants, when in the first
 blade, are in greater danger of being destroyed
 by insects, than in any situation afterwards : If
 so, there is certainly a time of the moon in
 which, when seed is sown, the young plants are
 in less danger of being destroyed, than when
 sown at any other. Pliny, as has already been
 observed,

* Observandum est, ne ante vigesimam quintam lunam
 feratur, quia sic fatam limaces persequuntur ; Pal. lib. 11.
 tit. vi.

† Praeterea tam facile intelligi, ut formica minimum
 animal interlunio quiescat, plenilunio etiam noctibus o-
 peretur ; Plin. Nat. Hist. lib. xviii. cap. xxix.

observed, says, that beans come up in fifteen days : Now, when sown immediately before the full moon, they would come up about the time of the change, at which time some of the hurtful insects are probably confined.

But it might likewise be observed by the attentive husbandmen, that seed sown at one time of the moon came up sooner than when sown at another. This seems to be implied in a general direction given by Palladius, and the reason which he assigns for the direction. ‘ All seed,’ says he, ‘ should be sown in the increase of the moon, and in warm days, for warmness makes it spring, and cold prevents it *.’ Though we are not sensible of the heat of the moon, yet it is probable that it is in proportion to her light, and may have some influence in vegetation. That the corn in autumn is ripened by the full moon, is asserted by many farmers ; and, if this is true, we may easily believe, that, in the same situation, she has an influence upon the seed that is sown, and makes it spring sooner. We may therefore conclude, that the directions
which

* Omnia quae feruntur, crescente luna, et diebus tepidis sunt ferenda ; nam tepor evocat, frigus includit ; Pal. lib. 1. tit vi.

which the Roman rustic writers give about sowing at particular times of the moon, do not proceed entirely from superstition.

The other operations which these writers say ought to be regulated by the motions of the moon, may perhaps have as little concern with superstition as these mentioned. For what we know, the moon may have greater influence in vegetation than is commonly supposed. The influence that she has upon the sea, in causing the tides, is acknowledged almost by all that are acquainted with these things. If the principles are just, by which the moon's influence upon the tides is accounted for, she must have a similar influence upon the air, which is a fluid as well as water; and this influence must be greater or less, according to her situation. The greater influence that she has upon the air, at the full and change, is often discovered in storms, which are commonly most violent at these times: this greater influence is found likewise, in some cases, to affect the animal structure; and that it may have a much greater effect in vegetation, is not impossible. The Roman farmers, therefore, in the regard which they paid to the situation of the moon in some
of

of their operations, may have, for what we know, acted agreeably to rules established by long experience and observation.

Every farmer that considers the manner in which beans, according to these authors, were cultivated, will observe, that there is something in it that is very remarkable. They were sown upon unploughed land; and, when no dung was laid on, upon land that had not carried a crop the year immediately preceding, and in this case had not been ploughed for two years. The seed, after being sown, was ploughed in; afterwards, the field was formed into ridges, in such a manner as to allow the crop to be hoed; and, lastly, it was harrowed. If any of our ploughmen were directed to do these things, they would find themselves at a great loss: Besides, if the land happened to be stiff, it would rise in such clods as no harrowing would be sufficient to break. But, in the Roman agriculture, and soils of Italy, the directions are easily executed, and the land easily reduced. It must be remembered, that the land on which beans were sown, in the Roman husbandry, was in high narrow ridges: These ridges were formed by the furrow that ploughed in the former seed,
and

and the hoeing given to the former crop. When seed of any kind is sown upon land in this situation, the greatest part of it falls into the furrows. The beans thus sown were ploughed in, by cleaving the ridges with the common plough. If this operation was performed in the same manner, as land was commonly ploughed for the first time, the mold would be better broken, and prevented from rising in such large clods as by the common ploughing. By this manner of ploughing, the furrows would be left very foul, and unfit for water furrows. Hence it became necessary to clear them with the boarded plough, by which they would be deepened, the seed better covered, and the field formed into proper ridges. After this, the land was harrowed; not as our land is, by which the furrows would have been filled up, but by drawing rakes along the crowns of the ridges, and breaking any clods that were there. This method of cultivating beans would probably answer very well on lands moderately light; and it must be remembered, that the lands called strong lands in Italy, are light lands when compared with our clays in Britain.

Beans

Beans have been long cultivated in some parts of Britain; but, in former times, they were commonly sown in the broad cast way, and little care taken to prepare the land for them.

Of late years, a method of culture has been introduced, that has a nearer resemblance to the Roman method, and is found to succeed much better. When the plough is going in the field, the sower follows it, and drops the seed into every second or third furrow that is made in ploughing. By this method of sowing, the beans rise in rows at $1\frac{1}{2}$ or 2 feet distance the one from the other. The intervals are carefully hoed several times; and, if the soil is tolerably deep and in good order, a very great crop is produced. Some persons approach still nearer to the Roman method of culture; they sow the field in the broad cast way, and then cover the seed by throwing one furrow against another, in the manner already described; or they first plough the field in this manner, then sow, and cover the seed with harrows drawn along the ribs. In both these ways, particularly the last, very good crops have been raised. There is another way that has been tried likewise with success, and which has the appearance of being the best.

best. In the beginning of winter, the field is formed into small ridges by two *bouts* of the plough. If it is proposed to dung the field, this should be done in the time of frost, and the dung laid in the furrows. At seed-time, the seed is sown on the top of the dung, and then covered by a small one-horse plough. The ridges should be made 24 or 26 inches broad, which a ploughman in any degree attentive can easily do by the four furrows; when of this breadth a plough can be used for hoeing. This operation should be performed twice at least; and, if hands can easily be got, the rows should be weeded. A field of a deep soil cultivated in this manner, and properly managed, may be expected to produce, if dunged, or if in good heart without dung, at the rate of five or six quarters in the English acre, and the field after the crop in good order.

Very little is said by the rustic writers with respect to the culture of the other pulse mentioned, except informing us, in general, what kind of land is proper for them, what was the quantity of seed sown upon the *jugerum*, and what was the kind of work and number of days that

210 OF THE HUSBANDRY

the crops required. As they are not much used in Britain, and of no great consequence, it is needless to make any particular inquiry about them.

CHAP.

C H A P. XXXII.

Of the Culture of the Medica, and other things sown for green forage.

THERE were a great many things cultivated by the Romans, to be cut green for forage to the labouring cattle. These following are mentioned, as applied for this purpose; *ocinum, foenum Graecum, vicia, cicera, ervum, farago*. They were commonly sown in autumn. Cato recommends a second and third sowing. 'Sow,' says he, 'at seed-time *ocinum, vicia, foenum Graecum, faba, ervum*, for forage to the oxen. Sow fodder a second and third time; then sow other fruits *.' Columella mentions
two

* Sementim facito, *ocinum, viciam, foenum Graecum, fabam, ervum, pabulum bubus*. Alteram et tertiam pabuli fationem facito. Deinde alias fruges serito; Cat. cap. xxvii.

two sowings of the *vicia* and *foenum Graecum*, and gives an account of their culture. One of the sowings was intended for a crop of fruit, and the other for green forage. ‘There are,’ says he, ‘two sowings of the *vicia*; one for forage, about the time of the autumnal equinox, at the rate of seven *modii* to the *jugerum*; the other, for carrying fruit in the month of January, and even later, at the rate of six *modii*. At both times the seed may be sown on unploughed land, but better upon land once ploughed. This seed, when sown, is hurt by dews, and therefore ought not to be thrown into the ground, till after eight or nine in the forenoon, when all the moisture is sucked up by the sun, or carried off by the wind; nor ought more to be sown at a time than can be covered the same day; for, if night comes on before this is done, it will be corrupted, as this is occasioned by the smallest moisture. Care must be taken not to sow them before the twenty-fifth day of the moon, otherwise we find they will be greatly hurt by the snail*.’

A

* *Viciae autem duae sationes sunt. Prima, qua pabuli causa circa aequinoctium autumnale serimus septem modios*

A little after, he says : ‘ There are two seasons
 ‘ for sowing *foenum Greacum*, which the husband-
 ‘ men call *siliqua* : The one for forage in the
 ‘ month of September, about the equinox, at
 ‘ the same time with the *vicia* ; the other in the
 ‘ end of January, or beginning of February, for
 ‘ reaping. In the last case, six *modii* are sown on
 ‘ the *jugerum*, in the first, seven. In both cases,
 ‘ the seed may be sown not improperly upon
 ‘ unploughed land ; and care must be taken,
 ‘ that it be ploughed in with very shallow and
 ‘ narrow furrows ; for, if the seed is covered
 ‘ more than three inches deep, it does not easi-
 ‘ ly spring up ; for which reason, some first
 ‘ plough the land with small ploughs, then sow
 ‘ and

dios ejus in unum jugerum : Secunda, qua sex modios
 mense Januario, vel etiam serius jacimus femini progene-
 rando. Utraque satio potest cruda terra fieri, sed melius
 profcissa : Idque genus praecipue non amat rores, cum
 feritur. Itaque post secundam diei horam, vel tertiam
 spargendum est, cum jam omnis humor sole ventove de-
 terfus est : Neque amplius projici debet, quam quod eo-
 dem die possit operiri. Nam si nox incessit, quantulocun-
 que humore prius, quam obruatur, corrumpitur. Obser-
 vandum erit, ne ante quintam et vigesimam lunam terrae
 mandetur ; aliter satae fere limacem nocere comperimus ;
 Col. lib. 11. cap. xi.

‘ and cover the seed with hoes *.’ Pliny mentions three seasons for sowing the *vicia*; the first about the setting of Arcturus, to be pastured in December; he adds, ‘ then is the best time to sow it for fruit, and the crop is not hurt by being pastured.’ The second sowing, he says, is in January, and the latest in March; ‘ Then,’ he adds, ‘ it is best for forage.’ Pliny observes further, with respect to the *vicia*, that, if early reaped, the straw is the best of any, and that it requires very little culture: ‘ It does not,’ says he, ‘ require much work from the husbandman; it is sown upon land once ploughed; it is not hoed nor dunged; nor does it require any thing to be done to it after sowing, but
‘ to

* Foenum Graecum, quod filiquam vocant rustici, duo tempora sationum habet: Quorum alterum est Septembris mensis (cum pabuli causa feritur) iisdem diebus quibus *vicia* circa aequinoctium: Alterum autem mensis Januarii ultimo, vel primo Februarii, cum in messem seminatur: Sed hac ratione jugerum sex modis, illa septem occupamus: Utraque cruda terra non incommode fit: Daturque opera, ut spisse aretur, nec tamen alte: Nam si plus quatuor digitis, adobrutum est semen ejus, non facile prodit: Propter quod nonnulli prius quam ferant, minimis aratris profcindunt, atque ita jaciunt semina, et farculis adobruunt; Col. id.

‘ to be harrowed *.’ Some of these crops were supposed to better the land that produced them; Cato mentions the *vicia* among the crops of this kind †.

Columella observes, that it was the opinion of Salserna, that land was bettered by crops of the *lupinum*, *faba*, *vicia*, *ervum*, *lens*, *cicercula*, *pisum*, and then adds: ‘ I am in no doubt that
 ‘ this may be the case with the lupine, and like-
 ‘ wise the vetch, when used for green forage;
 ‘ if, immediately after the forage is cut, the
 ‘ stubble, while it is yet green, is ploughed in:
 ‘ This indeed will serve for a dunging; but if,
 ‘ after the forage is cut, the roots are left to wither, they deprive the soil of all its juice, and
 ‘ the earth of all its virtue; which apparently
 ‘ happens

* *Vicia*—nec ipsa agricolis operosa: Uno sulco sata, non sarritur, non stercoratur, nec aliud quam deocatur. Sationis ejus tria tempora: Circa occasum Arcturi, ut Decembri mense pascat; tunc optime seritur in semen. Æque namque fert depasta. Secunda satio mense Januario est; novissima Martio; tum ad frondem utilissima.— Ex semine ejus, si lecta matura est, palea caeteris praefertur; Plin. Nat. Hist. lib. xviii. cap. xv.

† *Lupinum*, *faba*, *vicia*; Cat. cap. xxxvii. An attempt is made to explain this difficult passage in cap. xi.

‘ happens likewise in a crop of beans, and other
 ‘ pulse, by which the earth seems to become
 ‘ fatter ; for, if the land is not ploughed imme-
 ‘ diately after the crop is reaped, they are of no
 ‘ benefit to the crops that follow *.’ Palladius
 expresses himself to the same purpose : ‘ The
 ‘ lupine,’ says he, ‘ and the vetch for forage,
 ‘ if cut green, and the field immediately plough-
 ‘ ed, enrich land in the same manner as dung ;
 ‘ but, if they are allowed to wither before the
 ‘ land is ploughed, the juices of the earth are
 ‘ carried off by them †.’ Pliny says in the ge-
 neral

* Sed ex iis, quae retuli, feminibus, idem Saferna pu-
 tat aliis stercoreari et juvari agros, aliis rursus peruri, et e-
 maciari. Stercoreari lupino, faba, vicia, ervo, lente, cicercu-
 la, piso. De lupino nihil dubito, atque etiam de pabulari
 vicia, si tamen eam viridem defectam confestim aratrum
 subsequatur, et quod falx reliquerit, priusquam inarescat,
 vomis rescindat, atque obruat : Id enim cedit pro stercore.
 Nam si radices ejus defecto pabulo relictæ inaruerint, suc-
 cum omnem solo auferent, vimque terrae absument, quod
 etiam in faba, caeterisque leguminibus, quibus terra glis-
 cere videtur, veresimile est accidere : Ut si protinus sub-
 lata messe earum rescindatur, nihil in segetibus, quae
 deinceps in eo loco feminari debent, profuturum sit ; Col.
 lib. II. cap. XIV.

† Lupinus et vicia pabularis, si virides succidantur, et
 statim

neral of the vetch, that it enriches the fields * : He says the same of the lupine. However, he seems to be of the same opinion with Columella, that they must be cut or pastured green, and the land ploughed immediately to make them answer this purpose; for, although he does not say this, yet he directs it to be done †.

Besides the things already mentioned, the *medica* was also sown for forage. This is an article so important, that it deserves to be treated separately, and very particularly.

This plant was considered as a medicine for sick cattle: Both Columella and Palladius inform us of this: And, it is probable, that it was on this account that it got the name of *medica*. This is the more probable, as the Assyrian apple, which was considered as an antidote
 against

statim supra sectas eorum radices aretur, stercoris similitudine agros foecundant: Quae si exaruerint, antequam profcindas, in his terrae succus aufertur; Pal. lib. 1. tit. vi.

* Et vicia pinguescunt arva; Plin. Nat. Hist. lib. xviii. cap. xv.

† Pinguescere hoc fatu arva vineasque diximus. — Si depastum sit in fronde inarari protinus solum opus est; lib. xviii. cap. xiv.

against poison, had this name given it by some*. It is not impossible, however, but that it may have received the name of *medica* from the country from which it was brought; for Pliny informs us, that it was not found originally in Greece; but that it was brought from Medea, in the time of Darius †. This author gives a description of it: He says ‘It is like the trefoil, ‘ jointed where the branches and leaves come; ‘ and the higher up in the stalks, the leaves are ‘ the more contracted ‡.’

The properties of the *medica* Columella represents in this manner: ‘But of all those that ‘ please us, the herb *medica* is the most excellent; because one sowing lasts ten years, and ‘ affords commonly four, sometimes six cuttings ‘ in the season; because it enriches the land ‘ that produces it; fattens all kinds of lean cattle, and is a remedy for such as are sick; and ‘ because

* Malus Assyria, quam alii vocant medicam, venenis medetur; Plin. Nat. Hist. lib. XII. cap. III.

† Medica externa etiam Graeciae, ut a Medis advecta per bella Persarum, quae Darius intulit; lib. XVIII. cap. XVI.

‡ Similis est trifolio; caule, foliisque geniculata; quidquid in caule affurgit, folia contrahuntur; id.

‘ because one *jugerum* completely feeds three
 ‘ horses for a whole year *.’ Palladius to the
 same purpose, says; ‘ One sowing lasts ten years,
 ‘ and may be cut four or six times in the year ;
 ‘ It enriches land, fattens lean cattle, cures sick
 ‘ ones, and a *jugerum* of it completely feeds three
 ‘ horses for a whole year †.’ Pliny agrees with
 Columella and Palladius, with respect to the
 number of cuttings that the *medica* affords in a
 year ; for he says, that ‘ it affords six, at the
 ‘ least four †.’ But he differs from them with
 respect to the time that it lasts ; for he says, in-
 stead

* Sed ex iis quae placent, eximia est herba medica ;
 quod cum semel feritur, decem annis durat ; quod per
 annum deinde recte quater, interdum etiam sexies, deme-
 titur ; quod agrum stercoreat ; quod omne emaciatum ar-
 mentum ex ea pinguescit, quod aegrotanti pecori remedi-
 um est ; quod jugerum ejus toto anno tribus equis abunde
 sufficit ; Col. lib. 11. cap. 11.

† Medica serenda est ; quae semel feritur, decem an-
 nis permanet, ita ut quater vel sexies possit per annum
 recidi. Agrum stercoreat, macra animalia reficit, curat
 aegrota ; jugerum ejus toto anno tribus equis abunde suf-
 ficit ; Pal. lib. v. tit. 1.

‡ Id sexies evenit per annos, cum minimum, quater ;
 Plin. Nat. Hist. lib. xviii. cap. xvi.

stead of ten, that it lasts thirty years *. Pliny, as he was indefatigable in his inquiries, might have seen, or been informed, of some fields that had lasted good, no less than thirty years, though it was seldom allowed to stand, or continued good more than ten. It is commonly destroyed by the natural grass, and it is uncertain how long it might continue to flourish, if delivered from this enemy.

The most remarkable thing with respect to the *medica*, mentioned by these authors, is this, that a *jugerum* of it is sufficient to maintain three horses for a whole year. A late author thinks, that these ancient authors have exaggerated a little in their accounts of this matter; his words are:
 ‘ As most authors have been imitators (or transcribers rather) one from another, in matters
 ‘ of husbandry, so of course no one has ventured to controvert these assertions of Columella
 ‘ and Palladius, but admitted them implicitly,
 ‘ for the space of 1700 years. Nevertheless, I
 ‘ cannot help suspecting that the *Roman authors*
 ‘ *exaggerated a little*; for, as the methods of
 ‘ drilling,

* Tanta dos ejus est; cum ex uno fatu amplius quam tricenis annis duret; id.

drilling, transplanting, and horse-hoeing, were
 then unknown, (and as we have raised greater
 crops by these means, than ever were raised
 by broad cast promiscuous sowing, even in I-
 taly) I cannot easily induce myself to believe,
 that three quarters of an English acre will
 maintain plentifully three working horses the
 whole year round: Nor do I imagine that it
 can be done either in France or Italy at pre-
 sent*. Were these authors capable of exag-
 gerating in their accounts of any thing which
 they relate as a fact, they must be considered as
 unworthy of credit, or of being cited as autho-
 rities for the principles and practices of the Ro-
 man husbandry. I think myself, therefore, be-
 fore I proceed further, obliged to endeavour at
 least to vindicate them from this aspersions, and
 to remove the difficulty that arises from what
 they have asserted in this matter; and I hope to
 do this to satisfaction, without supposing a bul-
 lock fed upon the green *medica*, and the profits
 employed to buy hay for the horses, which is the
 only way that this gentleman can contrive,
nearly

* *Essays on Husbandry*, printed for W. Frederick in Bath, 1764; *Essay II. sect. XI. p. 124.*

nearly to verify the assertion of Columella and Palladius*.

In this, I must begin by observing, that this author commits a mistake, when he says, that a Roman husbandman allowed twenty pounds of lucern hay at night only to a working ox: For this he cites the authority of Varro †. In a note he cites likewise the authority of Cato ‡. I do not find that Varro gives any account of the quantity of food given to an ox. Cato indeed says; ‘Give twenty-five pounds of hay to one ox in the night ||.’ And, in another place; ‘Give in spring a *modius* of malt, or of grape stones, or a *modius* of steeped lupines, and fifteen pounds of hay §.’ Columella says, that ‘forty pounds of hay in the day, is sufficient for an ox in the season of his greatest labour **.’

But

* Essay II. sect. XI. p. 126.

† Essay II. sect. XI. p. 124.

‡ Essay II. sect. XIII. p. 134.

|| Interdiu pascito, noctu foeni pondo xxv. uni bovi dato; Cat. cap. LIV.

§ Ubi verno dare coeperis, modium glandis aut vinaciorum dato, aut modium lupini macerati, et foeni pondo xv.; Cat. id.

** Vel si nihil horum est, per se foeni pondo quadraginta; Col. lib. VI. cap. III.

But the hay mentioned by Cato cannot be supposed to be *medica* hay; for he does not so much as mention this plant in his treatise; and, it is probable, that, in his time, it was little known in Italy. Instead of *medica* hay, we have more reason to believe, that it was short straw mixed with weeds, and sprinkled with salt; for we find, immediately before the passage from Cato last cited, this direction given: ‘When you build
 ‘ up the straw, put under cover that kind amongst
 ‘ which there is the greatest quantity of weeds,
 ‘ and sprinkle it with salt, then give it for hay *.’ Besides, it is probable, as shall be shown afterwards, that, in this passage, there is an error of the transcribers, and that in place of, xxv. it should be x. or xv. at most. That the hay mentioned by Columella is meadow hay, appears from a passage in the chapter last cited from this author; for, after observing, that, in dry countries, the oxen must be fed at their stalls with such food as the country affords, he mentions the kinds that are best in this manner: ‘And
 ‘ nobody doubts but vetches, and chichlings,
 ‘ and

* Cum stramenta condes, quae herbosissima erunt, in testo condito, et sale spargito; deinde ea pro feno date; Cat. cap. LIV.

‘ and meadow hay (*foenum pratense*) are the
‘ best *.’

Lucerne hay, as appears by the experiments made by M. Lullin de Chateaufvieux, in the environs of Geneva, is much more nourishing than common hay: He found, that his horses, fed partly with common hay, and partly with this hay chopped, were in better order, than when fed with common hay and oats †. M. du Hamel too, informs us, that it was that gentleman’s custom, to feed his horses with lucerne in the summer, the season of their greatest labour; and that he observed more and more the advantage of that food; and that five or six pound weight in the day, was sufficient for an horse of an ordinary size ‡. From this account
of

* Eoque nemo dubitat, quin optimi sunt vicia in facem ligata, et cicercula, itemque pratense foenum; Col. lib. vi. cap. III.

† Je quis affurer, que de chevaux nourris en partie de certe luzerne, et sans avoine, feront en meilleur etat, plus forts, et plus vigoureux, que ceux qu’ on nourrira du foin de pres naturels, et auxquels on fera manger de l’avoine suivant l’usage ordinaire; Du Hamel, Cult. de ter. tome IV. chap. III. art. XVI.

‡ M. de Chateaufvieux ne met ses chevaux à la luzerne que

of the matter, it appears, that one pound of lucerne, whether in grass or in hay, is to be considered as equal in feeding to two or three pounds of ordinary grass; and therefore, that, to maintain three horses during the winter, it is not necessary that there should be as much lucerne hay, as there is of common hay used for this purpose.

I must next observe, that this author is very right in his conjecture, that, as the laborious work among the Romans was performed by oxen, the farmers horses being used only for riding, were not so well fed as our labouring horses are. There is a passage in Columella, that puts this beyond all dispute, and informs us in what proportion grass and hay were given to oxen and horses: Treating of the famous shrub *cytissus*, he says; ‘ Fifteen pounds of it green are
 ‘ sufficient for a horse, twenty for an ox, and to
 ‘ other animals it ought to be given according
 ‘ to

que pendant l’été, saison dans laquelle ils travaillent le plus, et il reconnoît de plus en plus l’avantage de cette nourriture. Cinq ou 6 livres pesant de luzerne, données chaque jour, suffisoient pour entretenir des chevaux de moyenne taille; tom. v. ch. v. art. x.

‘to their strength*.’ In this passage, we find not only the proportion, but also the quantity of this kind of food given to horses and oxen. We may be sure, that there was not such a quantity of it in weight given when dry, as when green. Columella advises care to be taken of this in the passage that follows the one last cited: ‘If you shall give it dry,’ says he, ‘give it more sparingly, because it has more strength; first infuse it in water, and, when taken out, mix it with short straw †.’ Pliny is more particular; after saying, that this kind of forage is always given to cattle after it is two days cut, and, in the winter, infused in water, because it is dry, he adds; ‘Ten pounds are sufficient for a horse, and to other cattle in proportion †.’

What

* Equo abunde est viridis pondo xv. bubus pondo vicensena, caeterisque pecoribus pro portione virium; Col. lib. v. cap. xii.

† Aridum si dabis, parcius praebeto, quoniam vires majores habet, priusque aqua macerato, et exemptum paleis permisceto; id.

‡ Datur animalibus post biduum semper. Hieme vero quod inaruit, madidum. Satiant equos denae librae, et portione minora animalia; Plin. Nat. Hist. lib. xiii. cap. xxiv.

What the Roman authors have said in commendation of the *medica*, has already been mentioned: To judge of its value, it may not be amiss to compare with this what they say with respect to the *cytifus*.

Varro joins the *medica* and *cytifus* together, and says, that they are both fit for feeding sheep, that they easily make them fat, and produce milk *. Columella says; ‘ It is of very great
 ‘ importance to have as much *cytifus* in the farm
 ‘ as possible, because it is very useful for poul-
 ‘ try, bees, goats, oxen likewise, and all kinds
 ‘ of cattle; because it soon fattens sheep, and
 ‘ makes ewes give plenty of milk; likewise be-
 ‘ cause it may be used eight months for green
 ‘ forage, and afterwards may be used dry. Be-
 ‘ sides, in every kind of land, even the poorest,
 ‘ it quickly strikes root, and is not hurt by any
 ‘ accident †.’

This,

* At maxime amicum cytifum, et medica. Nam et pingues facit facillime, et genit lac; Var. lib. II. cap. II.

† Cytifum in agro esse quam plurimum maxime referet, quod gallinis, apibus, capris, bubus quoque et omni genere pecudum utilissimus est: Quod ex eo cito pinguescit, et lactis plurimum praebet ovibus: Tum etiam quod octo mensibus

This, in another place, he repeats almost verbatim*.

Pliny gives still a more particular account of this shrub: 'There is a shrub,' says he, 'called *cytissus*, very much recommended by Aristomachus the Athenian for food to sheep; and, when dry, for swine likewise; and he promises, that the annual return from a *jugerum* of middling land, shall be two thousand *sestertii*, (L. 64: 11: 8), useful as the *ervum*, but fattens more quickly, quadrupeds fattening very much by a moderate quantity, so that labouring cattle fed upon it despise barley. There is no kind of forage that produces better milk, or a larger quantity of it; and, by the experience of all, is found to be the best medicine for the diseases of cattle †.' In another place,

he
mensibus viridi eo pabulo uti, et postea arido possis. Præterea in quolibet agro, quamvis macerrimo, celeriter comprehendit; omnem injuriam sine noxa patitur; Col. lib. v. cap. xii.

* Liber de Arboribus, cap. xxviii.

† Frutex est et *cytissus*, ab Aristomacho Atheniensi miris laudibus prædicatus pabulo ovium, aridus vero etiam suum; spondetque jugero ejus annua H s. vel mediocri solo redditus. Utilitas, quæ ervo, sed ocyor *fatietas*,

he joins the *cytifus* and *medica* together, and seems to mention them as of equal value: After having given an account of the culture of the *medica*, he adds: ‘Of the *cytifus*, to which and this kind is given the palm amongst the forage *.’ When we consider these accounts of the *medica* and *cytifus*, given us by these ancient authors, and compare them with the account given us of lucerne by M. Lullin de Chateaueux, we cannot certainly be thought to deviate far from the truth, in supposing, that a quantity of *medica*, whether green or dry, was equal in value, for feeding horses, to the same weight of *cytifus*. Now, if this is allowed, a *jugerum* of *medica*, far inferior in value to the crops raised by M. Lullin de Chateaueux, will appear sufficient for the maintenance of three horses during the whole year †.

Thus

tietas, perquam modico pinguescente quadrupede, ita ut jumenta hordeum spernant. Non ex alio pabulo lactis major copia aut melior, super omnia pecudum medicina a morbis omni usu praestante; Plin. Nat. Hist. lib. XIII. cap. XXIV.

* De cytifo, cui et ipsi principatus datur in pabulis; Plin. Nat. Hist. lib. XVIII. cap. XVI.

† Lucerne may be cut green for one half of the year,

at

Thus I have endeavoured to vindicate the Roman authors from the charge brought against them,

at least, which is 183 days. M. Lullin de Chateauvieux cut a field six times; the first time in May, and the last in November: 'En 1753, J'ai coupé six fois cette luzerne, savoir, en Mai, Juin, Juillet, Août, Septembre, et a la dernière fois au commencement de Novembre;' Du Hamel Cult. de Ter. tom. iv. ch. iii. art. xvi. Now, at the rate of 15 lib. *per* day, 2745 lib. of green lucerne is sufficient for one horse, and 8235 lib. for three horses, during that time. It is supposed, that green lucerne, when dried, loses three fourths of its weight. At this rate, 8235 lib. of green lucerne would produce, of dry hay, 2059 lib. nearly. For the remaining 182 days, let us suppose, that the horses are fed on hay, at the rate of ten pounds each in the day: At this rate, 1820 lib. is sufficient for one horse, and 5460 lib. for three horses, during that time: This 5460 lib. added to 2059 lib. the quantity of dry hay that we suppose may be produced by the quantity of green lucerne, necessary for three horses in the summer half of the year, makes 7519 lib. the quantity of hay that a *jugerum* must produce to maintain three Italian horses for a whole year, at the rate of 15 lib. of green lucerne *per* day in the summer, and 10 lib. of dry hay *per* day in the winter, the quantities of *cytisus* that were given. A Roman pound is to an Averduoise pound as three to four nearly; so that 7519 lib. Roman, are nearly equal to 5639 lib. Averd. to 5035 lib. Dutch, and to 4604 lib. of Geneva.

M.

them, of exaggerating in their accounts of the value and utility of the *medica*; with what success,

M. Lullin de Chateavieux had of dried lucerne hay, from an arpent, in the year 1754, 15300 lib. in 1755, 13396, and in the 1756, 17108. ‘ Un planche de 40 toises longueur à un seul rangée de luzerne

‘ A rapporte de ‘ foin sec	}	En 1754	225	} liv. pes.’
		En 1755	197	
		En 1756	281	

Du Hamel, Cult. de Ter. tom. v. chap. v. art. v. compared with tom. iv. ch. iii. art. xvi. where we find the following passages: ‘ En 1754, la luzerne a poussé plus tard au printemps: Les terres ont été encore plus seches, que l’année precedente, je n’ai fait que cinq recoltes; la premiere le 27 Mai, la second, le 1 Juillet; la troisieme, le 27 Juillet; la quatrieme, le 26 Août; la cinquieme, le 23 Octobre. — Ces cinq recoltes ont donné en total par planche deux cents vingt-cinq livres pesant de foin tres-sec. — Un terrain de 40 toises de longueur, comme font mes planches, et de 34 toises de largeur, contiendrait un arpent; cet arpent divisé en 64 planches de 3 pieds de largeur chacune; fournissant sur le pied de 225 livres pesant de foin par planche, le produit total d’une année seroit 153000 livres pesant par arpent.’ In this passage, the size of the arpent is mentioned; it is said, that a field 40 toises long and 34 broad, make one; the toise by which this gentleman reckoned, was not the Geneva toise
of

cells, is left to the impartial reader to determine. It is proper now to give some account of their manner of cultivating this valuable plant.

Cato

of nine feet, but the French toise of six feet: 'Ce champ
' contient, suivant notre mesure, six poses. Chaque pose
' est de 400 toises quarrées, la toise a neuf pieds de roi :
' Enforte que toute la surface de ce champ est de 5400
' toises de six pieds de roi ;' p. 468. — 'Ce champ con-
' tient environ 1960 de nos toises, ou 4200, toises de
' six pieds de roi ;' p. 478. — 'Premierement le champ
' de six poses, ou de 5400 toises ;' p. 483. — 'Le champ
' d'environ cinq poses ou 4200 toises ;' *ibid.* These pas-
sages, compared together, shew evidently, that it is the
toise of six feet by which M. de Chateauxvieux reckons.
As the letters in which these things are mentioned, are
addressed to M. du Hamel, it is natural to suppose, that
he means French feet. The arpent, therefore, according
to this account, contains 1360 square, or 48960 square
feet, which is 560 square feet more than the largest of the
French arpents: The French foot is to the English foot
as 1068 to 1000; the square foot French is therefore to
the square foot English as the square of 1068, which is
1140624, is to the square of 1000, which is 100000; so
that 48960 square feet French are equal to 55844 square
feet English nearly, the number of square feet English in
an arpent of Geneva.

A Roman *jugrum*, according to Columella, as has al-
ready been observed, contains 28800 square feet Roman,
which

Cato mentions neither the *medica* nor *cytibus*,
 an evidence that they were not then cultivated
 in

which are equal to 26928 square feet English; so that an arpent of Geneva is nearly equal to 2.074 Roman *jugera*. The smallest yearly produce of the arpent of Geneva, mentioned by M. Lullin de Chateavieux, is in the year 1755, which is 13396 lib.: In this proportion, a Roman *jugerum* should produce 6466 lib. It has already been observed, that the quantity necessary for maintaining three horses for a whole year, is 5035 lib. Dutch, or 4604 lib. of Geneva. Now, if the pounds mentioned by M. de Chateavieux, are Dutch or French pounds, a Roman *jugerum*, at the rate mentioned, produces 1431 lib. more than is necessary: And, if the pounds mentioned by that gentleman are Geneva pounds, a Roman *jugerum* produces, at the rate mentioned, 1862 lib. more than is necessary. But let it be remembered, that, in the year 1756, the arpent mentioned produced no less than 17108 lib. of hay. In this proportion, a Roman *jugerum* should produce 8253 lib.: If these are Dutch pounds, there are 3218 lib. more, and if Geneva pounds, 3649 lib. more than necessary. This would afford to three horses in the year, at the rate of 24 lib. Roman of green forage in the day, during the summer half of the year; and at the rate of 16 lib. of dry hay in the day, during the winter, to each horse. This is much more than was given of the *cytibus*, yet it may perhaps be thought too little; and probably would be found so in this climate: But though it should,

in Italy ; for, as he was very careful in the management of his farm, had such valuable plants been cultivated in Italy, he certainly would have tried them.

Varro mentions both the *medica* and *cytissus* in the passage that has already been cited ; he says very little about the culture of these plants ; all that

yet this would be no evidence that the Roman rustic writers have exaggerated in this matter ; for it is more than probable, that, in the climate of Italy, lucerne is much stronger food than in the climate of Britain ; was it not so, we cannot suppose, that five or six pounds of hay, made of it, would serve in place of a day's feeding of oats, as M. Lullin de Chateauvieux asserts, which, at a moderate computation, makes it equal in value to its weight of the very best kind of oats. It is a thing well known to every grazier, that, in a warm dry season, the same quantity of grass goes much farther in feeding cattle, than in a cold and wet season : And, indeed, it is natural to suppose, that the juices of the earth are rich in proportion to the smallness of the quantity of water contained in them ; and that, in consequence of this, the juices of the plants nourished by these richer juices are richer likewise. If this is the case, lucerne, in the warm and dry climate of Italy, is certainly much stronger food, than in the cold and wet climate of Britain ; and less weight of it is necessary for nourishing an equal number of the same kind of cattle.

that we find in his writings, about the culture of the *medica*, is as follows: ‘ Concerning the *medica*, it must be particularly observed, not to put the seed into land too dry or various, but of a temperate moisture: If the land is of this kind, authors say, that one and one-half *modius* of seed is necessary to a *jugerum*. It is sown in the same manner as the seed of fodder and corn *.’

Virgil

• De *medica* in primis observet, ne in terram nimium aridam, aut variam, sed temperatam, semen demittas. In *jugerum* unum, si est natura temperata terra, scribunt opus esse *medicae* sesquimodium, id feritur ita, ut semen jactatur, quemadmodum scilicet cum pabulum, et frumentum feritur; Var. lib. i. cap. XLII.

Commentators are not agreed whether the former part of this sentence belongs to the *medica*, or to the sowing of olives, which he mentions immediately before. It is of no great importance to which of the two it belongs; however, it appears rather to belong to the *medica*, even though it should be true that the first two words of the sentence, *de medica*, are not in the old copies. Varro, in the preceding chapter, says, that it is much better to plant the suckers of the fig tree in a nursery, than sow the seed, and mentions the raising of figs and olives from the seed, as proper only when persons are disposed to send particular kinds over the sea, or bring them from beyond

it:

Virgil does no more than direct the *medica* to be sown in spring upon land well reduced*.

Columella is very particular in his directions about the culture of the *medica*: ‘The field,’ says he, ‘destined to be sown in the spring with *medica*, must be ploughed about the beginning of October, and allowed to mellow through the winter; about the beginning of February
‘ it

it: ‘Quare ex’ (it should rather be *et*) ‘terra potius in
‘feminariis surculos de ficeto, quam grana de fico expedit
‘obruere: Praeter si aliter nequeas: Ut si quando quis
‘trans mare femina mittere, aut inde petere vult.’ Then, after giving an account of the method, and observing, that by that means several kinds of figs had been brought into Italy, he adds: ‘For the seed of olives may be sown
‘when in the kernel; but, because the stem grows much
‘flower from it than from the stock, when ingrafted into it,
‘therefore we choose rather to plant stocks in the nursery.
‘—Simili de causa oleae semen cum sit nucleus, quod
‘ex eo tardius enascebatur colis, quam e taleis, ideo potius
‘in feminariis taleas, quas dixi, serimus.’ After this, one would imagine, that he would scarcely mention what kind of land is most proper for this seed; at least, that this would not have appeared to him of such importance, as mentioning what kind is most proper for the *medica*, which he has not done, unless in these words.

* Vere fabis fatio: Tum te quoque medica putres

Accipiunt fulci.

Vir. Geor. 1. l. 215.

' it must be ploughed a second time, all the
 ' stones carried off, and the clods well broke;
 ' afterwards, it must be ploughed a third time
 ' in March, and harrowed: When the mold is
 ' thus well reduced, the field must be formed
 ' into beds, like those in a garden, ten feet
 ' broad and fifty feet long, that so through the
 ' whole of it water may be easily conveyed, and
 ' access given to weeders; then old dung must
 ' be laid on, and, in this situation, it must be
 ' sown in the month of April, at the rate of a
 ' *cyathus* upon fifty square feet; when this is
 ' done, the seed must be immediately covered;
 ' it is important to attend to this, for the seed
 ' is very soon destroyed by the sun; after it is
 ' sown, it must not be touched by any iron tool,
 ' but cleaned with wooden rakes, and frequent-
 ' ly weeded, that so no kind of weed may de-
 ' stroy the feeble *medica*: It is proper to let it
 ' stand, before the first cutting, till some of the
 ' seed has fallen; afterwards, when it is grown
 ' up, it may be cut as tender as is thought
 ' proper, and given to the labouring cattle; but
 ' at first sparingly, till they are accustomed to it,
 ' lest the novelty of the forage should hurt
 ' them; for it makes cattle swell, and creates
 ' much

' much blood : After every cutting, it must be
 ' frequently watered, and a few day's after,
 ' when the plants begin to bush, every kind of
 ' weed must be plucked out. Thus cultivated,
 ' it will cut six times in the year, and last ten
 ' years *.' The quantity of seed which Colu-
 mella

* Locum in quo medicam proximo vere faturus es,
 profcindito circa Calendas Octobris, et eum tota hieme
 putrescere finito. Deinde Calendis Februariis diligenter
 iterato, et lapides omnes egerito, glebaeque offringito.
 Postea circa Martium mensem tertiato, et occato. Cum
 sic terram subegeris, in morem horti areas latas pedum
 denum, longas pedum quinquagenum facito, ut per femi-
 tas aqua ministrari possit, aditusque utraque parte run-
 cantibus pateat. Deinde vetus sterco injicito ; atque ita
 mense ultimo Aprilis serito tantum, quantum ut singuli
 cyathi feminis locum occupent decem pedum longum, et
 quinque latum. Quod ubi feceris, ligneis rastris, id enim
 multum confert, statim jacta femina obruantur : Nam ce-
 lerrime Sole aduruntur. Post sationem ferro tangi locus
 non debet. Atque, ut dixi, ligneis rastris farriendus, et
 identidem runcandus est, ne alterius generis herba invali-
 dam medicam perimat. Tardius messem primam ejus
 facere oportebit, cum jam feminum aliquam partem eje-
 cerit. Postea quam voles teneram, cum profuerit, dese-
 ces licet, et jumentis praebeas ; sed inter initia parcius,
 dum consuescant, ne novitas pabuli noceat : Inflat enim,
 et

mella affigns, is a *cyathus* to fifty square feet; this is 576 *cyathi* to the *jugerum*; there are 192 *cyathi* in the *modius*; so that 576 *cyathi* are equal to three *modii*. This is at the rate of five pecks to the English acre, and a little more than six pecks wheat measure to the Scotch acre.

Palladius is likewise particular in his directions about the culture of the *medica*, and expresses himself much in the same manner as Columella does: In his kalander for September, he says; ‘ In the end of this month the lands ought to be ploughed for the first time, that are intended for *medica* *.’ In February, he says; ‘ Now the land intended for *medica* (of the nature of which we shall treat, when we direct how to sow it) ought to be ploughed a second time, and, after taking off all the stones, ought to be well broken; And, about the beginning of March, the soil being reduced as
‘ in

et multum creat sanguinem. Cum secueris autem, saepius eam rigato. Paucos deinde post dies, ut coeperit fruticare, omnes alterius generis herbas eruncato. Sic culta sexies in anno demeti poterit, et permanebit annis decem; Col. lib. ii. cap. xi.

* Hoc mense postremo, prima vice agros proficiademus, qui habituri sunt medicam; Pal. lib. x. tit. vii.

' in a garden, beds are to be made, ten feet
 ' broad and fifty feet long, so as water may be
 ' thrown upon them, and they may be easily
 ' weeded from each side; then, laying on old
 ' dung, they are to be left, thus prepared, to
 ' the month of April *.' In April, he says;
 ' In this month, the *medica* ought to be sown in
 ' the beds already prepared in the manner that
 ' has been mentioned.' Then, after the passage
 cited before, representing the properties of this
 forage, he adds: ' One *cyathus* of seed is suffi-
 ' cient for a place that is five feet broad and ten
 ' feet long. Immediately after the seed is sown,
 ' it must be covered with wooden rakes, for it
 ' is very quickly burned by the sun: After it
 ' is sown, the place must not be touched with
 ' iron, but the weeds frequently pulled out with
 ' wooden rakes, lest they should choke the
 ' tender

* Nunc ager qui accepturus est medicam (de cujus
 natura, cum erit ferenda, dicemus) iterandus est, et pur-
 gatis lapidibus, diligenter occandus. Et circa Martias Cal.
 subacto sicut in hortis solo, formandae sunt areae latae pe-
 dibus x. longae pedibus quinquaginta, ita ut eis aqua mi-
 nistretur, et facile possint ex utraque parte runcari. Tunc
 injecto antiquo stercore in Aprilem mensem referentur pa-
 ratae; Pal. lib. III. tit. VI.

'tender *medica*. The first cutting should be so
 'late, as to make a little of the seed fall; af-
 'terwards, it may be cut as soon as is thought
 'proper, and given to labouring cattle; but, at
 'first, this new kind of forage must be given
 'sparingly, for it makes cattle swell, and creates
 'much blood. After cutting, it should be wa-
 'tered often, and a few days after, when it be-
 'gins to brush, all weeds must be pulled out.
 'Thus, it will cut six times in the year, and
 'last for ten years together *.'

Pliny

* *Aprili mense in arvis, quas ante (sicut diximus) prae-*
parasti, medica ferenda est.——Singuli cyathi feminis
occupant locum latum pedibus quinque, longum pedibus
decem. Sed mox ligneis rastellis obruantur jacta femina,
quia Sole citius comburuntur. Post sationem ferro locum
tangi non licet, sed rastris ligneis frequenter herba mun-
detur, ne teneram medicam premat. Prima messis ejus
tardius fiet, ut aliquantum semen excutiat. Caeterae
vero messes quam volueris cito peragantur, et jumentis
praebeantur. Sed primo parcius praebenda est novitas
pabuli: Inflat enim, et multum sanguinem creat. Ubi
fecueris, saepius riga; post paucos dies, cum fruticare
coeperit, omnes alias herbas runcato: Ita et sexies per an-
num metis, et annis decem poterit manere continuis; Pal.
lib. v. tit. i.

Pliny is likewise particular in his directions about the culture of the *medica*; 'The land,' says he, 'intended for it, must be stoned, cleaned, and well ploughed, in autumn; afterwards it must be ploughed again, the mold well broken by harrowing it with a *crates* again and again, allowing five days to intervene between each harrowing; after this it must be dunged. But let it be observed, that it requires a dry soil, not in danger however of being too much parched, or a soil capable of being watered. If the soil is wet and foul with root weeds, the *medica* is soon overcome, and the field becomes a meadow. The land, thus prepared, is sown in May; if sooner, it is in danger of being hurt by hoar frost: It is necessary, that by the seed the whole land be occupied, that so the weeds that would grow amongst it may be excluded; for which reason, twenty *modii* are necessary for a *jugerum*: Care must be taken to prevent the seed from being burned after it is sown, and therefore it must be immediately covered with earth about an inch deep; likewise, as soon as the seeds appear, they must be pulled out, rather with the hand than with a hoe. It should be cut when it begins
' to

' to flower, and again as often as the flower ap-
 ' pears; this will happen six times in a year, at
 ' least four times. It should not be allowed to
 ' perfect its seed, because the forage is the more
 ' valuable, and in this case continues good for
 ' three years. It ought to be hoed in spring,
 ' and freed from all weeds. After three years,
 ' it may be scraped close to the ground by *mar-*
 ' *rae*: Thus the other herbs will be destroyed,
 ' without any damage to it, on account of the
 ' depth of its roots: If weeds shall get the better
 ' of it, the only remedy is to plough it often,
 ' till all their roots are destroyed. It should not
 ' be given to satiety, lest it should be necessary
 ' to let blood; it is most useful when green;
 ' *when allowed to stand long*, it dries one shoot
 ' after another, and at last is reduced to an use-
 ' less dust *.'

The

* Solum, in quo feratur, elapidatum purgatumque
 subigitur autumnis: Mox aratum, et occatum integitur
 crate iterum ac tertium, quinque diebus interpositis, et fimo
 addito. Poscit autem siccum succosumque, vel riguum.
 Ita praeparato feritur mense Maio; alias pruinis obnoxia.
 Opus est densitate feminis omnia occupari, internascentef-
 que herbas excludi. Id praestant in jugera modica vicena.
 Cavendum ne aduratur, terraque protinus integri debet.

Si

The quantity of seed mentioned by Pliny is very extraordinary, no less than twenty *modii* upon

Si sit humidum solum, herbosumve, vincitur, et desciscit in pratum. Ideo protinus altitudine unciali herbis omnibus liberanda est, manu potius, quam sarculo. Secatur incipiens florere, et quoties refloruit. Id, sexies evenit per annos, cum minimum, quater. In semen maturefcere prohibenda est, quia pabulum utilius est usque at trimatum. Verno feri (rather sariri) debet, liberarique caeteris herbis: Ad trimatum, marris ad solum radi. Ita reliquae herbae intereunt sine ipsius damno, propter altitudinem radicum. Si evicerunt herbae, remedium unicum est aratio, saepius vertendo, donec omnes aliae radices intereant. Dari non ad satietatem debet, ne deplere sanguinem necesse sit. Et viridis utilior est. Arescit sarculosae ac postremo in pulverem inutilem extenuatur; Plin. Nat. Hist. lib. xviii. cap. xv.

Any person that takes the trouble to compare the translation which I have given of this passage, with the original, will observe, that I have transposed some of the sentences: In the order that the sentences and words stand, they are not intelligible: Immediately after ‘*poscit autem siccum succosumque, vel riguum,*’ I have placed ‘*si sit humidum solum herbosumque, vincitur, et desciscit in pratum:*’ This last sentence, in its situation according to the printed copies, seems to contain an argument for weeding; but it may be observed, that weeding is strongly recommended, of whatever kind the soil is upon

upon a *jugerum*: As Columella and Palladius propose only three *modii*, and Varro no more than

on which the *medica* is sown. This passage, therefore, ought rather to be considered as a caution not to sow the *medica* upon such kind of land. He says, that it requires a dry soil; and, to engage persons to choose this kind, he adds: 'If it is a wet soil, the crop is soon destroyed by weeds.' In this view, I have considered it in the transposition; besides, by transposing it in the manner I have done, the words 'altitudine unciali,' come nearer to 'ter-raque protinus integri debet,' with which passage they ought certainly to be joined. To speak of pulling out weeds an inch deep, and with the hand, rather than the hoe, is improper and unintelligible; but, to speak of covering seed an inch deep is very intelligible, and, in this case, a thing not improper: As the seed was sown in beds, the earth, from the alleys, as in a garden, might be thrown upon the seed, and thereby cover it to any depth. Columella indeed says, that the seed was covered with wooden rakes: But, before Pliny's time, the method of covering it with earth from the alleys of the beds, may have been introduced as a better one. There seems to have been more freedom used with it in a matter more material. Columella expressly forbids it to be touched with an iron tool; whereas Pliny says, that on the third year, it should be scraped close to the ground by *marrae*, to destroy weeds.

The

than the half of this, it cannot be supposed that the quantity mentioned by Pliny is necessary. But, whether this is a mistake in Pliny himself, or in his transcribers, is uncertain.

When weeds get the better of the *medica*, Pliny proposes, as a remedy, to plough the field often, till all their roots are destroyed: 'if weeds,' says he, 'shall get the better of it, the only remedy is to plough it often, till all other roots are destroyed.' By this way of expressing himself, it seems to have been his opinion, that this operation destroys the weeds, while at the same time it does not hurt the *medica*. When a field, promiscuously sown with *medica*, is ploughed with a plough that has a narrow pointed share, that goes very narrow below, and does not remove the earth much from its place, as seems
to

The manner in which the sentences are transposed, is as follows: 'Poscit autem ficcum succosumque, vel riguum. Si sit humidum solum, herbosumve, vincitur, et defiscit in pratum. Ita praeparato feritur mense Maio; alias pruinas obnoxia. Opus est densitate feminis omnia occupari, internascentesque herbas excludi. Id praestant in jugera modia vicena. Cavendum ne aduratur, teraque protinus altitudine unciali integri debet. Ideo protinus herbis omnibus liberanda est, manu potius, quam sarculo.'

to have been the case with the Roman plough, it is probable, that the roots of the *medica*, being strong and deep, resist the share, and remain unhurt, while the other roots are torn up and destroyed by it.

From the whole accounts given, it appears, that the Romans were at great pains in cultivating this plant; and in this they were justified by the value of the crop. The methods of culture now proposed, transplanting, setting in rows, and horse hoeing, or pastinating, as the Romans called this kind of culture given to their trees, are certainly improvements, especially in wet soils, and in climates where the natural grass is so much encouraged: But, in the dry soils and climate of Italy, the method practised by the Romans may be supposed to have answered very well; and, if we can raise such crops, with all our advantages, as they raised, we may be very well satisfied.

C H A P. XXXIII.

Of the Culture of the Rapa and Napus.

THE *rapa* and *napus* are two kinds of turnip, that were cultivated by the Romans. Columella says of the *napus*, that it does not broaden into a belly, but pushes a small root downwards*.

Pliny says, that there are three kinds of the *rapa*: 'One kind,' says he, 'stretches out flat and broad; another kind grows round like a ball; the third is the wild kind, has a long root like a radish, has a pointed and rough leaf, and acrid juice †.'

The

* Quia non in ventrem latefcit, fed tenuem radicem deorfum egit; Col. lib. ii. cap. x.

† Species vero omnium tres. Aut enim in latitudinem fundi aut in rotunditatem globari: Tertiam speciem filveftrem

The difference between the *rapa* and *napus*, is represented both by Columella and Palladius, as occasioned by the soil on which they grow: Columella, after saying that the *rapa* delight in low and wet lands, and the *napus* in dry and sandy soils, he adds: ‘The nature of the soil changes the seed of both: If the *rapa* are sown in the soil different from their nature, in two years they are changed into the *napus*; and if the *napus* is sown in the soil different from its nature, it is turned in the same time into the *rapa* *.’ Palladius expresses himself almost in the same words †.

The

vestrem appellavere, in longitudinem radice procurrente, raphani similitudine, et folio anguloso scabroque, succo acri; Plin. Nat. Hist. lib. xviii. cap. xiii.

* Sed *rapa* campis et locis humidis laetantur; *napus* devexam amat, et siccam tenuique propiorem terram; itaque glariosis fabulosisque arvis melior exit, locique proprietates utriusque semper commutat. Namque in alio solo *rapa* biennio fata convertuntur in *napum*, in alio *napus* raporum accipit speciem; Col. lib. ii. cap. x.

† Loci proprietates utrumque semen in alterum mutat. Nam *rapa* in alio solo per biennium fata mutantur in *napos*; alio vero, *napus* transit in *rapum*; Pal. lib. viii. tit. ii.

The crops of both kinds were reckoned very valuable and useful. Columella says: 'It is proper to reckon the *napus* and *rapa* among the pulse, because both of them feed the rustics: The *rapa*, however, are the more useful of the two, because they have a greater increase, and not only serve for food to man, but, also to oxen; especially in Gaul, where these cattle are fed by them in winter *.'

'The Roman authors,' says Pliny, 'have treated of the *rapa* only in a cursory way; the Greeks more particularly; but as a plant to be cultivated in gardens: If a just order is observed, they should have been mentioned immediately after corn, at least after the bean; for there are none of the others more excellent or useful, none of them so well adapted for food for all sorts of animals: in the feed, they are proper food for all kinds of village fowls, particularly if boiled in water: Quadrupeds likewise are fattened with the leaves; and in their

* Ab his leguminibus ratio est habenda naporum raporumque: Nam utraque rusticos implent. Magis tamen utilia rapa sunt, quia et majore incremento proveniunt, et non hominem solum, verum etiam boves pascunt, praecipue in Gallia, ubi hiberna cibaria praedictis pecudibus id olus praebet; Col. lib. 11. cap. x.

' their season, the tender shoots are as agreeable
 ' to man, as those of any other plant: When
 ' dried and preserved, they are likewise stronger
 ' than when green; for they become hard, and,
 ' when preserved in the earth, they remain good
 ' almost to the season of the next crop, and
 ' hence are a constant food. The people on the
 ' other side the Po, reckon this crop the third
 ' in goodness, grapes and corn being only pre-
 ' ferable. They are approved of for our tables,
 ' dressed in a variety of different ways; and they
 ' are preserved the whole year mixed with mus-
 ' tard. Besides their natural colour, they may
 ' be painted six others, and, amongst these, pur-
 ' ple; nor is there any other thing used at our
 ' tables, that can conveniently be dressed in
 ' this manner. The Greeks suppose that there
 ' are two kinds, the male, and female; and are
 ' of opinion, that both are produced from the
 ' same seed by the manner of sowing; that, by
 ' thick sowing, or sowing upon stiff land, the
 ' male kind is produced; the smaller the seed is,
 ' it is reckoned the better. The best kind grows
 ' in the fields about Nursia. A pound is com-
 ' monly sold for a *sestertius*, and, in times of
 ' scarcity,

‘scarcity, for two. The next to this, is that
‘kind produced in the fields about Algidum *.’

Columella says: ‘Both kinds require a free
‘and open soil, and do not succeed on stiff land:
‘The *rapa* delight in moist and low fields, and
‘the *napus* in rising, dry, and light lands, and,
therefore,

* *Quanquam prius de rapis dixisse conveniat: In transfursu ea attingere nostri, paulo diligentius Graeci, et ipsi tamen inter hortensia: Si iustus ordo fiat, a frumento protinus aut certe faba dicendis, quando alii usus praestantior ab his non est. Ante omnia namque cunctis animalibus nascuntur, nec in novissimis satiant ruris alitum quoque genera, magisque si decoquantur aqua. Quadrupedes et fronde eorum gaudent. Et homini non minor rapaciorum suis horis gratia, quam cymarum; flavidorum quoque, et in horreis enecatorum, vel major quam virentium. Ipsa vero durant et in sua terra servata; et postea passa, paene ad alium proventum, famemque sentiri prohibent. A vino, atque messe, tertius hic Transpadanis fructus.—In cibis quidem nostris pluribus modis commendantur: Durantque ad alia, sinapis acrimonia domita, etiam coloribus picta, praeter suum, sex aliis, purpureo quoque; neque aliud in cibis tingi decet. Genera eorum Graeci duo prima fecere, masculum, foeminumque, et ea ferendi modo ex eodem semine. Densiore enim satum masculum, item in terra difficili. Semen praestantius, quo subtilius.—Palma in Nursino agro nascentibus. Taxatio in libras sestertii singuli, et in penuria bini: Proxima in Algido natis; Plin. Nat. Hist. lib. xviii. cap. xiiii.*

‘ therefore, is always good in gravelly and sandy soils.—In fields that can be watered, both kinds are properly sown after the summer solstice: In dry lands, the sowing must be delayed till the end of August, or beginning of September. They require the land to be well broken by frequent ploughings and harrowings, and also to be well dunged: This is of great importance, not only as the crop of these roots is thereby rendered larger, but as the land is thereby prepared for carrying good crops of corn *.’

‘ In the month of July,’ says Palladius, ‘ we may sow, in fields that can be watered, the *napus* and *rapa*: The soil must not be stiff, but free and open. The *rapa* delight in low moist lands;

* Solum putre et solutum res utraque desiderat, nec densa nascitur humo. Sed rapa campis et locis humidis laetantur, napus devexam amat, et ficcam tenuique propiorem terram. Itaque glariosis fabulosisque arvis melior exit.—Riguis locis utrumque recte ab solstitio feritur: Siccis, ultima parte mensis Augusti, vel prima Septembris. Subactum solum pluribus iterationibus aratri vel rastri, largoque stercore fatiatum postulant. Nam id plurimum refert, non solum quod melius ea proveniunt, sed quod etiam post fructum eorum sic tractatum solum segetes optimas facit; Col. lib. ii. cap. x.

‘ lands; but the *napus* succeeds best in dry, light,
 ‘ shelving, and sandy soils.—They require the
 ‘ land to be well reduced, well ploughed and
 ‘ dunged; because it is made to produce two
 ‘ crops in a year; the crop of turnip that is to
 ‘ be sown, and the crop of corn already reaped*.’
 ‘ In the month of August,’ says the same au-
 ‘ thor likewise, ‘ the *rapa* and *napus* are to be
 ‘ sown in dry places †.’

Pliny says: ‘ There is no necessity for great
 ‘ care in choosing soil for the *rapa*: They may
 ‘ be sown where scarcely any other crop will
 ‘ succeed: They are nourished by mists, by hoar
 ‘ frost, and cold, to a prodigious bulk; I have
 ‘ seen some of them upwards of forty pounds
 ‘ weight.’ He says, in another place: ‘ It is
 ‘ supposed, that by cold they are made both
 ‘ sweeter

* Hoc mense (Julio) loco irriguo, naps feremus, et
 rapa, solo putri et soluto, nec spisso. Locis humidis lac-
 tantur, et campus: Sed naps in sicco et prope tenui, at-
 que devexo, et sabuloso melior nascitur.—Subactum so-
 lum stercoreatum versatumque conquirunt, quod et ipsis et
 segetibus proderit, quae ibi anno eodem feruntur; Pal.
 lib. viii. tit. ii.

† Hoc etiam mense (Augusto) ultimo, sicis locis ra-
 pa et naps ferenda sunt, hac ratione qua ante dictum
 est; lib. ix. tit. v.

‘ sweeter and larger ; that by heat they grow
 ‘ to leaves.’ ‘ The Amiterninian *napus*,’ he says
 afterwards, ‘ which is of the same kind, delights
 ‘ equally in colds.’ He says further, with re-
 spect to the culture of these : ‘ They are sown
 ‘ in February, at the rate of four *sectarii* to a
 ‘ *jugerum*: The more diligent husbandmen plough
 ‘ five times for the *napus*, four times for the *ra-*
 ‘ *pa*, and apply dung to both. The crop of the
 ‘ *rapa* is bettered by sowing chaff with the seed.
 ‘ ———The proper time of sowing both kinds, is
 ‘ between the feasts of Neptune and Vulcan,’
 (from the end of July to the end of August).
 ‘ It is alledged, from a nice observation, that,
 ‘ if they are sown between the times mentioned
 ‘ on the same day of the moon on which the
 ‘ first snow in the preceding winter happened
 ‘ to fall, there will be an extraordinary crop.
 ‘ In warm and moist places, they are sown like-
 ‘ wise in spring *.’

Colu-

* Terram non merose eligit, paene ubi nihil aliud feri
 possit. Nebulis, et pruinis, ac frigore ultro aluntur, am-
 plitudine admirabili. Vidi xl libras excedentia.—Fri-
 gore dulciora fieri existimantur et grandiora ; tepore in
 folia exeunt.—Napi vero Amiternini, quorum eadem
 fere

Columella observes, that four *sextarii* of the seed of the *rapa* are sufficient for a *jugerum*; but that one-fourth more of the seed of the *napus* is required *. Palladius, to the same purpose, says, that four *sextarii* of the *rapa*, and five of the *napus*, are sufficient; and adds, that ‘when too thick, some of the plants must be pulled up, that so the rest may become stronger.’ The same author gives directions for transplanting the *rapa*, by which he observes, that they are made to grow very large: ‘To make them grow larger,’ says he, ‘pull them up, strip off the leaves,

fere natura, gaudent aequè frigidis. Seruntur et ante Calend. Martias in jugero sextarii quatuor. Diligentiores quinto fulco napum feri jubent, rapa quarto, utrumque stercoreata. Rapa laetiora fieri, si cum palea seminentur. — Satus utrique generi justus, inter duorum numinum dies festos, Neptuni atque Vulcani. Feruntque subtili observatione, quota Luna praecedente hieme, nix prima ceciderit, si totidem luminum die intra praedictum temporis spatium serantur, mire provenire; seruntur et vere in calidis atque humidis; Plin. Nat. Hist. lib. xviii. cap. xiii.

* *Jugerum agri non amplius quatuor sextariis raporum seminis obserendum est; quarta parte amplius napi spargendum, quia non in ventrem latefcit, sed tenuem radicem deorsum agit; Col. lib. ii. cap. x.*

‘ leaves, and cut them off within one-half finger
 ‘ of the root; then plant them in furrows of
 ‘ well reduced land, at the distance of eight
 ‘ fingers; cover their roots with earth, well
 ‘ pressed down: By this they will grow very
 ‘ large *.’

Columella says, that he had tried the sowing
 turnip seed upon hard ground, covered with
 chaff; but without success, as it is natural to
 suppose. He expresses himself in this manner:
 ‘ Hyginus is of opinion, that the seed of the
 ‘ *rapa* should be sown upon the chaff left in the
 ‘ *area* after threshing, thereby they will become
 ‘ very large; as the hardness of the ground un-
 ‘ der the seed, does not suffer the root to pene-
 ‘ trate

* Jugero raporum quatuor sextarii, napi autem quin-
 que sufficiunt. Si spissa sunt, intervalles aliqua, ut cae-
 tera roborentur. Ut vero femina majora redigantur, e-
 ruta rapa, foliis omnibus purgabis, et ad dimidii digiti
 crassitudinem in caule succides. Tunc in fulcis diligen-
 ter subasus, octonis digitis separata obrues, et injicies ter-
 ram, et calcabis; ita magna nascentur; Pal. lib. viii. tit.
 11. Five *sextarii* to the *jugerum* are nearly in the pro-
 portion of one-half peck to the English acre, and $2\frac{1}{2}$ for-
 pets wheat measure to the Scots acre.

‘trate deep. This I have often tried in vain,
 ‘and therefore am of-opinion, that the *rapa*, the
 ‘*raphanus*, and the *napus*, are much more ad-
 ‘vantageously sown upon well reduced soil *.’

Turnip, while in the first blades, is often destroyed by a fly, and the farmer thereby disappointed of his crop. This, it seems, is the case in Italy, as well as in Britain; and Columella informs us, that the accident happens only in the time of drought: He proposes a remedy, which, he says, he had tried with success; and which, therefore, deserves to be attended to: ‘Whoever,’ says he, ‘sows the *rapa* and *napus*
 ‘in summer, must take care lest, by reason of
 ‘drought, the fly consume the tender leaves,
 ‘when coming out; to prevent which, he ought
 ‘to gather the dust that is found in the cham-
 ‘bers, or the smoke that adheres to the roofs
 ‘above the fires; and then, on the day before
 ‘sowing, he should mix these with the seed, and
 ‘sprinkle

* *Rapae femina* Hyginus putat post trituram jacentibus adhuc in area paleis inspergi debere, quoniam fiunt vastiora capita, cum subjacens soli duritia non patitur in altum descendere. Nos istud saepe frustra tentavimus: Itaque rapum, et raphanum, et napum melius existimamus subacta terra obrui; Col. lib. xi. cap. iiii.

‘ sprinkle them with water, that through the
 ‘ night the sap may be sucked in; for, thus
 ‘ steeped, the seed may be sown next day. Some
 ‘ authors, as Democritus, direct that seeds be
 ‘ anointed with the juice of the herb called *se-*
 ‘ *dum*; and to use the same remedy against all
 ‘ insects; which, from experience, I have found
 ‘ to be true. But, because the sowing of this
 ‘ herb is not very great, I have more frequently
 ‘ used foot, and the above mentioned dust, and
 ‘ thereby have well enough secured the plants
 ‘ from hurt *.’

Summer

* Qui aestate ista feret, caveat, ne propter siccitates
 culex adhuc tenera folia prorepentia consumat. Id quo-
 que ut vitetur, pulvis qui supra cameram invenitur, vel
 etiam fuligo, quae supra focos testis inhaeret, colligi de-
 bet: Deinde pridie quam satio fiat, commisceri cum fe-
 minibus, et aqua conspergi, ut tota nocte succum trahant:
 Nam sic macerata postero die recte feruntur. Veteres
 quidam auctores, ut Democritus, praecipunt, semina om-
 nia succo herbae, quae sedum appellatur, medicare, eo-
 demque remedio adversus bestiolas uti; quod verum esse
 nos experientia docuit. Sed frequentius tamen, quoniam
 hujus herbae minus larga est facultas, fuligine, et prae-
 dicto pulvere utimur; satisque commode tuemur his in-
 columitatem plantarum; Col. lib. xi. cap. iiii.

Summer is the season in which turnips are commonly sown in our fields; and every farmer who has dealt much in the culture of them, has undoubtedly had occasion to make the same observation that Columella does in the above passage, which is, that it is in the time of drought that the young turnips are destroyed by the fly: In a rainy season, the flies are probably prevented from generating, or coming abroad; besides, when the land is in good heart, and has sufficient moisture, the plants, soon after they come up, push the second set of leaves which are not consumed by the fly, and by which, in consequence of this, the plants are preserved when the first set is gone. However, as drought is very common at the proper season of sowing, it is important to secure the young plants from the fly; and if sprinkling the seed, the day before that of sowing, with foot and water, is effectual for this purpose, as Columella asserts from his own experience, every person has it in his power to prevent his being disappointed in a crop from this accident.

Palladius, without seeming to have any particular view to turnip, says in the general: ‘ As
 ‘ a remedy against flies and snails, we spread ei-
 ‘ ther

‘ther new amurca, or soot from the chimnies*.’
 This indeed is much easier than what is proposed by Columella, but probably not so effectual. The soot, when sprinkled, may be washed from the feeds by rain, but, when once they have imbibed its oils, it is probable, that nothing will prevent the first leaves of the plant from tasting of them; in which situation, it is likewise probable, that no fly will touch them.

While the turnips were growing in the fields, it appears, that persons were not much restricted from pulling them. Columella observes, that, in his time, the more superstitious husbandmen still observed the custom of the ancients, who, while sowing them, prayed that they might grow both for themselves and neighbours †. Pliny likewise takes notice of this, and adds; ‘That the sower was naked ‡.’

Every

* Contra culices et limaces, vel amurcam recentem, vel ex cameris fuliginem spargimus; Pal. lib. i. tit. xxxv.

† Servantque adhuc antiquorum consuetudinem religiosiores agricolae, qui cum ea ferunt, precantur, ut et sibi, et vicinis nascantur; Col. lib. xi. cap. iii.

‡ Serere nudum volunt, precantur sibi et vicinis ferere se; Plin. Nat. Hist. lib. xviii. cap. xiiii.

Every person that is acquainted with the culture of this root, will observe, that there is very little difference between the method practised by the Roman farmers, as it has been described, and the ordinary method at present practised in Britain. It may likewise be observed, that the kind of soil which the Roman authors mention as the best for turnip, is found likewise by the British farmer to be the most proper for it; and therefore, we need not be surprised, considering the advantages of the climate, that great crops were raised, and that the roots should sometimes swell to the size and weight mentioned by Pliny.

There are a variety of different kinds of turnips cultivated in Britain, distinguished by their colours and shapes. The colour is commonly attended to, and yet seems to be of very little importance: The shape, on the other hand, seems to be most important, and therefore deserves the greatest attention: If a field of turnips is inspected in winter, it will be found, that many of those that are broad and flat in the top, are rotten, especially those that have several plants formed upon the broad top, while all those
that

that are round in the top, and oblong, are found and firm. This last kind, from their form, resists the rain, while the others receive it, especially those that are formed into several plants on the top, which are almost always split through in growing. Whether these differences are owing to circumstances arising from the soil and weather, I cannot say; but this is certain, that the several kinds may be very early distinguished by the position of the leaves. If the kinds are really different, so that the seed of each produces its kind, it would be of very great importance, if those that raise turnip seed, would keep the seed of the round and oblong turnips separate from the others. Perhaps it may be necessary to keep the turnips themselves separate while growing, which can easily be done by transplanting; for, when they are allowed to stand promiscuously in the same field, it is possible, that they may be so impregnated, as to prevent the seed from being precisely of the same kind with the root.

Before this chapter is concluded, it may not be improper to observe, that the Romans knew the several uses of turnip, as well as any of the
moderns;

moderns; and, that the feeding cattle with their roots in the winter season, an improvement in husbandry not very old in Britain, was, in the time of Columella, practised in Gaul.

CHAP.

C H A P. XXXIV.

Of the Culture of Flax or Lint. (Linum.)

FLAX or lint was reckoned by the Romans a very hurtful crop. ‘Lint-feed,’ says Columella, ‘ought not be sown, unless
 ‘there is reason to expect a very great crop,
 ‘and one is tempted by a very great price; for
 ‘it is of all other things the most hurtful to
 ‘land*.’ Virgil joins it with oats and puppy, and says; ‘That all these exhaust the soil†.’ Palladius says, that ‘it ought not to be sown on
 ‘account of its bad effects, for it exhausts the
 ‘fruit-

* Lini semen, nisi magnus est ejus in ea regione quam colis proventus, et pretium proritat, ferendum non est; agris enim præcipue noxium est; Col. lib. 11. cap. x.

† Urit enim lini campum seges, urit avenae;

Vir. Geor. I. l. 77.

‘Fruitfulness of the soil *.’ ‘To convince us,’
 that nature is unwilling to produce
 a barren land, and makes foil much
 He adds afterwards: ‘Nor is there
 brought to perfection;
 it is pulled in summer, and yet
 the land †.’

the ancients for sails
 ‘What greater miracle,’
 that there should be a plant,
 nearer to Italy,
 grow from so small a
 slender and short a stalk,
 carries the globe itself
 Through this was the principal
 use.

quod pro
 uber exhaust;
 urit agrum,
 Plin. Nat. Hist. lib.
 Vere fatum, aes-
 injuriam facit; id.

herbam esse, quae admo-
 Denique tam parvo femine
 vitro citroque portet, tam
 Plin. Nat. Hist.

use of it, linen however was likewise, by some nations, made of it, for wearing apparel: ‘The Cadurci,’ says Pliny, ‘the Caleti, the Ruteni, the Bituriges, and the Morini, reckoned the best of men, even all the nations of Gaul, weave it into webs; and, long ago, our enemies beyond the Rhine did the same; nor did their women know any garments more beautiful, than those made of this stuff*.’

All these authors, though they condemn the raising of lint, yet they say something of its culture: ‘It requires,’ says Columella, ‘a rich and moderately moist soil: It is sown from the beginning of October to the rising of *Aquila*, which is on the seventh of December: Eight *modii* are sown upon a *jugerum*; some sow it very thick upon poor land, that it may produce the finer flax: The same kind of seed is sown likewise in the month of February, upon dunged land; then it is necessary to sow ten
modii

* Cadurci, Caleti, Ruteni, Bituriges, ultimique hominum existimati Morini, imo vere Galliae universae vela ex eo texunt. Jampridem et Transrhenani hostes; nec pulchriorem aliam vestem eorum foeminae novere; id. cap. 1.

THE HUSBANDRY

Virgil mentions
which, he says, is from
In this
lint-feed
representing the
already
you will in
and mode-
on the
door and
It
place
some
low

to be
Geor.

si si veis loco
vna mo-
la aequantur

‘ sown lint-feed upon well dunged land, at the
 ‘ rate of ten *modii* to the *jugerum*, and obtain
 ‘ fine flax *.’ Pliny mentions only the spring
 sowing, and says: ‘ It is sown chiefly upon
 ‘ sandy soils, after one ploughing †.’

Pliny is the only one of the authors mentioned, that informs us in what manner lint was managed in Italy. Although this does not properly belong to agriculture, yet, as it is a branch of husbandry, it may not be improper to give an account of it. He expresses himself in this manner: ‘ We know when it is ready by two
 ‘ marks, the swelling of the seed, or the colour
 ‘ becoming yellow; then it is pulled up, bound
 ‘ into small bundles, and dried in the sun, hang-
 ‘ ing one day with the roots uppermost, and o-
 ‘ ther five in the contrary way, with the tops of
 ‘ the bundles inclining towards each other, that
 ‘ the seed may fall into the middle: The seed
 ‘ has power as a medicine, and was formerly u-
 ‘ sed by the nations beyond the Po, for making
 ‘ a

* Hoc mense aliqui lini semen laeto solo in jugerum
 x modios spargunt, et lina consequuntur exilia; id. lib.
 III. tit. XXII.

† Seritur fabulosis maxime, unoque fulco; Plin. Nat.
 Hist. lib. XIX. cap. 1.

‘ a rustic and luscious kind of meat ; but, for
‘ some time past, this is used only in religious
‘ ceremonies. After the wheat harvest, the
‘ stalks deprived of the seed, are steeped in wa-
‘ ter, that has been warmed in the sun, having
‘ some weight put upon them to keep them
‘ down, as they are of themselves very light ;
‘ the skin parting easily from the boon is the
‘ sign of its being well enough watered : It is
‘ turned up and down as before, and dried in
‘ the sun : When dry, it is bruised upon a stone
‘ by a lint mallet : That which is next to the
‘ boon, is called *stupa*, is a worse kind of flax,
‘ and fit for little except wicks of candles ; even
‘ this too is combed, however, in iron heckles,
‘ till it is freed from all the boon. There are ma-
‘ ny kinds of the fine flax, distinguished by their
‘ colour and softness : To spin flax, is becoming
‘ even in men : The boons, when separated from
‘ the flax, may be used for heating ovens or
‘ furnaces : There is an art in heckling and ma-
‘ naging flax ; when this is properly done, fifty
‘ pound of dried lint in the bundles should pro-
‘ duce fifteen pound of heckled flax : After-
‘ wards, it is whitened in the thread, frequently
‘ taken out of the water, and beaten upon a
‘ stone ;

‘ stone; and, when weaved, is again knocked
 ‘ with malls, being always made more excellent
 ‘ by the injury *.’

Pliny likewise gives an account of some kinds
 of flax, possessed of very extraordinary qualities,
 which

* *Apud nos maturitas ejus duobus argumentis intelligitur, intumescente semine, aut colore flavescente. Tum evulsum, et in fasciculos manuales colligatum, siccat in sole, pendens conversis superne radicibus uno die, mox quinque aliis, in contrarium inter se versis fascium cacuminibus, ut semen in medium cadat. Inter medicamina huic vis, et in quodam rustico ac praedulci Italiae Transpadanae cibo, sed jampridem sacrorum tantum gratia. Deinde post messem triticeam virgae ipsae merguntur in aquam solibus tepidam, pondere aliquo depresso: Nulli enim levitas major. Maceratas indicio est membrana laxatior; iterumque inversae, ut prius, sole siccantur. Mox arefactae in saxo tunduntur stupario malleo. Quod proximum cortici fuit, stupa appellatur, deterioris lini, lucernarum fere luminibus aptior. Et ipsa tamen pestitur ferreis hamis, donec omnis membrana decorticetur. Medullae numerosior distinctio, candore, mollitia. Linumque nere et viris decorum est. Cortices quoque decussi, clibanis et furnis praebent usum. Ars depestendi digerendique: Justum a quinquagenis fascium libris quinas denas carminari. Iterum deinde in filo politur, illisum crebro in fillice ex aqua, textumque rursus tunditur clavis, semper injuria melius; Plin. Nat. Hist. lib. xix. cap. 4.*

which it may not be amifs to take notice of:
 ‘ There is one kind,’ fays he, ‘ lately found
 ‘ out, which is not confumed by fire; it is cal-
 ‘ led living flax: I have feen table-cloths of it
 ‘ thrown into a fire, as they were taken from
 ‘ the tables after an entertainment, and cleaned
 ‘ much better and made brighter than could
 ‘ have been done by water. Hence fhrouds for
 ‘ Kings are made of it, and thereby the afhes
 ‘ of the body are feperated from the other afhes.
 ‘ It is produced among dire ferpents, in the
 ‘ burning fands of India, where no rain falls,
 ‘ and is thereby accuftomed to live amidft burn-
 ‘ ing. It is very rarely to be found, and is
 ‘ twifted with great difficulty, on account of its
 ‘ fhortnefs: The red colour, of all others, be-
 ‘ comes the moft fplendid in the fire. When
 ‘ found, is equal in price to the moft excellent
 ‘ pearls: It is called by the Greeks *afbestinum*
 ‘ from its nature *.’

There

* Inventum jam eft etiam, quod ignibus not abfu-
 meretur. Vivum id vocant, ardentefque in focis convi-
 viorum ex eo vidimus mappas, fordibus exuftis splende-
 fcetes igni magis, quam poffent aquis. Regum inde fu-
 nebres tunicae, corporis favillam ab reliquo feperant ci-
 nere. Nafcitur in defertis, aduftifque fole Indiae, ubi non
 cadunt

There is another kind which he mentions, and of which he speaks things almost as extraordinary: 'It is not long,' says he, 'since the flax of Zoelicum was brought from Spain into Italy, most proper for snares: This is a city of Galicia, near to the ocean. There is an excellent kind likewise at Cumanum in Campania, for making nets for catching fishes and birds; very proper likewise for snares; for we do not set fewer snares of flax for all kinds of animals, than we do for one another. The snares made of the flax of Cumanum are so strong as to entangle boars, and so hard, as to resist even the stroke of a sword. I have seen these snares of such fineness, as to pass with the ropes at the upper and under side, through the ring of a man's finger; one man being able to carry as many of them as to surround a forest: Nor is this the most extraordinary thing;

cadunt imbres, inter diras serpentes; affuecitque vivere ardendo, rarum inventu, difficile textu propter brevitatem. Rufus de caetero colos, splendescit igni. Cum inventum est, aequat pretia excellentium margaritarum. Vocatur autem a Graecis albestinum ex argumento naturae; Plin. Nat. Hist. lib. XIX. cap. I.

‘ thing ; for each thread of them consisted of
 ‘ one hundred and fifty ply, such as lately be-
 ‘ longed to Julius Lupus, who died governor
 ‘ of Egypt. The ignorant may wonder at a
 ‘ thing of this kind, in the breast-plate of a King
 ‘ of Egypt, called Amasis, found in the temple
 ‘ of Minerva, in the island of Rhodes ; the
 ‘ threads of this breast-plate are shown to con-
 ‘ sist of three hundred and sixty-five ply : Muti-
 ‘ anus, thrice consul, who found this out lately,
 ‘ has shown it at Rome ; but now very little of
 ‘ it remains, by reason of the injuries it has re-
 ‘ ceived from the frequent trials that have been
 ‘ made *.’

I

* Non dudum ex eadem Hispania Zoëlicum venit in
 Italiam, plagis utilissimum. Civitas ea Galleciae et oceano
 propinqua. Est sua gloria et Cumano in Campania, ad
 piscium et alitum capturam. Eadem et plagis materia.
 Neque enim minores cunctis animalibus insidias, quam
 nobismetipsis lino tendimus. Sed Cumanæ plagæ confi-
 dunt apros, et hi casses vel ferri aciem vincunt. Vidi-
 musque jam tantæ tenuitatis, ut anulum hominis cum e-
 pidromis transfirent, uno portante multitudinem qua saltus
 cingerentur. Nec id maxime mirum, sed singula earum
 stamina centeno quinquageno filo constari ; sicut paulo
 ante Julio Lupo, qui in præfectura Ægypti obiit. Miren-

tur

I have cited these passages to show, not only that the ancients raised flax of an extraordinary fineness, but also, that the art of spinning and twisting yarn, was raised amongst them to a degree of perfection, which the moderns have no conception of.

C H A P.

tur hoc ignorantes in Ægypti quondam regis, quem Amasim vocant, thorace, in Rhodiorum insula ostendi in templo Minervae, cccLXV filis singula fila constare. Quod se expertum nuper Romae prodidit Mutianus ter consul, parvasque jam reliquias ejus superesse hac experientium injuria; Plin. Nat. Hist. lib. XIX. cap. 1.

C H A P. XXXV.

Of the Culture of Willows.

WHEREVER there are vineyards, there is a great demand for willows: They were used by the ancients for binding the vines to the trees that supported them, and for making all sorts of baskets used in the vineyard. Cato, after directing in what manner to plant reeds, adds; ‘Plant the Greek willow around the reed field, that so there may be twigs for tying the vines *.’ Varro expresses himself to the same purpose †. A *jugerum* of willows was reckoned sufficient for twenty-five *jugera* of vines.

* *Salicem Graecam circum arundinetum ferito, uti fiet qui vineam alliges; Cat. cap. vi.*

† *Salicem Graecam circum arundinetum feri oportere, uti fit, qui vitis alligari possit; Var. lib. i. cap. xxiv.*

vines *. But willows were necessary not only in the vineyards, but also in the olive-yards: Thus, Cato directs that willows be gathered in time to make baskets for the olives †. A crop of willows was reckoned so valuable in the time of Cato, that he ranks the willow field next in value to the vineyard and garden ‡.

With respect to the culture of the willow, Cato says only, that it should be planted in low, marshy, and shadowy places, near to rivers ||. Columella and Pliny treat more particularly of this subject: ‘The most proper land for the willow,’ says Columella, ‘is that which may be watered, or is naturally wet; however, rich

* *Salicis viminalis jugera singula sufficiunt xxv vineae jugeribus*; Plin. Nat. Hist. lib. xvii. cap. xx.

Viminalium (ut Atticus putat) singula jugera sufficere possunt quinque et viginti jugeribus ligandae vineae; Col. lib. iv. cap. xxx.

† *Ad oleam cogendam quae opus erunt, parentur. Vimina matura, falix per tempus legatur, uti fiet unde corbulae fiant*; Cat. cap. xxxi.

‡ *De omnibus agris, optimoque loco si emeris jugera agri centum, vinea est prima, si vino multo fiet; secundo loco hortus irriguus, tertio salictum*; Cat. cap. i.

|| *Salicta locis aquosis, humectis, umbrosis, propter aranes ibi feri oportet*; Cat. cap. ix.

' rich land lying flat answers very well ; it must
 ' be trenched two and one-half feet deep, (for
 ' so the ancients require). It is of no impor-
 ' tance what kind of willow is planted, provided
 ' it is very pliable : It is reckoned, however,
 ' that there are three principal kinds, the Greek,
 ' the Gallic, and the Sabine, which some call the
 ' Amerine. The Greek is of a yellow colour ;
 ' the Gallic is a bad purple, and has a very
 ' small twig ; the Amerine bears a slender and
 ' reddish twig : Of these, either tops or cuttings
 ' are planted ; stalks from the tops, of a mode-
 ' rate bigness, which, however, do not exceed
 ' the thickness of a two pound ball, are the best
 ' for planting, provided they are pushed down
 ' as far as the solid earth ; cuttings, one and
 ' one-half foot long, put into the earth, are co-
 ' vered over a little. A field that may be wa-
 ' tered, requires the willows to be planted at
 ' greater distances than others ; on such a field,
 ' they are properly placed in the form of a quin-
 ' cunx, at the distance of six feet from each o-
 ' ther. On drier land, they must be planted
 ' thicker, but so as easily to admit those that cul-
 ' tivate them ; five feet between the rows, and
 ' two feet between each plant in the row, is e-
 ' nough.

' nough. The time of planting is before the
 ' buds come out; the branches to be used
 ' should be taken from the trees when dry; for,
 ' if they are cut when wet with dew, they do
 ' not succeed well; for the same reason, neither
 ' are they to be lopped on rainy days: In the
 ' first three years, willow fields should be fre-
 ' quently digged in the same manner as new
 ' planted vineyards: When the plants become
 ' strong, three diggings are sufficient; if culti-
 ' vated with less care, they soon fail; even when
 ' great care is taken, many of the willows die:
 ' in the room of which, others ought to be pro-
 ' pagated, by layers from the nearest plants;
 ' these are made by bending the tops of the
 ' branches, and fixing them in the ground: In
 ' this manner, the places of those that die are
 ' supplied: The layer, when a year old, may be
 ' cut from the stock; as then, like a vine treat-
 ' ed in the same manner, it may be nourished
 ' by its own roots*.' The same author, after
 treating

* Salicem vel rignus ager vel uliginosus optime, nec
 incommode tamen alit planus et pinguis. Atque is debet
 converti bipalio (ita enim praecipunt veteres) in duos
 pedes et femissem: Nec refert cujus generis vimen feras,
 dum

treating of the culture of the broom, which was used for the same purposes with the twigs of willows, adds: ' The willow for poles requires
' much the same kind of soil with the willow for
' twigs;

dum sit lentissimum. Putant tamen tria esse genera prae-
cipue falicis, Graecae, Gallicae, Sabinae, quam plurimi
vocant Amerinam. Graeca flavi coloris est; Gallica ob-
soleti purpurei, et tenuissimi viminis; Amerina falix gra-
cilem virgam et rutilam gerit. Atque hae vel cacumi-
nibus vel taleis deponuntur. — Taleae sesquipedales terre-
no immerfae paullulum obruuntur. Riguus locus spatia
laxiora desiderat, eaque fenum pedum per quincuncem
recte faciunt; siccanus spiffiora, sic ut sit facilis accessus
colentibus ea. Quinum pedum interordinia esse abunde
est. ut tamen in ipsa linea confitionis alterna vacuis inter-
missis bipedaneis spatiis consistant semina. Satio est eo-
rum priusquam germinent, dum silent virgae, quas arbo-
ribus detrahi siccas conveniet: Nam rosidas si recideris,
parum prospere proveniunt: Ideo pluvii dies in exputan-
da falice vitantur. Fodienda sunt primo triennio faliceta
crebrius, ut novella vineta; cum deinde convaluerint, tri-
bus fossuris contenta sunt, aliter culta celeriter deficient.
Nam quamvis adhibeatur cura, plurimae falices intereunt;
quarum in loco ex propinguo mergis propagari debent,
curvatis, et defossis cacuminibus, quibus restituatur quic-
quid intercidit. Anniculus deinde mergus decidatur a
stirpe, ut suis radicibus tanquam vitis ali possit; Col. lib.
iv. cap. xxx.

' twigs ; the best kind is a field that may be wa-
 ' tered : It is planted by branches, and, when it
 ' buds, is trained up to a pole ; the plants re-
 ' quire to be frequently digged about, and weed-
 ' ed ; nor are they to be less pruned than vines,
 ' that so the branches may stretch out more to
 ' the length, than grow to the thickness. Thus
 ' cultivated, they may be cut in the fourth year ;
 ' those that are cultivated for bindings, may,
 ' when a year old, be cut to within two and one-
 ' half, or two feet of the ground, that so they
 ' may push out from the stock, and like a dwarf
 ' vine be disposed into branches. If the land
 ' is dry, it is better not to cut them till they are
 ' two years old *.'

Pliny,

* *Perticalis fere salix eundem agrum, quem viminalis, desiderat ; melior tamen riguo provenit, atque ea taleis conferitur, et cum germinavit, ad unam perticam submittitur, crebroque foditur, atque exherbatur, nec minus quam vinea pampinatur, ut in longitudinem ramorum potius, quam in latitudinem, evocetur. Sic culta quarto demum anno caeditur. Nam quae vinculis praeparatur, potest annicula praecidi ad semissem supra duos pedes, ut e truncis fruticet, et in brachia velut humilis vinea disponatur. Si tamen siccior fuerit ager, bima potius refecabitur ; Col. lib. iv. cap. xxxi.*

Pliny, treating of the subject, expresses himself in this manner : ‘ Of the things planted for the benefit of vines, the willow holds the first place : It is planted in moist land, digged two and one-half feet deep, by twigs or rods one and one-half foot long ; the larger the more useful : The intervals between the rows should be six feet wide : When three years old, they should be cut within two feet of the ground, that so they may spread to the breadth, and be cut down without ladders ; for the willow is the more fruitful, the nearer it grows to the earth : It is necessary that these be digged about every year in the month of April : This is the culture of willows, when designed for twigs. When they are intended for polls, let twigs or rods be planted upon land prepared in the same manner, and polls may be cut from them on the fourth year : Such as die, may be replaced by layers from the old stocks, a branch being put into the ground, and, after a year, cut from the old root *.’

There

* Principatum in iis obtinent salices, quarum satio fit loco madido ; tamen refosso duos pedes et semipedem, talea

There is not so great a demand for willows in Britain as in Italy, and other places, where there are vineyards: However, the demand for them is greater than can be at present supplied; at least it is so in many places of the kingdom. We have many low, wet, and marshy lands, very fit for raising them, and which, in their present situation, are of very little value: These may be very properly applied to this purpose; such of our farmers as attempt to raise them, are far from being so careful in the culture of them as the Roman farmers were. This, possibly, may be the reason, that there are not such profits from the crop as to encourage them to proceed: But, were we to imitate the Roman farmers, prepare the land for being planted,

lea sesquipedali, vel pertica, quae utilior, quo plenior.—
Trimae pedibus binis a terra putatione coercentur, ut se
in latitudinem fundant, ac sine scalis tondeantur. Salix
enim foecundior est, quo terrae propior. Has quoque
omnibus annis confodi jubent mense Aprili. Haec est
viminalium cultura. Perticulis et virga et talea feritur,
fossura eadem. Perticulis ex ea caedi justum est, quarto fe-
re anno. Et eae autem senescentium propagine refarciunt
locum, pertica immerfa, ac post annum recifa; Plin. Nat.
Hist. lib. xvii. cap. xx.

ed, by trenching it two and one-half feet deep, carefully dig around the plants after they are set, and keep them free from all kinds of weeds, we would have good reason to expect a very good, and, if in a convenient part of the country, a very valuable crop.

CHAR.

C H A P. XXXVI.

Of Meadows.

PASTURING land, being attended with small expence, was reckoned, by the most prudent and careful of the Roman husbandmen, the way of management of all others the most certainly profitable: There is a saying of Cato's to this purpose, mentioned both by Columella and Pliny: Columella having said that pasturing is very ancient, and likewise very profitable, immediately adds: 'As likewise M. Cato believed, who being asked what was the part of husbandry, by the exercise of which one would quickly become rich? answered,' "By grazing cattle well." 'Being asked again, by what part one might have a tolerably good income? answered,' "By grazing cattle indifferently well." 'It grieves me to tell what was further said by this wise man, which however

‘ ever some authors record : Being asked what
 ‘ is the third profitable thing in husbandry, af-
 ‘ ferted, “ To feed badly ; especially when the
 ‘ slothful and unskilful shepherd loses more than
 ‘ the skilful and diligent one gains.” ‘ With
 ‘ respect to the second question, however, there
 ‘ is no doubt, but the profits of cattle exceed
 ‘ what the ordinary diligence of a master can
 ‘ acquire in any other way *.’

Pliny,

* Nam in rusticatione vel antiquissima est ratio pascen-
 di, eademque questuosissima : Propter quod nomina quo-
 que et pecuniae et peculii tracta videntur a pecore :
 Quoniam id solum veteres possederunt, et adhuc apud
 quasdam gentes unum hoc usurpatur divitiarum genus :
 Et nunc apud nostros quidem colonos alia res uberior,
 nulla est. Ut etiam M. Cato credidit, qui consulenti,
 quam partem rei rusticae exercendo celeriter locupletari
 posset ? respondit, Si bene pasceret : Rursusque interro-
 ganti, quid deinde faciendo satis uberes fructus perceptu-
 rus esset ? affirmavit, Si mediocriter pasceret. Caeterum
 de tam sapiente viro piget dicere, quod eum quidam auc-
 tores memorant, eidem quaerenti, quodnam tertium in a-
 gricolatione quaestuosum esset ? asservasse, Si quis vel male
 pasceret : Cum praesertim magis dispendium sequatur in-
 certem et inscium pastorem, quam prudentem diligentem-
 que compendium. De secundo tamen responso, dubium
 non est, quin mediocrem diligentiam domini fructus pe-
 coris exuperat ; Col. lib. vi. praef.

Pliny, in citing the sayings of Cato upon this subject, mentions only the two first questions and answers, doubting, probably, of the truth of the last: Having mentioned the order in which Cato places different kinds of land, according to the value of their produce, and made some observations upon it, he adds: ‘The same Cato being asked, what produces the most certain profit? answered,’ [“If you feed well:”] ‘What the next? “If you feed moderately.” To this Pliny adds: ‘The meaning of all which is, that we should approve most of the crop that is produced at the smallest expence *.’

Pliny seems not to confine this maxim to pasture land, but to extend it likewise to meadows; for, immediately before he mentions Cato’s sayings about pasturing, he cites some others of his maxims concerning the purchase of land, and its comparative value, as has already been observed: ‘He declares,’ says Pliny, ‘that a vine-
‘ yard

* Idemque Cato interrogatus, quis esset certissimus quaestus? Respondit, si bene pascas. Quis proximus? Si mediocriter pascas. Summa omnium in hoc spectando fuit, ut fructus is maxime probaretur, qui quam minimo impendio constaturus esset; Plin. Nat. Hist. lib. xviii. cap. v.

‘ yard is the most profitable of all fields, not
 ‘ improperly, as above all it answers the expence;
 ‘ next, watered gardens; nor is this false, if
 ‘ near a town: And, as for meadows, *these are*
 ‘ *likewise valuable*, for the ancients called them
 ‘ *parata*, always ready *.’ After this follow
 the questions put to Cato, and his answers.

Columella likewise extends to meadows the
 advantages allowed to pasture lands: After men-
 tioning the necessity of getting hay for the la-
 bouring cattle, he says: ‘ The culture of mea-
 ‘ dows it therefore necessary, to which the an-
 ‘ cient Romans gave the first place in husbandry:
 ‘ They received their name from this, that they
 ‘ are always ready, and do not require much cul-
 ‘ ture. M. Porcius has mentioned these further
 ‘ advantages; they are not so liable as all the
 ‘ other fields of the farm to be hurt by storms;
 ‘ need little expence, and every year produce a
 ‘ crop; this too not of one kind, as they bring
 ‘ as

* Ille in agro quaestuosissimam judicat vitem; non frustra, quoniam ante omnia de impensae ratione cavit. Proxime hortos riguos: Nec id falso, si sub oppido sint. Et prata antiqui parata dixerunt. Idemque Cato interrogatus, &c. See the preceding note.

* as much by the pasture of the fog, as by the
‘ hay *.’

When Cato is represented as passing such high encomiums upon pasture grounds and meadows, one is surpris'd to find, that he assigns them only the fifth place, when he mentions fields in their order, according to their value †: But it
may

* Et ideo necessarius ei cultus est etiam prati, cui veteres Romani primas in agricolatione tribuerunt. Nomen quoque indiderunt ab eo, quod protinus esset paratum, nec magnum laborem desideraret. M. quidem Porcius et illa commemoravit, quod nec tempestatibus affligeretur, ut aliae partes ruris, minimique sumptus egens, per omnes annos praeberet redditum, neque eum simplicem, cum etiam in pabulo non minus redderet, quam in foeno; Col. lib. II. cap. XVII.

† De omnibus agris, optimoque loco si emeris jugera agri centum, vinea est prima, si vino multo fiet, secundo loco hortus irriguus, tertio salictum, quarto oletum, quinto pratum; Cat. cap. 1. Some of the commentators argue, from this circumstance, that Cato has no regard to the value or profits of land, in the order in which he places the fields in this passage: Without this supposition, these learned gentlemen cannot make Cato consistent with himself. Every person, however, that considers this passage, and attends to the design of it, must observe, that Cato had very little reason to mention these different fields, if

may be observed, that, when he says that grazing is the thing by which most money may be made, he does not mean that meadow or pasture land is more valuable than vineyards, gardens,

he had not intended to point out their comparative value to a purchaser: It is certain, that in this sense Pliny understood it, as appears from the passage already cited: In this sense too, it is certain, that Varro likewise understood it: 'Cato indeed,' says he, 'tells us what fields are preferable to others, setting nine of them in order one after another, according to their goodness: The first is where vineyards may be made; the second where a watered garden; the third where a willow field; the fourth where an olive garden; the fifth where a meadow; the sixth where a corn field; the seventh where a wood, that grows again after being cut; the eighth where an *arbutum* for vines; the ninth where a wood for mast.

—Cato quidem inquit, gradatim praeponens, alium alio agrum meliorem dicit esse in novem discriminibus, quod sit primus, ubi vineae possunt esse bono vino et multo; secundus ubi hortus irriguus; tertius ubi salicta; quartus ubi oliveta; quintus ubi pratium; sextus ubi campus frumentarius; septimus ubi caedua filva; octavus ubi arbutum; nonus ubi glandaria filva; Var. lib. 1. cap. vii. From the manner then, in which both Varro and Pliny cite this passage from Cato, it is evident, that his design is to place the several fields in order, according to their value.

dens, and the other things that he places in order before them, if these are properly managed; but that, when country affairs are left to the management of servants, such is the ignorance, indolence, and dishonesty of man, that one has the chance of making more of land in grass, than land in any other situation, which requires more trouble and expence in the management and culture. Columella, in treating of soils, considers them not according to the particular crops upon them, or what they were intended for, as Cato does the fields which he mentions, but according to the goodness of the crops in general, which, by culture, they may be made capable to produce: In this view, he gives lands capable of being watered the third place: he assigns this reason; 'Because,' says he, they 'produce their crops without any expence.' Then he adds: 'Cato puts this first, when he 'prefers the produce of meadows to that of others lands *.' This shows for what reason Cato gives the preference to grass lands; not
because

* Tertia est ratio loci rigui, quia sine impensa fructum reddere potest. Hanc primam Cato esse dicebat, qui maxime reditum pratorum caeteris anteponebat; Col. lib. 11. cap. 11.

because the produce of them was most valuable, but because it was acquired with less trouble and risk.

The giving the preference to grass lands in a certain view, an opinion that seems to have been adopted by Cato, was carried further by some, who preferred them in every view. This appears from what Varro says immediately after the passage last cited: ‘ I know,’ says he, ‘ that
 ‘ Cato has written so; but all do not consent to
 ‘ this, for there are some who give the prefer-
 ‘ ence to good meadows, amongst whom I am;
 ‘ *because they require little or no expence; for*
 ‘ which reason, the ancients called meadows *pa-*
 ‘ *rata*, ready. Caesar Vopiscus the aedile, when
 ‘ pleading before the censors, asserted, that the
 ‘ Campus Rosea is the richest spot in Italy; in
 ‘ which stakes being left, were the very next
 ‘ day covered by the length of the grass*.’ Pliny likewise mentions this, when treating of the
 qualities

* Scio, inquit, scribere illum: Sed de hoc non consentiunt omnes, quod alii dant primatum bonis pratis, ut ego quoque: A quo antiqui prata parata appellarunt. Caesar Vopiscus aedilicius, causam cum ageret apud censes, campos roseae Italiae dixit esse fumen, in quo relicta pertica postridie non appareret propter herbam; Var. lib. i. cap. vii.

qualities of different soils, and the crops they are most proper for producing *.'

Cato, agreeable to that opinion of his, that has been so often mentioned, advises the laying out much land in meadows: 'As much,' says he, 'as is in your power, make watered meadows, if you have water; if you have no water, make as many dry ones as is possible: In this way, one should lay out land, whenever it is in his power †.'

Columella likewise mentions both these kinds of meadows: 'Therefore,' says he, 'I shall treat of two kinds; the one dry, the other watered: Land that is naturally rich, and that is in good heart, does not need to have water set over it; and it is better hay, which nature, of its own accord, produces in a juicy soil, than what water draws from a soil that is overflowed: This, however, is a necessary practice, when

* Caesar Vopiscus, cum causam apud Censores ageret, campos roseae dixit Italiae fumen esse, in quibus perticas pridie relictas gramen operiret; Plin. Nat. Hist. lib. xvii. cap. iv.

† Prata irrigua, si aquam habebis, potissimum facito: Si aquam non habebis, sicca quam plurima facito. Hoc est praedium quod ubi vis expedit facere; Cat. cap. ix.

‘ when the poverty of the soil requires it; and
 ‘ a meadow may be formed either upon stiff or
 ‘ free soil, though poor, when water may be
 ‘ set over it *.’

The same author likewise describes very particularly the position of the land most proper for meadows: ‘ Neither a low field,’ says he, ‘ with
 ‘ hollows, nor a field broken with steep rising
 ‘ grounds, are proper: The first because it contains too long the water collected in the hollows; the last, because it makes the water to
 ‘ run too quickly over it. A field, however,
 ‘ that has a moderate descent, may be made a
 ‘ meadow, whether it is rich, or so situated as
 ‘ to be watered: But the best situation is, where
 ‘ the surface is smooth, and the descent so gentle, as to prevent either showers, or the rivers
 ‘ that overflow it, from remaining long; and,
 ‘ on the other hand, to allow the water that
 ‘ comes

* *Ejus igitur animadvertimus duo genera, quorum alterum est ficcaneum, alterum riguum. Laeto pinguique campo non desideratur influens rivus, meliusque habetur foenum, quod suapte natura succoso gignitur solo, quam quod irrigatum aquis elicitur, quae tamen sunt necessariae, si macies terrae postulat; nam et in densa et resoluta humo, quamvis exili, pratum fieri potest, cum facultas irrigandi datur; Col. lib. II. cap. XVII.*

‘ comes over it gently to glide off: Therefore,
 ‘ if, in any part of a field intended for a mea-
 ‘ dow, a pool of water should stand, it must be
 ‘ let off by drains; for the loss is equal, either
 ‘ from too much water, or too little grass*.’

Palladius is likewise very particular in his de-
 scription of the situation and nature of the soil
 proper for meadows: ‘ If,’ says he, ‘ we have
 ‘ it in our power to make a choice, we ought
 ‘ to pitch upon a field that is rich, moist, plain,
 ‘ and gently declining; or a valley from which
 ‘ the water is not forced in a hurry, nor upon
 ‘ which it is allowed long to remain. Meadows
 ‘ may even be formed upon a free and thin soil;
 ‘ if it is so situated as to be watered †.’

Pliny

* Ac nec campus concavae positionis esse, neque collis
 praerupti debet: Ille, ne collectam diutius contineat a-
 quam; hic, ne statim praecipitem fundat. Potest tamen
 mediocriter acclivis, si aut pinguis est aut riguus ager,
 pratium fieri. At planities maxime talis probatur, quae
 exigue prona non patitur diutius imbres, aut influentes ri-
 vos immorari? aut si quis eam supervenit humor, lente
 prorepat. Itaque si palus in aliqua parte subsidens restag-
 nat, sulcis derivanda est. Quippe aquarum abundantia
 atque penuria graminibus aequae est exitio; id.

† Nunc prata, si libuerit, possumus novella formare.

Si

296. OF THE HUSBANDRY

Pliny mentions three kinds of soils proper for meadows; a soil enriched with dung, or one naturally moist, or one capable of being watered, and this particularly by rain-water from an high-way*.

All these authors treat very particularly of the manner of making and cultivating meadows: 'Many meadows,' says Columella, 'through negligence, become old and barren; it is necessary to renew them, and, in order to this, to plough them up for corn; because such land, by lying long idle, carries good crops: If a meadow, therefore, is to be renewed, or a new one made, the place intended for it must be well ploughed and reduced in summer, and, in the autumn, sown with turnip or beans; next year it must be sown with corn; on the third

Si eligendi facultas est, locum pinguem, rosidum, planum, leniter inclinatum, vel hujusmodi valem deputabimus, ubi humor nec statim praecipitari cogitur, nec diu debet inhaerere. Potest quidem et soluto et gracili solo prati forma, si rigetur, imponi; Pal. lib. x. tit. x.

* Prata circa Calend. Junii caeduntur, quorum facillima agricolis cura ac minimi impendii, haec de se postulat dici. Relinqui debent in laeto solo vel humido, vel riguo, eaque aqua pluvia rigari via publica; Plin. Nat. Hist. lib. xviii. cap. xxviii.

' third year, it must be carefully ploughed, and
 ' all the strong weeds, briars, and trees, which
 ' stand in the way, effectually extirpated; un-
 ' less it is designed at the same time for an *ar-*
 ' *bustum*; then vetches, mixed with hay-seeds,
 ' must be sown; afterwards, the clods must be
 ' well broken with hoes, the surface levelled with
 ' a *crates*, and the heaps left by the *crates* in
 ' turning, scattered, that so there may be nothing
 ' to interrupt the scythe of the mower: It is not
 ' proper to cut the vetches till they are fully
 ' ripe, and have dropped some of their seeds;
 ' then the crops must be mowed, bound up, and
 ' carried off: Afterwards, the field should be wa-
 ' tered, if there is the command of water, and
 ' if the land is stiff; but, when the soil is open
 ' and well reduced, it is not proper to bring o-
 ' ver a great force of water, till it has become
 ' firm, and bound together by turf; because the
 ' force of the water washes away the soil, and
 ' the grass, having its roots made bare, is not
 ' allowed to spread over the surface: For which
 ' reason, likewise, cattle ought not to be let into
 ' meadows that have a tender and easily pierced
 ' turf; but, as often as the grass grows up, it
 ' should be mowed; for cattle, as I have for-
 Vol. II. P p ' merly

‘merly said, print their hoofs upon a soft soil,
 ‘and the roots of the grass being thus separated,
 ‘are not allowed to spread and thicken. In the
 ‘second year, the smaller cattle may be admit-
 ‘ted after mowing, if then the drieness and si-
 ‘tuation of the field allows it: Afterwards, in
 ‘in the third year, when the meadow becomes
 ‘more solid and hard, it may receive the larger
 ‘cattle *.’ Although Columella is not particu-
 lar

* Sin autem nova fuerint instituenta, vel antiqua re-
 novanda (nam multa sunt, ut dixi, quae negligentia ex-
 olefcant, et fiunt sterilia) ea expedit interdum etiam fru-
 menti causa exarare, quia talis ager post longam desidiam
 laetas fegetes affert. Igitur eum locum, quem prato des-
 tinaverimus, aestate proscissum, subactumque saepius per
 autumnum raris, vel naris, vel etiam faba conferimus;
 insequente deinde anno, frumento; tertio diligenter ara-
 bimus, omnesque validiores herbas, et rubos, et arbores,
 quae interveniunt radicitus extirpabimus, nisi, si fructus
 arbuti id facere nos prohibuerit. Deinde viciam permis-
 tam feminibus foeni feremus; tum glebas farculis resol-
 vemus, et inducta crate coequabimus, grumosque, quos
 ad versuram plerumque tractae faciunt crates, dissipabi-
 mus ita, ut necubi ferramentum foenifecae possit offen-
 dere. Sed eam viciam non convenit ante desecare, quam
 permaturuerit, et aliqua femina subjacenti solo jecerit.
 Tum foenifecam messorum oportet inducere et desectam
 herbam

lar in distinguishing the methods used in making new meadows, from those used in repairing old ones, yet it is easy to observe, what ought to be applied to the one, and what to the other: The sowing the first year with turnip, the second with corn, and the third year carefully extirpating all trees and shrubs, are applicable only to the renewing of old meadows, or making new ones out of grass ground: The frequent ploughings and harrowings, the sowing with vetches and hay-seeds, the smoothing the surface carefully after sowing, and the manner
of

herbam religare, et exportare: Deinde locum rigare, si fuerit facultas aquae; si tamen terra densior est. Nam in resoluta humo non expedit inducere majorem vim rivo-
rum, prius quam conspissatum, et herbis colligatum fit solum: Quoniam impetus aquarum proluit terram, nudatisque radicibus gramina non patitur coalescere. Propter quod nec pecora quidem oportet teneris adhuc et subfidentibus pratis immittere, sed quoties herba profuerit falcibus defecare. Nam pectudes, ut ante jam dixi, molli solo infigunt ungulas, atque interruptas non sinunt herbarum radices serpere et condensare. Altero tamen anno minora pecora post foenesecia permittemus admitti, si modo siccitas, et conditio loci patietur. Tertio deinde cum pratum solidius ac durius erit, poterit etiam majores recipere pecudes; Col. lib. ii. cap. xviii.

of managing the meadow when formed, is applicable both to the renewing of old meadows, and the making of new ones, whether out of land in grass or tillage.

Palladius, though not so particular in his directions as Columella, yet makes a distinction between the methods of making new meadows, and renewing old ones: 'The field,' says he, 'intended for a meadow, should at this time' (September) 'be cleared and freed from all impediments, whether large and strong weeds, or shrubs: Afterwards, when frequently exercised and well reduced by many ploughings, the stones carried off, and all the clods broken, it ought to be manured with fresh dung, in the increase of the moon: It must be carefully kept from being touched by the hoofs of cattle, particularly when wet, lest their deep footsteps should render the surface in many places unequal*.' These are the directions that

* Nunc prata, si libuerit, possumus novella formare, &c.—Extirpandus est itaque locus hoc tempore, et liberandus impedimentis omnibus, vel herbis latioribus et solidis, atque virgultis. Deinde cum frequenter exercitatus fuerit, ac multa aratione resolutus, submotis lapidibus,

that Palladius gives for making new meadows. His directions for renewing old ones, are to this purpose: ' But, if the place that was a meadow
' has become barren, by being spongy, or thro'
' carelessness, or age, it ought to be ploughed,
' and the surface again smoothed; for it is fre-
' quently advantageous to break up barren mea-
' dows: But, in the new meadow, turnip should
' be sown, and, when they are taken up, the
' things already mentioned are to be done: Af-
' ter which, vetches, mixed with hay-feeds, must
' be sown: It is not proper to water new mea-
' dows till the surface becomes hard, lest the
' force of the flowing water should break the
' tender turf *.' The mixing vetches with the
hay-

bus, et glebis ubique confractis, stercoretur luna crescente recenti laetamine. Ab unguis jumentorum summa intentione servetur intactus, praecipue quoties humescit, ne inaequale solum reddant multis locis impressa vestigia; Pal. lib. x. tit. x.

* Quod si sterilis factus est locus carie, incuria, vetustate, exaretur, ac de novo rursus aequetur. Nam prata sterilia plerumque arare conveniet. Sed in novo prato rapa conferere possumus, quorum messe finita, caetera quae dicta sunt exequemur. Viciam tamen foeni seminibus mixtam post haec spargemus. Rigari vero antequam durum solum fecerit, non debet, ne ejus cratem minus solidam vis interflui corrumpat humoris; Pal. lib. x. cap. x.

seeds, and not watering them till the surface becomes firm, should be applied not only to the renewing old meadows, but also to the forming of new ones.

Pliny, though not so particular as either Columella or Palladius, is however more distinct: 'It is most advantageous for the grass,' says he, 'to have the field ploughed sufficiently as soon as possible, and then harrowed: It must be harrowed again, after sowing the hay-seeds that fall in the hay-lofts and cribs. Meadows must not be watered the first year, nor pastured till after the second cutting, lest the grass be pulled up, or hurt by the cattle trampling upon it. Meadows become old, and ought to be renewed by sowing on them beans, or turnip, or millet: After these, in the second year, they should be sown with corn, and then, in the third year, laid off again into meadows*.'

As

* Utilissimum simul et herbae arare, deinde cratire, ferere florem ex foenilibus, atque ex praesepibus foeno dilapsum spargere, priusquam cratiantur. Nec primo anno rigari, nec pasci ante secunda foenifecia, ne herbae vellantur, obtrituque hebetentur. Senescunt prata, restituique debent faba in his fata, vel rapis, vel milio; mox insequente anno frumento, rursusque in prata tertio relinqui; Plin. Nat. Hist. lib. xviii. cap. xxviii.

As these authors give directions how to make new meadows, and repair old ones, so likewise they give directions how to cultivate meadows.

Cato says, that the meadows that cannot be watered, must be dunged early in spring, at the time of the new moon; and that, when the zephyrs begin to blow, they must be secured from cattle, cleaned of all noxious weeds pulled up by the root*.

Varro places the cleaning of meadows among the operations to be performed early in spring; and the defending them, among the works to be done after the equinox: 'In the first interval,' says he, 'between the zephyr and the vernal equinox, these things ought to be done; nurseries prepared for planting all kinds of trees, vines digged about, and the higher roots cut off, meadows cleaned †,' &c. 'In the second interval,

* Prata primo vere stercoreto Luna silente; quae irrigua non erunt, ubi Favonius flare coeperit; cum prata defendes, depurgato, herbasque malas omneis radicitus effodito; Cat. cap. L.

† In primo intervallo, inter Favonium et aequinoctium vernali, haec fieri oportet. Seminaria omne genus ut ferantur putari (or rather parari) in primis, circum vites ablaquari, radices, quae in summa terra sunt, praecidi,

prata

‘ interval, between the vernal equinox and the
 ‘ rising of the Pleiades, these things ought to be
 ‘ done,

prata purgari, &c.; Var. lib. 1. cap. xxix. Though it does not properly belong to the subject of this chapter, yet it may not be improper to observe, that some copies, instead of *putari in primis*, have *putari in pratis*: The commentators have discovered a great deal of learning, and been at great pains to fix the true reading. One would think, that it does not require either much learning or sense, to determine that *in pratis* is not the true reading: There were no trees in the meadows, except when the meadow was at the same time an *arbusum*, which was a very uncommon thing, and to which, if our author had in this passage alluded, he would certainly have expressed himself in a different manner; nothing therefore in them was pruned, all shrubs and large weeds were extirpated; and all work of this kind is implied in *prata purgari*. It may be observed, likewise, that the learned gentlemen are so attentive to the settling the true reading, that they neglect to explain the first part of the passage, *seminaria omne genus et serantur*; the manner of expression in this, is so different from that of the other parts of the sentence, and of all the parallel passages, that we cannot imagine that Varro intends nothing more in it than that nurseries should be planted with all sorts of trees; It is more natural to suppose, that he directs nurseries to be prepared for this purpose; and the rather, as it appears from Columella's book of trees, chap. 1. and 11. that this is the season in
 which

‘ done, the growing corn weeded, land plough-
 ‘ ed, willows cut, meadows defended *.’

Columella mentions different seasons for clean-
 ing and defending meadows, according to their
 different situations. In his kalendar for January,
 he says: ‘ In warm, poor, and dry soils, mea-
 ‘ dows should now be cleaned and defended
 ‘ from cattle, that there may be plenty of hay†.’
 And again, in his kalendar for March, he says:
 ‘ Now is the season for cleaning meadows, and
 ‘ defending them from cattle; but, in warm
 ‘ and dry soils, even in the month of January,
 ‘ as I have already observed, this ought to be
 ‘ done;

which nurseries were prepared: If therefore, instead of
putari in primis, we read *parari in primis*, the difficulty is
 removed, and the meaning obvious; and this may possi-
 bly be the true reading, though there is no copy to ju-
 stify it.

* *Secundo intervallo inter vernal aequinoctium, et Ver-
 giliarum exortum haec fieri. Segetes runcari, herbam e
 fegetibus expurgari, boves terram profcindere, salicem
 caedi, prata defendi; Var. lib. i. cap. xxx.*

† *Apricis etiam et macris aut aridis locis prata jam
 purganda, et a pecore sunt defendenda, ut foeni fit copia;
 Col. lib. xi. cap. ii.*

‘ done ; but, in cold places, meadows are soon
 ‘ enough preserved from the feast of Minerva *.’

Palladius is likewise particular in his directions about this : ‘ In places,’ says he, ‘ exposed
 ‘ to the sun, that are poor and dry, meadows
 ‘ ought to be cleaned and defended from cattle
 ‘ in January † ; in temperate places in Februa-
 ‘ ry ‡ ; and in cold places in March ||.’

Columella is very particular in his directions, not only at what time, but also in what manner, these things ought to be done : ‘ The culture of
 ‘ meadows,’ says he, ‘ requires more care than
 ‘ labour : In the first place, no roots or stumps
 ‘ of trees, no thorns or large weeds, must be al-
 ‘ lowed to remain ; some of these should be ex-
 ‘ tirpated before winter, and during the autumn,
 ‘ as

* Prata purgare, et a pecore defendere jam tempestivum est : Locis quidem calidis et ficcis etiam a mense Januarii, ut supra diximus, id fieri debet : Nam frigidis vel a quinquatribus prata recte submittuntur ; Col. lib. xi. cap. ii.

† Apricis, aut macris, aut aridis locis prata jam purganda sunt, et a pecore vindicanda ; Pal. lib. ii. tit. ii.

‡ Februario mense locis temperatis prata incipient custodiri ; Pal. lib. iii. tit. i.

|| Nunc locis frigidis prata purganda atque servanda sunt ; Pal. lib. iv. tit. ii.

‘ as brambles, rushes, and all kinds of shrubs ;
 ‘ others during the spring, as endive and thorns,
 ‘ that grow about the solstice : Swine ought not
 ‘ to be allowed to feed in them, because they
 ‘ dig with their snouts, and tear up the turf ;
 ‘ neither ought the larger kind of cattle, except
 ‘ when the ground is very dry, because, by the
 ‘ sinking of their hoofs, they bruise and cut
 ‘ the roots of the grass : In the month of Febru-
 ‘ ary, the poor and shelving places should be
 ‘ manured with dung, while the moon is in-
 ‘ creasing : All stones, and all other things that
 ‘ obstruct the scythes, ought to be gathered and
 ‘ carried off : And the meadows ought to be
 ‘ kept from the cattle sooner or later in the sea-
 ‘ son, according to the climate and soil *.’

He

* Cultus autem pratorum magis curae, quam laboris
 est. Primum, ne stirpes aut spinas validiorisque incrementi
 herbas inesse patiamur : Atque alias ante hiemem, et per
 autumnum extirpemus, ut rubos, virgulta, juncos : Alias
 per ver evellamus, ut intuba, ac solstitiales spinas : Ac ne-
 que fuem velimus impasci, quoniam rostro suffodiat et
 cespides excitet ; neque pecora majora, nisi cum siccissi-
 mum solum est, quoniam demergunt ungulas, et atterunt,
 scinduntque radices herbarum. Tum deinde macriora et
 pendula loca mense Februario luna crescente fimo juvanda
 sunt ;

He proposes, that the dung used for meadows shall not be taken from the old dung-hill, in which the dung is prepared for the corn fields; but from the new dunghill, because, in it the hay-seeds with which the dung is mixed are not destroyed: 'Wherefore,' says he, 'the very ' freshest dung should be laid upon meadows, ' because this produces more grafs.' He says further; ' This ought to be done in the month ' of February, while the moon is increasing.' He adds as the reason, for this thing likewise ' gives a little assistance to the crop of hay *.' This dung, he proposes likewise, should be mixed with hay-seeds, and chiefly laid upon the higher parts of the field: ' But this,' says he, ' shall particularly be attended to, that, at the ' blowing of Favonius, on the thirteenth of February, the poor and high parts of the fields ' be

funt; omnesque lapides, et si qua objacent falcibus obnoxia, colligi debent, ac longius exportari, submittique pro natura locorum, aut temporius, aut serius; Col. lib. II. cap. XVIII.

* Itaque pratis quam recentissimum debere injici, quod plus herbarum progeneret: Idque mense Februario luna crescente fieri oportere: Nam ea quoque res aliquantum foeni fructum adjuvat; Col. lib. II. cap. xv.

‘ be manured with dung mixed with hay-seeds ;
 ‘ for the higher shelving places afford nourish-
 ‘ ment to those that lie below, when a shower
 ‘ or water set over them carries the sap of the
 ‘ dung from the higher to the lower grounds :
 ‘ For which reason, the skilful husbandmen lay
 ‘ more dung upon the higher than upon the
 ‘ lower places, even of a field in tillage ; be-
 ‘ cause the rains, as I have said, always carry the
 ‘ rich stuff down into the hollows *.’

Palladius, to the same purpose, directs, ‘ That
 ‘ in February, meadows, if poor, before they
 ‘ are shut up from the cattle, be well dunged in
 ‘ the growing of the moon ; that the freshest
 ‘ dung be used, which is best for nourishing
 ‘ grafs ; and that it be laid chiefly on the higher
 ‘ parts

* Sed in totum curandum est, ut secundum Favonii ex-
 ortum, mense Februario, circa Idus immittis feminibus
 foeni, macriora loca, et utique celsiora, stercorentur :
 Nam editior clivus praebet etiam subjectis alimentum, cum
 superveniens imber, aut manu rivus perductus, succum
 stercoreis inferiorem partem secum trahit. Atque ideo fere
 prudentes agricolae etiam in aratis collem magis, quam
 vallem stercoreant : Quoniam, ut dixi, pluviae semper om-
 nem pinguiorem materiam in ima deducant ; Col. lib. 11.
 cap. xviii.

‘ parts of the field, that so its juice may be conveyed over all *.’

Both Columella and Palladius give directions for destroying moss, with which old meadows, and indeed all kinds of grass ground, are frequently pestered: ‘ There are some meadows,’ says Columella, ‘ that are covered over with a scurf of age, and with an old and thick moss, to destroy which, husbandmen are in use to sow hay-seeds from the hay-loft, and lay on dung; none of which are so effectual as the sprinkling them with ashes; for this stuff kills moss †.’

Palladius, besides this, advises a thing that seems to be very proper: ‘ When moss,’ says he, ‘ grows over old meadows, it should be scraped

* *Februario mense locis temperatis prata incipient custodiri, quae prius (si macra sunt) sparso laetamine faturerentur, quod ejiciendum est luna crescente. Quanto recentius fuerit, tanto plus nutriendis herbis valebit, quod a superiori parte fundatur, ut succus ejus per totum possit elabi; Pal. lib. III. tit. I.*

† *Sunt etiam quaedam prata situ vetustatis obducta, veteri vel crasso musco; quibus mederi solent agricolae feminibus de tabulato superjectis, vel injecto stercore; quorum neutrum tantum prodest, quantum si cinerem saepius ingeras; ea res muscum enecat; Col. lib. II. cap. XVIII.*

‘scraped off, and hay-seeds sown upon the bare
 ‘places; ashes likewise should be frequently laid
 ‘on, which is very useful for destroying the
 ‘moss*.’ When some particular spots of a
 grass field are overgrown with moss, the direc-
 tion here given by Palladius is certainly very
 proper, and the operation may be easily per-
 formed. When the farmer proposes to dung a
 grass field, whether for hay or pasture, perhaps
 it would be of some advantage to harrow it well,
 and sow some grass seeds upon it, before the
 dung is laid on; by this, the moss, and other
 weeds of this kind, may be destroyed, and good
 grass raised in their place.

Watering meadows is mentioned by all the
 rustic writers; but none of them are very par-
 ticular in directing at what times, and in what
 manner. Pliny is the only one that mentions
 watering, before cutting the first crop of hay:
 ‘Meadows,’ says he, ‘ought to be watered im-
 ‘mediately after the equinox, and the waters
 ‘restrained whenever the grass shoots up into
 ‘the

* Sed si prata vetera muscus obduxerit, abradendus
 est, et scalptis eisdem locis foeni spargenda sunt femina,
 et quod ad necandum muscum prodest, cinis saepius inge-
 rendus; Pal. lib. x. tit. x.

‘the stalk *.’ He mentions likewise another watering, immediately before cutting the hay: Having cited a passage from Cato, that directs hay to be cut early, he adds: ‘Some persons water them the day before, when they have water at command.’ This watering was probably intended to make the grass cut the more easily; for it immediately follows, ‘It is better to cut in dewy nights †.’

Virgil likewise mentions the cutting hay, as one of the works to be done in the night-time; and, probably, for the same reason that the meadow was watered by some before cutting; that the grass, by the night-dews, might be made to resist the scythe, and thereby become more easily cut; this appears from what follows: ‘In the night-time, a gentle moisture is never wanting †.’

It

* Rigare prata aequinoctii diebus primis. Cum herba creverit in festucam, arcere aquas; Plin. Nat. Hist. lib. xviii. cap. xxvii.

† Quidam pridie rigant, ubi sunt rigua. Noctibus roscidis secari melius; Plin. Nat. Hist. lib. xviii. cap. xxviii.

‡ Nocte leves melius stipulae, nocte arida prata

Tondentur: Noctes lentus non difficit humor.

Vir. Geo. I. l. 289.

It was the custom to water meadows immediately after the first crop of hay was carried off. This is mentioned by Varro, Columella, and Pliny *.' In watering, the water was not allowed to stagnate, but made to run gently over the field: This appears from some passages already cited from Columella and Palladius †.' To these may be added a passage from Pliny, who says expressly, that, even where watering is approved of, it is not found useful, if it remains long, except to willows ‡.'

From these passages, it is evident, that the watered meadows were situated upon a declivity, and that the water was first let upon the higher ground, from which it made its way into the lower, and from thence quite off from the field.

It

* Si prata irrigua habebis, simulac foenum sustuleris, irrigare; Var. lib. 1. cap. xxxi.

Tum foenifecam messorum oportet inducere et defectam herbam religare, et exportare: Deinde locum rigare, si fuerit facultas aquae; Col. lib. 11. cap. xviii.

Rursus rigari defecta oportet, ut secetur autumnale foenum; Plin. Nat. Hist. lib. xviii. cap. xxviii.

† Col. lib. 11. cap. xvii. and xviii. Pal. lib. x. tit. x.

‡ Sed neque illa quae laudatur, diu praeterquam salicis utilis sentitur; Plin. Nat. Hist. lib. xviii. cap. 17.

It is natural to suppose, that they raised the water of their rivers in the ordinary way of raising water for driving milns, and that they had sluices by which they put it over their fields; and, when necessary, had drains for conveying it again into the rivers below. This is a practice that prevails in some parts of England, and has likewise been introduced into some parts of Scotland; it is probable, that it would be an advantage to render it more general.

Before this article is concluded, it may not be amiss to observe, that there is a practice in the culture of grafs, mentioned both by Columella and Palladius, which appears very extraordinary, though perhaps very proper in such a climate as Italy: They were in use to burn their pasture lands in the month of August: ‘But the pasture lands for the cattle,’ says Columella, ‘require some care; for, that the grafs may grow thicker, it is burned in the end of summer: This both renews the tender grafs, and, by burning the briars, prevents the bushes from shooting up into stalks *.’ To the same purpose,

* *Levis autem cura pascui est: Nam ut laetior herba confurgat, fere ultimo tempore aestatis incenditur. Eares*

purpose, Palladius, in his kalander for August, says: ' Now pastures should be burned, that so the large herbs, prevented from rising to the stalk, may push out from the root; and likewise, the dry grass being burned, a new richer crop may succeed *.' It may be observed, that, in the season in which this operation was performed, many of the plants on our rich pastures, when not too much burdened with cattle, rise to the seed; in this situation, cattle are not fond of them; and besides, remaining in this situation, the young grass is prevented from rising from their roots; this long withered grass the Romans set fire to, which made the field produce a better crop in the end of the season. Whether this operation would have the same effect in a colder climate, such as ours, is uncertain, and can only be determined by proper experiments.

Columella, mentioning the necessity of renewing old meadows by ploughing, observes, as an encouragement

res et teneriora pabula recreat, et sentibus ustis fruticem surrecturum in altitudinem compefcit; Col. lib. vi. cap. xxiii.

* Nunc prenda sunt pascua, ut et aliorum fruticum festinatio reprimatur ad stirpes, et incensis aridis nova lætius succedant; Pal. lib. ix. tit. iv.

encouragement to do this, that such land, by lying long idle, carries good crops. Thus their land proper for meadows was turned alternately from grafs into tillage, and from tillage into grafs: This seems to be the most proper and beneficial method of managing land. In a country where there is the command of dung, land may be kept in order by fallowing, and raising green crops; but, where no foreign manure can be easily obtained, it is certainly the most proper management to lay off a considerable part of the farm in grafs, and to form the scheme of management in such a manner, as to make the whole to pass from tillage into grafs, and from grafs into tillage, alternately. If the land laid off in grafs is well prepared, good crops of corn may be expected, when it is again broken up: Any dung that the farm produces, may be very properly applied, either to the grafs before it is broken up, or to fallow while the land is in tillage.

C H A P.

C H A P. XXXVII.

*Of the Fruitfulness of Meadows, and of
Hay-making.*

THE meadows mentioned by the Roman rustic writers were commonly twice cut: They were cut for the first time in May, and a second time in August or September. All the writers mention the first cutting; and Varro and Pliny mention the second.

Varro places the second cutting of hay among the works to be performed between the time of the dog-star and the autumnal equinox*.

Pliny, when directing meadows to be watered, to prepare them for the second cutting, informs us, that the hay of this crop was called
cordum:

* Quinto intervallo inter caniculari, et æquinoctium autumnale oportet, &c.—prata irrigua iterum fecari; Var. lib. i. cap. xxxiii.

cordum: And Columella mentions this kind of hay among the things proper to be given to sheep in the winter: ‘They are fed very well,’ says he, ‘with elm or oak-leaves, laid up on purpose, or autumnal hay, which is called *cordum*; for this is softer, and, on that account, sweeter than the hay come to its full growth*.’ It is probable, that this is the kind of fodder which Cato mentions, and which he calls *foenum cordum*: Among other directions to the bailiff, he says: ‘Cut down poplar, elm, and oak-leaves, and put them up in time, not over-dry, for fodder to the sheep; likewise *foenum cordum*, and the after-cuttings of the meadows, which the mower passes, put up these dry †.’

Imme-

* Rurfus rigari defecta oportet, ut fecetur autumnale foenum, quod vocant cordum; Plin. Nat. Hist. lib. xviii. cap. xxviii.

Aluntur autem commodissime repositis ulmeis, vel ex fraxino frondibus, vel autumnali foeno, quod cordum vocatur; nam id mollius, et ob hoc jucundius est, quam maturum; Col. lib. vii. cap. iii.

† Frondem populneam, ulmeam, querneam caedito, per tempus eam condito, non peraridam, pabulum ovibus. Item foenum cordum, sicilimenta de prato ea arida condito; Cat. cap. v.

Immediately after the first crop of hay was carried from the field, it seems to have been the practice to give the meadow a second mowing; the principal design of which was, to cut down the grass left at the first mowing. This is mentioned both by Varro and Pliny: Varro, after mentioning the carrying the hay from the field, adds: 'Which being done, the meadow must be mowed again, that is, the grass cut which the mowers pass by, who leave the field ridged by the grass *.' 'As often,' says Pliny, 'as meadows are cut, the mowers must come over them again, and cut what they leave the first time.' This, no doubt, would add to the crop, which is one reason for the practice; but Pliny seems to give another, which is, that it is improper to allow the plants to rise to the seed, which the grass passed over by the mowers will certainly do, when allowed to stand till the time of the autumnal hay-making: 'For,' says he, 'it is very improper to allow the grass to grow up to the seed †.' Columella likewise mentions
this

* Quo facto sicilienda prata, id est, falcibus confectanda, quae foenifeces praeterierunt, ac quasi herba tuberosum reliquerunt campum; Var. lib. 1. cap. XLIX.

† Praeterea quoties facta sunt, siciliri, hoc est, quae foenifeces

this second cutting of meadows, after the hay is carried off; but only among the works lawful on holy days, without giving any particular directions about it *.

Although the ordinary meadows were cut only twice, yet there were some that were cut much oftener: Pliny says, that near Interamna in Umbria, meadows are cut four times in the year, though they are not watered †.

It is not certain, from any passages in the rustic writers, what is the quantity of hay that a *jugerum* of their meadows was in use to produce. Columella, indeed, when mentioning what quantity a man should mow in a day, expresses himself in this manner: ‘ A good mower cuts a *jugerum* of meadow, and one likewise binds 1200 bundles of hay, of four pounds each ‡.’ Pliny says,

foenifeces praeterierunt, secari. Est enim in primis inutile, enasci herbas sementaturas; Plin. Nat. Hist. lib. xviii. cap. xxviii.

* Feriis autem ritus majorum etiam illa permittit, far pinfere, &c.—Prata ficilire; Col. lib. ii. cap. xxii.

† Interamnae in Umbria quater anno secantur, etiam non rigua; Plin. Nat. Hist. lib. xviii. cap. xxviii.

‡ Bonus operarius prati jugerum defecat, nec minus mille ducentos manipulos unus obligat, qui sint singuli quaternarum librarum; Col. lib. xi. cap. ii.

says, to the same purpose: 'It is one day's work of a man, to mow a *jugerum*, and to bind 1200 bundles, of four pounds each *.' From these passages, it seems probable, that this is the quantity that a *jugerum* of good meadow ground used to carry: This too we are to consider as the quantity of dry hay; for it shall afterwards be shown, that the hay was tied in bundles to be carried home, and that this was not done till the hay was properly dried, and ready to be put under cover. Now, 1200 bundles, at four pounds, make 4800 pounds Roman, which are equal to 3600 pounds Averdupoise: This is the quantity on a *jugerum*, and is nearly equal to 5825 lib. Averdupoise on the English acre, and to 7332 lib. Averdupoise, or 327 stone Trone weight, on the Scots acre: Besides this, there were the rakings of the meadows, the grafs that was left by the mowers at first cutting, and the second or autumnal crop; all of which put together, cannot be computed at less than one-half of the first crop; so that we may reasonably suppose,

* *Justum est una opera jugerum in die defecari; alligarique manipulos mille ducentos, quaterna pondo; Plin. Nat. Hist. lib. xviii. cap. xxviii.*

suppose, that the produce of meadows was reckoned very valuable by the Romans, and preferable to the produce of corn fields, the greatest part of which had but one crop in two years.

Pliny informs us what kind of plants commonly grow in the meadows of Italy: 'The best,' says he, 'is trefoil, the next is the common grass, the worst is the *mimmulus*: The hard *siliqua* likewise, and the plant called *equifetis*, on account of its resemblance to a horse's tail, are hated by the mower*.' These plants, mentioned by Pliny as good for a meadow, are proper both for green forage and hay, and a rich crop of them would be very valuable.

The dry seasons in Italy render the making of hay in that climate much easier than in this, where the summer heat and droughth are not so great. However, it will not be improper to give an account of the manner in which the Romans performed this part of husbandry.

It

* Herba optima in prata trifolii, proxima graminis, pessima mimmuli, filiquas etiam diras ferentis: Invisa et equifetis est, a similitudine equinae setae; Plin. Nat. Hist. lib. xviii. cap. xxviii.

It is the opinion of all the rustic writers, that
 grafs for hay fhould be cut before it begins to
 wither. ‘Cut hay,’ fays Cato, ‘when it is rea-
 dy, and take care not to be too late in cutting.
 ‘Cut before the feed is ready, and put up the
 ‘beft hay by itfelf*.’ ‘Whenever grafs,’ fays
 Varro, ‘ceafes to grow, and begins to wither
 ‘with the heat, it ought to be cut with fcythes †.’
 ‘Hay,’ fays Columella, ‘fhould be cut before
 ‘it begins to wither; for, in this fituation, it
 ‘produces a larger crop, and affords pleafanter
 ‘food for cattle ‡.’ ‘In May,’ fays Palladius,
 ‘in dry, warm, or maritime places, hay may be
 ‘cut, but before it withers ||.’ ‘The time of
 ‘cutting,’ fays Pliny, ‘is when the ftalk begins
 ‘to lofe the flowers and to harden: It ought to
 ‘be

* *Fœnum, ubi tempus erit, fecato, cavetoque ne fero feces. Priusquam semen maturum fiet, fecato, et quod optimum fœnum erit, feorfum condito; Cat. cap. LIII.*

† *Herba cum crefcere defuit, et aestu arefcit, fubfecari falcibus debet; Var. lib. I. cap. XLIX.*

‡ *Fœnum autem demetitur optime antequam inarefcit; nam et largius percipitur, et jucundiozem cibum pecudibus praebeet; Col. lib. II. tit. XIX.*

|| *Hoc mense in locis ficcis, calidis, five maritimis fœna recidantur, prius tamen quam exarefcant; Pal. lib. VI. tit. I.*

‘ be cut before it withers.’ After this, he cites the above passage from Cato *. The whole authors we see mention this circumstance; and, therefore, we may well suppose, that they consider it as a matter of importance: In this they are very worthy of our imitation; for, by cutting grafs early, not only the hay is of a much better quality, but also less hurt is done to the land by the crop, a thing that ought not to be overlooked.

The ancient manner of making hay among the Romans, is a little different from the modern practice in Britain: ‘ As it dries,’ says Varro, ‘ it ought to be turned with forks, and, ‘ when sufficiently dry, it ought to be tied up in ‘ small bundles, and carried home; then, what ‘ is left strawed upon the meadow, should be ‘ raked together, and added to the crop †.’
‘ There

* Secandi tempus, cum spica deflorescere coepit, atque roborari: Secandum, antequam inarescat. Cato foenum, inquit, ne sero feces; prius quam semen maturum sit, fecato; Plin. Nat. Hist. lib. xviii. cap. xxviii.

† Et quoad perarescat, furcillis versari. Cum peraruit, de his manipulos fieri, ac vehi ad villam. Tum de pratis stipulam rastellis eradi, atque addere foenificiae cumulum; Var. lib. i. cap. xlix.

‘ There is a very proper measure,’ says Columella, ‘ in drying hay, that so it may be put
 ‘ up, neither very dry nor too green; the one,
 ‘ because, if it loses all the sap, it becomes like
 ‘ straw; the other, because, if it retains too
 ‘ much, it is apt to putrify in the loft; and of-
 ‘ ten, when it heats, takes fire and burns; some-
 ‘ times too, after the hay is cut, the work is
 ‘ stopped by a shower; for, if the grass is wet,
 ‘ it is vain, in this situation, to muddle with it;
 ‘ it is better to allow the upper part of it to dry
 ‘ in the sun, than to turn it over, and, when
 ‘ dry on both sides, to draw it into a row, and
 ‘ so make it up into bundles: Nor is the bring-
 ‘ ing it under cover to be delayed a moment:
 ‘ And, if it is not proper to carry home the hay,
 ‘ or even to make it up into bundles, certainly
 ‘ whatever quantity of it is properly got, should
 ‘ be built into ricks, and these sharpened into
 ‘ very narrow tops; for thus the hay is well de-
 ‘ fended from rain: Though there should be no
 ‘ fear of rain, yet it is not improper to build
 ‘ the hay into ricks of the kind mentioned, that
 ‘ so, if there is still any moisture in the grass,
 ‘ it may sweat out and be consumed in them;
 ‘ for this purpose, prudent husbandmen, even
 ‘ after

‘ after their hay is brought under cover, do not
 ‘ lay it up, till it has been allowed for a few
 ‘ days to heat and cool in open built stalks *.’

It may be observed, from these passages, that it was the common practice, after the hay was properly got, to put it up in bundles, and so carry it home, to be laid up under cover; and it is
 in

* Est autem modus in ficcando, ut neque peraridum, neque rursus viride colligatur: Alterum, quod omnem succum si amiserit, stramenti vicem obtinet, alterum, quod, si nimium retinuerit, in tabulato putrescit; ac saepe cum concaluit, ignem creat et incendium. Nonnunquam etiam cum foenum cecidimus, imber oppressit: Quod si permaduit, inutile est udum movere; meliusque patiemur superiorem partem Sole ficcari. Tunc demum convertemus, et utrumque ficcatum coartabimus in strigam, atque ita manipulos vinciemus: Nec omnino cunctabimur, quo minus sub tectum congeratur, vel si non competit, ut aut in villam foenum portetur, aut in manipulos colligatur, certe quicquid ad eum modum, quo debet, ficcatum erit, in metas extrui conveniet, easque ipsas in angustissimos vertices exacui. Sic enim commodissime foenum defenditur a pluviis, quae etiam si non sint, non alienum tamen est praedictas metas facere; ut si quis humor herbis inest, exudet, atque excoquatur in acervis. Propter quod prudentes agricolae, quamvis jam illatum tecto, non ante componunt, quam per paucos dies temere congestum, in se concoqui et deservescere patiantur; Col. lib. II. cap. XIX.

in this chiefly, that the ancient practice in Italy differs from the modern practice in Britain. Pliny, in his directions, is not so particular as Columella; he says: ‘ Hay, when cut, should
 ‘ be exposed to the sun, and ought not to be
 ‘ built up till dry.’ He adds, as a reason; ‘ If
 ‘ this is not diligently observed, it is certain,
 ‘ that the ricks in the morning will begin to
 ‘ smoke, and soon after will be kindled by the
 ‘ sun and consumed *.’

Pliny is the only author that mentions the scythe, and the manner of mowing, but not so fully as to give us a just idea of them: Having said, that, in some parts of Italy, meadows are cut after harvest, he adds: ‘ This was more ex-
 ‘ pensive to our ancestors; the whitstones from
 ‘ Crete, and from beyond the sea, were the on-
 ‘ ly ones known; and these could not put an
 ‘ edge upon the scythe without oil: Wherefore,
 ‘ the mower moved forward, having an horn
 ‘ with oil tied to his leg. In Italy, there have
 ‘ been

* Sectum verti ad Solem, nec nisi ficcum construi oportet; nisi fuerit hoc observatum diligenter, exhalari matutino nebulam quandam, metasque mox Sole accendi, et conflagrare certum est; Plin. Nat. Hist. lib. xviii. cap. xxviii.

' been found lately water whitstones, that grind
 ' iron like a file; but these water whitstones
 ' soon become furred with green, and lose their
 ' virtue. Of scythes, there are two kinds; the
 ' Italian is the shortest of the two, and managea-
 ' ble among bushes: In the extensive fields of
 ' Gaul, they go a less expensive way to work;
 ' for they cut the long grass near the middle,
 ' and pass over the short grass: The Italian mow-
 ' er, on the other hand, cuts lower, and uses
 ' his right hand only *.' From this passage, it
 appears probable, that the Gallic scythe was
 long like ours, and used too in the same man-
 ner; and that the Italian one was shorter, ma-
 naged by the right hand only, and fit to be used
 amongst bushes, and where it was necessary to
 cut very low. The whitstones here mentioned
 seem

* Fuit hoc quoque majoris impendii apud priores.
 Creticis tantum Transmarinisque cotibus notis, nec nisi o-
 leo falcis aciem excitantibus. Igitur cornu propter oleum
 ad crus ligato foenifex incedebat. Italia aquarias cotes
 dedit, limae vice imperantes ferro. Sed aquariae protinus
 virent. Falcium ipsarum duo genera: Italicum brevius,
 ac vel inter vepres quoque tractabile. Galliarum lati-
 fundia majoris compendii, quippe medias cedunt herbas,
 brevioresque praetereunt. Italus foenifex dextra una ma-
 nu fecat; Plin. Nat. Hist. lib. xviii. cap. xxviii.

seem to be of the same kind with those used in this country, and the same thing happens to ours, which Pliny, in this passage says, happened to them: By frequent rubbing upon the scythe, the pores are filled up by the juice of the grass that sticks to the scythe, and, from this juice, it also receives the green colour which Pliny mentions. This, it is probable, may be prevented, by rubbing the scythe with a cloth before the whitstone is used: But it is indeed of no great importance to attend to this, as the whitstones are purchased at a very small expence.

C H A P. XXXVIII.

Of Inclosing.

INCLOSING lands is now a very common practice in modern husbandry: It is reckoned a great improvement; and indeed, without it, lands cannot be brought to the highest degree of culture. The scheme of agriculture, in which land is changed alternately from tillage into grass, and from grass into tillage, is certainly the most advantageous; but, unless our lands are inclosed, it cannot be properly executed. In this, there seems to be a great difference between the ancient and modern husbandry; for, although the Romans had a great many different methods of inclosing, yet it does not appear that, in the time of Columella, or even in the time of Pliny, there were any inclosures in Italy for feeding cattle: Columella, when treating of the improvement of uncultivated

ted lands, expresses himself in this manner:
 ‘ But stony land is easily improved by gathering
 ‘ the stones : If there are a great many of them,
 ‘ they must be piled up on some parts of the
 ‘ field, that the rest may be cleared ; or they
 ‘ may be buried in a deep trench, which is the
 ‘ best way, if it can be done at small expence *.’

When he gives an account of the manner of feeding labouring cattle in the several months, and the kind of food given them, no mention is made of their being put into inclosures; neither is there any proposal made for this purpose. Cato indeed mentions the putting oxen out to pasture; but then he says expressly, that this ought not to be done except in winter, when they are not employed in labour †. It was not necessary, therefore, that there should be inclosures for this purpose; because, as this was in
 some

* At saxosum facile est expedire lectione lapidum, quorum si magna est abundantia, velut quibusdam substructionibus partes agri sunt occupandae, ut reliquae emundentur: Vel in altitudinem sulco depresso lapides obruendi: Quod tamen ita faciendum erit, si suadebit operarum vilitas; Col. lib. II. cap. II.

† Boves nisi per hiemem, cum non arabunt, pasci non oportet; Cat. cap. LIV.

some measure an idle time, the farmer would be at no loss to get persons to attend them. To these things, it may be added, that Columella, when giving directions about the breeding and feeding of cattle, makes no mention of inclosures for these purposes, which he certainly would have done, had there been any: Frequent mention indeed is made of defending meadows; but this can mean nothing more than preventing the cattle from going upon them, which, it is probable, they were in use to do after the last crop of hay was taken off. Mention is likewise made of inclosed places for sheep, near the farmhouse; but these were only a larger kind of folds for confining them in the night time; this appears from their having the same name with the poultry yards, and likewise from the description that Columella gives of them: ‘ Their folds,’ says he, ‘ must be low, extended rather to the
‘ length than to the breadth, that, at the same
‘ time, while they are warm in winter, their
‘ narrowness may not too much straiten those
‘ that are with young: They ought to front the
‘ south; for this kind of cattle, although the
‘ best clothed of all animals, are yet the least a-
‘ ble to bear the colds of winter, and the damps
‘ of

‘ of summer *.’ Inclosures of the same kind are mentioned as necessary for cows, but used like those for sheep, only to defend them in the night-time. Columella says, ‘ Inclosures must be made in a wide space, that so those that are with young may not be squeezed too much in strait places, and that the weak may elude the strokes of the stronger †.’ That the cows commonly pastured in the open fields, is evident from what this author mentions a little below: After saying, that it tends much to their health to have salt laid upon stones, or brought near their folds, he adds: ‘ For this ought always to be done at the twilight, that the cattle, if any of them remain in the woods, at the sound of the horn, may be accustomed to return to their folds ‡.’

Any

* *Humilia facere stabula, sed in longitudinem potius, quam in latitudinem porrecta, ut simul hieme calida sint, nec angustiae foetus oblidant. Ea poni debent contra medium diem: Namque id pecus, quamvis ex omnibus animalibus vestitissimum, frigoris tamen impatientissimum est, nec minus aestivi vaporis; Col. lib. vii. cap. iiii.*

† *Sed laxo spatio confecta facienda sunt, ne in angustiis confectum altera alterius elidat, et ut invalida fortioris ictus effugiat; Col. lib. vi. cap. xxiiii.*

‡ *Nam id quoque semper crepusculo fieri debet, ut ad sonum*

Any inclosures used in the time of Columella, were parks for deer and other wild beasts: Of these he gives a very particular description, and informs us likewise, that they had such things in ancient times: ‘I come now,’ says he, ‘to the inclosing of wild beasts, and the management of bees, both of which may be reckoned amongst the animals that are reared in the *villa*. It was an ancient custom to place parks for hares, goats, and other wild beasts of these kinds, near the villa, within view of the mansion house, that so these beasts feeding might afford an agreeable prospect; and also, when needed for the table, might be ready and at hand*.’ Pliny likewise mentions these parks, and informs us who was the person that first contrived them in Italy: ‘The first Roman,’ says

sonum buccinae pecus, si quod in silvis subliterit, septa repetere consuecat; Col. lib. vi. cap. xxiii.

* Venio nunc ad tutelam pecudum silvestrium et apium educationem: Quas et ipsas, Publi Silvine, villaticas partitiones jure dixerim, siquidem mos antiquus lepuseulis capreisque, ac similibus feris juxta villam plerumque subiecta dominicis habitationibus ponebat vivaria, ut et conspectu suo clausa venatio possidentis oblectaret oculos, et cum exegisset usus epularum, velut e cella promerentur; Col. lib. ix. praef.

says he, ' that contrived parks for wild boars, ' and other wild beasts, was Fulvius Lupinus, ' who established the way of feeding these beasts ' in the country near Tarquinia *.'

However, it appears, that, in the time of Palladius, inclosures were made for other purposes: When mentioning the taking stones off from land, instead of proposing to have them piled up, as Columella directs, on the contrary, he says, that the field may be inclosed by them: ' If a ' field,' says he, ' is stony, it may be cleared, ' and then inclosed by a stone wall, formed of ' the stones †.' In another place, he says: ' Care ' should be taken to inclose meadows, as well as ' gardens and orchards †.'

Though the ancient Romans had no inclosures for the cattle used in their farms, yet we find, that fences of different kinds were used by them for defending their marches, or inclosing their

* Vivaria horum, caeterorumque silvestrium, primus togati generis invenit Fulvius Lupinus, qui in Tarquiniensi feras pascere instituit; Plin. Nat. Hist. lib. viii. cap. LII.

† Si lapidosus, per macerias saxorum a turba collectas, et purgari poterit, et inde muniri; Pal. lib. vi. tit. III.

‡ Studendum praeterea ut hortis et pomariis cingi possit, aut pratis; Pal. lib. i. tit. VIII.

their gardens and orchards. Varro mentions
 many different kinds of them : ‘ Now,’ says he,
 ‘ I shall treat of fences, which are made for de-
 ‘ fending the farm, or any part of it ; there are
 ‘ four kinds of these ; one raised by nature, a-
 ‘ nother made of the timber of the country, a
 ‘ third like the military rampart, and a fourth
 ‘ of mason work : Of each of these there are se-
 ‘ veral sorts ; the first is the natural fence, and
 ‘ raised by planting briars or thorns which have
 ‘ roots, and which, being a live-hedge, is not
 ‘ in danger from the burning torch of the wan-
 ‘ ton passenger ; the second is the fence made of
 ‘ the timber of the country, and is a dead hedge ;
 ‘ it is made by fixing stakes near to each other,
 ‘ and weaving them with twigs ; or taking broad
 ‘ ones, with holes bored in them, and putting
 ‘ poles into these holes, two or three of them a-
 ‘ bove each other ; or, by putting the trunks of
 ‘ trees in the earth, placing them in proper
 ‘ order. The military fence, which is the third
 ‘ kind, is a ditch and earthen dike ; the ditch
 ‘ ought to be so large as to contain all the wa-
 ‘ ter that falls from the heavens, or with such a
 ‘ descent, as to make the water from it pass out
 ‘ of the farm ; and the dike ought to have a ditch
 ‘ running

‘ running along it in the inside, or so high and
 ‘ steep as not to be easily passed over : This kind
 ‘ of fence is commonly made along high-ways
 ‘ and rivers : Along the Salarian way, upon the
 ‘ lands upon the banks of the Crustumium,
 ‘ dikes may be seen in several places with ditches
 ‘ joined to them, to prevent the river from hurt-
 ‘ ing the fields : Some give to the dikes made
 ‘ without ditches the name of walls, as in the
 ‘ lands about Reate. The fourth kind, is a wall
 ‘ of mason work, and is the best : There are
 ‘ four sorts of it ; one of stone, as in the Thuf-
 ‘ calan fields ; another of burned bricks, as in
 ‘ the Gallic fields ; a third of unburned bricks,
 ‘ as in the Sabine fields ; and the fourth of earth
 ‘ and gravel compounded and pressed together
 ‘ in frames, as in Spain and the lands about
 ‘ Tarentum *.’

Colu-

* Nunc de septis, quae tutandi causa fundi, aut partis
 fiant, dicam. Earum tutelarum genera IIII. unum natu-
 rale, alterum agreste, tertium militare, quartum fabrile.
 Horum unumquodque species habet plures. Primum na-
 turale sepimentum, quod obseri solet virgultis aut spinis,
 quod habet radices, ac vivae sepis, praetereuntis lascivi
 non metuet facem ardentem. Secunda sepes est ex a-
 gresti ligno, sed non vivit. Fit aut palis statutis crebris,

e virgultis implicatis ; aut latis perforatis et per ea foramina trajectis longuriis fere binis aut ternis : Aut ex arboribus truncis demissis in terram, deinceps constitutis. Tertium militare sepimentum est fossa, et terreus agger. Sed fossa ita idonea, si omnem aquam, quae e coelo venit, recipere possit, aut fastigium habet, ut exeat e fundo. Agger is bonus, qui intrinsecus junctus fossa, aut ita arduus, ut eum transcendere non sit facile. Hoc genus sepes fieri secundum vias publicas solent, et secundum amnes. Ad viam Salariam, in agro Crustumino videre licet locis aliquot conjunctos aggeres cum fossis, ne flumen agris noceat. Aggeres qui faciunt sine fossa, eos quidam vocant muros, ut in agro Reatino. Quartum fabrilis sepimentum est novissimum, maceria. Hujus fere species quatuor. Quod fiunt e lapide, ut in agro Tusculano : Quod e lateribus costilibus, ut in agro Gallico : Quod e lateribus crudis, ut in agro Sabino : Quod ex terra, et lapillis compositis informis, ut in Hispania, et agro Tarentino ; Var. lib. 1. cap. xiv. Commentators are not agreed what kind of fence the one last mentioned was : Some are of opinion, that Varro does not mean walls formed of earth pressed into frames ; but it is probable that he does, as Pliny mentions walls built after this manner in Africa and Spain : ‘ Are there not,’ says he, ‘ earth walls in Africa and Spain, called *formacii* ; because two boards being formed, one on each side, as a frame, the walls may be said more properly to be crammed into this, than to be built ; they last for ages unhurt by rain, wind, or fire, and are stronger than can be made of any kind of cement.—Quid ? non in Africa Hispaniaque ex terra

‘terra parietes, quos appellant formaceos, quoniam in
 ‘forma circumdatis utrinque duabis tabulis inferciuntur
 ‘verius, quam instruuntur; aevis durant incorrupti im-
 ‘bribus, ventis, ignibus, omnique caemento firmiores?
 Plin. Nat. Hist. lib. xxxv. cap. xiv. It is probable like-
 wise, from a passage in the same author, that follows the
 one above cited, that the walls made of unburned bricks,
 mentioned by Varro, were cemented with mud, and built
 in frames, with cross bars, like those used at present in
 Britain for brick partitions. He says; ‘Even now may
 ‘be seen in Spain, the spying houses of Hannibal, and the
 ‘earthen towers which he caused to be built on the tops
 ‘of mountains: From these, the nature of the turf used
 ‘appears very proper both for the ramparts of camps, and
 ‘for banks to resist the force of rivers. But who is igno-
 ‘rant that the grates of the walls that last long are be-
 ‘dawbed with mud, and built up with unburned bricks.
 ‘— Spectat etiam nunc speculas Annibulis Hispania,
 ‘terrenasque turres jugis montium impositas. Hinc et
 ‘cespitem natura castrorum vallis accommodata, con-
 ‘tra fluminum impetus aggeribus. Illini quidem crates
 ‘parietum luto, et lateribus crudis extrui; id. Some com-
 mentators consider this as a further description of the
 walls first mentioned; and, because those walls were to
 be seen in Africa, alledge, that the mud here mentioned
 is the cement called *lutum Punicum*: But the brick walls
 described in the last passage seem to be of a construction
 very different from the earthen walls described in the first;
 particularly, it is said, that the brick walls had mud in
 them for mortar; whereas, it is said of the earthen walls,
 that

Columella, when treating of the management of the orchard, mentions three kinds of fences ; a built wall, a hedge, and a ditch *.

Pal-
that they were stronger than any made with mortar or cement, and that the earth was not formed into bricks, and piled up, but pressed down with force into a frame made with boards. It is probable, therefore, that the description of the brick walls in the latter passage, has no relation to the earthen walls mentioned in the former one. In the chapter immediately before the one where we find these passages, Pliny mentions some kinds of earth, that by the water are turned into stone ; this naturally led him to mention earths that were hardened in a different manner, and formed into firm and lasting walls : He first mentions the earthen walls in Africa and Spain, called *formacii*, of which were Hannibal's spying houses, and earthen towers, which, our author says, were to be seen in his time : Next he mentions walls made of brick, built in frames, and cemented with mud ; he informs us what kind of earth is most proper for making bricks ; that the Greeks preferred them even to stone, although they had very good kinds for building ; and that the strongest walls were made of them, among which were the temples of Jupiter and Hercules, the royal palaces of Attalus and Croesus, and the tomb of Mausolus, all of which remained in his time. It seems, therefore, more agreeable to Pliny's design, to suppose that he intended to describe two kinds of walls, than that he had one kind only in view.

* *Locum pomarii, priusquam femina feras circummu-
nire*

Palladius, when treating of gardens, informs us, that there are many kinds of fences; that some, by putting mud into frames, imitate brick walls; that those who have plenty of stones, make them of stone and mortar; that many make them of dry stones; that some surround the places that are to be cultivated with ditches, which he says should not be done unless they are marshy, because thereby the moisture is carried off; and that others make a fence by planting thorns, or sowing their seeds*.

Columella gives a particular description of the manner of fencing a garden by hedges: 'I will show,' says he, 'a way how to fence a garden at a small expence, so as to defend it both from men and cattle: The most ancient authors prefer a live-hedge to a built fence, because it may not

nire maceris oportet, vel sepe, vel fossa praecipiti; Col. lib. v. cap. x.

* Munitionis multa sunt genera; alii luto inter formas clauso, parietes figuratos ex lateribus imitantur. Quibus copia suppetit, maceris luto et lapide excitant. Plerique sine luto congesta in ordinem saxa componunt. Nonnulli fossis spatia colenda praecingunt: Quod vitandum est, quia horto subducit humores, nisi forte locus palustris colatur. Alii spinarum plantas et femina in munitione disponunt; Pal. lib. i. tit. xxxiv.

' not only be raised at less expence, but also lasts
 ' much longer; therefore, they have delivered
 ' this method of making a fence, by planting
 ' thorns: The place intended to be inclosed, as
 ' soon after the autumnal equinox as the earth
 ' is moistened with showers, must be surrounded
 ' with a double ditch, three feet distant, two
 ' feet deep, and as many wide; these must be
 ' left open through the winter, and the seeds
 ' that are to be sown prepared: The largest
 ' thorns are the best, particularly the *rubus*, the
 ' *paliurus*, and what we call the dog's thorn;
 ' the seeds of these thorns ought to be gathered
 ' as ripe as possible, and mixed with *erville* meal;
 ' these should be sprinkled with water, and then
 ' spread upon old ship ropes, or indeed upon a-
 ' ny kind of ropes; when this is done, the ropes
 ' must be dried and replaced in the loft; then,
 ' about forty days after the solstice, at the co-
 ' ming of the swallow, and when the *Favonius* is
 ' blowing, after the thirteenth of February, if
 ' there is any water in the ditches, it must be
 ' drawn out, and the pulverized soil that was
 ' thrown out in autumn must be replaced, so
 ' far as to fill the ditches half way to the top;
 ' then the ropes, ready prepared in the loft, must
 ' be

' be unfolded, and, being stretched long ways
 ' upon the earth in the ditches, must be cover-
 ' ed, but so as there may not be so much earth
 ' thrown upon them as to prevent the seeds of
 ' the thorns that stick between the strands of the
 ' ropes from vegetating: These seeds come up
 ' in about thirty days, and, as they grow up,
 ' they should be bended towards the middle space
 ' between the furrows: On this, it is necessary
 ' likewise to set a twig hedge, for the thorns
 ' from both ditches to rest upon till they become
 ' strong: It is obvious, that this hedge cannot
 ' be destroyed without digging up the roots;
 ' besides, it is certain, that, after an injury from
 ' fire, it can easily be renewed. This is the
 ' manner of inclosing a garden most approved
 ' of by the ancients *.'

Pal-

* Ipse igitur ostendam rationem, qua non magna opera
 hortum ab incurfu hominum pecudumque munimus. Ve-
 tustissimi auctores vivam sepem struisti praetulerunt, quia
 non solum minorem impensam desideraret, verum etiam
 diuturnior immensis temporibus permaneret: Itaque ve-
 pres efficiendi consitis spinis rationem talem reddiderunt.
 Locus, quem sepire destinaveris, ab aequinoctio autumnali
 simulatque terra maduerit imbribus, circumvallandus est
 duobus fulcis tripedaneo spatio inter se distantibus. Mo-
 dum

Palladius likewise gives an account of this method of inclosing. Though he is not so particular

dum altitudinis et latitudinis eorum abunde est esse bipedaneum: Sed eos vacuos perhiemare patiemur praeparatis feminibus, quibus obserantur. Ea sint vastissimarum spinarum, maximeque rubi, et paliuri, et ejus quam Graeci vocant *κρυσεύριον*, nos sentem canis appellamus. Horum autem ruborum femina quam maturissima eligi oportet, et ervi moliti farinae immiscere: Quae cum est aqua conspersa, illinitur vel nauticis veteribus funibus, vel quibuslibet aliis restibus. Siccati deinde funiculi reponuntur in tabulato. Mox ubi bruma confecta est, intermissis quadraginta diebus, circa hirundinis adventum, cum jam Favonius exoritur, post Idus Febuario, si qua in sulcis per hiemem constitit aqua, exhauritur, resolutaque humus, quae erat autumnio regeſta, usque ad mediam fulcorum altitudinem reponitur. Praedicti deinde funes de tabulato prompti explicantur, et in longitudinem per utrumque fulcum porrecti obruuntur, sed ita, ut non nimium supergeſta terra femina spinarum, quae inhaerent toris funiculorum, enasci possint. Ea fere circa trigessimum diem prorepunt: Atque ubi coeperunt aliquod incrementum habere, sic insuesci debent, ut in id spatium, quod sulcis interjacet, inclinentur. Oportebit autem virgeam sepe interponere, quam superſcendant fentes utriusque sulci, et sit quo interdum quasi adminiculo priusquam corroborentur, acquiescant. Hunc veprem manifestum est interimi non posse, nisi radicitus effodere velis. Caeterum
etiam

particular as Columella, yet I shall cite the passage, as there is something particular in it: After observing, that some make a fence by planting thorns, or sowing their seeds, he adds: ‘ But
 ‘ it is the better way to gather the ripe seeds of
 ‘ the *rabus*, and the thorn called the dog’s thorn,
 ‘ and to mix them with erville meal, wet with
 ‘ water; then spread this mixture upon old
 ‘ broom ropes, that so the seeds, being received
 ‘ between the strands of the ropes, may be pre-
 ‘ served till the beginning of spring; then, where
 ‘ the hedge is intended, let two ditches be made,
 ‘ at three feet distance from each other, and one
 ‘ foot and one-half foot deep; and, in both, let
 ‘ the ropes with the seeds be covered with a lit-
 ‘ tle earth: Thus, the thorns will come up in
 ‘ thirty days, which, while tender, it is neces-
 ‘ sary to assist with props, by which the thorns
 ‘ may be joined together across the spaces left
 ‘ between the rows *.’

From

etiam post ignis injuriam melius renasci nulli dubium est.
 Et haec quidem claudendi horti ratio maxime est antiquis
 probata; Col. lib. xi. cap. iii.

* Sed melius erit rubi femina, et spinae quae rubus ca-
 ninus vocatur, matura colligere, et cum farina ervi ex
 aqua macerata miscere: Funes dehinc sparteos veteres

From these passages it appears, that all the different methods of inclosing practised by the moderns, were known to the ancients, and, in some cases, practised by them. That they had not more inclosures, was probably owing to the climate that renders pasture grass much inferior in value to the same quantity of land sown in pulse; besides, their schemes of agriculture, well calculated to keep their land in good heart and free from weeds, rendered it less necessary in them than in us to turn their fields alternately, from grass to corn, and from corn to grass. It is absurd to suppose, that they did not observe all the advantages of inclosures from those that they used; and, it is equally absurd to suppose, that they did not inquire whether the making them for the cattle belonging to their farms, or for feeding other cattle, would produce an annual profit sufficient to balance the expence; and, in
this

hoc genere missionis sic inducere, ut intra funes semina recepta serventur usque ad verni temporis initia. Tunc ubi sepes futura est, duos sulcos tribus a se pedibus separatos, sesquipedis altitudine faciemus, et per utrosque, funes cum feminibus obruemus levi terra. Ita trigesima die procedunt fentes, quos teneros adminiculis opus est adjuvare, quibus inter se fentes per spatia vacua relicta jungentur; Pal. lib. 1. tit. xxxiv.

this inquiry, it is probable, that they judged that the expence was too great, which indeed it appears to have been in the time of Columella, when money was at six *per cent. per annum*, and a labouring slave cost upwards of sixty pounds. If things were in such a situation with us, neither inclosing, nor the other branches of improvement, would make such progress as they have done of late years.

CHAP.

C H A P. XXXIX.

Of Reaping.

THE proper time of reaping depends upon circumstances, arising chiefly from the weather, climate, and situation of the crop: In a warm and dry climate, corn may be reaped in a situation, in which it would be improper to reap it in a climate that is cold and wet: So likewise corn that is strong in the stalk and clean, may be reaped in a situation in which it is improper to reap corn that is soft in the stalk, and mixed with juicy weeds.

In the northern parts of this island, the climate is rather cold and wet, and the corn in general is far from being free from weeds; on these accounts, it is reckoned bad husbandry to cut corn before it is fully ripe, except when the near approach of winter renders it necessary; hence the proverb, *A green sheaf is a bad shake.*

In

In Italy, matters are in a different situation : The season, in the time of harvest, is warm and dry ; and, from the manner in which the Roman farmers managed their farms, the stalks of their corn were commonly strong, and few weeds were in their fields ; hence, the directions given by almost all the writers on husbandry, to reap corn before it is quite ripe. ‘ When corn is ‘ ready,’ says Columella, ‘ it must be quickly ‘ reaped, before it is scorched by the heats of ‘ summer, which are very great at the rising of ‘ the dog-star ; for a delay in this is attended ‘ with great loss ; first, because it becomes a ‘ prey to birds, and other animals, and then, ‘ because the grain, and even the ears, fall from ‘ the parched stalks ; and, if there should be ‘ storms or whirlwinds, the greater part is driven ‘ to the ground. For these reasons, there ought ‘ to be no delay, but, as soon as the corn is all ‘ equally yellow, before the grain is hardened, ‘ and when it acquires a reddish colour, the reap- ‘ ing should be begun, that so the corn may be- ‘ come larger rather in the threshing-floor and ‘ the heap, than growing in the field ; for it ‘ happens, if corn is early cut, that it afterwards ‘ be-

‘ becomes larger *.’ The general direction here given, he applies particularly to barley in another passage: ‘ Barley,’ says he, ‘ when it is a little
 ‘ ripe, should be cut down more early than any
 ‘ other corn; for, having a brittle stalk, and the
 ‘ grain having no chaff to defend it, quickly
 ‘ falls; and, for the same reasons, it is more
 ‘ easily threshed than any other corn †.’ Columella, in the first of these passages, declares it
 to

* Sed cum matura fuerit seges, ante, quam torreatur vaporibus aestivi fideris, qui sunt vastissimi per ortum caniculae, celeriter demetatur. Nam dispendiosa est cunctatio. Primum, quod avibus praedam, caeterisque animalibus praebet: Deinde quod grana, et ipsae spicae culmis arenantibus et aristis celeriter decidunt. Si vero procellae ventorum, aut turbines incefferint, major pars ad terram defluit: Propter quae recraftinari non debet, sed aequaliter flaventibus jam satis, ante, quam ex toto grana indurescant, cum rubicundum colorem traxerunt, messis facienda est, ut potius in area, et in acervo, quam in agro grandescant frumenta. Constat enim si tempestive decisa sint, postea capere incrementum; Col. lib. II. cap. XXI.

† Proximus est his frumentis usus ordei, &c. — Idque ubi paullum maturuerit, festinantius, quam ullum aliud frumentum demetendum erit. Nam et fragili culmo, et nulla vestitum palea granum ejus celeriter defidit, iisdemque de causis facilius teritur, quam caetera; Col. lib. II. cap. IX.

to be his opinion, that corn ripens after it is cut: There are many modern farmers of the same opinion: It is natural to suppose, that the juices in the stalk after it is cut, are not wholly exhausted, but that some of them continue their natural course, and tend to the nourishment of the grain.

Palladius, when treating of this subject, applies particularly to barley what Columella says of corn in general; and, that the grain may ripen after the stalks are cut down, he proposes, that they shall be allowed to lie some time on the field: ‘Now,’ says he, ‘the barley harvest begins first, which should be all cut down before the grain falls from the parched ears; because barley is not defended by small leaves in the ear, as *triticum* is.—But we ought to allow the stalks of barley to lie a little while in the field; for, by this means, it is thought that the grain grows larger*.’

Pliny, upon this subject, expresses himself to this purpose: ‘The later that wheat is reaped,

‘ it

* Nunc primo ordeï messis incipitur, quæ consummanda est antequam grana arefactis spicis lapsa decurrant, quia nullis, sicut triticum, folliculis vestiuntur.—Sed ordeï culmos jacere in agris aliquantulum finamus, quia fertur hoc more grandescere; Pal. lib. vii. tit. ii.

‘ it is found to give the more flour ; and the
 ‘ sooner that it is reaped, it is the fairer and
 ‘ plumper : The most proper time is before the
 ‘ grain is hard, and just when it has got the co-
 ‘ lour. It is a maxim, that it is better to reap
 ‘ two days too soon, than be two days too late*.’

What Pliny here says has the appearance of a paradox : It is indeed natural enough to suppose, that wheat that stands long should give more flour, than that which is sooner cut ; but it is not so easy to conceive how the wheat soon reaped should be plumper in the grain than that which stands longer : In hot countries, a few very warm dries, when wheat is near ready, whiten it on a sudden, which makes the grain shrivelled : Possibly, when the corn is cut down and laid together, the heat has not such an influence in extracting the juices from the stalks, as when they are standing exposed ; and, consequently, allow more of them to go to the nourishment of the grain ; at the same time, this
 plumper

* *Triticum*, quo serius metitur, copiosius invenitur ; quo celerius vero, hoc speciosius ac robustius. Lex aptissima antequam granum indurescat, et cum jam traxerit colorem. Oraculum vero, biduo celerius messem facere potius, quam biduo serius ; Plin. Nat. Hist. lib. xviii. cap. xxx.

plumper grain will not be so solid, as that which is more exposed to the sun, and therefore will not give so much flour to the bulk.

Various are the methods of reaping corn that was used by the ancients, and as various the instruments employed in this work. Varro describes three different ways of reaping: ‘ There
 ‘ is one way,’ says he, ‘ as in Umbria, where
 ‘ they cut the straw close to the ground with a
 ‘ hook, and lay down each handful as it is cut;
 ‘ when many of these are laid down, they go o-
 ‘ ver them again, and strip the ears from the
 ‘ stalks; they throw the ears into baskets, and
 ‘ carry them to the threshing-floor; they leave
 ‘ the straw on the field, from whence it is taken
 ‘ and stacked up. They reap after another
 ‘ manner, as in Picenum, where they have a
 ‘ curved wooden *batillum*, upon the extremity
 ‘ of which there is a little iron saw; this, when
 ‘ it comprehends a bunch of ears, cuts them,
 ‘ and leaves the straw standing in the field to be
 ‘ cut afterwards. There is a third manner of
 ‘ reaping, as in the environs of Rome, and ma-
 ‘ ny other places, where they cut the stalks in
 ‘ the middle, the upper part of which they take
 ‘ in their left hands: From which middle, I am

‘ of opinion, the word *messis* is derived: The
 ‘ straw below the hand, which remains fixed to
 ‘ the ground, is afterwards cut; but that which
 ‘ is fixed to the ear, is carried in baskets to the
 ‘ threshing floor *.’

Colu-

• *Frumenti tria genera sunt messionis, unum, ut in Umbria, ubi falce secundum terram succedunt stramentum; et manipulum, ut quemque subsecurunt, ponunt in terra. Ubi eos fecerunt multos, iterum eos percensent, ac de singulis secant inter spicas et stramentum; spicas conjiciunt in corbem, atque in aream mittunt. Stramenta relinquunt in segete, unde tollantur in acervum. Altero modo metunt, ut in Piceno, ubi ligneum habent incurvum batillum, in quo sit extremo ferrula ferrea, haec cum comprehendit fascem spicarum, desecat, et stramenta stantia in segete relinquit, ut postea subsecentur. Tertio modo metitur, ut sub urbe Roma, et locis plerisque, ut stramentum medium subsecent, quod manu sinistra summumprehendunt; a quo medio messem dictam puto. Infra manum stramentum, quod terrae haeret postea subsecatur. Contra, quod cum spica stramentum haeret, corbis in aream defertur; Var. lib. 1. cap. 1. The last of the ways of reaping here mentioned, is the same with that commonly used in Britain: It is probable too, that, in the first way mentioned, the corn was grasped with the left hand, as in the last way, and cut with an instrument of the same kind; and that the only difference was, that it was cut lower, and, before threshing, had the ears strip-*
 ped

Columella likewise mentions different ways of reaping, and different instruments used for this purpose :

ped from the straw : It is not easy to conceive, how handfuls could be laid down on the ground, as Varro directs, unless the corn was cut in this manner. The second way of reaping mentioned in this passage, is not so fully described as to enable us to form a distinct idea of it; the instrument used is called *batillum*; this name is given to different kinds of instruments; it is given to an instrument used for holding or carrying live coals. Horace ridicules Aufidius Luscius, praetor of *Fundi*, who had formerly been an attorney, for his vanity in affecting the behaviour of a Prince; and, among other things, he mentions his having fire carried before him in a *batillum*.

Fundos Aufidio Lusco Praetore libenter
Linquimus, infani ridentes praemia scribae,
Praetextam, et latum clavum, prunaeque batillum.

Hor. Sat. i. v. 34.

This kind of *batillum* was no doubt made of iron, or some hard metal; for which reason, Varro calls the reaping instrument *batillum ligneum*: This name is likewise given to an instrument used for cleaning earthen floors, or floors paved with stone. Varro, when giving an account of the way of managing and rearing pea-fowls, after having described two places necessary for them, adds: ‘ These fowls
‘ require both places to be kept clean, therefore the keep-
‘ er ought to go over them with a *batillum*, and take a
‘ way

356 OF THE HUSBANDRY

purpose: 'There are,' says he, 'several ways
 ' of reaping: Many cut the stalks by the mid-
 ' dle, with drag hooks, and these either beaked
 ' or toothed: Many gather the ears with *mergas*,
 ' and others with combs; this method does very
 ' well when the crop is thin; but it is very trou-
 ' blesome where the corn is thick. If, in reap-
 ' ing with hooks, a part of the straw is cut off
 ' with the ears, it is immediately gathered into
 ' a heap, or into the *nubilarium*, and, after be-
 ' ing dried, by being exposed to the sun, is
 ' threshed:

' way the dung.—Utrumque locum purum esse volunt
 ' hae volucres; itaque pastorem earum cum batillo circum-
 ' ire oportet, ac sterqus tollere;' Var. lib. III. cap. VI. The
batillum here mentioned, from the use made of it, appears
 to be a kind of shovel: Probably it was like our fire sho-
 vels, open and wide before, and raised at the end next to
 the handle, and at the sides sloping gradually to the fore
 part; the *batillum* for reaping was probably of a shape
 resembling this, but curved in such a manner, as to turn
 the sharp edge of it to the side; upon this edge, the iron
 saw seems to have been fixed, which comprehended the
 stalks between the teeth, and these being sharp, cut off the
 ears; the ears, when cut off, fall into the bottom of the *ba-*
tillum. It is probable, that it was used with the right hand
 as a small scythe, and that the reaper, at every stroke,
 emptied it into the basket, by which the ears were carried
 to the *area*.

‘ threshed : But, if the ears only are cut off,
 ‘ they are carried directly to the granary, and
 ‘ threshed during the winter *.’

Pliny

* Sunt autem metendi genera complura. Multi falci-
 bus vericulatis, atque iis vel rostratis, vel denticulatis,
 medium culmum secant : Multi mergis, alii pectinibus spi-
 cam ipsam legunt, idque in rara segete facillimum, in
 densa difficillimum est. Quod si falcibus seges cum parte
 culmi demessa sit, protinus in acervum, vel in nubilarium
 congeritur, et subinde opportunis Solibus torrefacta prote-
 ritur. Sin autem spicae tantummodo recisae sunt, possunt
 in horreum conferri, et deinde per hiemem, vel baculis
 excuti, vel exteri pecudibus ; Col. lib. 11. cap. XXI.

The instrument first mentioned in this passage, is called
falx vericulata ; *vericulum* signifies a drag net ; and, al-
 though there cannot be supposed any resemblance between
 the figure of a drag net, and of a reaping hook, yet there
 may be some resemblance in the manner of their opera-
 tion ; a drag net carries along with it the fishes that it
 incloses, and brings them to land, so a scythe may be
 made of such a form, as to carry along with it the ears of
 corn which it incloses, with the part of the straw which
 it cuts off, and throw them together in a heap on the
 ground : A scythe of this kind may be called not impro-
 perly *falx vericulata* ; this instrument is different from the
batillum mentioned by Varro ; for the *batillum* cut off the
 ears only, but the *falx vericulata* cut a part of the straw a-
 long with the ears.

It

Pliny gives the following account of the ancient manner of reaping: ' There are different
' ways

It is easy to understand what Columella means by a *falx rostrata*; a hook sharp in the point, and curved like the bill of a bird; but what he means by *falx denticulata*, as distinct from *falx rostrata*, is not so plain; the hooks which we commonly use have small teeth, which makes them cut easier; but these cannot be the teeth here mentioned; for, in this sense, a hook may be both *rostrata* and *denticulata*: It is probable, that the *falx denticulata* was straight, and that it had long teeth towards the left hand, that these teeth were broad at the root, sharp in the points and on the sides, and placed near to each other: An instrument of this kind, used by the right hand as a small scythe, receives the stalks upon the sharp sides of the teeth and cuts them. The *batillum* mentioned by Varro, it is supposed, cut off the ears in the same manner.

Another instrument used Columella calls *merga*; it is uncertain what kind of instrument it was; by it, the ears only of the corn were cut off, and the straw left on the ground: The Commentators naturally suppose that this word is derived from the verb *mergere*, which signifies to plunge in water, and is applied to the diving of birds. There is a way of propagating vines by a *mergus*, which is mentioned by Columella: A branch of an old vine is bended downwards, and is put into the earth with the top of it turned upwards: This branch was called *mergus*, probably from its diving as it were like a sea-fowl, and coming
up

‘ ways of reaping,’ says he, ‘ in the extensive
 ‘ plains of Gaul ; large hollow machines, with
 ‘ teeth

up again : As the *merga* gathered the ears only of the corn, it is probable, that the manner of working with it had some resemblance to the manner in which a sea-fowl dives and comes again above water with its prey ; if so, it must have been an instrument with prongs wide at the end to receive the stalks, and narrow at the root to entangle the ears, and cut them off in raising the instrument : The person that used it, probably pushed it before him into the standing corn, by which all the stalks comprehended by it would be received between the prongs ; then, by raising the instrument, the ears would be cut off, and lie upon the prongs, or fall back into the hollow part of the instrument, made on purpose to receive them, from which they would be thrown into a basket. It is possible, that the *batillum* of Varro was an instrument of the same kind, and used in the same manner ; in this case, it would be curved in a manner different from what is represented.

The *pesten* was an instrument that cut off the ears of corn in the same manner as the *merga*. It is mentioned by Pliny as well as Columella : He says, that the inhabitants of Gaul reaped the millet and panic with a *pesten* : ‘ Panicum et milium singulatim pectine manuali legunt ‘ Galliae ;’ Plin. Nat. Hist. lib. xviii. cap. xxx. He calls it *pesten manuale*, to distinguish it from an instrument used for the same purpose, which was pushed forward by an ox, and which shall be afterwards mentioned ; This word

360 OF THE HUSBANDRY

‘teeth fixed in the fore part, are pushed forward on two wheels through the standing corn, by

is derived from the verb *peſtere*, which is applied to a variety of different things: Columella applies it to wool, and ſays, that it ſhould always be ready prepared and *combed* for the bailiff’s wife: ‘Ut ad lanificium reducatur, prae-
paratae ſint, et *peſtita*e lanae;’ Col. lib. xiii. cap. 111. He applies it likewise to young plants in a garden, when they are hoed, and the weeds deſtroyed: ‘Let the careful
gardener,’ ſays he, ‘comb them with a two-horned in-
ſtrument, and exterminate the choaking weeds from the
furrows.’

At cum foeta fuos nexus ad aperta reſolvit,
Florida cum ſoboles materno pullulat alvo,
Primitiis plantae modicos tum praebeat imbres
Sedulus irrorans olitor, ferroque vicorni
Peſtat, et angentem fulcis exterminet herbam.

Col. lib. x. v. 145.

Pliny applies *peſtere* to flax, when he mentions the preparing it for being ſpun: Having mentioned the worſt kind of it, he ſays: ‘And even this is combed with iron heckles, till it is ſeparated entirely from the boon.—Et ipſa ta-
men peſtitur ferreis hamis, donec omnis membrana de-
corticetur;’ Plin. Nat. Hiſt. lib. xix. cap. 1. Whatever was the form of this inſtrument, it is evident from theſe paſſages, that it was uſed as the *merga*, and that by it the ears were ſtripped from off the ſtalks: Perhaps, in-
ſtead

‘ by an ox yoked to the hind part ; the ears cut
 ‘ off by the teeth, fall into the hollow part of
 ‘ the machine. In other places, the stalks are
 ‘ cut in the middle with hooks, and the ears
 ‘ cut off between two *mergites*. In other places,
 ‘ they pull up the plants by the root ; those
 ‘ that use this method, as they draw away the
 ‘ sap, imagine that this serves in some measure
 ‘ in place of a ploughing : There is a difference
 ‘ in the manner of reaping, according to cir-
 ‘ cumstances ; where they cover their houses
 ‘ with stubble, they cut high, to preserve this of
 ‘ as great a length as possible ; where there is a
 ‘ scarcity of hay, they cut low, that straw may
 ‘ be added to the *palea* *.’

The

stead of being in the form of a fork with prongs, and pushed forward below the ears, as the *merga* was, it was in the form of a rake, with a very short handle, and the reaper put it over as many of the ears as it could conveniently contain, and pulled it to him : The wool combs used at present are of this shape ; it is probable, that they were of the same shape in ancient times, and that, from the resemblance that this instrument had to them, it got the name of *pesten*.

* *Messis ipsius ratio varia ; Galliarum latifundiis valli praegrandes dentibus in margine infestis, duabis rotis per*

The first way of reaping here mentioned by Pliny, is by an instrument more particularly described

segetem impelluntur, jumento in contrarium juncto: Ita direptae in vallum cadunt spicae: Stipulae alibi mediae falce praeciduntur, atque inter duas mergites spica destringitur. Alibi ab radice vellunt; quique id faciunt, proscindi ab se obiter agrum interpretantur, cum extrahant succum. Differentia haec: Ubi stipula domos contegunt, quam longissimam servant. Ubi foeni inopia est, stramento paleam quaerunt; Plin. Nat. Hist. l' b. xviii. cap. xxx. The *mergites* here mentioned, if used for cutting off the ears of the reaped corn, were probably like the combs used in many places for stripping the bolls from the green lint. Some commentators indeed are of opinion, that there is an error in the passage, and that Pliny mentions a different method of reaping, not a way of using corn after it was reaped; and that the *mergites* here mentioned were instruments of the same kind with the *merga* mentioned by Columella; and therefore, that instead of *atque inter*, it should be *alibi inter duas mergites*: When the stalks of corn were cut by the middle, the manner here mentioned by Pliny, the straw that remained with the ears was called *palea*, and was carried along with the ears to the threshing floor: 'On the contrary,' says Varro, in a passage formerly cited, 'the straw that is cut with the ears, is carried to the *area* in baskets,' after which, he adds, 'from whence it is thrown openly into an exposed place; from which practice, it is probably called *palea*.

—Con-

scribed by Palladius; this instrument shall be considered afterwards. The second way of reaping here mentioned, is with a hook, probably of the same kind with the one mentioned by Varro and Columella, as it is represented as used in the same manner.

The other practice mentioned by Pliny, in the passage under consideration, is pulling up corn by the root: Many kinds of pulse were gathered in this manner, and it was from this way

‘ —Contra, quod cum spica stramentum haeret, corbi-
 ‘ bus in aream defertur; ubi discedit in aperto loco pa-
 ‘ lam: A quo potest nominata esse palea;’ Var. lib. i. cap.
 L. This *palea* too is represented as mixed in the *area* with
 the corn after it is threshed; ‘ But,’ says Columella,
 ‘ when the corn is mixed with the *palea*, they should be
 ‘ separated with the wind.—At ubi paleis immista sunt
 ‘ frumenta, vento separentur;’ Col. lib. ii. cap. xxi. How-
 ever, notwithstanding what is said of the *palea* in these
 passages, it is possible, that the *mergites* were instruments
 used for stripping the ears from the straw, after the corn
 was cut with hooks; for Varro, in a passage already ci-
 ted, mentions it as a practice in some places, first to cut
 the standing corn close to the ground, and then to cut off
 the ears from the straw; which practice of cutting off the
 ears, may possibly have been observed in the time of Pliny
 by some persons, even when the corn was cut by the mid-
 dle.

way of gathering them, as Varro informs us, that they were called *legums* *. To this kind of plants, therefore, it is probable, that this manner of reaping is only to be applied.

Palladius takes no notice of the ordinary methods of reaping mentioned by the other rustic writers; he contents himself with giving a particular description of the reaping machine mentioned by Pliny: ‘ In the plains of Gaul,’ says he, ‘ they use this quick way of reaping, and, ‘ without reapers, cut large fields with an ox in ‘ one day: For this purpose a machine is made, ‘ carried upon two wheels; the square surface ‘ has boards erected at the sides, which casting ‘ outwards, make a wider space above; the board ‘ on the fore part is lower than the others; upon ‘ it there are a great many small teeth, wide set, ‘ in a row, answering to the height of the ears ‘ of the corn, and turned upwards at the ends; ‘ on the back part of this machine, two short ‘ shafts are fixed, like the poles of a litter; to ‘ these an ox is yoked, with his head to the ma-
‘ chine,

* Serendum viciam, lentem, cicerculam, ervilam, caeteraque, quae alii legumina, alii (ut Gallicani quidam) legaria appellant, utraque dicta a legendo, quod ea non fecantur, sed vellendo leguntur; Var. lib. 1. cap. xxxii.

‘ chine, and the yoke and traces likewise turned
 ‘ the contrary way, well trained, and who does
 ‘ not go faster than he is driven; when this ma-
 ‘ chine is pushed through the standing corn, all
 ‘ the ears comprehended by the teeth, are heap-
 ‘ ed up in the hollow part of it, being cut
 ‘ off from the straw, which is left behind, the
 ‘ driver setting it higher or lower, as he finds it
 ‘ necessary; and thus, by a few goings and re-
 ‘ turnings, the whole field is reaped. This ma-
 ‘ chine does very well in plain and smooth fields,
 ‘ and in places where there is no necessity for
 ‘ feeding with straw *.’ The description given
 of

* Pars Galliarum planior hoc compendio utitur ad me-
 tendum, et praeter hominum labores, unius bovis opera
 spatium totius messis absument. Fit itaque vehiculum, quod
 duabus rotis brevibus fertur: Hujus quadrata superficies
 tabulis munitur, quae forinsecus reclines in summo red-
 dant spatia largiora: Ab ejus fronte carpenti brevior est
 altitudo tabularum. Ibi denticuli plurimi ac rari ad spi-
 carum mensuram constituuntur in ordinem, ad superio-
 rem partem recurvi. A tergo vero ejusdem vehiculi duo
 brevissimi temones figurantur, velut amites basternarum.
 Ibi bos capite in vehiculum verso jugo aptatur, et vincu-
 lis, mansuetus sane qui non modum compulsoris excedat.
 Hic ubi vehiculum per messes coepit impellere, omnis spi-

of this machine by Palladius, is copied almost verbatim by Crescenzo, without any remarks, or so much as informing us whether such a machine was used in his time. It is probable, that it acted like the *merga*, that the teeth were narrow at the points, broad at the bottom, and sharp in the edges; when the machine was pushed forward, these teeth being set in height a little below the height of the ears, would naturally comprehend all the stalks that were standing immediately before the machine, intangle the ears, and cut them off; the teeth being raised at the points, and sloping downwards to the fore-board, the ears cut by them being pushed by those next intangled, would naturally fall back into the bottom of the machine.

It does not appear, from any of the passages already cited, that it was a custom among the Romans to bind their corn into sheaves, and
set

ca in carpentum denticulis comprehensa cumulatur, abruptis, ac relictis paleis; altitudinem vel humilitatem plerumque bubulco moderante, qui sequitur: Et ita per paucos itus ac reditus brevi horarum spatio tota messis impletur. Hoc camprestribus locis vel aequalibus utile est, et iis quibus necessaria palea non habetur; Pal. lib. VII. tit. II.

set up these in shocks, as is the custom in the more northern climates: When the ears were cut off, they were sent directly to the threshing-floor, or to the barn. Varro, in a passage already cited, after mentioning it as a practice in some places, to cut the ears from off the stalks soon after the corn was cut, adds: ‘ They throw the ears into a basket, and send them to the threshing-floor*.’ And a little below, he says: ‘ The reaped ears ought to be carried in baskets to the *area* †.’ To the same place, and in the same manner, he says the corn was likewise carried, when the ear was cut off with part of the straw ‡. Columella, in a passage already cited, says, that ‘ when corn is reaped with a part of the straw, it is immediately gathered into a heap, or into the *nubilarium*; but, if the ears only are cut, they may be carried into the barn ||.’ Pliny says, that ‘ *far*, because it is
‘ with

* Spicas conjiciunt in corbem, atque in aream mittunt; Var. lib. 1. cap. L.

† Messas spicas coribus in aream deferre debent; Var. id.

‡ Contra, quod cum spica stramentum haeret, coribus in aream defertur; Var. id.

|| Quod si falcibus seges cum parte culmi demessa sit, protinus

‘ with difficulty beat out, should be laid up with
 ‘ the *palea*, and only freed from the straw and
 ‘ beards *.’ In none of these passages is there
 any mention made of binding the reaped corn
 into sheaves ; even some of them are inconsis-
 tent with this practice : There is however a pas-
 sage in Virgil, from which, according to some
 translators, it appears to have been customary
 sometimes to bind barley with a rope made of
 the straw ; ‘ Often,’ says the poet, ‘ when the
 ‘ husbandman has brought the reapers to his
 ‘ yellow fields, and has just begun to bind the
 ‘ barley with the brittle straw †.’ The word u-
 sed by Virgil, and translated *bind*, may be ap-
 plied to the grasping of the growing corn in
 reaping, as well as to the binding it after it is
 reaped : In this sense, the passage may be tran-
 slated, ‘ and had just begun to grasp the brittle
 ‘ straw :’

protinus in acervum, vel in nubilarium congeritur. —
 Sin autem spicae tantummodo recisae sunt, possunt in hor-
 reum conferri ; Col. lib. II. cap. XXI.

* Far, quia difficulter excutitur, convenit cum palea sua
 condi ; et stipula tantum, et aristas liberatur ; Plin. Nat.
 Hist. lib. XVIII. cap. XXX.

† Saepe ego, cum flavis in messorem induceret arvis
 Agricola, et fragili jam stringeret hordea culmo.

Vir. Geo. I. v. 316.

‘ straw :’ So that this being a passage of a doubtful meaning, cannot be properly adduced as a proof that binding corn into sheaves was a custom among the ancient Romans.

In the eastern countries, the ordinary way of cutting down corn was with hooks : In the law, a sheaf, or a handful of the first fruits, is required to be brought to the priest, who is directed to wave it before the Lord *. In reaping, it is probable too, that they took the stalks in handfuls, as we do in this age, and in this part of the world : Boaz is represented as desiring his reapers to drop some handfuls for Ruth †. The corn too, after it was cut, was not carried off immediately, but was allowed to lie some time upon the field. In the passage above cited, Boaz is represented as allowing Ruth to glean even amongst the sheaves or handfuls laid down: Whether

* When ye shall come into the land which I give unto you, and shall reap the harvest thereof, then ye shall bring a sheaf of the first fruits, &c. ; Lev. cap. xxiii. v. 10.

† And when she was risen up to glean, Boaz commanded the young men, saying, Let her glean even among the sheaves, and reproach her not; and let fall also some of the handfuls of purpose for her; Ruth, cap. ii. v. 15. 16.

ther or no it was a custom to bind the corn into sheaves, does not appear from this passage; for we may suppose the corn lying upon the field either loose or bound: But this appears from another passage: Joseph, in the account which he gives of his dream to his brothers, expressly mentions the binding of sheaves*.

It was a custom in Greece to bind corn into sheaves, immediately after it was cut down. In the harvest represented by Homer upon one of the compartments of Achilles's shield, the sheaves are immediately bound: 'Next,' says the poet, 'he represented a field of corn, in which the reapers worked with sharp sickles in their hands; the corn fell thick along the furrows in equal rows; three binders were employed in making up the sheaves, the boys attending them gathered up the loose swarths, and carried them in their arms to be bound †.' There are

* For, behold! we were binding sheaves in the field, and lo, my sheaf arose, and also stood upright, and, behold, your sheaves stood round about, and made obeisance to my sheaf; Gen. xxxvii. v. 7.

† Ἐν δ' ἐπιθεῖ τιμῆτος βαθυλήιον. ἐνθα δ' ἐρῖθοι,

Ἡμῶν, οὐξίας δρεπκίας ἐν χερσὶν ἐχοῦτες.

Δραγματικα

are some circumstances in this description, that deserve to be noticed : The swarths are carried by boys to the binders : This is a very proper employment for boys, and which the situation of the corn fields in the ancient husbandry rendered necessary, even when the corn was mowed. It has already been observed, that, by the manner of ploughing in the seed, the field was formed into very narrow ridges ; that the corn stood in broad rows, upon the tops of these ridges ; and that there were empty spaces between each row in the furrows, which were well hoed, and thereby cleared of weeds ; a mower could not conveniently stretch over more than one row at a stroke, especially if he managed the scythe with one hand, as was the custom in Italy ; and therefore, the corn, when cut, would lie very thin in the swarths : This made it necessary to have some persons to gather it together, and carry it to the binders : The same thing would
like.

Δραγματὰ δ' ἄλλα μετ' ὄγκου σπηγριμα πιπτον εραζε,
 Ἄλλα δ' ἀμαλλοδιτηεις ἐν ἐλλεδαγοισι διαντο.
 Τρεεις δ' αὖρ' ἀμαλλοδιτηεις σφιστασαν. αὐταρ ὀπιθῶ
 Παιδεις δραγμαευοντις, ἐν ἀγκαλιδεσσι φεροντις,
 Ἀσπρεχίς παρεχον.

Hom. Il. lib. xviii. v. 550.

likewise be necessary when the corn was cut with sickles; because it would be inconvenient for the reaper to be stepping so frequently over furrows, or go so frequently backwards and forwards upon the ridge, as his laying the corn, when cut, into proper sheaves would render necessary: Whether the corn, in such a field, was mowed or cut with sickles, it would naturally be laid across the furrows; the rows would lie along the furrows, with the corn across at equal distances from each other; a situation that rendered it easy for the boys to lift up the corn, and carry it to the binders.

It was observed, in the chapter of ploughing, that, according to the opinion of some, when two ploughs were employed in the same field, it was a custom in Greece to divide the field into two equal parts, and to set the two ploughs to work on the sides of the field, opposite to each other, by which means, as they ploughed, they always approached nearer and nearer to each other. It was likewise a custom to set reapers to work in the same manner, one half of them on one side, and the other half on the opposite side.

Homer,

Homer, after having described the drawing up of the two armies, and their marching to attack in order of battle, compares them to reapers in a field: ‘In the same manner,’ says he, ‘as reapers placed upon opposite sides, in the wheat or barley field of a rich man, hasten towards each other, and make the numberless swaths to fall; so the Trojans and Greeks *,’ &c. Both the manner in which Homer expresses himself, and the thing itself, which the *simile* is intended to illustrate, make it necessary for us to suppose, that it was a custom to set reapers to work on the opposite sides of the same field, and make them move towards each other in cutting down the corn.

In both cases, the design seems to have been to raise an emulation between the parties; and to enable the landlord to judge which of them performed their work with the greatest care, diligence, and activity.

Columella informs us what labour the reaping a *jugerum* of each kind of corn and pulse required:

* Οι δ', ὡς ἀμητῆρες ἐναντίοι ἀλληλοῖσιν
 Οἶμον ἐλαυνῶσιν, ἀνδρὸς μακαροῦ κατ' ἀρουραν,
 Πυρῶν, ἢ κριθῶν, τὰ δὲ δραγματὰ τερφεία πιπτει.

Hom. Il. lib. xi. v. 67.

red: A *jugerum* of *triticum* or *siligo* required one and one-half days work of a labourer; beans one day; barley one; vetches one; *ervum* one; *filiqua* one; *phaseolus* one; *cicera* one; *lens* one; *lupines* one; *cicer* three; lint three; *sesamum* two; and *medica* one*.

In the warm and dry climates of the countries where the authors resided, whose works I have cited, the methods of cutting down and securing their crops, were no doubt sufficient, and some of them are observed in these countries at this day; but in the cold and wet climate of Britain, we are put to more trouble, and obliged to give greater attention: After our corn is cut down, we must expose it for many days to the wind, and, at the same time, secure it from the rain; this we do by binding it into sheaves, and setting it up in proper shocks; and, after all, in some seasons, we find it very difficult to get it secured in the barn yard. No comparison, therefore, in this article, can be made between the practices of countries situated in such different climates.

C H A P.

* Col. lib. II. cap. XIII.

C H A P. XL.

Of Threshing, or Beating out Corn.

THE ancients, when they carried their crops from the fields, did not manage them in the same manner as is commonly done in Britain: They did not carry their corn or pulse to a barn yard, and there build them in stacks, as we commonly do, to be afterwards carried into the barn and threshed; they carried them directly to the threshing-floor or the barn: The corn that was cut with part of the straw, when the field was at a distance from the threshing-floor, was carried in carts or wains, in the same manner as corn with the straw is carried with us. Virgil, after giving a description of the soil most proper for corn, adds: ‘ Nor from any plain will you behold a greater number of heavy loaded wains driven home *.’

The

* Optima frumentis: Non ullo ex aequore cernes

Plura

376 OF THE HUSBANDRY

The *area*, or threshing-floor, is mentioned by all the rustic writers ; and particular directions are given how it ought to be situated and constructed : Columella mentions it among the buildings of the villa, and directs that, if possible, it be so placed, that it may be easily observed by the landlord, or at least by the steward *. Palladius proposes likewise, that it be built near the *villa*, and adds another reason to the one mentioned by Columella : ‘ The *area*,’ says he, ‘ ought not to be at a great distance from the ‘ villa, both on account of the facility of carry- ‘ ing the corn from it, and that there may be ‘ less fear of fraud, from the landlord or steward ‘ being near at hand †.’ Varro says : ‘ It ought ‘ to be on high ground, much exposed to the ‘ wind, large enough for the extent of the fields ‘ in corn, as round as possible, and raised in the ‘ middle, that so the rain that falls upon it may ‘ the

Plura domum tardis decedere plaustra juvencis.

Vir. Geo. II. v. 205.

* *Area, si competit, ita constituenda est, ut vel a domino, vel certe a procuratore despici possit ; Col. lib. 1. cap. vi.*

† *Area longe a villa esse non debet, et propter exportandi facilitatem, et ut fraus minor timeatur, domini vel procuratoris vicinitate suspecta ; Pal. lib. 1. tit. xxxvi.*

‘ the sooner and the more easily find its way
 ‘ out.’ He adds, as the reason for making it
 round, that, in a round figure, the distance is
 shortest from the middle to an extremity *. Pal-
 ladius agrees with Varro in saying, that the *area*
 ought to be on high ground, open on all sides
 to the winds; and to this he adds: ‘ It ought
 ‘ to be at a distance from gardens, vineyards,
 ‘ and orchards.’ He gives this reason: ‘ As
 ‘ dung and straw are beneficial to vegetables,
 ‘ when applied to their roots, so they prove de-
 ‘ structive when they fall upon their leaves †.’

It must appear to be a matter of great impor-
 tance to have the floor of the *area* very smooth
 and hard; particular directions are therefore gi-
 ven

* *Aream esse oportet in agro, sublimiori loco, quam
 perflare possit ventus. Hanc esse modicam pro magnitu-
 dine segetis, potissimum rotundam, et mediam paullo ex-
 tumidam, ut si pluerit, non consistat aqua, et quam bre-
 vissimo itinere extra aream defluere possit. (Omne porro
 brevissimum in rotundo e medio ad extremum.)* Var. lib.
 1. cap. LI.

† *Sit autem area loco sublimi et undecunque perflabili,
 longe tamen ab hortis, vineis, atque pometis; nam sicut
 radicibus virgultorum profunt laetamen et paleae, ita in-
 sidentes frondibus eas perforant, atque arere compellunt;*
Pal. lib. 1. cap. xxxvi.

ven how to make it so. Cato, in his directions about this matter, expresses himself to this purpose: ‘ Make an *area* in this manner: dig the place where it is to be made, then sprinkle it with *amurca*, and allow the *amurca* to be imbibed; afterwards, break every bit of hard earth completely, then smooth the surface, and work it hard with beaters; afterwards, sprinkle it again with *amurca*, and allow it to dry: If it is made in this manner, neither ants will hurt it, nor herbs grow upon it*.’ In another place, he says; ‘ In this manner make the *area* for threshing corn: Let the earth be carefully digged, and sprinkled with plenty of *amurca*, that so it may drink up as much as possible; let the mold be well broken, and the surface smoothed with a roller or beater; when it is smoothed, it will neither be molested by ants, nor turned into mire with rain †.’ Varro, to the

* *Aream sic facito. Locum ubi facies confodito, postea amurca conspergito bene, finitoque combibat. Postea comminuito glebas bene. Deinde coaequato, et paviculis verberato. Postea denuo amurca conspergito, finitoque arefcet. Si ita feceris, neque formicae nocebunt, neque herbae nascentur; Cat. cap. xci.*

† *Aream ubi frumentum teratur, sic facito. Confodiat*

the description which he gives of the situation and figure of the *area*, as has already been observed, adds: ‘ It ought to be laid with solid earth, and well beaten, (particularly if laid with potters clay, *argilla*,) that so the heat may not open it in chinks, and the grain falling into these chinks, lie hid, the rain-water be received, and a passage opened for ants and mice; therefore, it is usual to sprinkle it with *amurca*, which prevents the growth of weeds, and is a poison to ants and moles. Some persons, that the floor may be very firm, surround it with a stone wall, and lay it with a stone pavement. In some places, the *area* is covered as in Bagienna, because, in that country, through the whole harvest season, there are frequent showers; and, where it is not covered, and the climate hot, a shade ought to be made near it, for the workmen to repose themselves in during the mid-day heat*.’ Columella

atur minute terra, amurca bene conspergatur, ut combibat quam plurimum. Comminuito terram, et cylindro aut paviculo coaequato. Ubi coaequata erit, neque formicae molestae erunt, et cum pluerit, lutum non erit; Cat. cap. cxxix.

* *Aream esse oportet.*—solida terra pavitam, maxime

mella describes in this manner the way of making an *area*: ‘ If the *area*,’ says he, ‘ is of earth, that it may be firm enough for threshing, it ought first to be scraped, then digged, and cleared of vermine, by strowing it with *palea*, mixed with *amurca*, that has not received salt; for this thing defends the corn from the ravages of mice and ants; then, being levelled, it should be firmed with beaters, or a millstone, and again being strowed with *palea*, it should be well beat, and so left to be dried in the sun *.’ He mentions another very simple and

si est argilla, ne aestu paeminosa in rimis ejus grana oblitescant, et recipiant aquam, et ostia aperiant muribus ac formicis. Itaque amurca solent perfundere: Ea enim herbarum est inimica, et formicarum, et talparum venenum. Quidam aream ut habeant solidam, muniunt lapide, aut etiam faciunt pavementum. Nonnulli etiam tegunt areas, ut in Bagiennis, quod ibi saepe id temporis anni oriuntur nimbi. Ubi ea resecta, et loca calida, prope aream faciendum umbracula, quo succedant homines in aestu tempore meridiano; Var. lib. 1. cap. 11.

* Area quoque si terrena erit, ut sit ad trituram satis habilis, primum radatur, deinde confodiatur, permistisque paleis cum amurca, quae salem non accepit, extergatur, nam ea res a populatione murium formicarumque frumenta defendit. Tum aequata paviculis, vel molari lapide

con-

and easy way, practised by some: ' However,'
 says he, ' there are some who rather choose to
 ' make an *area* by threshing some beans upon
 ' a part of the most commodious bean field:
 ' Having reaped and gathered the beans, the
 ' *area* is smoothed by threshing them; for, while
 ' the *legums* are trodden out by the cattle, the
 ' weeds are at the same time rubbed off by their
 ' hoofs; and the floor becomes smooth and fit
 ' for having any kind of grain threshed upon it*.'
 But, although he gives this description, yet he
 says in another place, ' that the best kind is floor-
 ' ed with flint stone, because, by this the corn
 ' is more quickly rubbed out, as the floor does
 ' not yield to the pressure of the hoofs of the
 ' cattle, or the *tribulae*; and likewise because,
 ' when

condensetur, et rursus subjectis paleis inculcetur, atque ita
 Solibus siccanda relinquatur; Col. lib. 11. cap. xx. Colum-
 mella probably makes use of the word *extergatur* instead
 of *irrigetur*, because by the *amura* the floor was cleared
 of all weeds and vermine, and because *irrigetur* cannot
 properly be applied to straw.

* Sunt tamen, qui potius adjacentium fabalium partem
 triturae destinant, areamque demessa faba et lesa expo-
 liunt: Nam dum a pecudibus legumina proculcantur,
 herbae etiam unguis atteruntur, atque ita glabrescit, et
 fit idonea trituri area; Col. id.

‘ when dressed, is much cleaner, and is free of
 ‘ the small stones and gravel, which an earthen
 ‘ floor almost always throws up in threshing *.’
 Palladius expresses himself much in the same
 manner as Columella, only, instead of beaters
 or a mill-stone, he mentions a round stone, or
 the fragment of a column, and says, that by its
 going round the floor is made firm †. In ano-
 ther place, this author gives a description of the
 area something different: ‘ It ought,’ says he,
 ‘ to be paved with flint stones, or cut out of a
 ‘ rock upon a mountain; or, if of earth, it ought
 ‘ to be hardened before using, by letting water
 ‘ upon it, and treading it with the hoofs of
 ‘ cattle, then it must be inclosed and secured
 ‘ with a strong rail †.’ Virgil too, does not
 think

* *Eaque optima est filice constrata, quod et celeriter frumenta deteruntur, non cedente solo pulsibus unguarum tribularumque, et eadem eventulata mundiora sunt, lapillisque carent, et glebulis, quas per trituram fere terrena remittit area; Col lib. i. cap. vi.*

† *Junio mense area paranda est, &c.—Tunc premenda est rotundo lapide, vel columnae quocunque fragmento; Pal. lib. vii. cap. i.*

‡ *Sit autem vel strata filice, vel saxo montis excisa, vel sub ipso triturae tempore unguis pecorum, et aquae admisione*

think the description of the way of making the area unworthy of his muse: 'First,' says he, 'the *area* should be smoothed with a huge roller, wrought with the hand, and consolidated with binding clay, that so no weeds may come up, and that it may not become dusty, and open in chinks: If these things are not prevented, various plagues may disappoint your hopes; often under the ground the little mouse builds its house and granaries; the blind moles dig their chambers; and, in hollow places, are found the toad, and other vermine, which the earth produces in abundance; the large heap of *far* is wasted by the wevil, and by the ant likewise, which is afraid of a needy old age*.'

Pliny

tionē solidata, clausa deinde et robustis munita cancellis propter armenta, quae, cum teritur, inducimur; Pal. lib. i. tit. xxxvi.

* Area cum primis ingenti ad aequanda cylindro,
 Et vertenda manu, et creta solidanda tenaci:
 Ne subeunt herbae, neu pulvere victa fatiscat:
 Tum variae illudant pestes: Saepe exiguus mus,
 Sub terris posuitque domos, atque horrea fecit:
 Aut oculis capti fodere cubilia talpae:
 Inventusque cavis bufo, et quae plurima terrae
 Monstra ferunt; populatque ingentem farris acervum
 Curculio; atque inopi metuens formica fenestae.

Vir. Geo. I. v. 178.

Pliny mentions a way of making the *area* different from those mentioned by the others, and which too he calls the most common. Having mentioned some of the works to be performed about the solstice, he adds: ‘ The *area* for the harvest should be prepared with clay, according to the opinion of Cato, properly mixed with *amurca*. Virgil requires a more laborious method. Men commonly content themselves with levelling the floor, and bedawbing it with thin cow dung; this is thought sufficient to prevent dust *.’

Varro, as has already been observed, says, that it was a custom in some places to cover the *area*: This is done in some of the eastern countries; Boaz is represented as sleeping all night in his threshing-floor, and this a thing not uncommon †.

Contiguous to the *area*, there was in Italy a covered place, frequently built, called *nubilarium*;
into

* *Aream ad messem creta praeparare, Catonis sententia amurca temperata, Virgilii operosius. Majore ex parte aequant tantum, et fimo bubulo dilutiore illinunt. Id satis ad pulveris remedium videtur; Plin. Nat. Hist. lib. xviii. cap. xxix.*

† Ruth, chap. iii. v. 7.

into this place the corn was carried directly from the field, from thence it was thrown into the *area*, and back again, in case of a sudden shower. Varro gives a description of this place: ‘It is proper,’ says he, ‘to build a house, under the cover of which the whole crop may be laid: This house some call *nubilarium*: It ought to be of a largeness proper for the farm, placed contiguous to the *area* where the crop is to be threshed, and open on the side towards it, that so the corn may be easily thrown from this covered place into the *area*, and quickly thrown back again when it threatens rain: It ought to have windows on the sides, from whence it may be expected to receive the greatest benefit from the wind*.’ Columella too mentions the *nubilarium*, and observes, that it is particularly necessary in Italy, on account of the
 incon-

* *Ædificium facere oportet, sub quod tectum totam fundi subjicere possis messem, quod vocant quidem nubilarium. Id secundum aream faciendum, ubi triturus sis frumentum, magnitudine pro modo fundi ex una parte apertum, et id ab area, quo et in trituram prouere facile possis, et si nubilare coeperit, inde ut rursus celeriter rejicere. Fenestras habere oportet ex ea parte, unde commodissime perflare possit; Var. lib. i. cap. XIII.*

inconstancy of the weather, that so the corn, when not completely threshed, may be gathered into it, and protected when a sudden shower comes *. Palladius likewise mentions the *nubilarium*, and observes, that it is very proper for drying the corn that has happened to get a shower before it is carried to the granary †.

It is probable, that the *nubilarium* of the ancients had a resemblance to the large barns used in some parts of England, into which the whole crop is gathered: It was not necessary, however, to make the *nubilarium* so large in proportion as these, because, in the way of reaping used by the Romans, there was not so much of the straw cut with the ears, as is commonly done in Britain; besides, as the corn in Italy was threshed
out

* Area, &c.—Huic autem nubilarium applicari debet, maximeque in Italia, propter inconstantiam coeli, quo collata semetrita frumenta protegantur, si subitaneus imber incefferit; Col. lib. 1. cap. vi.

† Area, &c.—fit circa hanc locus alter planus et purus, in quem frumenta transfusa refrigerentur, et horreis inferantur: Quae res in eorum durabilitate proficiet. Fiat deinde proximum tectum, maxime in humidis regionibus: Sub quo propter imbres subitos frumenta, si necessitas coegerit, raptim vel munda vel semetrita ponantur; Pal. lib. 1. tit. xxxvi.

out as soon as possible, part of it would be thrown immediately into the *area*, without passing thro' the *nubilarium*; and, it is probable likewise, that, in every year, the threshing would be begun before the whole crop was gathered.

Various were the methods used by the ancients for beating out the corn in the *area*: Varro mentions two ways, one by a machine, and the other by the hoofs of cattle; he likewise gives a description of this machine: 'The grain,' says he, 'is beat out of the ears in the *area*, which some do by yoked cattle and a *tribulum*: This machine is made of a board rough with stones or iron, which, with a driver placed upon it, or a great weight, is drawn by yoked cattle to beat the grain from the ears: Or it is made of a plank, with little rollers in place of teeth; this kind is called *plostellum poenicum*: In Hither Spain, and other places, a man sits upon this machine, and drives the cattle that draw it. Others beat out the corn with a number of cattle unyoked, and driven about, by whose hoofs the grain is beat out from the ears*.'

Colu-

* E spicis in aream excuti grana; quod fit apud alios jumentis junctis, ac tribula; id fit e tabula lapidibus, aut ferro

Columella gives this account of the manner of beating out corn: 'When the ears only are reaped, they may be carried to the barn, and afterwards, during the winter, beaten out with flails, or treaded out with cattle; but, if it is found convenient to beat out the corn in the *area*, there is no doubt but this work is better performed with horses than oxen; and, if there are few of these, a *tribula* or *traba* may be added, either of which very easily bruise the straw; when ears only are to be threshed, this is best done with flails*. Virgil mentions this

ferro asperata, quo imposito auriga, aut pondere grandi trahitur jumentis junctis, ut discutiat e spica grana; aut ex assibus dentatis cum orbiculis, quod vocant plostellum poenicum. In eo quis sedeat, atque agitet, quae trahant, jumenta, ut in Hispania Citeriore, et aliis locis faciunt. Apud alios exteritur grege jumentorum inacto, et ibi agitato perticis, quod unguis e spica exteruntur grana; Var. lib. i. cap. lxi.

* Sin autem spicae tantummodo recisae sunt, possunt in horreum conferri, et deinde per hiemem, vel baculis excuti, vel exteri pecudibus. At si competit, ut in area teratur frumentum, nihil dubium est, quin equis melius, quam bubus ea res conficiatur: Et si pauca juga sunt, adjicere tribulam et traham possis: Quae res utraque culmos facillime comminuit. Ipsae autem spicae melius fustibus tunduntur; Col. lib. ii. cap. xxi.

this work as performed by horses: 'Often,' says he, treating of horses, 'they shake them likewise with running, and fatigue them in the sun, when the *area* groans heavily with threshing, and the empty ears are tossed to the rising zephire *.' Pliny does no more than mention the three different ways of threshing: 'The corn,' says he, 'when reaped, is beat out in the *area*; in some places with a *tribula*, in others by the trampling of horses, and in others by flails †.'

It seems to have been the custom in Greece, to beat out corn by driving oxen over it: Homer compares the slaughter made by the horses and chariot of Achilles, to the beating out of grain by the trampling of oxen:

As with autumnal harvests cover'd o'er,
And thick bestrown, lies Ceres' sacred floor,
When

* Saepe etiam cursu quatiant, et sole fatigant,
Tum graviter tunsis gemit area frugibus, et cum
Surgentem ad Zephyrum paleae jactantur inanes.

Vir. Geo. III. v. 132.

† Messis ipsa alibi tribulis in area, alibi equarum gressibus exteritur, alibi perticis flagellatur; Plin. Nat. Hist. lib. xviii. cap. xxx.

390 OF THE HUSBANDRY

When round and round, with never weary'd pain,
The trampling steers beat out the unnumber'd grain,
So the fierce courfers *, &c. POPE.

This translation of Mr Pope's, though very poetical, does not, however, so fully as the original, express the force of the *simile*. The passage may be thus translated: 'As when the husbandman yokes the stout and heavy steers, to thresh the fair barley in the smooth *area*, the grain is quickly and easily bruised out under the feet of the toiling cattle, so the hard hoofed horses, guided by the magnanimous Achilles,' &c.

It does not appear certain, from this passage, that the *tribula* or *traba* was used by the Greeks; to suppose that it was the custom among them to yoke the oxen employed in this work to a machine of this kind, in which the man stood who guided them, would certainly render the *simile* more complete: That this was done, is the more probable, as the oxen in the passage are represented as yoked together: 'Ως δ' ὅτε τις

ζεύξη

* 'Ως δ' ὅτε τις ζεύξη βοας ἀρσενίας ευρυμειτωπούς,
Τριβειμιναι κρη λευκον ευτραχαλα' ἐν ἀλωῃ,
Ρυμφα τε λιπτ' ἐγειοντο βοων' ὑπο πόσσ' ἐριφυκῶν.
'Ως ὑπ' Ἀχιλλῆος, &c.

Hom. Il. lib. xx. v. 495.

ξυζην βοας, and, as Achilles, pushing his chariot horses over carcaffes, shields, &c. in the field, is compared to the husbandman driving his yoked cattle over the barley in the *area*, and bruising it out quickly and easily.

In the eastern countries, they seem to have had all the different ways of beating out corn mentioned by the Roman authors: We find them alluded to in a passage of the prophecies of Ifaiah: ‘for the *fitches*,’ says the Prophet, ‘are not threshed with a threshing instrument, neither is a cart-wheel turned about upon the *cummin*; but the *fitches* are beaten out with a staff, and *cummin* with a rod: Bread corn is bruised, because he will not be ever threshing it, nor break it with the wheel of his cart, nor bruise it with his horsemen*.’ The ordinary way of beating out corn, from this passage, seems to have been by the threshing instrument, or cart wheel, as it is called; but the *fitches* and *cummin* were beaten out more conveniently and expeditiously by a rod or flail: This threshing instrument was probably the same with the one mentioned by Varro, which he calls *plostellum poenicum*, and which seems to have had rollers; these

* If. chap. xxviii. v. 27. 28.

these rollers bruised out the corn in turning round: The machine here called the cart wheel, seems to have done this in the same manner. It appears likewise from this passage, that horses were used; it is not mentioned indeed, whether the horses were yoked in the machine, or driven about loose, to tread out the corn with their feet: It is probable, that they were used sometimes the one way, and sometimes the other*.

Though

* There is a part of this passage, with which the commentators are very much diffculted; *Bread corn is bruised, because he will not be ever threshing it*: The several explanations given are far from being satisfying: It is probable, that by bread corn, the Prophet means that kind of grain called *far* by the Roman authors, which, in ancient times, was the grain chiefly used for bread by that people, and of which there were several kinds used by the Greeks, and Eastern nations, and called by them, according to Pliny, *zea, olyra, tiphe*, &c. This kind of grain has a very strong husk, which was not broken by the ordinary ways of threshing; for which reason, as has already been observed, it was not only laid up, but also sown with it; and, before it was grinded into flour, this husk was taken off by bruising, either in hand milns, or mortars; the husbandman is represented by the Prophet as acting in the same manner: Instead of threshing this bread corn in the threshing-floor, till it parted from the husk, which would
have

Though Ifaiah does not mention oxen as employed in bruising out the corn; yet it is certain, that they were employed in this work, and were probably the only cattle used in more ancient times: We read in the law of Moses, ‘Thou shalt not muzzle the ox that treadeth out the corn*.’ But this passage does not determine, whether the oxen were loose, and treaded

have proved a work both tedious and difficult, he laid it up with the husk, and afterwards bruised it in a miln, or mortar. It does not belong to this subject to inquire what is the design of the Prophet in representing these operations of the husbandman; it is sufficient to observe, that he intends to describe a very expert one, who knows how to time his operations, as well as perform them in the most proper manner: He asks, Does such a man plough and harrow continually? No! As soon as his land is prepared, he sows the different sorts of grain in their seasons, upon the fields intended for them; and, after his crop is reaped, he does not thresh all kinds in the same manner; he beats out wheat, barley, and rye, with a threshing instrument, by the turning of a wheel, and the trampling of horses; but *fitches* and *cummin*, he beats out with a flail; bread corn he does not attempt to separate from the husk in the ordinary way of threshing, but bruises it out with an instrument made for the purpose.

* Deut. chap. xxv. v. 4.

treaded out the corn with their hoofs, or were yoked in a threshing instrument; for what is said may be applied to them with equal propriety in both situations.

Such are the methods of threshing corn used by the ancients: In Britain, one of the methods only is used; in some of the southern countries, the others are used likewise: There seems as yet no improvement; attempts have been made to construct a machine for driving flails, but none of them have been successful.

CHAP.

C H A P. XLI.

Of Cleaning, or Winnowing the Corn.

IT has already been observed, that the *area* was situated in such a manner, as to have the benefit of any wind that should blow. After the corn was threshed out, the first opportunity of wind for winnowing it was embraced; for it was not carried to the granary till such time as it was cleaned. However, in what manner this operation was performed is not certain, as so little is said about it.

Varro mentions two instruments for winnowing corn; the one he calls *vallus*, the other *ventilabrum*. He says: ‘ When the grain is beaten
 ‘ out of the ears, it should be thrown from the
 ‘ earth with *valli* and *ventilabra*, while a gentle
 ‘ wind blows; that so the light stuff in it, called
 ‘ chaff, may be blown out of the threshing-floor,
 ‘ and the corn, which is heavy, may remain
 ‘ clean

‘ clean for the basket *.’ These instruments, from the use made of them, seem to have been of the same kind with shovels. That the *ventilabrum* was of this kind, is evident from a passage in Columella; as in this passage, he gives an account of an easy way of threshing and cleaning beans, I shall translate the whole: ‘ And these chiefly,’ says he, ‘ of all the other *legums*, cannot be most expeditiously beat out without cattle, and cleaned without wind: Let a small number of bundles be placed loose in one end of the *area*, along which, length ways and through the middle, let three or four men push the bundles forwards with their feet, at the same time beating them with forks and sticks; then, when they have arrived at the other end of the threshing-floor, let them lay up the straw in a heap, allowing the grain beat out to lie in the *area*, to have the other bundles threshed above it in the same manner: The hardest of the chaff it indeed thus cut off, and
 * *fepa-*

* *Iis tritis, oportet e terra subiectari vallis, aut ventilabris, cum ventus spirat lenis: Ita fit, ut quod levissimum est in eo, atque appellatur acus, evannatur foras extra aream, ac frumentum quod est ponderosum, purum veniat ad corbem; Var. lib. 1. cap. LII.*

‘ separated by the beating, but the small chaff
 ‘ which falls from the pods with the beans, is
 ‘ separated in another way; when there is a heap
 ‘ of mixed chaff and grain collected, this heap
 ‘ being thrown to a distance with *ventilabra*, the
 ‘ chaff being light falls short, and the grain fly-
 ‘ ing farther, falls pure on the place whither the
 ‘ *ventulator* intended to throw it*.’ The use
 made of the *ventilabrum*, as represented in this
 passage, shows that it was a kind of shovel; the
vallus, which is the name of the other instru-
 ment mentioned by Varro, was probably of a
 differ-

* Maximeque ex leguminibus ea, et sine jumentis teri,
 et sine vento purgari expeditissime sic poterit. Modicus
 fasciculorum numerus resolutus in extrema parte areae
 collocetur, quem per longissimum ejus, mediumque spatium
 tres vel quatuor homines promoveant pedibus, et baculis
 furcillisve contundant; deinde cum ad alteram partem
 areae pervenerint, in acervum culmos regerant. Nam
 femina excussa in area jacebunt, superque ea paulatim
 eodem modo reliqui fasciculi excutientur. Ac durissimae
 quidem acus refectae separataeque erunt a cudentibus;
 minute vero quae de filiquis cum faba refederunt, aliter
 fecernentur. Nam cum acervus paleis, granisque mistus
 in unum fuerit coniectus, paulatim ex eo *ventilabris* per
 longius spatium jactetur: Quo facto palea, quae levior est,
 citra decidet: Faba, quae longius emittetur, pura eo per-
 veniet, quo ventilator eam jaculabitur; Col. lib. ii. cap. x.

different form, but intended for the same purpose, of throwing corn, and other things of the same kind, from one place to another. The manner of winnowing corn with these instruments, as the same author informs us in the passage above cited, was by throwing it while a gentle wind was blowing; if corn, in the open air is thrown several times across the wind, and well scattered in throwing, the chaff being light, not only falls short, but is also blown away, and the grain thereby remains clean.

Columella gives an account of the manner of winnowing, as follows: ‘When the corn,’ says he, ‘is mixed with the *palea*, these ought to be separated in the wind; for this purpose, the west wind is reckoned the best, which blows soft and equal through the summer months: However, to wait for this wind is the sign of a slothful husbandman; for, while he is expecting it, he may be overtaken by a severe storm; therefore, in the *area*, the corn that is threshed, should be so heaped up, that it may be cleaned with any wind; but, if for several days the weather should continue quite calm, the corn must be cleaned with vans; lest, after a calm, a severe tempest should destroy the labours

‘labours of the whole year*.’ It may be observed, from this passage, that there was an instrument used for cleaning corn, when there was no wind, called *vannus*; The method of cleaning corn with this instrument, he recommends in some cases, even when there was wind blowing. Immediately before the passage last cited, he says: ‘When there are ears only, the corn is best beat out with flails, and cleaned with vans.’ And then adds: ‘But, if the corn is mixed with the *palea*, they may be separated in the wind †.’ The placing the vans and the wind thus in opposition to each other, shows that the vans were used, though there was no wind; and that, in the particular case mentioned,

* At ubi paleis immista sunt frumenta, vento separentur: Ad eam rem Favonius habetur eximius, qui lenis aequalisque aestivis mensibus perflat: Quem tamen operiri lenti est agricolae: Quia dum expectatur, saeva nos hiems deprehendit. Itaque in area detrita frumenta sic sunt aggerenda, ut omni flatu possint excerni. At si compluribus diebus undique sibilat aura, vannis expurgentur, ne post nimiam ventorum segnitiam vasta tempestas irritum faciat totius anni laborem; Col. lib. II. cap. XXI.

† Ipsae autem spicae melius fustibus tunduntur, vannisque expurgantur: At ubi paleis immista sunt frumenta, vento separentur; Col. id.

ed, this way of cleaning with them was the preferable one. This instrument is mentioned by Virgil among the things which he says ought to be prepared before hand, and is called by him the mystic van of Bacchus*.

The Greeks, likewise, had different kinds of instruments for winnowing; one of them seems to have been of the same kind with the *ventilabrum* of the Romans, and, probably, had some resemblance in its shape to the modern shovel. Homer, in describing a people unacquainted with sea affairs, represents a shepherd, upon seeing an oar, calling it a van; this kind of van was undoubtedly used as a shovel is, the only kind that can be supposed to have any resemblance to an oar.

He mentions this kind of van in other passage.

As on some ample barn's well hardned floor,
 (The winds collected at each open door,)
 While the broad fan with force is whirl'd round,
 Light leaps the golden grain resulting from the
 ground;

So

* *Arbuteae crates, et mystica vannus Iacchi.*

Vir. Geo. I. v. 166.

So from the steel that guards Atrides heart
Repell'd to distance flies the bounding dart *.

POPE.

In the eastern countries, they had likewise several instruments for winnowing. Isaiah mentions two, the van and the shovel: Speaking of a time when there should be great plenty of corn, he says: 'The oxen likewise, and the young asses, that eat the ground, shall eat clean provender, which has been winnowed with the shovel, and with the van †.' Amos mentions

a

* 'Ως δ' ἄτ' ἀπο πλατεῶς πτυοφιν μεγάλην κατ' ἀλωῆν
Θρωσκουσίην κυάμοι μαλανοχροῖς, ἢ εἰβενθοί,
Πνοῆν ὑπο λιγυρῆ καὶ λικμητηρῶς ἔρωη.
'Ως ἀπο θωρηκῶς Μενελάου, &c.

Hom. H. lib. XIII. v. 588.

Mr Pope seems to think, that the rebounding of the arrow from the breast-plate of Menelaus, is here compared to the rebounding of grain from the floor in winnowing: But it seems rather to be compared to the throwing of the grain in this operation. The passage may be thus translated: 'As grain from the broad van bounds over the large area, driven by the roaring wind, and the force of the winnower, so the arrow, repelled by the breast-plate of Menelaus, flies to a distance.'

† If. ch. xxx. v. 24.

a sieve for sifting, and that this instrument was used in the same manner as the modern sieve, is evident from his manner of expressing himself: 'For, lo! I will command, and I will sift the house of Israel among all nations, like as corn is sifted in a sieve, yet shall not the least grain fall upon the ground *.' That the sifting of corn is here meant, though corn is not in the original, appears from this, that, in sifting meal or flour, these fall to the ground, and the husks or bran are kept in the sieve; but, in sifting corn, the corn is preserved in the sieve, and the dust and small seeds fall to the ground; hence the Prophet says, 'yet shall not the least grain fall upon the earth.' That corn, as well as flour, was sifted, appears from a passage in Luke's Gospel, in which Jesus is represented as saying to Peter, 'Simon, Simon, Satan hath desired to have you, that he may sift you as wheat *.'

When it was intended that grain should be preserved a long time, it was common to give it a second dressing. This is mentioned by Columella:

* Amos ch. ix. v. 9.

† Εἶπε δὲ ὁ κυριος Σιμων, Σιμων. ἰδου ὁ σατανας ἐζητησατο υμῶν, του σιτισαι ὡς τον σιτον; Luke, ch. xxii. v. 31.

lumella: 'If corn,' says he, 'is to be laid up for years, it ought to be again cleaned; for, the cleaner that it is, the less it is hurt by the weevil. But, if it is intended for immediate use, there is no need for this second dressing; it is enough to have it exposed a little in a shade, and so laid up in the granary *.' It is probable, that this second dressing was given by sieves to take out any small pebbles, pieces of hard earth, or seeds of weeds, that might have been mixed with the grain, and would not be separated from it by the ordinary dressing.

Such were the methods of dressing grain, and the instruments used for this purpose by the ancients. Perhaps, in this kingdom, we have arrived at greater perfection than they in this operation: Many and various are the instruments we use in it, and, probably, the machine which was invented not many years ago, and is now generally used in the corn countries of Scotland, called by us *fanners*, is a great improvement upon

* Pura deinde frumenta, si in annos reconduntur, repurgari debent. Nam quanto sunt expolitiora, minus a curculionibus exeduntur. Sin protinus ufui destinantur, nihil attinet repoliri, satisque est in umbra refrigerari, et ita granario inferri; Col. lib. II. cap. XXI.

404 OF THE HUSBANDRY

upon the van of the ancients ; but then it must be remembered, that, as the ancients were at much greater pains in keeping their lands free from weeds, than the very best of the modern farmers are, the dressing of corn would not be so difficult or troublesome a work to them, as it is at present to us.

CHAP.

C H A P. XLII,

Of Straw, and the Uses made of it.

IT was already observed, that, by some ways of reaping, the whole straw, and that, by others, one-half of it was left standing on the fields. It was likewise observed, that this straw was afterwards cut. Columella mentions this as one of the works performed in the end of July: In his kalendar for this season, he says: ‘ In these days, the harvest is ended in places that are temperate, and near the sea; and, within thirty days after the reaping of the corn, the straw is cut and gathered into a heap.’ He adds: ‘ One man may cut a *jugerum* in a day *.’ This operation Varro calls *spicilegium*;

he

* His diebus locis temperatis et maritimis messis conficitur, et intra dies triginta qua defecta est, stramenta praecisa in acervum congeruntur. Jugerum stramentorum opera una defecat; Col. lib. xi. cap. ii. 54.

he says, it comes after harvest, and the straw should be gathered and carried home; or, if the crop is thin, and the price of labour high, it should be eaten upon the ground: 'This thing,' he adds, 'should be particularly attended to, that the expence does not exceed the value of the crop *.' In another passage, he mentions the cutting of stubble as one of the works to be performed between the dog-star and autumnal equinox †. When this author proposes to feed cattle upon the stubble in the fields, to save expence, he probably means, that the cattle were to be put upon it as it stood in the field, without being at the trouble or expence of cutting it down.

Though the straw of some fields might be pastured without being cut down, yet the great variety of purposes for which straw was used, made it necessary to carry the greatest part of it home.

The

* *Messe facta spicilegium venire oportet, aut domi legere stipulam: Aut si sunt spicae raras, et operae carae, compasce. Summa enim spectanda, ne in ea re sumptus fructum superet; Var. lib. 1. cap. LIII.*

† *Quinto intervallo inter caniculum, et aequinoctium autumnale oportet stramenta defecari; Var. lib. 1. cap. XXXIII.*

The principal use made of straw, was to litter cattle. Cato, among the directions given to the bailiff, says; ‘He ought diligently to litter the sheep and oxen *.’ That this was done with straw, when it could be got, appears from another direction which he gives a little after: ‘When straw,’ says he, ‘is wanting, gather holm leaves, and lay them below the sheep and oxen †.’ Varro says: ‘It is the opinion of some, that straw is called *stramentum*, because it is strowed before the cattle ‡.’ And Columella says: ‘Straw must be provided for litter to the cattle in winter ||.’ ‘And either straw or fern must be put below the sheep §.’ Sometimes

* *Pecori et bubus diligenter substernatur*; Cat. cap. v. 7.

† *Stramenta si deerunt, frondem iligneam legito, eam substernito ovibus bubusque*; Cat. cap. v. 8.

‡ *Alii stramentum a stando, ut stamen dictum putant. Alii ab stratu, quod id substernatur pecori*; Var. lib. i. cap. l. 3.

|| *Boves calore sub divo, frigoribus intra tectum manere oportet. Itaque hibernae stabulationi eorum praeparanda sunt stramenta, quae mense Augusto intra dies triginta sublatae messis praecisa, in acervum extrui debent*; Col. lib. vi. cap. lll.

§ *Deturque opera, ne quis humor subsistat, ut semper quam*

times the straw was bruised, before it was used for this purpose: 'When straw,' says Pliny, 'is sufficiently dry, they brake it upon stones 'for litter *.' This would be an advantage; for it would mix more easily with the dung, and be sooner dissolved.

The *palea*, or short straw, that was bruised in the threshing-floor, was given to cattle in the place of hay. Columella, after naming the things most proper for feeding cattle, adds: 'They are fed less advantageously with straw, (*paleis*) which is every where used for this purpose, and, in some places, is the only thing to 'be got.' After this, he proceeds to name the kinds most proper, in their order: 'The best,' says he, 'is the straw of millet, after it that of 'barley, and next that of wheat †.' He represents, however, the straw of the different
kinds

quam aridissimis filicibus, vel culmis stabula contrata sint, quo purius et mollius incubent foetae; Col. lib. viii. cap. iii. 8.

* Culmum saxosis locis cum inaruit, baculo frangunt, substratu animalium; Plin. Nat. Hist. lib. xviii. cap. xxx.

† Minus commode tuemur armentum paleis, quae ubique, et quibusdam regionibus solae, praesidio sunt. Eae probantur maxime ex milio, tum ex ordeo, mox etiam ex tritico; Col. lib. vi. cap. iii. 3.

kinds of pulse as best for sheep; for, when mentioning the proper food for this animal, he says: ‘When other things are wanting, the straw of pulse is likewise necessary*.’ No mention is made of any other kind of straw, and therefore we are to consider, that this is the only kind that was reckoned proper for sheep.

Pliny describes the straw that was reckoned best of its kind: ‘Many nations,’ says he, ‘use the *palea* for hay; the smaller that this is in the pen, the shorter, and the nearer it is reduced to dust, it is the better. Millet straw is the best, next, that of barley, and the worst, that of *triticum*, except to labouring cattle.’ He adds: ‘If the *palea* is deficient, the straw from which the corn is reaped, is broken for this purpose.’ He describes the manner of preparing this straw: ‘It is sooner cut down than otherwise it would be, lies a considerable time sprinkled with brine, then, when dried, is rolled up in bundles, and so given to the oxen for hay †.’

Another

* *Necessariae tamen, ubi caetera defecerunt, etiam ex leguminibus paleae*; Col. lib. vii. cap. iii. 22.

† *Palea plures gentium pro foeno utuntur. Melior ea,*
VOL. II. 3 F quae

Another use made of straw was to cover houses. This likewise is mentioned by Pliny: ‘ In the places,’ says he, ‘ where they cover houses with stubble, they reap in such a manner, as to make this as long as possible.’ The same author seems to intimate, that the manner of reaping corn was determined by the uses intended to be made of the straw; for, after mentioning the several ways of reaping, he adds: ‘ The difference arises from this; where they cover houses with stubble, they make it as long as possible; where there is a scarcity of hay, they increase the quantity of *palea* by taking off from the other straw *.’ The meaning of which is; in the one case, they cut high, to lengthen the stubble for covering the houses; in

quae tenuior, minuiorque, et pulveri propior: Ideo optima e milio, proxima ex hordeo, pessima ex tritico, praeterquam jumentis opere laborantibus.—Si palea defecit, et culmus teritur; ratio haec: Maturius defecit, muria diu resperfus, dehinc siccatus in manipulos convolvitur, atque ita pro foeno bubus datur; Plin. Nat. Hist. lib. xviii. cap. xxx.

‡ Differentia haec. Ubi stipula domos contegunt, quam longissimam servant. Ubi foeni inopia est, stramento paleam quaerunt; id.

in the other case, they cut low, to increase the quantity of fodder for the cattle.

In places where there was plenty of hay, the *palea* was used for litter; and the other straw was sometimes burned in the fields. Virgil represents this as very beneficial to land: ‘It is often,’ says he, ‘very advantageous likewise to set fire to the barren lands, and to burn the light stubble *.’ Pliny likewise mentions this custom, and adds, that the chief reason for it is to burn the seeds of weeds: ‘There are some,’ says he, ‘who burn the stubble on the fields, a practice very much recommended by Virgil; the chief reason for this, that they may destroy the seeds of weeds *.’ In another passage, he says, that the straw (*culmus*) of millet was, for the most part, burned †. These different customs, he alledges, were observed in different places,

* Saepe etiam steriles incendere profuit agros,
Atque levem stipulam crepitantibus urere flammis.

Vir. Geo. I. v. 84.

† Sunt qui accendant in arvo et stipulas, magno Virgilio praeconio. Summa autem ejus ratio, ut herbarum semen exurant; Plin. Nat. Hist. lib. xviii. cap. xxx.

‡ Milii culmum fere inurunt; id.

places, according to the extent of the harvest, and price of labour*.

The burning of stubble seems also to have been a practice in the eastern world. There are several passages in the writings of the Prophets that allude to this: 'Therefore,' says Isaiah, 'as the fire devoureth the stubble, and the flame consumeth the chaff, so their root shall be as rottenness †.' In Obadiah, the allusion is still plainer: 'And the house of Jacob shall be a fire, and the house of Joseph a flame, and the house of Esau for stubble; and they shall kindle in them and devour them, and there shall not be any of the house of Esau remaining ‡.'

CHAP.

* Ritus diversitatem magnitudo facit messium, et caritas operariorum; id.

† Is. chap. v. v. 24.

‡ Obad. v. 18.

C H A P. XLIII.

Of the Manner of Preserving Corn.

THE preserving corn is an object of very great importance; it is necessary to keep it not only from one year to another, but, in years of plenty, it is also necessary to lay it up for a supply in years of scarcity. In Egypt, in the time of Joseph, corn was laid up during the seven years of plenty, sufficient to supply the inhabitants during the seven years of scarcity that followed. The crops in Egypt depend upon the overflowing of the Nile: ‘If this overflowing,’ says Pliny, ‘does not exceed twelve cubits, famine is certain, and no less so if it exceeds fifteen*.’ One or other of these extremes, in
the

* Si duodecim cubita non excessit, fames certa est. Nec minus, si XVI exsuperavit. Tanto enim tardius decedit, quanto abundantius crevit, et sementem arcet; Plin. Nat. Hist. lib. XVIII. cap. XVIII.

the overflowing of the Nile, no doubt, frequently happened, in consequence of which, the crop would fail; this would teach that people, so famous for learning, to fall upon proper methods for preserving their grain, which indeed would not be a difficult matter in so dry a climate.

Preserving corn was a matter more difficult in Italy in the time of the Romans; we find that it was an object of the greatest care and attention, and that all their writers on husbandry, are particular in describing the methods of doing it in the most effectual manner.

Cato gives this general direction: ‘ To prevent the wevil from hurting corn, and mice from touching it, make a plaster of lees of oil, (*amurca*,) add a little *palea* to it; allow this to be well soaked, and mix them well; lay over the whole granary with this thick plaster, and afterwards, when it is dry, sprinkle it with *amurca*; there lay up the corn, well dried, in a shade, and the wevil will not hurt it *.’

Varro

* Frumento ne noceat curculio, neu mures tangant, lutum de amurca facito, palearum paulum addito, finito macerescant bene, et subigito bene, eo granarium totum oblinito

Varro is still more particular, and describes not only the different ways of laying up corn for preservation, but also the different places used for this purpose: ‘Wheat,’ says he, ‘ought to be laid up in high granaries, exposed to the east and north winds, upon which no moist air from the neighbouring places blows. The walls and floor ought to be well secured with marble plaster, at least with plaster made of clay and *amurca*, mixed with the chaff of corn. This does not suffer either mouse or worm, and makes the grain more firm and solid. Some persons sprinkle the wheat itself with *amurca*, at the rate of a quadrantal to a thousand *modii*; and others powder or sprinkle it with other things, such as chalk of Chalcis or of Caria, or wormword, and other things likewise of this kind. Some have caves below ground for granaries, which they call *σιγες*, as in Cappadocia and Thracia. Others have wells, as in Hither Spain, in the country about Carthage and Osca; they straw the floors of these with *palea*, and are careful not to allow

oblinito crasso luto, postea conspergito amurca omne quod lutaveris. Ubi aruerit, eo frumentum refrigeratum condito, curculio non nocebit; Cat. cap. xcii.

416 OF THE HUSBANDRY

' low any moisture to get in, or even air, except
 ' when they take out the corn; for, wherever
 ' the air does not penetrate, no weevil is bred:
 ' Wheat, laid up in this way, remains good e-
 ' ven fifty years, millet more than an hundred.
 ' Some make very high granaries above ground
 ' in the fields, as in Hither Spain and Appulia.
 ' And some make them in such a manner, as to
 ' be ventilated, not only from the sides through
 ' the windows, but also from below through the
 ' floor *.'

Colu-

* At triticum condi oportet in granaria sublimia, quae
 perfentur vento ab exortu, ac septentrionum regione, ad
 quae nulla aura humida ex propinquis locis adspiret. Pa-
 rietes et solum opere tectorio marmorato loricandi: Si-
 minus, ex argilla mixto acere e frumento, et amurca, quod
 murem et vermem non patitur esse, et grana facit solidio-
 ra, ac firmiora. Quidam ipsum triticum conspergunt, cum
 addant in circiter mille modium quadrantal amurcae. I-
 tem alius aliud adfriat, aut aspergit, ut Chalcidicam aut
 Caricam cretam, aut absinthium; item hujus generis alia.
 Quidam granaria habent sub terris, speluncas quas vocant
cupeas, ut in Cappadocia, ac Thracia. Alii, ut in Hispa-
 nia Citeriore, puteos, ut in agro Carthaginienfi, et Ofsensi.
 Horum solum paleis substernunt; et curant ne humor,
 aut aer tangere possit, nisi cum promitur ad usum. Quo
 enim spiritus non pervenit, ibi non oritur curculio. Sic

Columella gives a particular description both of the barn and granary, in which corn was preserved: ‘Granaries,’ says he, ‘should be entered by ladders, and have small windows to the north; for this exposure is the coldest and driest, both which things are very beneficial for preserving corn*.’ He adds, a little after: ‘Nor has it escaped me, that some are of opinion, that the best place for laying up corn, is a barn with an arched roof, the earthen floor of which, before it is laid, being digged up and moistened with new unfalted *amurca*, is firmed like Signinean work with beaters; then afterwards, when dried, it is again in the same manner laid over with hard plaster, that

‘ is

conditum triticum manet vel annos quinquaginta: Milium vero plus annos centum. Supra terram granaria in agro quidam sublimia faciunt, ut in Hispania Citeriore, et in Appulia. Quidam quae non solum a lateribus per fenestras, sed etiam subtus a solo ventus regelare possit; Var. lib. 1. cap. LVII. 3.

* Sed granaria, ut dixi, scalis adeantur, et modicis fenestellis aquilonibus insporentur. Nam ea coeli positio maxime frigida et minime humida est; quae utraque perennitatem conditis frumentis afferunt; Col. lib. 1. cap. VI. 10.

' is made instead of water with *amurca*, mixed with
 ' lime and sand; this hard plaster must be forced
 ' down with the heaviest beaters, and polished,
 ' and all the joinings of the walls and floor care-
 ' fully bound together by it; for it is common-
 ' ly at these joinings that the chinks appear,
 ' which afford lurking places to the subterrane-
 ' ous animals. The granary ought to be divi-
 ' ded into different apartments, that so each
 ' kind of pulse may be laid up by itself; the
 ' walls are bedaubed with plaster, wrought with
 ' *amurca*, and which, instead of *palea*, is mixed
 ' with box; and, if these cannot be got, with
 ' olive leaves; when this plaster is dry, it is a-
 ' gain sprinkled with *amurca*, and, when the *a-*
 ' *murca* is dried in, the corn is laid up. This
 ' way of ordering granaries, seems to be very
 ' effectual for preserving the corn laid up in
 ' them from the wevil, and such like animals,
 ' which soon consume it, when proper care is
 ' not taken: But then, unless they are in a dry
 ' situation, the firmest grain laid up in them be-
 ' comes mouldy; and, when there is no danger
 ' of this, corn may be preserved under ground,
 ' as in some of the Transmarine provinces, where
 ' the earth being digged after the manner of the
 ' wells

‘ wells called *siri*, receives the corn that it has
 ‘ produced. In this country, which has too
 ‘ much moisture, we prefer the hanging grana-
 ‘ ries, with the pavement and walls secured in
 ‘ the way that has been mentioned; because, as
 ‘ has already been observed, the floors and sides
 ‘ of a barn, thus fortified, prevents the wevil:
 ‘ When this pest falls upon corn, many are of
 ‘ opinion, that it may be restrained by ventila-
 ‘ ting, and thereby, as it were, airing the affec-
 ‘ ted corn in the barn: But this is an egregious
 ‘ mistake; for these animals are not expelled by
 ‘ this operation, but are mixed with the whole
 ‘ heap; which, when it remains untouched, is
 ‘ infested only in the upper part, because, a
 ‘ hand-breadth below, the wevil is not bred;
 ‘ and it is much better, that the part which is
 ‘ already spoiled should remain so, than that the
 ‘ whole should be endangered: And, when there
 ‘ is a call for any of the corn, it is easy to take
 ‘ off what is spoiled in the top, and make use of
 ‘ that which is found below *.’ The manner of
 ven-

* Neque me praeterit, sedem frumentis optimam qui-
 busdam videre horreum camera contactum, cujus solu...
 terrenum priusquam consternatur, perfossum, et amurca
 recenti

ventilating corn here mentioned, it is probable, was by throwing it from one place to another:

The

recenti non falsa madefactum, velut Signinum opus paviculis condensatur. Tum deinde cum exaruit, simili modo pavimenta testacea, quae pro aqua receperint amurcam mistam calci et arenae, superfsternuntur, et magna vi paviculis inculcantur, atque expoliuntur, omnesque parietum et foli juncturae testaceis pulvinis fibulantur. Nam fere cum his partibus aedificia rimas egerunt, cava praebent et lateras subterraneis animalibus. Sed et lacubus distinguuntur granaria, ut separatim quaeque legumina ponantur. Parietes oblinuntur amurca subacto luto, cui pro paleis admittunt arida oliastri, vel si ea non sunt, oleae folia. Deinde cum praedictum tectorium inaruit, rursus amurca respergitur, qua siccata frumentum infertur. Ea res ab noxa curculionum, et similibus animalium commodissime videtur conditas truges defendere; quae nisi diligenter repositae sint, celeriter ab eis consumuntur. Sed id genus horrei, quod scripsimus, nisi sit in sicca positione villae, quamvis granum robustissimum corrumpit situ: Qui si nullus adfit, possunt etiam defossa frumenta servari; sicut Transmarinis quibusdam provinciis, ubi puteorum in modum, quos appellant siros, exhausta humus, editos e se fructus recipit. Sed nos in nostris regionibus, quae redundant uligine, magis illam positionem pensilis horrei, et hanc curam pavimentorum et parietum probamus; quoniam, ut retuli, sic emunita sola et latera horreorum prohibent curculionem; quod genus exitii cum incidit, multi opinantur

The shovels by which the corn was thrown, were called *ventilabra*, and the thrower *ventilator*, as appears from a passage in Columella, already cited: This is the more probable, as Varro relates that olives were ventilated in the same manner: ‘ If the gathered olives,’ says he, ‘ lie too long in the heap, they rot by heating, and the oil is foetid; therefore, if you cannot despatch them in time, it is necessary to ventilate the heaps by throwing *.’

Palladius is likewise very particular in his description of granaries. After having given directions about building wine cellars, he says: ‘ Such too is the method of constructing barns, though

opinantur arceri posse, si exesae fruges in horreo ventilentur, et quasi refrigerentur. Id autem falsissimum est: Neque enim hoc facto expelluntur animalia, sed immiscentur totis acervis: Qui si maneant immoti, summis tantum partibus infestantur, quoniam infra mensuram palmi non nascitur curculio: Longeque praestat id solum, quod jam vitiatum est, quam totum periculo subicere. Nam cum exiget usus, facit e est, eo sublato quod vitiatum erit, integro inferiore uti; Col. lib. 1. cap. vi. 12.

* Olea lecta, si nimium diu fuit in acervis, calore fracescit, et oleum foetidum fit. Itaque si nequeas mature conficere, in acervis jactando ventilare oportet; Var. lib. 1. cap. LV. 6.

' though they may want the north exposure.
 ' They are placed higher in a cold, airy, and
 ' dry situation, and at a distance from all mois-
 ' ture and dung, as well as the houses and folds
 ' of cattle: In building, particular care is to be
 ' taken to prevent them from opening in chinks;
 ' therefore, the whole floor ought to be laid
 ' with two feet, or smaller bricks, upon hard
 ' plaster; then, if a great quantity of corn is
 ' expected, the barn ought to be divided into
 ' different apartments, one for each grain; but
 ' if the poorness of the soil does not promise
 ' much, the granaries may be divided by basket-
 ' work rails, or the small crop may be collected
 ' into twig hampers. When the barn is built,
 ' the walls are bedaubed with plaster, wrought
 ' with *amurca*, and which, instead of *palea*, is
 ' mixed with box, or olive leaves; when this
 ' plaster is dry, it is again sprinkled with *amur-*
 ' *ca*; and, as soon as the *amurca* is dried in,
 ' the corn may be laid up: This kind of plaster
 ' is destructive to the wevil, and other noxious
 ' animals. Some mix coriander seeds with the
 ' corn, as of great benefit for preserving it; no-
 ' thing, however, is more effectual for this pur-
 ' pose, than to carry the corn from the *area* to
 ' some

‘ some other place near at hand, and there to
 ‘ air it for a few days, and so lay it up in the
 ‘ granary.’ After observing that Columella for-
 bids corn to be ventilated, he adds : ‘ The herb
 ‘ *conyza*, (as the Greeks assert,) strewed dry be-
 ‘ low corn, helps to preserve it. To all these it
 ‘ may be added, that barns must be secured a-
 ‘ gainst the south wind *.’

Pliny

* Sicut horreorum quamvis ipsam septentrionis desideret partem, et superior, et longe ab omni humore et laetamine et stabulis ponendus est, frigidus, ventosus, et ficcus : Cui providendum structurae diligentia, ne rimis possit abrumpi. Solum igitur omne bipedis sternatur, vel minoribus laterculis, quos suffuso testaceo pavimento debemus imprimere. Tunc divisas cellas (si magnus sperabitur seminum modus) grano cuique tribuemus. Et si terrae pauperies minora promittit, vel craticis podiis erunt discernenda granaria, vel vimineis vasculis reditus tenues colligemus. Sed factis granariis, amurca luto mista parietes linuntur ; cui aridi oleastri vel olivae folia pro paleis adjiciuntur : Quo testorio siccato, rursus amurea respergitur : Quae ubi siccata fuerit, frumenta condentur. Haec res gurgulionibus et caeteris noxiis animalibus inimica est. Aliqui coriandri folia frumentis miscent ad servandum profutura : Nihil tamen diu custodiendis frumentis commodius erit, quam si ex areis in alterum locum vicinum transfusa refrigerentur aliquantisper diebus, atque ita horreis inferantur.

—Herba

Pliny likewise gives an account of the different kinds of granaries. After treating of the harvest, he adds: 'The manner of preserving corn is connected with this: Some require costly barns to be built with brick walls three feet thick; besides, to be filled from the top, to have no windows, and admit of no wind: Others allow of windows to the north, and north-east; they require likewise that they be built without lime, because it is a thing most prejudicial to corn. On the contrary, in other places, they raise wooden granaries upon pillars, and expose them to the wind on all sides, and also from the floor. Others again, are of opinion, that grain becomes shrivelled by lying upon a deal floor open below, and that it heats by lying under a tile roof*.' He
likewise

—Herba conyza sicca (ut Graeci afferunt) substrata frumentis addit aetati. Ab horreis tamen auster esse debet averfus; Pal. lib. 1. tit. XIX.

* Connexa est ratio frumenti fervandi. Horrea opere tripedali crassitudine, pariete lateritio, exaedificari jubent aliqui. Praeterea superne impleri, nec afflatus admittere, aut fenestras habere ullas. Alii ab exortu tantum aestivo, aut septentrione, eaque sine calce construi, quoniam fit frumento inimicissima.—Alibi contra suspendunt

likewise mentions several things proper for preserving corn, that ought to be attended to in the manner of laying it up: ‘ The laying up ‘ corn,’ says he, ‘ in a proper season and condition, seems to be the most material thing; ‘ for, if it is put together not sufficiently dry ‘ and firm, or, if it is laid up warm, enemies ‘ must of necessity be produced in it *.’ Upon this subject, he says afterwards: ‘ Some, to preserve wheat, sprinkle it with *amurca*, at the ‘ rate of a quadrantal to a thousand *modii*: Others powder it with chalk of Chalcis, or of ‘ Caria, or with wormwood: There is a likewise a kind of earth of Olynthus and Corinthus, in Euboea, which secures grain from ‘ corruption. Neither is it often damaged when ‘ laid up in the ear; it is very well preserved in ‘ pits, which are called *siri*, as in Cappadocia and ‘ Thracia :

pendunt granaria lignea columnis, et perflari undique malunt, atque etiam a fundo. Alii omnino pendente tabulato extenuari granum arbitrantur: Et si tegulis subjaceat, confervescere; Plin. Nat. Hist. lib. xviii. cap. xxx.

* Nobis referre plurimum tempestivitas condendi videtur. Nam si parum tostum atque robustum collectum sit, aut calidum conditum, inimica innasce necesse est; id.

‘ Thracia: They are careful above all things,
 ‘ in Spain and Africa, to have these made in a
 ‘ dry soil; they likewise carefully straw *palea* be-
 ‘ low the grain; and, besides, lay it up in the
 ‘ ear: It is certain indeed, that corn will receive
 ‘ no hurt, if the air has no access to it. Varro
 ‘ asserts, that wheat, laid up in this manner,
 ‘ will remain good fifty years, and millet a hun-
 ‘ dred. Beans and pulse, in oil casks daubed
 ‘ with ashes, will last good a long time. The
 ‘ same author asserts, that beans, in a cave of
 ‘ Ambracia, remained good from the time of
 ‘ King Pyrrhus, to the piratical war in the time
 ‘ of Pompey the Great, about one hundred and
 ‘ twenty years *.’

Theo.

* Quidam ipsum triticum diuturnitatis gratia aspergunt
 amurca, mille modios quadrantali. Alii Chalcidica aut
 Carica creta, aut etiam absinthio. Est et Olynthi ac Ce-
 rinthi Euboeae terra, quae corrumpi non sinat. Nec fere
 condita in spica laeduntur. Utilissime tamen servantur in
 scrobibus, quos sros vocant, ut in Cappadocia, et in
 Thracia. In Hispania et Africa, ante omnia ut sicco solo
 fiant, curant: Mox ut palea substernatur. Praeterea cum
 spica sua conduntur. Ita frumenta si nullus spiritus pe-
 netret, certum est nihil maleficum nasci. Varro auctor
 est, sic conditum triticum durare annis quinquaginta, mi-
 lium

Theophrastus observes, that corn is best preserved in the ear; that its being long preserved depends upon the place where it is laid up; that in Cappadocia, it continues forty years fit for seed, and seventy fit for food; that the proper place is in a high situation, and open to the east, west, and south winds*.

The pits for preserving corn, mentioned by Pliny, are still used in Sicily, near Agrigentum; and no doubt must be very proper for the purpose, as they have been so long in use.

Thus

lium vero centum. Fabam et legumina in oleariis cadis oblita cinere, longo tempore fervari. Idem fabam a Pyrrhi regis aetate, in quodam specu Ambracia usque ad piraticum Pompeii Magni bellum durasse, annis circiter centum viginti; id.

* *Triticum in spica nondum messum durare maxime potest. — Licet ea quoque viribus inter sese differant, locorum scilicet causa, quibus conduntur. Quamobrem Cappadociae loco quodam petra vocato, vel quadragenos annos foecunda, et ut sementem percommoda durare proditum est: Sexagenos autem et septuagenos ad usum cibarium fervari posse idonea. — Locum etenim istum cum alias excelsum, tum flatibus esse apertum: Et auris ab exortu, occasu, meridieque editum; Theoph. de Hist. Plant. cap. xi.*

Thus we see, that the Romans were at great pains in constructing their granaries, and in preparing their corn for being laid up for preservation. Whether the ventilated granaries, lately invented, are improvements, and fitter for preserving corn, than those used by the ancients, I have not such knowledge of them as to determine.

CHAP.

C H A P. XLIV.

Of the Management of Oxen.

OXEN were the labouring cattle chiefly used by the ancients; they were considered as animals formed for labour. Ovid makes Pythagoras say this, in his speech against the eating of animal food: ‘What have oxen deserved,’ says the philosopher, ‘an innocent simple kind of animal, without fraud or guile, and formed to endure labour *?’ Columella observes, that they are stronger than mules: These animals were sometimes put to the plough; and this author, when treating of them, says: ‘Both sexes are very proper both for the road and the plough, provided the price is not too high

* *Quid meruere boves, animal sine fraude dolisque
Innocuum, simplex natum tolerare labores.*

Ovid M. lib. xv. 11.

‘ high for the husbandman, or his stiff lands re-
 ‘ quire the strength of the ox *.’

Pliny informs us, that the ox that tilled the ground, was so much respected by the ancient Romans, that he was considered as the companion of the husbandman; and that there was a man indicted and condemned for killing one: The story, as told by this author, is as follows: ‘ We reckon this animal our companion in labour, and the culture of our lands; and such was the care of our ancestors, that there is an instance of a man who was indicted and condemned by the Roman people, because he had killed his ox to gratify a wanton boy, who said he had not eat any tripes in the country: He was banished, as a man who had killed his ploughman †.’ Columella likewise informs us, that,

* Sed uterque fexus, et viam recte graditur, et terram commode profcindit; nisi pretium quadrupedis rationem rustici oneret, aut campus gravi gleba robora boum depescat; Col. lib. vi. cap. xxxvii. 11.

† Socium enim laboris agrique culturae habemus hoc animal, tantae apud priores curae, ut sit inter exempla damnatus a populo Romano, die dicta, qui concubino procaci rure omasum edisse se negante, occiderat bovem, acsusque in exilium, tanquam colono suo interempto; Plin. Nat. Hist. lib. viii. cap. xlv.

that, in ancient times, it was capital to kill an ox*; and both he and Pliny have taken this from Varro, who asserts the same thing †.

It was common to put only one yoke of oxen to the plough, and for the man that held the plough also to drive the cattle. Cato, for the culture of 240 *jugera* of olive yard, assigns three ploughmen, and three pair of oxen; and for 100 *jugera* of vineyard, one ploughman, and one pair †. Varro observes, that it was Cato's opinion, that one yoke of oxen is necessary for 80 *jugera*; but that Safferna, in his writings, declares, that one yoke is sufficient for 100 *jugera* †. Columella, when describing the different labourers in a farm, does not mention any for driving the plough; he always assigns a ploughman
for

* Cujus tanta fuit apud antiquos veneratio, ut tam capitale esset bovem necasse, quam civem; Col. lib. vi. Praef.

† Hic socius hominum in rustico opere, et Cereris minister. Ab hoc antiqui manus ita abstinere voluerunt, ut capite sanxerint, si quis occidisset; Var. lib. ii. cap. v. 4

‡ Olivetum agri ccxl jugerum. — bubulcos iii. — boves trinos; Cat. cap. x.

§ Safferna ad jugera cc arvi, boum juga duo satis esse scribit. Cato in olivetis ccxl jugerum, boves trinos; ita fit, ut Safferna dicat, verum, ad centum jugera jugum opus esse, si Cato, ad octogena; Var. lib. i. cap. xix.

for every yoke of oxen; and he asserts, that one yoke is sufficient for ploughing the land necessary for sowing 120 *modii* of *triticum*, as many of pulse, and 75 *modii* of trimeſtrian corn; and then proceeds to prove this, by mentioning the number of days ploughing that the above mentioned quantity of ſeed requires, and the number of days that a plough can conveniently work in the year*.

The ſame author mentions, as qualifications of the ploughman, that he have a ſtrong voice to terrify the cattle, and that he ſhould be more terrible than cruel, that ſo, while the oxen obey him, they may not be haraſſed both by their work and by laſhes †. Qualifications of very little
uſe,

* Hac conſummatione operarum colligitur poſſe agrum ducentorum jugerum ſubigi duobus jugis boum, totidemque bubulcis.—quæ nos ratio docet, ſufficere poſſe jugum boum tritici centum viginti quinque, modiis, totidemque leguminum, — et poſt hanc nihilominus conferat trimeſtrium modios quinque et ſeptuaginta; Col. lib. 11. cap. XIII. 7.

† Bubulco quamvis neceſſaria, non tamen ſatis eſt in-
doles mentis, niſi eum vaſtitas vocis, et habitis metuen-
dum pecudibus efficit. Sed temperet vires clementia: Quo-
niam terribilior debet eſſe, quam ſævior, ut et obſequan-
tur ejus imperiis, et diutius perennent boves non conſeſſi
vexatione ſimul operum, verberumque; Col. lib. 1. cap. 12.

use, upon the supposition, that, besides the ploughman, there was a driver.

This seems likewise to have been the practice in Greece. Homer compares the two Ajaxes to two oxen, joined together and labouring at the plough; and, from the manner in which he expresses himself, it does not seem to have been common to put a greater number to it.

So when two lordly bulls, with equal toil,
Force the bright plough-share through the fallow
foil,
Join'd to one yoke, the stubborn earth they tear,
And trace large furrows with the shining share,
O'er their huge limbs the foam descends in snow,
And streams of sweat down their four fore heads
flow *.

POPE.

It seems likewise to have been the custom among the Eastern nations, to plough with one yoke

* Ἄλλ' ὥστ' ἐν νῆϊα βοε οἰνοπέ πηκτόν ἀρότρων,
Ἴσον θυμὸν ἔχοντε, τιταίνετόν' ἀμφὶ δ' ἀρα σφιν
Πρυμνοῖσιν κεραεῖσσι πολὺς ἀνακκηκίη ἰδρωῶς·
Τῶ μὴν τε ζυγὸν οἶον εὐξοὸν ἀμφὶς ἔεργει
Ἰεμεῖνῳ κατὰ ὠλάα, τιμνεὶ δὲ τε τελευτὸν ἀρούρης.

HOM. II. lib. XIII. v. 703.

yoke of oxen, and to have only one man at the plough. Elifha, when Elijah came to him, is represented as ploughing with twelve yoke of oxen before him, and himself with the twelfth*. There were, it would seem, twelve ploughs in the field, and Elifha ploughing with the last of the twelve.

But, although it was common to have only one yoke of oxen in the plough, yet sometimes there were more: Pliny mentions four yoke used in some parts of Italy: After describing the manner of ploughing and sowing in Egypt, and on the banks of the Tigris and Euphrates, he adds: ‘Likewise in Syria, they plough with a very shallow furrow, when, in many places in Italy, eight oxen labour hard at one plough †.’

As it was common to put only one yoke of oxen to a plough, and to have only one person both for managing the plough and driving the cattle, it became necessary that the cattle should be well trained: The manner therefore of doing this, as a matter of very great importance, is
parti-

* 1 Kings XIX. 19.

† Syria quoque tenui fulco arat, cum multifariam in Italia octoni boves ad singulos vomeres anhelent; Plin. Nat. Hist. lib. XVIII. cap. XVIII.

particularly described by almost all the rustic writers.

Virgil advises to begin very early to train the young cattle to the yoke: ‘Those,’ says he, ‘which you intend for country labour, instruct while they are calves, and use the manner of breaking, while their youthful minds are tractable, and their age manageable: First bind round their necks wide wreaths of tender twigs, then, when their free necks have been accustomed to servitude, put real collars upon them; join bullocks of equal strength, and make them step together; at first, let them frequently be employed in drawing along the ground wheels, without any carriage upon them, so that they may print their steps only on the top of the dust; afterwards, let the beachen axle groan under the heavy load, and the pole draw the wheels joined to the weighty carriage*.’

Varro

* Tu quos ad studium, atque usum formabis agrestem,
 Jam vitulos hortare, viamque insiste domandi,
 Dum faciles animi juvenum, dum mobilis aetas.
 Ac primum laxos tenui de vimene circlos
 Cervici subnecte; dehinc, ubi libera colla

Servitio

Varro is more particular in the directions which he gives: 'When any person,' says he, 'buys young bullocks, if he put their necks between forked stakes, set up one for each bullock, and give them meat from the hand, they will become tractable in a few days; then, that by degrees they may be accustomed to the yoke, let an untrained one be joined with a veteran; for he will be most easily trained by imitating; first, let them go upon even ground, and without a plough, then yoked to a light plough, in sand or light soil. That they may be trained for carriages, they should first be put to empty carts, and driven, if convenient, through a village or town; the habit of hearing frequent noise, and seeing a variety of objects, will soon make them fit for use *.'

Colu.

Servitio affuerint, ipsis e torquibus aptos
 Junge pares, et coge gradum conferre juvencos.
 Atque illis jam saepe rotae ducantur inanes
 Per terram, et summo vestigia pulvere signent.
 Post valido nitens sub pondere faginus axis
 Instrepat, et junctos temo trahat aereus orbes.

Vir. Geo. III. v. 163.

* Novellos cum quis emerit juvencos, si eorum colla in furcas destitutas incluserit, ac dederit cibum, diebus paucis

Columella is still more particular in describing the manner of training oxen for labour: 'Calves,' says

cis erunt mansueti, et ad domandum proni. Tum ita subigendum, ut minutatim affuefaciant, et ut tironem cum veterano adjungant; imitando enim facilius domatur; et primum in aequo loco, et sine aratro, tum eo levi, et principio per arenam, aut molliorem terram. Quos ad vecturas item instituendum, ut inania primum ducunt plaustra, et si possis, per vicum aut oppidum. Creber crepitus, ac varietas rerum consuetudine celerrima ad utilitatem adducit; Var. lib. 1. cap. xx.

There is an expression in this passage, 'si eorum colla in furcas destitutas incluserit,' with which the commentators are greatly diffculted: But, instead of criticising upon the words, it is better to consult Columella and Palladius, who give a more particular description of the method of training oxen for labour: From what they say, it appears, that this *furca* was a forked piece of timber, resembling a yoke, raised above the stalls, and fixed to a beam seven feet from the ground; into this the neck of the bullock was fixed, in the same way as in the yoke. The *furcae* are here called *destituta*, probably because the cattle, when put into them, stood single, and not in pairs, as the oxen commonly stood. The *bubilia* seem to have been divisions in the cow-house for the several pairs of oxen. Columella says, that they must be ten, or at least nine feet broad, to afford space for the cattle to lie down, and the person that attended to go round them. 'Lata bu-

' bilia

438 OF THE HUSBANDRY

says he, ‘ of such a make while young, should
 ‘ be accustomed to be handled and tied to the
 ‘ stalls, that so there may be less trouble or dan-
 ‘ ger in breaking them ; the proper age for this,
 ‘ is between three and five ; below three they are
 ‘ too tender, and above five too obdurate. Such
 ‘ as have never been in hands, it is proper to
 ‘ break in this manner : First of all, a large
 ‘ stable ought to be prepared, in which the break-
 ‘ er can easily go about, and from which he can
 ‘ get out without danger ; before the stable there
 ‘ must be no strait places, but either an open
 ‘ field, or very wide path, that so, when the
 ‘ bullocks are brought out, they may have a free
 ‘ course, and, if frightened, may not entangle
 ‘ them-

‘ bilia esse oportebit pedes decem, vel minime novem ; quae
 ‘ mensura et ad procumbendum pecori, et jugari ad cir-
 ‘ cumeundem laxa ministeria praebeat ;’ Col. lib. 1. cap.
 vi. Palladius is more particular ; he says, a place eight
 feet broad, and fifteen feet long, is sufficient for each pair :
 ‘ Octo pedes ad spatium standi boum paribus abundant,
 ‘ et in porrectione xv. ;’ Pal. lib. 1. cap. xxxi. It was in-
 deed very proper, to make the oxen that went under the
 same yoke in the plough, to stand together when in the
 house ; but, when cattle were training for the yoke, and,
 for this purpose, had their necks put in the *furcae*, it was
 necessary to make each one stand by himself.

‘ themselves among trees or other impediments,
 ‘ and thereby get hurt: In the stable, there should
 ‘ be large stalls, and above these should be fixed
 ‘ cross beams, in the form of a yoke, raised se-
 ‘ ven feet from the ground, that to these the
 ‘ bullocks may be bound; when these things
 ‘ are ready, take the morning of day for begin-
 ‘ ning to break them, that is free from storms
 ‘ and religious ceremonies, and bind hempen
 ‘ ropes round the horns of the bullocks; but let
 ‘ skins with the wool be wrapped round the
 ‘ nooses by which they are caught, to save their
 ‘ tender foreheads under their horns from being
 ‘ galled *. When you have thus secured the
 ‘ bullocks, bring them to the stable, and tie them
 ‘ to the stakes in such a manner, that they may
 ‘ have little freedom, and there may be such a
 ‘ distance between them, as to prevent them from
 ‘ hurting each other in struggling; if they are very
 ‘ wild, let them rage in this situation for all that
 ‘ day and night; after they have spent their fu-
 ‘ ry, they may be brought out in such a manner,
 ‘ that

* The ropes bound round the horns of the bullocks,
 are here called *jaculi*; probably, this name was given to
 ropes with a noose at one end, to be thrown over the horns
 of cattle when it was difficult to catch them:

' that one before, and several behind, may keep
 ' them fast by ropes, while another, walking be-
 ' fore with a willow switch, may restrain their
 ' efforts by moderate blows; but, if the cattle
 ' are gentle and quiet before the evening of the
 ' day in which they are tied up, they may be
 ' brought out, and taught to walk a thousand
 ' paces composedly, and without fear; when
 ' brought home, they must be tied so closely to
 ' the stakes, that they may not be able to move
 ' their heads: When thus tied, those that ap-
 ' proach them, must not do it behind, nor at the
 ' side, but before, gently, and speaking softly,
 ' that thereby they may be accustomed to behold
 ' those that come near them; then let their
 ' nostrils be well rubbed, that they may learn to
 ' smell a man; it is proper likewise, immedi-
 ' ly after, to handle their backs and sprinkle
 ' them with new wine, by which they will be-
 ' come more familiar with the ploughman; like-
 ' wise to put the hand under and along the whole
 ' belly, that afterwards they may not be afraid
 ' at such a touch, and that the vermine, which
 ' sometimes breed there, may be destroyed; when
 ' the breaker does this, he must stand to a side,
 ' without reach of the bullock's foot: After
 ' these

‘ these things, his vices being conquered, take
 ‘ hold of his tongue, rub his palate over with
 ‘ salt, put down his throat cakes of a pound
 ‘ weight, dipped in melted fat salted, and pour
 ‘ into him a sectary of wine with a horn; for,
 ‘ by this soothing usage, he will in three days be
 ‘ accustomed to his keeper, and, on the fourth,
 ‘ receive the yoke, to which a branch, in place
 ‘ of a pole, may be fixed and drawn; sometimes
 ‘ a little weight may be added, that so his pa-
 ‘ tience may be tried by a greater effort of la-
 ‘ bour; after these trials, the oxen ought to be
 ‘ yoked to an empty cart, and, by degrees, be
 ‘ obliged to draw it further and further, with an
 ‘ addition of weight: Thus trained, they may
 ‘ be put to the plough, but in land already
 ‘ ploughed, lest they should yield to the severity
 ‘ of the labour, and their necks, still tender, be
 ‘ galled by the first cutting of the hard earth:
 ‘ In what manner the ploughman is to manage
 ‘ the oxen in ploughing, I have mentioned in
 ‘ the first book: Care must be taken, that the
 ‘ ox in training do not touch any person with
 ‘ his horn or foot; for, unless this is guarded a-
 ‘ gainst, these vices will not leave him, even af-
 ‘ ter he is broke. These advices I have given,
 Vol. II. 3 K ‘ upon

‘ upon the supposition that the farmer has no
 ‘ trained cattle; for, if he has, there is a much
 ‘ more expeditious way of breaking, which I
 ‘ have always followed on my estate. When I
 ‘ propose to break a bullock for the cart or
 ‘ plough, I join with him the stoutest and most
 ‘ tractable of the trained oxen, who retards him
 ‘ when he pushes too hard, and brings him up
 ‘ when he falls behind; but, if one will take the
 ‘ trouble to get a yoke made for three oxen, by
 ‘ this contrivance, he may train the most con-
 ‘ tumacious cattle to the severest labour; for,
 ‘ when a stubborn bullock is placed in the yoke
 ‘ between two veterans, and being put to the
 ‘ plough, is obliged to till the ground, he has it
 ‘ not in his power to refuse; if enraged he springs
 ‘ forward, he is kept back at the will of the o-
 ‘ ther two, or, if he turns restiff, he is brought
 ‘ forward by them, or, if he endeavours to lie
 ‘ down, being kept up by his stronger compa-
 ‘ nions, is dragged along with them; thus dif-
 ‘ appointed in all his attempts, he is obliged,
 ‘ through necessity, to lay aside his stubbornness,
 ‘ and, by a very few strokes, is brought to en-
 ‘ dure his labour with patience: There is a soft
 ‘ kind of ox, that even after being broke, is apt
 ‘ to

‘ to lie down in the plough ; this fault ought, in
 ‘ my opinion, to be corrected not in a cruel,
 ‘ but in a reasonable way ; those who think to
 ‘ remove it by strokes, or fire, or other methods
 ‘ of tormenting, are ignorant of the true cause ;
 ‘ for a stubborn obstinacy commonly baffles the
 ‘ cruelest usage ; wherefore it is better, instead of
 ‘ tormenting the body of an ox that behaves in
 ‘ this manner, to cure his fault by making him
 ‘ suffer hunger and thirst ; for these natural
 ‘ wants will be much more effectual than wounds ;
 ‘ therefore, when an ox lies down in the work,
 ‘ the best way to deal with him is to tie his feet
 ‘ in such a manner, as to prevent him from
 ‘ standing, walking, or feeding, by which means,
 ‘ hunger and thirst will oblige him to lay aside
 ‘ his slothfulness ; which, however, is a vice
 ‘ very rare in home-bred cattle *.’

Palla-

* Talis notae vitulos oportet, cum adhuc teneri sunt,
 consuefcere manu tractari, ad praesepia religari, ut exigu-
 tus in domitura labor eorum, et minus fit periculi. Ve-
 rum neque ante tertium, neque post quintum annum ju-
 vencos domari placet, quoniam illa aetas adhuc tenera est ;
 haec jam praedura : Eos autem qui de grege feri compre-
 henduntur, sic subigi convenit. Primum omnium spatio-
 sum stabulum praeparetur, ubi domitor facile versari, et
 unde

Palladius does no more than give an abstract of Columella's directions, omitting the yoking of

unde digredi sine periculo possit. Ante stabulum nullae angustiae sint, sed aut campus, aut via late patens: Ut cum producentur juvenci, liberum habeant excursum, ne pavidi aut arboribus, aut objacenti cuilibet rei se implicent, noxamque capiant. In stabulo sint ampla praesepia, supraque transversi asseres in modum jugorum a terra septem pedibus elati configantur, ad quos religari possint juvenci. Diem deinde, quo domituram auspiceris, liberum a tempestatibus et a religionibus matutinum eligito: Cannabinisque funibus cornua juvencorum ligato. Sed jaculi, quibus capulantur, lanatis pellibus involuti sint, ne tenera fronte sub cornua laedantur. Cum deinde buculos comprehenderit, perducito ad stabulum, et ad stipites religato ita, ut exiguum laxamenti habeant, distentque inter se aliquanto spatio, ne in collustatione alter alteri noceat. Si nimis asperi erunt, patere unum diem noctemque desaeviant. Simul atque iras contuderint, manu producantur, ita ut et aliquis ante, et a tergo complures, qui sequantur, retinaculis eos contineant, et unus cum clava saligna procedens modicis ictibus subinde impetus eorum coerceat. Sin autem placidi et quieti boves erunt, vel eodem die, quo alligaveris, ante vesperum licebit producere, et docere per mille passus compositae ac sine pavore ambulare: Cum domum perduxeris, arcte ad stipites religato, ita ne capite moveri possint. Tum demum ad alligatos boves, neque a posteriore parte, neque a latere, sed adversus, placide

cide et cum quadam vocis adulatione venito, ut accidentem consueſcant aſpicere. Deinde nares perfricato, ut hominem diſcant odorari. Mox etiam convenit tota tergora et tractare, et reſpergere mero, quo familiariores bubulco fiant: Ventri quoque, et ſub femina manum ſubjicere, ne ad ejuſmodi tactum poſtmodum paveſcant, et ut ricini, qui plerumque feminibus inhaerent, eximantur. Itaque cum fit, a latere domitor ſtare debet, ne calce contingi poſſit. Poſt haec diductis malis educito linguam, totumque eorum palatum ſale deſfricato, libralsque offas in praefulſae adipis liquamine tinctas, lingula demittito, ac vini ſingulos ſextarios per cornu faucibus infundito: Nam per haec blandimenta triduo fere manſueſcunt, jugumque quarto die accipiunt, cui ramus illigatur, et temonis vice trahitur: Interdum et pondus aliquod injungitur, ut majore niſu laboris exploretur patientia. Poſt ejuſmodi experimenta vacuo ploſtro ſubjungendi, et paullatim longius cum oneribus producendi ſunt. Sic perdomiti mox ad aratrum inſtituantur, ſed in ſubacto agro, ne ſtatim difficultatem operis reformident, neque adhuc tenera colla, dura proſciſſione terrae contundant. Quemadmodum autem bubulcus in arando bovem inſtituat, primo praecepi volumine. Curandum ne in domitura bos calce aut cornu quemquam contingat. Nam niſi haec caveantur, nunquam ejuſmodi vicia, quamvis ſubacto, eximi poterunt. Verum iſta ſic agenda praecepimus, ſi veteranum pecus non aderit: Nam ſi aderit, expeditior tutiorque ratio domandi eſt, quam nos in noſtris agris ſequimur. Nam ubi ploſtro, aut aratro juvenum conſueſcimus, ex domitis bubus, valentiſſimum, eundemque placidiſſimum cum indo-

mito

of the young stubborn bullock between the two veterans*.

Pliny only observes, that bullocks are to be broke when three years old; that after this age it

mito jungimus; qui et procurrentem retrahat, et cunctantem producat. Si vero non pigeat jugum fabricare, quo tres jungantur, hac machinatione consequemur, ut etiam contumaces boves gravissima opera non recusent. Nam ubi piger juvenctus medius inter duos veteranos jungitur, aratroque injuncto terram moliri cogitur, nulla est imperium respuendi facultas. Sive enim efferatus profilit, duorum arbitrio inhibitur: Seu consistit, duobus gradientibus etiam obsequitur: Seu conatur decumbere, a valentioribus sublevatus trahitur: Propter quae undique necessitate contumaciam deponit, et ad patientiam laboris paucissimis verberibus perducitur. Est etiam post domituram mollioris generis bos, qui decumbit in fulco; eum non saevitia, sed ratione censeo emendandum. Nam qui stimulis, aut ignibus, aliisque tormentis id vitium eximi melius judicant, verae rationis ignari sunt: Quoniam pervicax contumacia plerumque saevientem fatigat. Propter quod utilius est citra corporis vexationem fame potius et siti cubitorem bovem emendare. Nam eum vehementius afficiunt naturalia desideria, quam plagae. Itaque si bos decubuit, utilissimum est sic pedes ejus vinculis obligari, ne aut insistere, aut progredi, aut pasci possit; quo facto inedia et siti compulsus deponit ignaviam; quae tamen rarissima est in pecore vernaculo; Col. lib. vi. cap. ii.

* Pal. lib. iv. tit. xii.

it is too late, and before it too soon; and that the best way is to join a young bullock with a trained ox*.

Oxen, both in the cart and plough, were yoked in pairs. Virgil, in the passage already cited, says, that they should be matched in pairs, and made to step together. The *bubilia*, into which the stable was divided, were for pairs standing together, the same pairs no doubt that were joined together in the yoke. All the authors that give directions about the breaking of oxen, mention the joining an unbroke with a trained one in the same yoke: Columella mentions indeed a yoke for three, but only for the purpose of breaking untractable cattle.

All these authors advise likewise, that the oxen be equally matched in the yoke; Varro says: ‘When oxen are bought for the yoke, they should be chosen not only very strong, but equally matched, that so in working the stronger may not wear out the weaker †.’ ‘Care likewise must
‘ be

* *Domitura boum in trimatu, postea fera, ante prae-matura: Optime cum domito iuuenus imbuitur; Plin. Nat. Hist. lib. viii. cap. xlv.*

† *Ut viribus magnis sint, ac pares, ne in opere firmior imbelliorem conficiat; Var. lib. i. cap. xx.*

‘ be taken,’ says Columella, ‘ not to join oxen
 ‘ unequal in bulk, stature, or strength ; for, in
 ‘ either of these cases, an end is soon made of
 ‘ the one that is inferior *.’ Palladius, in giving
 directions about buying oxen, says : ‘ Above all,
 ‘ care is to be taken that they be bought equal
 ‘ in strength for draught, that the stronger one
 ‘ may not destroy the other †.’

In our manner of ploughing, cattle are thought to be better matched, when those that go in the furrow are both a little taller and stronger than those that go on the land ; but it must be observed, that there was no such distinction among the Romans ; for, according to their manner of ploughing, as has already been shown, the cattle went alternately on the land and in the furrow.

Varro seems to think it an advantage, not to allow oxen to be yoked always on the same side : ‘ Nor,’ says he, ‘ are you to make the right side
 ‘ ox

* Item custodiendum est, ne corporacione, vel statura, vel viribus impar cum valentiore jungatur ; nam utraque res inferiori celeriter affert exitium ; Col. lib. vi. cap. 11. 13.

† Illud ante universa curandum est, ut viribus ad trahendum comparentur aequales, ne valentioris robur alteri procurret exitium ; Pal. lib. iv. tit. xi.

‘ ox always to remain so, because, if he is the
 ‘ left side one alternately, he will have, while
 ‘ he is labouring, ease alternately on each side*.’

Among the Romans, there were two ways of yoking cattle to the plough, the one by the neck, and the other by the horns. Both Columella and Palladius prefer the way of yoking by the neck: ‘ Therefore,’ says Columella, ‘ it is proper to have oxen joined closely in the yoke, that they may step the more stately, with their heads high raised, and that their necks may be less wearied, and the yoke, well fitted, may rest upon their shoulders. This way of yoking is most approved of; for that way of yoking by the horns, which prevails in some of the provinces, is condemned by almost all who have written of husbandry, and that too not undeservedly; for cattle can exert more strength from the neck and breast, than the horns; as in the one way, they press with the whole weight and bulk of their bodies; whereas, in the other way, they are tormented with having
 ‘ their

* Neque pertinaciter, quem feceris dexterum, in eo mandandum. Quod si alternis fit sinister, fit laboranti in alterutra parte requies; Var. lib. 1. cap. xx. 3.

‘ their heads drawn back, and turned up, and
 ‘ with difficulty stirs the surface of the earth
 ‘ with a light plough *.’

Palladius, without assigning any reason, says :
 ‘ It is better to yoke them by the neck than the
 ‘ head †.’

Pliny, in treating of this subject, expresses
 himself in such a manner, as seems to infer that
 he was of the same opinion with Columella and
 Palladius : ‘ It is necessary,’ says he, ‘ that oxen,
 ‘ in ploughing, be yoked as closely as possible,
 ‘ that so they may plough with lofty heads ;
 ‘ Thus,

* Igitur in opere boves arcte junctos habere convenit,
 quo speciosius ingrediantur sublimes, et elates capitibus,
 ac minus colla eorum labefaciuntur, jugumque melius ap-
 tum cervicibus insidat. Hoc enim genus juncturae maxi-
 me probatum est. Nam illud, quod in quibusdam provin-
 ciis usurpatur, ut cornibus illigetur jugum, fere repudia-
 tum est ab omnibus, qui praecepta rusticis conscripserunt ;
 neque immerito. Plus enim queunt pecudes collo et pec-
 tore conari, quam cornibus ; atque hoc modo tota mole
 corporis, totoque pondere nituntur : At illo, retractis et
 resupinis capitibus excruciantur, aegreque terrae summam
 partem levi admodum vomere fauciunt ; Col. lib. 11. cap.
 11. 22.

† Sed boves melius collo, quam capite junguntur ; Pat.
 lib. 11. tit. 111.

‘ Thus, they are in less danger of galling their necks *.’

From a passage in Homer, already cited, it seems probable, that it was the custom in Greece to yoke oxen in the plough by the horns: When comparing the two Ajaxes to two oxen labouring hard at the plough, he says of the oxen: ‘ From around the roots of their horns much sweat breaks forth †.’ This supposes the yoke to be fixed there; for, where the yoke is fixed, there the sweat is most profuse.

Pliny indeed says, that it was a custom in the Alps to yoke cattle by the horns, and that there they

* *Araturos boves quam arctissime jungi oportet, ut capitibus sublatis arent: Sic minime colla contundunt; Plin. Nat. Hist. lib. xviii. cap. xix.*

Both Columella and Pliny advise to join the oxen very close and strait. Columella says: ‘ In opere boves arcte junctos habere convenit.’ And Pliny still more strongly: ‘ Araturos boves quam arctissime jungi oportet.’ The reason given by both is, that they may draw with lofty heads. This shows, that the meaning of strait or close yoking, is fixing the yoke back between the neck and shoulders.

†

‘ *Ἀμφὶ δ’ ἄρα σφιν*

Ἡγυμνοῖσιν κεραισσι τολῆς ἀνακηκίῃ. Ἰδρῆς.

Hom. Il. lib. xiii. v. 704.

they endured great labour; but he seems to mention this rather as an evidence of the hardy nature of the cattle, than of the propriety of the manner of yoking: 'Those,' says he, 'are not
' to be reckoned degenerated that are not well
' made, such, in the Alps, give a great quantity
' of milk, and those that are of the smallest size,
' undergo the severest labour, and are yoked
' too by the head, and not by the neck *.'

Oxen, when in the plough, were not allowed to go a great way without turning; one hundred and twenty feet was the length fixed upon, and, farther than this, it was thought improper for them to pull hard without stopping. It is probable, that the breaks for the different kinds of corn and pulse, were laid out nearly of this length and breadth; though, in the sowing, they might join numbers of them together. 'It
' is hurtful for the cattle,' says Columella, 'to
' draw a furrow longer than one hundred and
' twenty feet; for they are more fatigued than
' they ought to be when this measure is exceed-
' ed.'

* Non degeneres existimandi etiam minus laudato aspectu; plurimum lactis Alpinis, quibus minimum corporis, plurimum laboris, capite, non cervice, junctis; Plin. Nat. Hist. lib. VIII. cap. XLV.

‘ ed *.’ ‘ In ploughing,’ says Palladius, ‘ a furrow ought not to be longer than one hundred and twenty feet †.’ ‘ The length of the furrow,’ says Pliny, ‘ that oxen make in ploughing, at once, without stopping, is called *actus*; this is one hundred and twenty feet.’ He adds: ‘ This, squared and doubled in length, makes a *jugerum* †.’

Amongst the Eastern nations, they seem likewise to have had the length of the furrow fixed, and from this to have taken their measures of land. In the first book of Samuel, we find these words: ‘ And that first slaughter which Jonathan and his armour-bearer made, was about twenty men, within, as it were, an half acre of land, which a yoke of oxen might plough ||,’ or *half a furrow of an acre of land*. Now, it is evident, that a particular measure is here mentioned,

* *Sulcum autem ducere longiorem, quam pedum centum viginti, contrarium pecori est, quoniam plus aequo fatigatur, ubi hunc modum excessit; Col. lib. II. cap. II. 27.*

† *Sulcus autem, in arationibus, longior, quam centum viginti pedum esse non debet; Pal. lib. II. tit. III.*

‡ *Actus, in quo boves agerentur cum aratur, uno impetu justo: Hic erat cxx pedum; Plin. Nat. Hist. lib. XVIII. cap. III.*

|| 1 Sam. chap. XIV. v. 14.

ed, a determined space, within which the bodies of those slain by Jonathan and his armour-bearer fell; and this supposes that the length of the furrow was also determined, and that the particular measures of land were taken from the length of this furrow.

It was thought proper, that oxen, in ploughing, should be allowed to stop a little at the turning, and, when they stopped, that the ploughman should put the yoke a little forward, that so their necks might cool: 'Neither,' says Columella, 'should they be allowed to stop in the middle of the line, but they should rest at the end; that so, from the hopes of this, they may the more speedily finish the whole course*.' And a little after, he adds: 'When they come to the turning, the ploughman should stop them, and put the yoke forward, that their necks may cool, which will soon become inflamed, unless regularly and carefully cooled; from this swellings, and afterwards ulcers arise †.' 'In ploughing,' says Pliny, 'the oxen should

* Sed nec in media parte versurae consistat, detque requiem in summa, ut spe cessandi totum spatium bos agilius enitatur; Col. lib. ii. cap. 11. 27.

† Cum ventum erit ad versuram, in priorem partem jugum

‘ should be obliged to finish the line, and not al-
 ‘ lowed to stop for breathing, except at turn-
 ‘ ing *.’ ‘ When the oxen,’ says Palladius,
 ‘ come to the turning, the ploughman should
 ‘ stop them, and push the yoke forward, that
 ‘ their necks may cool †.’

Oxen were treated with great tenderness, not
 only while in the plough, but also after they
 were unyoked: ‘ When the ploughman,’ says
 Columella, ‘ has unyoked his oxen, he must
 ‘ rub them after they are tied up, press their
 ‘ backs with his hands, pull up their hides, and
 ‘ not suffer them to stick to their bodies; for
 ‘ this is a disease that is very destructive to work-
 ‘ cattle; he ought to rub hard their necks, and,
 ‘ if they are very warm, pour wine into their
 ‘ jaws;

*jugum propellat, et boves inhibeat, ut colla eorum refrige-
 gescant, quae celeriter conflagrant, (nisi assidue refrige-
 rentur) et ex eo tumor, ac deinde ulcera invadunt; Col.
 lib. 11. cap. 11. 28.*

* *In arando versum peragi, nec striare in actu spiritus;*
 Plin. Nat. Hist. lib. xviii. cap. xix. In some copies, it is
strigare in place of *striare*, which seems to be the true
 reading.

† *Quos, ubi ad versuram venerint, arator retineat, et
 jugum propellat, ut eorum colla refrigerentur; Pal. lib. 11.
 tit. 111.*

‘ jaws ; two *sectaries* are sufficient for each ox ;
 ‘ but, before they are tied to their stalls, it is
 ‘ necessary that they have ceased from sweating
 ‘ and high breathing ; though they can eat im-
 ‘ mediately, yet it is not proper to give them
 ‘ much food, nor the whole of what is intended
 ‘ for them, but a part, and that by degrees ;
 ‘ and, when they eat up what is given them,
 ‘ they ought to be led to the water, and encou-
 ‘ raged by whistling ; when they have drank
 ‘ plentifully, they are again to be tied up, and
 ‘ receive what is thought sufficient to fill them*.’

Some of the rustic writers inform us what food
 was given to the labouring oxen through the year:
 ‘ Fodder for the oxen,’ says Cato, ‘ must be pro-
 ‘ vided

* Boves cum ab opere disjunxerit, substrictos confricet, manibusque comprimat dorsum, et pellem revellat, nec patiaturo corpori adhaerere, quia id genus morbi maxime est armentis noxium. Colla subigat, merumque faucibus, si aestuaverint, infundat. Satis autem est singulis binos sextarios praebere : Sed ante ad praesepia boves religari non expedit, quam sudare atque anhelare desierint. Cum deinde tempestive potuerint vesci, non multum nec universum cibum, sed partibus, et paullatim praebere convenit. Quem cum absumpserint, ad aquam duci oportet, sibiloque allecari, quo libentius bibant : Tum demum reductos largiore pabulo fatiari ; Col. lib. II. cap. III.

' vided and given in this manner: When the
 ' feed-time is finished, mast should be provided
 ' and gathered, and then thrown into water; of
 ' these, half a *modius* should be given to each ox
 ' in a day; if they are not employed in work,
 ' their going to pasture is sufficient; or you
 ' may lay up grape stones, and give a *modius* of
 ' these; sometimes, you may let them go to pas-
 ' ture through the day, and give at night twenty-
 ' five pound of hay to each; if there is no hay,
 ' give them holm and ivy leaves: Lay up wheat
 ' and barley straw, and bean, vetch, and lupine
 ' chaff, likewise all these things of the other
 ' kinds of corn and pulse: When you lay up
 ' straw, put that kind in which there is the
 ' greatest mixture of grass under cover, and
 ' sprinkle it with salt, then give it for hay.
 ' When you begin to feed in the spring, give a
 ' *modius* of mast or grape stones, or a *modius* of
 ' mashed lupines, and fifteen pound of hay:
 ' Where the *ocimum* is early, give it the first of
 ' *the green forage*; pluck it with the hand, that
 ' it may grow up again; that which is cut with
 ' a hook does not grow again; give this till it
 ' becomes dry, and then refrain; afterwards,
 ' give vetches, after them panic, and, after the

‘panic, elm leaves; mix with them poplar leaves,
 ‘if you have any, that the elm leaves may hold
 ‘out; when there are no elm leaves, give oak
 ‘and fig leaves. There is nothing of greater
 ‘importance than to take good care of the oxen;
 ‘unless in the winter, when there is no plough-
 ‘ing, the oxen ought not to be put out to pas-
 ‘ture*.’ The same author informs us what
 quantity

* Bubus pabulum hoc modo parari darique oportet. Ubi sementim patrueris, glandem parari legique oportet, et in aquam conjici. Inde semodios singulis bubis in dies dari oportet, et si non laborabunt, pascantur, fatius erit; aut modium vinaciorum, quos in dolium condideris. Interdiu pascito, noctu foeni pondo xxv uni bovi dato. Si focum non erit, frondem iligneam et ederaceam dato. Paleas triticeas, et ordeaceas, acus fabagium, viciam, vel de lupino: Item de caeteris frugibus omnia condito. Cum stramenta condes, quae herbosissima erunt, in tecto condito, et sale spargito. Deinde ea pro foeno dato. Ubi verno dare coeperis, modium glandis aut vinaciorum dato, aut modium lupini macerati, et foeni pondo xv. Ubi ocimum tempestivum erit, dato primum. Manibus carpi-
 to, id renascetur: Quod falcula secueris, non renascetur. Usque ocimum dato, donec arefcat, ita temperato, postea viciam dato, postea panicum dato, secundum panicum frondem ulmeam dato. Si populneam habebis, admisceto, ut ulmea fatis ciet. Ubi ulmeam non habebis, querneam

quantity is sufficient for a yoke of oxen through the year: 'The annual food,' says he, 'for each yoke of oxen, is one hundred and twenty *modii* of lupines, or two hundred and forty *modii* of mast, five hundred and eighty pounds of hay, or *ocimum*, twenty *modii* of beans, thirty *modii* of vetches: Besides what you sow of these for grain, see likewise that you sow enough for forage; when you sow for forage, make many sowings*.'

Columella is very particular in giving an account, not only of what kind, but also what quantity of food ought to be given to oxen every month of the year: 'There is not,' says he, 'the same way of feeding oxen in every country; for, if the fruitfulness of the place afford green forage, there is no doubt but this ought to be preferred to all others: This, however, is not to be
got,

et ficulneam dato. Nihil est quod magis expediat, quam boves bene curare. Boves nisi per hiemem, cum non arabunt, pasci not oportet; Cat. cap. LIV.

* Bubus cibaria annua, in juga singula lupini modios cxx, aut glandis modios ccxl foeni pondo, icxxo ocimi, fabae modios xx, viciae modios xxx. Praeterea granatui videto uti fatis viciae seras. Pabulum cum seras, multas sationes facito; Cat. cap. LX.

460 OF THE HUSBANDRY

' got, except in places where there is much wet-
 ' nefs or dew; and the greateft advantage in
 ' thefe is, that one man can work two yokes of
 ' oxen, which alternately plough and feed in
 ' their turn: In drier countries, oxen are fed at
 ' their ftalls, with fuch things as the climate af-
 ' fords, and without doubt the beft of thefe are
 ' vetches, tied in bundles, and *cicercula*, and like-
 ' wife meadow hay; lefs beneficially labouring
 ' cattle are fed upon *palea*, which every where
 ' is ufed, and, in fome countries, is the only
 ' kind of food to be got; the beft kind is that
 ' of millet, next that of barley, and nearly of e-
 ' qual value with the laft, is that of *triticum*:
 ' But to cattle that perform their full labour,
 ' barley is given, befides the ftraw. There are
 ' certain kinds of food given to oxen in the dif-
 ' ferent feafons of the year; in the month of
 ' January, it is proper to give each ox four *sec-*
 ' *taries* of bruifed *ervum*, fteeped in water, and
 ' mixed with *palea*; or a *modius* of fteeped lu-
 ' pines, or half a *modius* of fteeped *cicercula*
 ' and ftraw to the full; if there is a fcarcity of
 ' pulse, he may get, mixed with ftraw wafhed
 ' and dried, grape ftones, which are taken out
 ' of the *lora*; but it is certain, that thefe are
 ' much better when given with the fkins before
 ' they

' they are washed; for, in this situation, they
 ' have the strength both of meat and of wine,
 ' and make clean, spirity, and fleshy cattle: If
 ' no grain is given, a fodder-basket full of dry
 ' leaves, containing twenty *modii*, is sufficient,
 ' or thirty pound of hay; or, if none of these,
 ' a *modius* of green holm or laurel leaves; but
 ' to these must be added, if there are plenty in
 ' the country, a proper quantity of mast, which,
 ' if it is not given to satiety, breeds the scab;
 ' there may be given, likewise, in place of this,
 ' half a *modius* of bruised beans. In the month
 ' of February, the same kind of food is com-
 ' monly proper enough. In March and April,
 ' something should be added to the quantity of
 ' hay, because the land is then broke up; forty
 ' pounds, however, is enough for each. From
 ' the 14th of April to the 14th of June, green
 ' forage is cut, and, in cold places, the same
 ' may be got till the first of July. From this
 ' to the first of November, through the summer
 ' and autumn, there are plenty of leaves; which
 ' however are not good, but when wet with
 ' rain or sufficient dews; the best of them are
 ' elm leaves, next the ash, and then the poplar;
 ' the worst are the holm, the oak, and the lau-
 ' rel;

' rel ; but, after summer, when the others fail,
 ' these are necessary ; fig leaves may likewise be
 ' given very properly, if there are plenty of
 ' them, and if they may be safely taken from
 ' the trees ; oak leaves are inferior to the holm,
 ' of the kind that has no thorn ; for the kind
 ' that has it, as well as the juniper, is rejected
 ' by cattle on account of the prickles. In No-
 ' vember and December, during the feed-time,
 ' as much ought to be given as the cattle will
 ' take ; however, it is commonly reckoned suf-
 ' ficient to give to each, with plenty of straw,
 ' a *modius* of mast, or a *modius* of steeped lu-
 ' pines, or seven *setariæ* of *eroum*, sprinkled
 ' with water, and mixed with straw, or a *modius*
 ' of grape stones, provided, as has been said a-
 ' bove, there is added plenty of straw : Or, if
 ' none of these things can be got, forty pounds
 ' of hay by itself *.' What Columella says in
 this

* Boves autem recte pascendi non una ratio est. Nam
 si ubertas regionis viride pabulum subministrat, nemo du-
 bitat, quin id genus cibi caeteris praeponendum sit : Quod
 tamen nisi riguis, aut roscidis locis non contingit. Itaque
 in iis ipsis vel maximum commodum est, quod sufficit
 una opera duobus jugis, quae eodem die alterna tempo-
 rum

this passage, with respect to mast, is somewhat extraordinary; ' Unless it is given to satiety, it breeds

rum vice vel arant, vel pascuntur. Siccioribus agris ad praesepia boves alendi sunt, quibus pro conditione regionum cibi praebentur: Eosque nemo dubitat, quin optimi sint vicia in fascem ligata, et cicercula, itemque pratense foenum. Minus commode tuemur armentum paleis, quae ubique, et quibusdam regionibus solae, praesidio sunt. Eae probantur maxime ex milio, tum ex ordeo, mox etiam ex tritico. Sed jumentis justam operam reddentibus, ordeum praeter has praebetur. Bobus autem pro temporibus anni pabula dispensantur. Januario mense singulis fressi, et aqua macerati ervi quaternos sextarios mistos paleis dare convenit, vel lupini macerati modios, vel cicerculae maceratae semodios, et super haec affatim paleas. Licet etiam, si sit leguminum inopia, et eluta et ficcata vinacea, quae de lora eximuntur, cum paleis miscere. Nec dubium est, quin ea longe melius cum suis folliculis, antequam eluantur, praebere possint: Nam et cibi, et vini vires habent, nitidumque, et hilare, et corpulentum pecus faciunt. Si grano abstinemus, frondis aridae corbis pabulatoria modiorum viginti sufficit, vel foeni pondo triginta, vel si non, modius viridis laureae et iliginae frondis; sed his, si regionis copia permittat, glans adjicitur; quae nisi ad satietatem detur, scabiem parit. Potest etiam si proventus utilitatem facit, semodius fabae fressae praebere. Mense Februario plerumque eadem cibaria sufficiunt. Martio et Aprili debet ad foeni pondus adjici,

quia

‘breeds the scab.—Nisi ad fatietatem detur, ‘scabiem parit.’ Some of the commentators seem inclined to suspect, that, instead of ‘Nisi ad fatietatem,’ it should be ‘si ad fatietatem;’ naturally alledging, that Columella, in a following part of the passage, says, that a *modius* of
mast

quia terra profcinditur; sal autem erit pondo quadragena singulis dari. Ab Idibus tamen mensis Aprilis usque in Idus Junias viride pabulum recte secatur: Potest etiam in Calend. Julias frigidioribus locis idem praestari; a quo tempore in Calend. Novemb. tota aestate, et deinde autumnø fatientur fronde; quae tamen non ante est utilis, quam cum maturuerit vel imbribus, vel affiduis roribus: Probaturque maxime ulmea, post fraxinea, et ab hac populnea. Ultima sunt ilignea, et querneae, et laurea: Sed post aestatem necessariae deficientibus caeteris. Possunt etiam et folia ficulnea probe dari, si sit eorum copia, aut stringere arbores expediat. Ilignea tamen melior est querneae, sed ejus generis, quod spinas non habet; nam id quoque uti juniperus, respuitur a pecore propter aculeos. Novembri mense, ac Decembri, per sementem, quantum appetit bos, tantum praebendum est; plerumque tamen sufficiunt singulis modii glandis et paleae ad fatietatem datae, vel lupini macerati modii, vel ervi aqua conspersi sextarii vii permisti paleis, vel cicerculae similiter conspersae sextarii xii misti paleis, vel singuli modii vinaceorum, si iis, ut supra dixi, large paleae adjiciantur; vel si nihil horum est, per se foeni pondo quadraginta; Col. lib. vi. cap. 111.

maſt ſhould be given to each ; and that it ſeems more proper, in food apt to create a diſeaſe, to reſtrict them to a quantity, than to give them to ſatiety : But whatever is in this, it is probable, that the other is the true reading ; for it may be obſerved, that this author mentions, in other paſſages, things, with reſpect to maſt, as extraordinary as that which is mentioned in this paſſage appears to be. In his kalendar for October, he ſays : ‘ It is not improper likewise to
 ‘ give each yoke a *modius* of maſt ; nor is this
 ‘ to be given either for more or leſs than thirty
 ‘ days, leſt it ſhould hurt them ; for, if it is given
 ‘ for a ſhorter time, according to Hyginus, the
 ‘ oxen will be ſeized with the ſcab in the ſpring*.’
 In another paſſage, he mentions a thing ſtill more extraordinary, and more too to the preſent purpoſe. Treating of the way of breeding goats, he ſays : ‘ Nor are theſe the only things
 ‘ that produce abortion, but maſt likewise, when
 ‘ it

* *Glandis quoque non inutile eſt ſingulis jugis modios ſingulos dare : Nec tamen amplius, ne laborent, nec minus diebus xxx praeſtueris. Nam ſi paucioribus diebus detur, (ut ait Hyginus) per ver ſcabioſi boves fiunt ; Col. lib. xi. cap. ii. 83.*

‘ it is *not* given to satiety; therefore, unless it
 ‘ can be afforded in abundance, is not to be gi-
 ‘ ven to the flock *.’

There is another passage in Columella, in which he mentions the food given to labouring oxen in each month, which it will not be improper to compare with the above one: ‘ But,’ says he, ‘ the bailiff ought not to be ignorant what is proper to be given to a yoke of oxen each day in every month; wherefore, we shall set before him the manner of doing this: In the month of January he ought to give them *palea*, with six *seclaries* of steeped *ervum*, or *palea*, with one-half *modius* of bruised *cicercula*, or twenty *modii* of leaves, or twenty pounds of hay, with as much *palea* as they will take; or green leaves of holm or laurel to the full; or, what is preferable to all these, dry barley *farrago*. In February the same: In March the same; or, if they are to work hard, fifty pounds of hay. From the Calends to the Ides of April, oak and poplar leaves, or *palea*, with forty pounds

* Nec tamen ea sola creant abortus, sed etiam glans cum citra satietatem data est. Itaque nisi potest affatim praeberi, non est gregi permittenda; Col. lib. vii. cap. vi. 5.

' pounds of hay. In May, forage to the full.
 ' In June and July, leaves to the full. In Au-
 ' gust the same, or fifty pounds of fresh *palea*
 ' from the field. In September and October,
 ' leaves to the full, or a basket of fig leaves.
 ' To the Ides of November, the same: From
 ' this to the end of the month, a *modius* of mast,
 ' mixed with *palea*, and a *modius* of steeped lu-
 ' pines, mixed with *palea*, or early *farrago*. In
 ' December, dry leaves, or *palea*, with one-half
 ' *modius* of *ervum* steeped, or what is produced
 ' by steeping one-half *modius* of lupines, or a
 ' *modius* of mast, as is mentioned above, or *far-*
 ' *rago* *.' In the last part of this passage, Co-
 lumella

* Sed nec ignorare debet villicus, quid uni jugo
 boum quoquo mense per singulos dies praestari satis sit.
 Quare hujus quoque curae rationem subjiciemus. Mense
 Januario paleas cum ervi macerati sextariis sex; vel pa-
 leas cicerculae fresae semodio, vel frondis corbem pabulalo-
 rium modiorum viginti, vel paleas quantum velint, et foeni
 pondo viginti, vel affatim viridem frondem ex ilice vel
 lauro, vel quod his omnibus praestat, farraginem ordea-
 cem dabit ficcam. Februario mense idem: Martio idem,
 vel, si opus facturi sunt, foeni pondo quinquaginta. A-
 prili frondem querneam, et populneam ex Cal. ad Idus,
 vel paleas, vel foeni pondo quadraginta. Maio pabulum
 affatim:

lumella expresses himself in a manner very different from what he does in the other parts of it; he commonly says, *modium ervi*, or *lupini macerati*; but here he says, *cum ervi semodio macerato, vel lupini, quod ex semodio macerato exierit*. From this, one is apt to imagine, that, in the other cases, he means grain steeped, and then measured, and, in this case, grain measured, and then steeped.

It is probable, that some errors have been committed in transcribing the above cited passages from Cato and Columella, so that it is not possible to determine from them, with any degree of certainty, what were the real quantities of the different kinds of food actually given to oxen by the Roman farmers. It may perhaps

affatim: Junio ex Calen. frondem affatim: Julio, idem, Augusto idem, vel paleas ex arvo pondo quinquaginta. Septembri frondem affatim, Octobri frondem, et ficulnea folia. Novemb. ad Idus frondem vel folia ficulnea, quae sint corbis unius. Ex Idibus glandis modium unum paleis immistum, et lupini macerati modium unum paleis immistum, vel maturam farraginem. Decemb. frondem aridam, vel paleas cum ervi semodio macerato, vel lupini, quod ex semodio macerato exierit, vel glandis modium unum, ut supra scriptum est, vel farraginem; Col. lib. xi. cap. ii. 99.

haps throw some light upon the subject to consider, likewise, all the other passages that have a relation to it.

Columella, when treating of lupines, says;
 ‘ That boiled and steeped, they are good food
 ‘ for oxen in winter *.’ Pliny says of them;
 ‘ That single *modii* are sufficient for one ox, and
 ‘ make him stout †.’ Columella, treating of
ervum and *cicera*, (which he calls the same
 with the *cicercula*, only differing in colour) says;
 ‘ Bruised *cicera* is given to oxen in place of *er-*
 ‘ *vum*, in Boetica of Spain: When a little divi-
 ‘ ded by a suspended millstone, it is steeped in
 ‘ water, till it becomes soft, and then, mixed
 ‘ with *palea*, is given to cattle ‡.’ It is proba-
 ble, that these things were commonly given in
 the husks: When given as medicine, the free-
 ing them from the husks is particularly directed:

Thus,

* Boves per hiemem coctum maceratumque probe a-
 lit; Col. lib. ii. cap. x.

† Nam bovem unum modii singuli satiant, validumque
 praestant; Plin. Nat. Hist. lib. xviii. cap. xiv.

‡ Cicera bubus ervi loco fresa datur, id Hispania Boe-
 tica: Quae cum suspensa mola divisa est, paullum aqua
 maceratur, dum lentescat, atque ita mista paleis subtritis
 pecori praebetur; Col. lib. ii. cap. xi. 12.

470 OF THE HUSBANDRY

Thus, for a cough, Columella advises *ervum* without the husks, grinded with toasted barley*. And for an ox, after he has had a swelling in his palate cut open, he advises *ervum* freed from the husks and steeped, green leaves, or other soft food †. It may be observed likewise, that, when treating of sheep, the same author advises to give them in winter, as the best food, beans and *cicercula*, bruised with the husks; the manner certainly in which they were given to the larger cattle ‡. As it is probable from these passages, that the pulse mentioned in them were commonly given in the husk, when they are said to be bruised, the meaning must be, that the grain was rubbed out of the pods: In this sense, the word *fresus* is certainly used by Columella. Thus, mentioning the advantages of sardling beans, he says: ‘ So small a portion goes
‘ to the husks, that, when bruised (*fresae*) and
‘ cleaned,

* Facit idem pari mensura ervum sine valvulis cum torrefacto ordeo molitum; Col. lib. vi. cap. x.

† Exemptum valvulis ervum maceratum, viridemque frondem, vel aliud molle pabulum, dum sanetur praeberet; Col. lib. vi. cap. xiv.

‡ Nam per se ordeum, vel fresa cum suis valvulis faba, vel cicercula, sumptuosior est.—Sed si vilitas permittit, haud dubie sunt optima; Col. lib. vii. cap. iii. 22.

‘ cleaned, the *modius* is almost as full as when
‘ entire.’

Now, as it is probable, that some of the pulse mentioned were given in the hulks, and others without them, that some of them were measured before being steeped, and others after, it is impossible, without knowing the practices of the Roman farmers in these things, to determine, with any degree of exactness, what quantities were given by them to their labouring oxen, even though no errors have been committed by the transcribers. There is, however, a passage, that has not been as yet considered, which, although it does not throw any light upon the passages already cited, yet it is of some use to determine the question. Columella, when treating of the culture of the *ervum* and *cicera*, after the passage already considered, says; ‘ twelve
‘ pounds of *ervum*, and sixteen pounds of *cicera*,
‘ are sufficient for one yoke *.’ These, it is natural for us to consider as given besides straw, and when the oxen were employed in the severest labour.

The

* Sed ervi duodecim librae satisfaciunt uni jugo, cicerae sexdecim; Col. lib. 11. cap. 21. 12.

The quantity of hay may likewise be determined with some degree of exactness: In some cases, it is said, that 20 lib. was given, in others 30, in others 40, and in others 50: All these were given with straw; for, although Columella says, in one place, that it is sufficient to give 40 lib. by itself, *per se*, yet certainly he did not intend by this expression to exclude *palea*, of which there was always plenty, but the pulse before mentioned, of which there was sometimes a scarcity. Besides, in another place, when he advises the same quantity, he expressly requires *palea* to be given along with it: It is natural to suppose, that the quantity given was from 20 lib. to 50, according to the severity of the labour, and that 50 lib. was the greatest quantity given at any time; this quantity was for a yoke; for Columella, in one of the passages, says expressly, that the quantities mentioned were for this number; and though, in the other passage, he says in the general, ‘to each,’ *singulis*, which, with equal propriety, may be applied either to oxen, *bubus*, or to yokes, *jugis*; yet, from comparing the two passages, it is evident, that the quantities mentioned in both, are intended for the same number of oxen. The quantities mentioned by
Cato,

Cato, are indeed for single oxen, and he expressly directs, that xxv pound of hay shall be given at night to an idle ox, that pastured in a meadow through the day. But there is certainly some mistake in this; for, as the greatest quantity mentioned by Columella in the season of the greatest labour, is only 50 lib. to a yoke, and, as in this season, the highest feeding that Cato himself directs is only fifteen pound, with mast or grape stones, it is impossible to suppose, that twenty-five pound at night would be reckoned necessary for an idle ox, that pastured thro' the day; so that it is probable, that there has been an error in transcribing, and that, in place of *pondo xxv.* it should be *pondo xv.*: If we suppose then, that there was given to a yoke of oxen, in the time of their severest labour, from twelve to sixteen pounds of grain, or fifty pounds of hay, with as much *palea* as they could eat, when with us there is given from 9 to 12 pound Averdupoise of beans or barley broken, or 18 pound Averdupoise of hay, with plenty of oat straw, we may be considered as feeding our oxen nearly in the same way as the Roman farmer.

The rustic writers are very particular in their directions about buying cattle; among these

there is one mentioned by almost all of them ; it is this ; that the ground to which they are brought, be of the same kind with that on which they are bred. Varro says : ‘ Old oxen ought
 ‘ not to be brought from champaign lands, to
 ‘ hard and mountainous countries, nor contra-
 ‘ rywise, if it is possible to avoid it *.’

Columella says : ‘ Cattle bred upon the ground
 ‘ are much better than foreigners ; for those
 ‘ are not put to the trial with a change either
 ‘ of water, or food, or air, nor incommoded
 ‘ with the customs and situation of the country,
 ‘ as

* *Hos veteranos ex campestribus locis non emendum in dura ac montana : Necnon, ita si incidit ut fit, vitandum ;* Var. lib. i. cap. xx. 2. Of the last part of the sentence, there are many various readings. If the common reading is admitted, which, it seems very probable, is not the true one, then the meaning is ; ‘ Cattle are not to be
 ‘ brought from champaign to hilly grounds, if possible to
 ‘ prevent it.’ It seems, that, in an approved copy, instead of *necnon ita*, it is *nec nostra* : This cannot be the true reading ; but, if *nostra*, or *non ita*, is changed into *contra*, then the passage may be translated as is done above. Some of the commentators who admit this change, insist that Varro allows bringing oxen from hilly to champaign lands ; and thus make him contradict Columella and Palladius, a thing that ought not to be allowed, when the passage will admit of a different explication.

‘ as these are, that are brought from plain and
 ‘ champaign lands, to rough and mountainous,
 ‘ or from mountainous lands to champaign;
 ‘ for this reason, when we are obliged to bring
 ‘ oxen from a place at a distance, care must be
 ‘ taken to bring them from such grounds as our
 ‘ own *.’

Palladius, to the same purpose, says: ‘ It is
 ‘ better to buy oxen from the neighbouring
 ‘ grounds, because these are put to no trial by
 ‘ a change of ground or air; or, if this cannot
 ‘ be done, to bring them from like grounds to
 ‘ like †.’

It will not be thought amiss, I presume, be-
 fore this article is concluded, to give a descrip-
 tion

* *Longeque omnis bos indigena melior est quam pe-
 regrinus; nam neque aquae, nec pabuli, nec coeli muta-
 tione tentatur, neque infestatur conditione regionis, sicut
 ille, qui ex planis et campestribus locis in montana et
 aspera perductus est, vel ex montanis in campestria. Ita-
 que etiam, cum cogimur ex longinquo boves arcessere,
 curandum est, ut ex similibus patriis locis traducantur;*
Col. lib. vi. cap. ii. 12.

† *Melius autem boves de vicinis locis comparabimus,
 qui nulla soli aut aëris varietate tententur, aut si hoc
 deest, de locis similibus ad similia transferamus;* *Pal. lib.*
iv. tit. xi. 3.

tion of the ox which the ancients judged most proper for labour; and of the bull and cow which they judged most proper for breeding.

Varro says: 'The ox should have spacious
' horns, rather black than otherwise, a broad
' forehead, wide nostrils, a broad chest, and thick
' dewlap *.' In another passage, he is more particular in his description of this kind of cattle in general; he says: 'Persons that buy them should
' take care that they be well made, all their members complete, long and deep bodied, with black
' horns, broad foreheads, large and black eyes,
' hairy ears, close set jaws, flat noses and wide
' nostrils, blackish lips, thick and long necks,
' hanging down dewlaps, broad chests, round
' ribbed, thick shouldered, not humped, but the
' backbone gently declining downwards, round
' in the hips, with tails hanging down to their
' heels, and the lower part of them very rough
' with hair, legs rather short, the knee joints
' straight, a little protuberant, and at a proper
' distance from each other, the feet not broad,
' nor such as clank when going, the divisions of
' the

* Ut viribus magnis, &c.—Amplis cornibus, et nigris potius quam aliter: Ut sint lata fronte, naribus firmis, lato pectore, crassis coxendicibus; Var. lib. 1. cap. xx.

‘ the hoofs not wide, and the hoofs them-
 ‘ selves smooth and equal, the hide, to the touch,
 ‘ not rough or hard, the strongest of which is
 ‘ the hide with the black colour, the second
 ‘ that with the red, the third that with the dun,
 ‘ and the fourth that with the white; for cattle
 ‘ of this colour are the tenderest, those of the
 ‘ first the hardiest; of the two middle ones, the
 ‘ former is better than the latter, and both these
 ‘ kinds are better than either the black or the
 ‘ white *.’

Colu-

* Qui gregem armentorum emere vult, observare debet primum, ut sint hae pecudes aetate potius ad fructos ferendos integrae, quam jam exartae; ut sint bene compositae, ut integris membris, oblongae, amplae, nigricantibus cornibus, latis frontibus, oculis magnis et nigris, pilosis auribus, compressis malis, submissive, apertis naribus, labris subnigris, cervicibus crassis ac longis, a collo palearibus demissis, pectore amplo, bene costatos, latis humeris, ne gibberi spina leviter remissa, bonis clunibus, caudam profusam usque ad calces ut habeant, inferiorem partem frequentibus pilis subcrispam, cruribus potius minoribus, rectis genibus, eminulis, distantibus inter se, pedibus non latis, neque ingredientibus qui displodantur, nec cujus ungulae divaricent, et cujus unguis sunt leves et pares, corium tactu non asperum ac durum, colore potissimum nigro, dein rubeo, tertio helvo, quarto albo. Mollissimus enim hic, ut durissimus primus. De mediis duobus prior
 quam

Columella informs us, that he takes his description of the labouring ox from Mago the Car.

quam posterior melior; utriusque pluris quam nigri, et albi; Var. lib. II. cap. v. 7.

In the common copies, after ‘compressis malis submisive,’ follows, ‘gibberi spina leviter remissa, apertis naribus:’ These words, ‘gibberi spina leviter remissa,’ are certainly misplaced; it is probable, that Varro intended by them to describe the back, as it is not to be supposed, that he would omit so essential a part, and it is very improper to place the description of the back, between the description of the nose and of the nostrils; nor, indeed, can it be supposed, that any person would do this; I have therefore put them in what I imagine is their proper place, and have supposed, that the words were originally, ‘subsimis apertis naribus, &c. ne gibberi spina leviter remissa, bonis clunibus,’ &c.

In the common editions, likewise, after *palearibus demissis*, follows *corpore amplo*, which, from Columella and Palladius, I have supposed to have been originally *pectore amplo*. It is evident, that *corpore amplo* is implied in what our author mentions in the beginning of this description, *integris membris, oblongae amplae*; and, unless we suppose this to have been *pectore amplo*, he gives no description of the chest; what he calls *bene costatas*, Columella calls *lateribus porrectis*, and *bonis clunibus*, is, by the same author, called *clunibus rotundis*, in which sense I have translated the passage.

Carthaginian, and he gives it as follows: ‘ The
 ‘ oxen we buy should be young, square, with
 ‘ large

It may perhaps be thought necessary, that I should acknowledge, that I have rendered this passage from Varro, in a sense very different from that in which the commentators understand it. All these learned gentlemen, cited in the notes on this passage by the author of *Scriptores rei rusticae veteres*, consider the words ‘ colore potissimum nigro, dein rubeo, tertio helvo, quarto albo,’ as applied to the cattle themselves, and suppose, that Varro means, that the best kind of cattle are those of the black colour, next those of the red or brown, in the third place, those of the dun, and, in the fourth place, those of the white. Mr Martyn, likewise, in his notes on a passage of Virgil, produces these words of Varro, as an evidence that this was his opinion: This obliges them to give a forced explication of these words that follow; ‘ De mediis duobus prior quam posterior melior; utriusque plurius quam nigri et albi;’ and to suppose, that, by *nigri et albi*, Varro does not mean the black cattle and white cattle, which he had mentioned before, but cattle spotted black and white. Now, I have presumed to explain the words in a different sense: I suppose, that *colore potissimum nigro*, &c. should be applied, not to the cattle themselves, but to their hides: Our author says, immediately before, *corium tactu non asperum ac durum*; this is agreeable to the opinion of Columella, who says, *tactu corporis mollissimo*; to this Varro adds, *colore potissimum*

‘ large members, and lofty horns, black and
 ‘ strong; the forehead broad and rough, hairy
 ‘ ears;

tissimum nigro, &c.; the meaning of which, as I imagine, is not that, in judging of cattle, we are to consider those of the black colour as the best; but that, in judging of them by the touch, we are to have a regard to the colour; for those of the black colour have the strongest and hardest hide, next the red, in the third place the dun, and in the fourth place the white; so that, in company with each other, cattle of different colours, one, for example, white, and another black, should their hides feel equally soft, we are directed to conclude, that the black one has the quality of softness of hide in much greater perfection than the white one: Varro adds; ‘ *Mollissimus enim hic, ut durissimus primus. De mediis duobus prior quam posterior melior,*’ or, as it is in the old copies, ‘ *in eo prior;*’ the meaning of which is, cattle are hardy or delicate, according to the natural hardness or softness of their hides; the white are the most delicate, and the black are the hardest, and, of the other two, the red is in this respect preferable to the dun. But, although this is the order in which they ought to be placed, with respect to their being hardy or delicate, yet the red and dun are commonly more valuable than the black or the white. By explaining the passage in this manner, Varro is of the same opinion with Columella, who expressly declares, that the red, or the dark brown colour, is the best; and likewise gives a most important direction, which is, to have a regard to the colour in judging of cattle from the softness of the skin.

‘ ears ; black eyes and lips ; flat and turned up
 ‘ noses, with wide nostrils ; a long and brawny
 ‘ neck ; large dewlaps, and reaching almost to
 ‘ their knees ; the chest broad, large shoulders ;
 ‘ a large and protuberant belly, sides well
 ‘ stretched out ; broad flanks ; the back straight
 ‘ and even, or a little declining, round hips,
 ‘ legs compact and straight, but rather short
 ‘ than long, the knee-joints well set, large hoofs,
 ‘ very long tails, and hairy ; the hair upon the
 ‘ whole body thick and short ; the colour
 ‘ red or dark brown ; the whole body very soft
 ‘ to the touch *.’

Palla-

* Parandi sunt boves novelli, quadrati, grandibus membris, cornibus proceris, ac nigrantibus et robustis, fronte lata et crispa, hirtis auribus, oculis et labris nigris, naribus refimis patulisque, cervice longa et torosa, palearibus amplis, et pene ad genua promissis, pectore magno, armis vastis, capaci et tanquam implente utero, lateribus porrectis, lumbis latis, dorso recto planoque, vel etiam subfidente, clunibus rotundis, crunibus compactis ac rectis, sed brevioribus potius quam longis, nec genibus improbis, ungulis magnis, caudis longissimis et setosis, pilo totius corporis denso brevique, colore rubeo vel fusco, tactu corporis mollissimo ; Col. lib. vi. cap. 1.

In the common editions, after *longissimis et setosis*, follows *pilosisque, corpore denso brevique*, which is inconsistent with

Palladius expresses himself in this manner:
 ‘ These marks are to be looked for in oxen,
 ‘ whether we take them from our own herd, or
 ‘ that of another; that they be young, with
 ‘ square and large members, and a compact bo-
 ‘ dy, the muscles and sinews every where stand-
 ‘ ing out, large ears, a broad and rough fore-
 ‘ head, black eyes and lips, horns strong and
 ‘ curved, without any deformity in the bending,
 ‘ a flat and turned up nose, with wide nostrils,
 ‘ the neck brawny and compact, large dewlap
 ‘ hanging down to the knees, broad chest, large
 ‘ shoulders, belly rather protuberant, sides stretch-
 ‘ ed out, broad flanks, the back straight and e-
 ‘ ven, legs firm, nervous, and short, large
 ‘ hoofs, tails long and hairy, the hair upon
 ‘ the whole body thick and short, chiefly of a
 ‘ red or dark brown colour *.’

The

what he says before; and, besides, as it relates to the general make of the body, should have been in the beginning of the description, where we find *quadrati grandibus membris*: For these reasons, all the commentators are of opinion, that the passage was originally the same as we find in Palladius, from whom I have transcribed it.

* Haec tamen signa spectanda sunt in bobus, seu de nostro, seu de alieno grege fuerint comparandi, ut sint

boves

The description that Varro gives is intended for this kind of cattle in general; that which is given by Columella and Palladius, is intended for the labouring ox in particular. Both these authors give likewise a description of the bull and cow, most proper for breeding.

‘In my opinion,’ says Columella, ‘these
 ‘bulls are chiefly approved of, which have very
 ‘large members, placid manners, middle age;
 ‘almost all the other things we should observe
 ‘in them, which we do in choosing oxen; for
 ‘there is no difference between a good bull
 ‘and a bullock, except that the bull has a stern
 ‘countenance, a brisker look, shorter horns, a
 ‘more brawny neck, so great indeed, as to be
 ‘ a

boves novelli, quadratis et grandibus membris, et solidi corporis, musculis ac toris ubique surgentibus, magnis auribus, latae frontis et crispae, labris oculisque nigrantibus, cornibus robustis, ac sine curvaturae pravitate lunatis, patulis naribus, et refimis, cervice torosa atque compacta, pallearibus largis, et circa genua fluentibus, pectore grandi, armis vallis, ventre non parvo, porrectis lateribus, latis lumbis, dorso recto et plano, cruribus solidis, nervosis et brevibus, ungulis magnis, caudis longis ac setosis, pilo totius corporis denso ac brevi, rubei maxime coloris aut fusci; Pal. lib. iv. tit. xi.

‘ a large part of his body, and a belly a little
‘ more confined *.’

Palladius expresses himself much to the same purpose: He says, ‘ they should be tall, with
‘ huge members, of a middle age, rather young
‘ as old, of a stern countenance, small horns,
‘ a brawny and vast neck, a confined belly †.’

‘ The cows,’ says Columella, ‘ most approved
‘ of, are of a tall make, long with a very large
‘ belly, very broad forehead, eyes black and o-
‘ pen, horns graceful, smooth, and black, hairy
‘ ears, strait jaws, very large dewlap and tail,
‘ moderate hoofs and legs †.’

‘ Like-

* *Taurus maxime membris ampliffimis, moribus placidus, media aetate, probandos censeo. Caetera fere eadem omnia in his observabimus, quae in bubus eligendis. Neque enim alio distat bonus taurus a castrato, nisi quod huic torva facies est, vegetior aspectus, breviora cornua, torosior cervix, et ita vasta, ut sit maxima portio corporis, ventre paullo substrictiore; Col. lib. vi. cap. xx.*

† *Nunc tauros quoque (quibus cordi est armenta construere) comparabit, aut his signis a tenera aetate submittit: Ut sint alti atque ingentibus membris, aetatis mediae, et magis quae juventute minor est, quam quae declinet in senium: Torva facie, parvis cornibus, torosa vastaque cer-vice, ventre substricto; Pal. lib. iv. tit. xi.*

‡ *Vaccae quoque probantur altiffimae formae, longae-que,*

‘ Likewise,’ says Palladius, ‘ now is the time
 ‘ to provide cows; and we ought to choose
 ‘ them of a very tall make, long bodied, with a
 ‘ capacious and large belly, broad forehead,
 ‘ eyes large and black, comely horns, and chiefly
 ‘ black, hairy ears, dewlap and tail very large,
 ‘ short hoofs, and dark and small legs *.’

Virgil gives a description of the cow only, alledging, that the breeders, both of horses and cows, should attend principally to the make of the female: ‘ If any one,’ says he, ‘ fond of the
 ‘ prize at the Olympic games, breeds horses,
 ‘ if any one breeds stout bullocks for the plough,
 ‘ he chiefly attends to the make of the mother:
 ‘ The best shaped cow has a stern countenance,
 ‘ a

que, maximis uteris, frontibus latissimis, oculis nigris et patentibus, cornibus venustis et levibus et nigrantibus, pilosis auribus, compressis malis, palearibus et caudis amplissimis, unguis modicis, et modicis cruribus; Col. lib. vi. cap. xxi.

* Vaccas etiam nunc maxime parabimus: Sed eligimus forma altissima, corporis longi, uteri capacis et magni, alta fonte, oculis nigris et grandibus, pulchris cornibus, et praecipue nigris, aure fetosa, palearibus et caudis maximis, unguis brevibus, et cruribus nigris et parvis; Pal. lib. iv. tit. xi. 5.

‘ a large forehead, and much of a neck, with a
 ‘ dewlap hanging down from the chin to the
 ‘ knees; sides very long, all parts large; even
 ‘ the feet not small, and the ears hairy under
 ‘ the curved horns: Nor do I think it a great
 ‘ defect to be spotted with white, to refuse the
 ‘ yoke, or even sometimes to be rude with her
 ‘ horn; nor that she has the resemblance of
 ‘ a bull in her countenance, that she is lofty,
 ‘ and, in stepping, sweeps the ground with her
 ‘ tail *.’

Although these authors agree in the descriptions which they give, yet, as there are things mentioned by some, that are omitted by others, it will not be amiss to bring under view a full descrip-

* Seu quis Olympiacae miratus praemia palmae
 Pascit equos, seu quis forte ad aratra juvencos,
 Corpora praecipue matrum legat. Optima torvae
 Forma bovis, cui turpe caput, cui plurima cervix,
 Et crurum tenuis a mento palearia pendent.
 Tum longo nullus lateri modus: Omnia magna:
 Pes etiam, et camuris hirtae sub cornibus aures.
 Nec mihi displiceat maculis insignis, et albo;
 Aut juga detrectans, interdumque aspera cornu,
 Et faciem tauro propior; quaeque ardua tota,
 Et gradiens ima verrit vestigia cauda.

Vir. Geor. III. v. 49.

description of this kind of cattle, taken from the whole; that so their opinion of this matter may be compared with that of the moderns. I shall, in doing this, first mention the things that refer to their make in general, and then describe the form of the particular parts.

All agree, that the best colour is red or dark brown: Varro indeed says, that the black is the hardiest, but that they are not so valuable: It is probable, that this kind had come originally from some of the mountainous countries, and was not of so large a size, or so good a make as the others. Or rather, perhaps, they were of the buffalo race, which they have at present in Italy, and which they had likewise in the time of Crescenzio: This author gives a description of this kind of cattle, which agrees very well with what Varro says of the black coloured cattle which he mentions: ‘Of the ox kind,’ says Crescenzio, ‘some are black, large, strong, and, as it were, wild: They are called buffaloes; not very fit for the plough or cart; but, yoked by strong tackle, are employed to drag heavy weights along the ground: They are inclined to stay amidst water: Their hides are not so good

‘ good as those of other oxen ; however, they
‘ are very strong and thick *.’

They all agree likewise, that the hair should be short and thick, and the whole skin very soft to the touch ; the body in general long and deep, or compact and square, as Columella and Palladius call it.

With respect to the particular parts, they say, that the forehead should be broad and rough, the ears large and hairy, the horns black, strong, lofty, and curved, without any deformity in the bending, the jaws narrow and close set, the nose flat and turned up a little at the end, with wide nostrils, the lips black, the eyes black and large, the neck brawny and long, with a dewlap large, and extending from the chin to the knees, the chest broad, the shoulders thick, the sides well stretched out, the belly large and protuberant, wide flanks, the back not humped, but straight
and

* Ex genere boum, aliqui sunt nigri, magni, fortes, et quasi indomiti, qui bubuli vocantur, non bene habiles ad plaustra et aratra, sed in trahendis per terram magnis ponderibus exercentur, ligati artificialiter quibusdam catenis: Libenter morantur in aquis. Eorum coria non sunt adeo bona, ut aliorum boum, licet valde grossa sunt; Cref. lib. ix. cap. LXVI.

and even, and no matter though a little declining from the shoulders, the hips round, the legs compact, short, straight, and muscly, the knee joints straight set, and a little protuberant, the feet large, but not broad, nor such as clank when going, the hoofs not wide set, but large, smooth, and equal.

Such are the marks which the ancients have given of good cows and bullocks; I cannot say, from any knowledge that I have of cattle, whether or no these are the most proper marks, and therefore must leave the matter to be determined by the experienced dealers in cattle: But, at the same time, it may be necessary to remind these gentlemen, that, in judging in the present case, they must attend to this circumstance, that the Roman authors describe the cattle not most proper for carrying beef, but most proper to bear fatigue, and draw in the cart or plough.

There is nothing in which the moderns seem more to differ from the ancients, at least the modern Britons from the ancient Romans, than in the value put upon oxen: All the laborious work amongst the ancients was performed by this kind of cattle; but, in most places of Britain, horses are preferred by the farmers. It is not many

years since oxen were the principal cattle used for country work in Scotland, and probably likewise in England; but, in proportion as the farmer found it necessary to send or bring heavy loaded carriages to and from distant places, upon rough and hard roads, the use of oxen gave way to that of horses. The persons who first made this change, were the persons who first introduced substantial improvements in agriculture: Hence the custom of working with horses was followed by all who followed the example of these persons in other things; and it is probable, that it has been introduced in some places where there is no need for it, and continued in others after the reason for it has ceased.

It is evident, from the passages cited in this chapter, that the ancients considered oxen as the stoutest of all animals employed in rustic labour, as fitted from their make to bear fatigue, and superior in these respects even to mules. It is evident, likewise, from the universal practice of antiquity, that oxen are naturally very manageable, and may be trained as easily as horses to obey the command and directions of the ploughman. Although, therefore, it has been
 custo-

customary in this country, to put to a plough a greater number of oxen than of horses; yet, on light and free lands, it is probable, that a yoke of large, strong made, and well fed oxen, may be sufficient for a plough, and make as good work as a pair of able horses. If this is the case, in farms where few distant carriages are necessary, and where the roads are not hard, the introducing oxen in place of horses would certainly be beneficial: It is true, indeed, there will be some difficulty in this; it will be difficult to get servants to work with one yoke of oxen in the plough without a driver; but, was this effected, it would be an advantage as great as has been introduced by the most beneficial improvement.

To set this in a proper light, let us take a comparative view of the expence of oxen and horses.

The price of good draught horses, of a proper age, may very properly be stated at L. 16; let us suppose, that, one with another, they continue to work eight years, which is a sufficient time, allowing for accidents; in this case, each horse takes L. 2 to keep him in repair.

A good ox may be purchased at one-half of this price; and, if he is bought at a proper age, and well fed for two or three years, there will be a gain in felling him again: As oxen are not so liable to accidents as horses, we may consider these as sufficiently balanced by the gain, and therefore, that it takes nothing to keep an ox in repair.

The difference of the expence of feeding horses, and feeding oxen, is an article as considerable. In former times, the expence of feeding oxen was indeed very trifling; and it is no wonder that so many of them were found necessary to force through the earth the heavy ill made ploughs to which they were yoked. The ancients, as appears from the passages that have been cited from their rustic writers, were very careful in feeding their oxen; and Cato, in particular, says, that there is nothing of greater importance than to take good care of them: But, although this is done, although very great care is taken to feed them well, yet the expence is greatly inferior to the expence of feeding horses.

The quantity of green forage necessary to a horse, is greater than what is necessary for an ox; on the other hand, the quantity of hay or
straw

straw necessary for an ox, is greater than what is necessary for an horse: If these two are balanced, I presume the greater expence is on the side of the horse: However, let us suppose these equal, and, upon this supposition, let us consider what may be the value of the grain necessary for each.

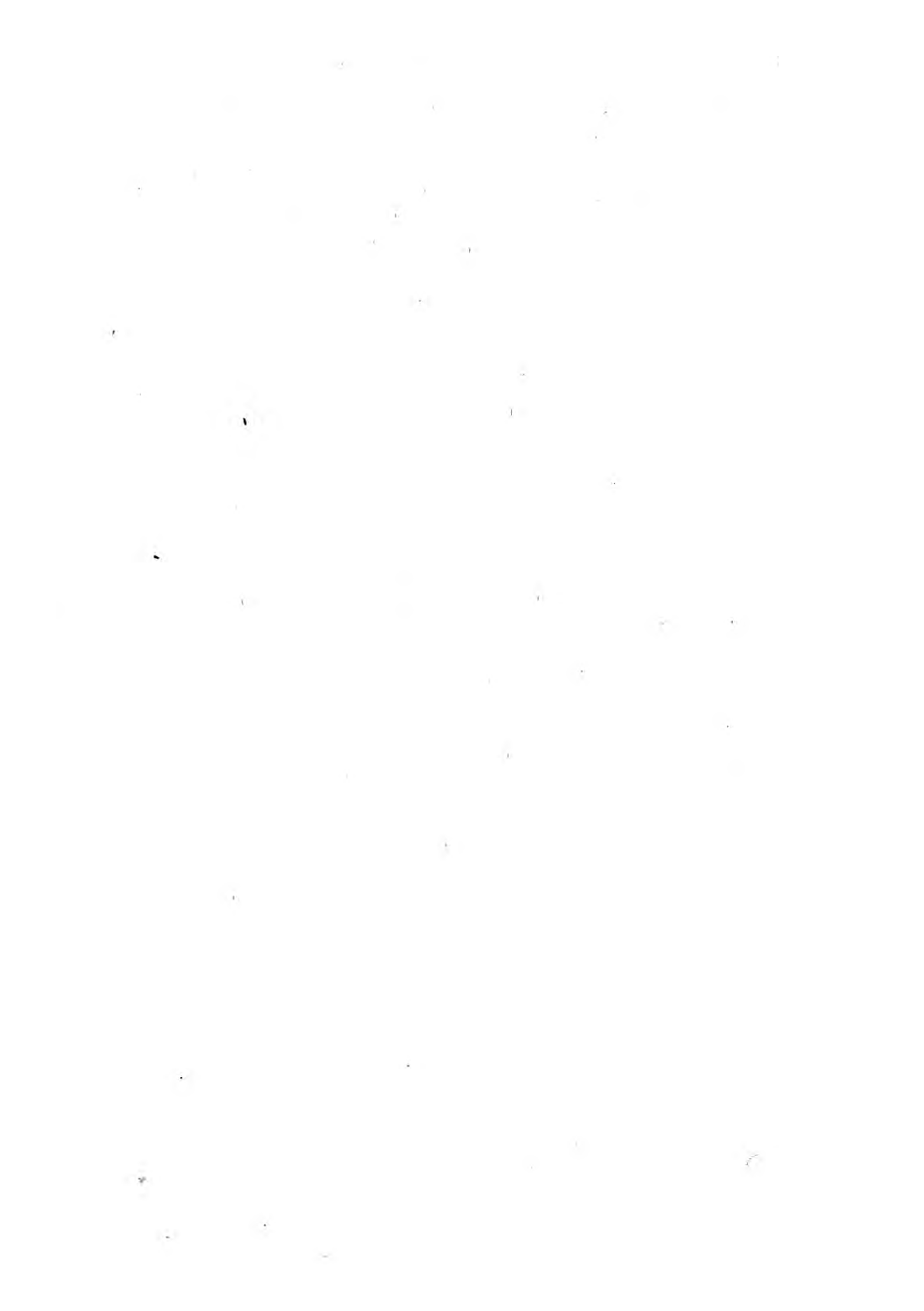
Among all the kinds of grain given by the ancients to oxen, and that are within our power, beans seem to be both the most valuable and excellent. Now, let us suppose that both are fed with grain for 200 days in the year, and that one-fourth of a peck of beans, broken in a mill, is to an ox in the day equal to one-half peck oats, Scots measure, or three fourths of a peck English to a horse, which will be found not an unreasonable proportion. In this case, an ox requires about $3\frac{1}{2}$ bolls, or 14 bushels beans, and a horse 7 bolls, or 42 bushels oats; the difference between the price of which may justly be reckoned at L. 2 : 9 : 0; this added to L. 2, the sum necessary to keep a horse in repair, makes L. 4 : 9 : 0, and this again added to 8 s. the difference between the interest of the price of the ox and of the horse, at five *per cent.* makes in all L. 4 : 17 : 0, as the difference of the annual

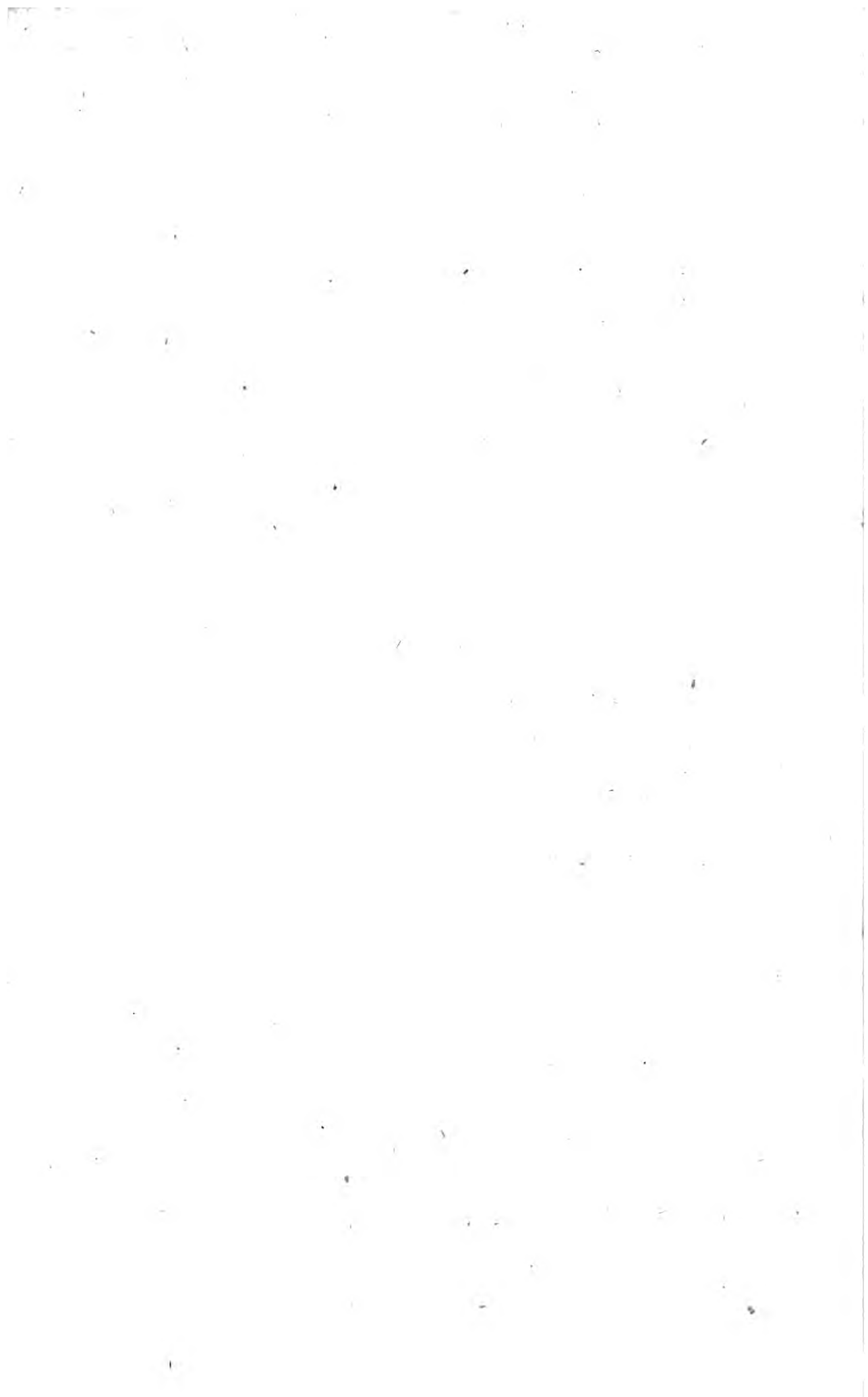
nual expence between a labouring ox and a labouring horse.

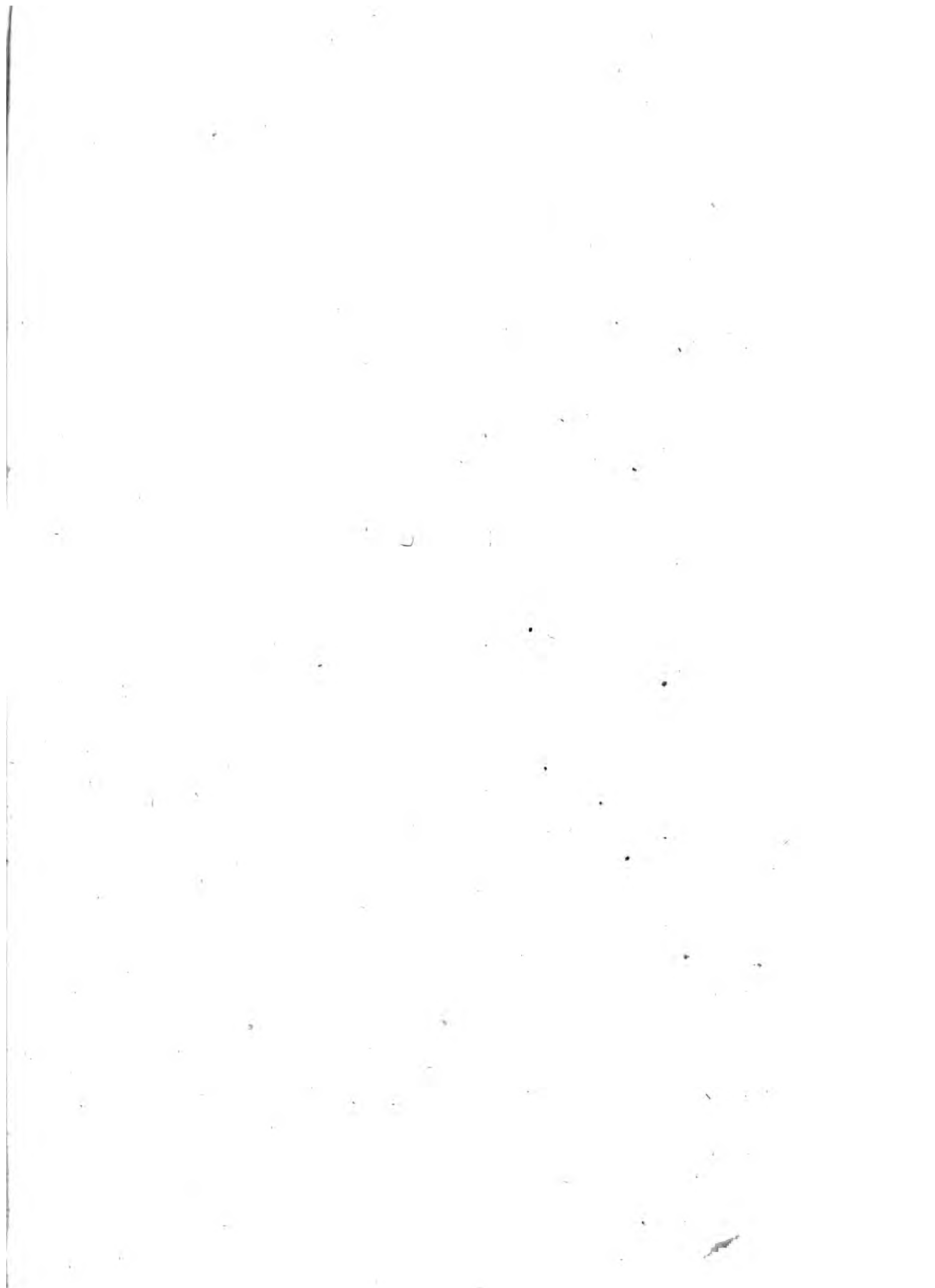
The expence of maintaining horses and oxen, is perhaps not proportioned with all the exactness with which it may be done; but it is easy for the farmer to make a proper calculation of it, according to circumstances, and also to try the experiment without any risk; and, although he may find some inconveniencies attending the ploughing with oxen in some situations, yet, at the same time, I am persuaded, that he will find a considerable saving in the expence.

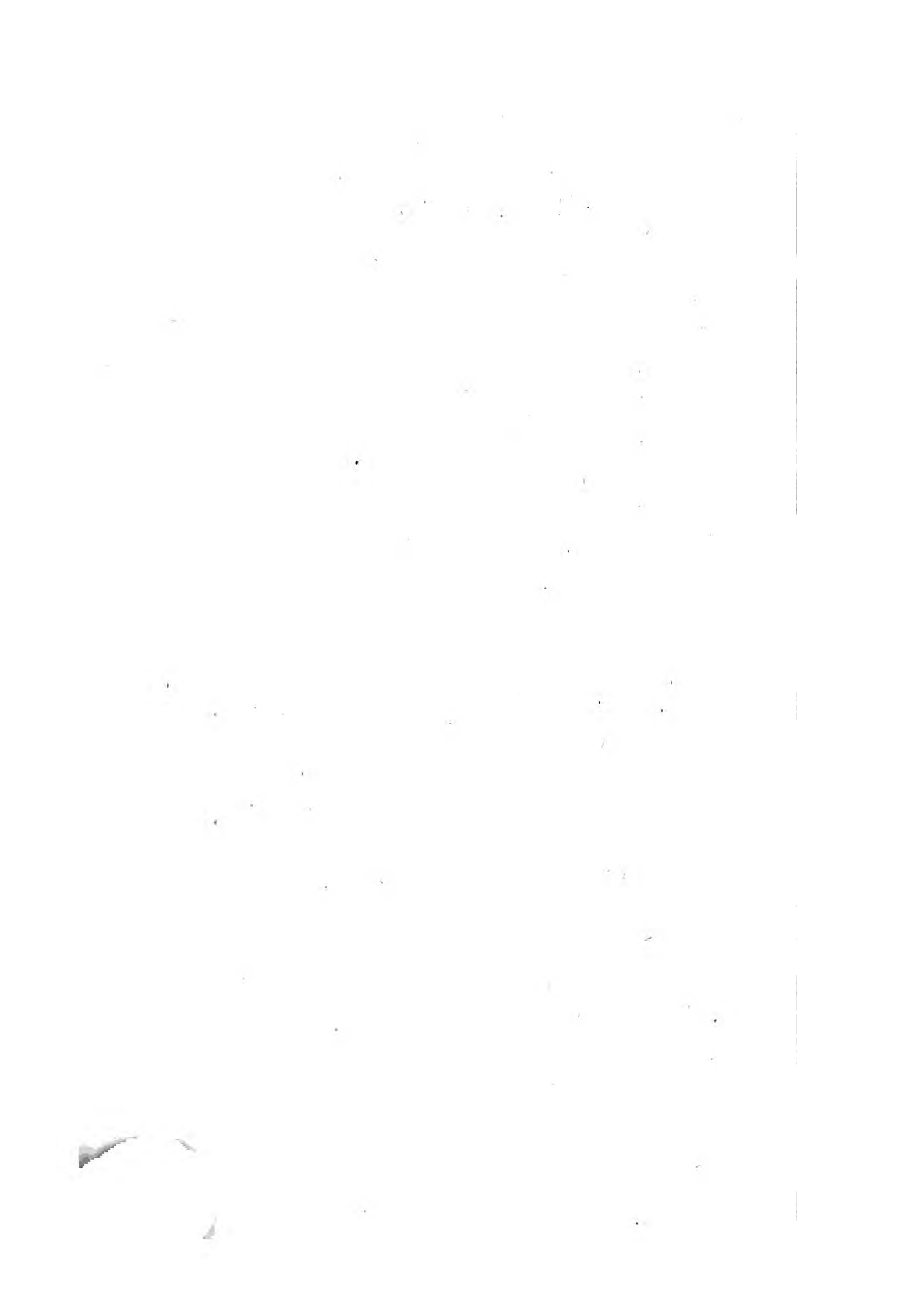
The advantage to the nation in general, by introducing this practice, will be still greater than to the farmer in particular; for thereby there will not only be a quantity of grain annually saved, but also an additional number of cattle annually bred; by both which, a greater quantity of food is provided for the society.

F I N I S.











100

100



100

100

