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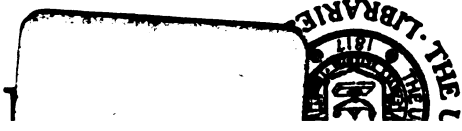


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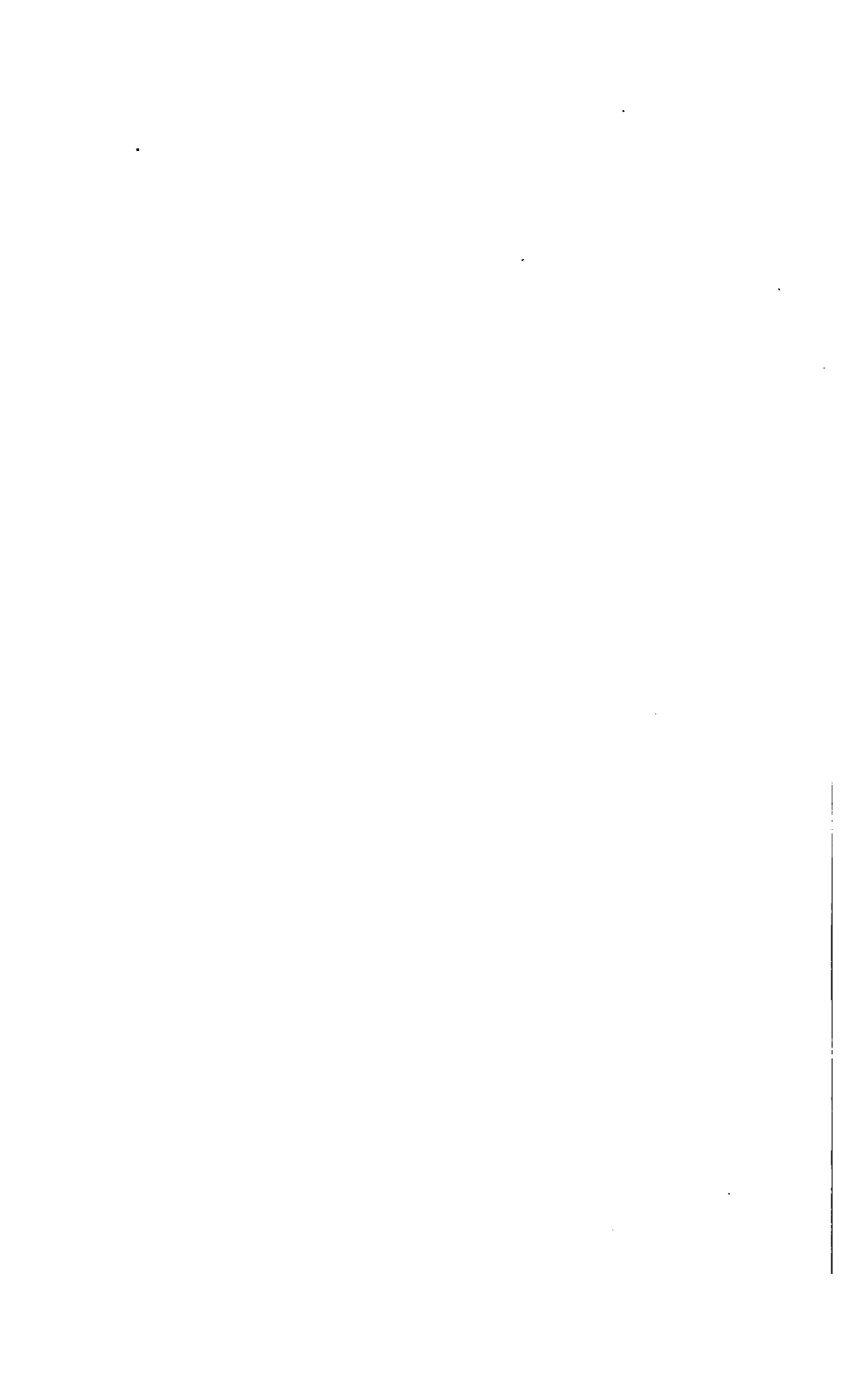
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Author Walter Howte

E S S A Y S
O N
H U S B A N D R Y,
E S S A Y I.
A
GENERAL INTRODUCTION;

S H E W I N G

That Agriculture is the Basis and Support of all flourishing Communities; — the antient and present State of that useful Art; — Agriculture, Manufactures, Trade, and Commerce justly harmonized; — of the right Cultivation of our Colonies; — together with the Defects, Omissions, and possible Improvements in English Husbandry.

E S S A Y II.

An Account of some Experiments tending to improve the Culture of LUCERNE by *Transplantation*: Being the first Experiments of the Kind hitherto made and published in England: From whence it appears, that *Lucerne* is an Article of great Importance in English Husbandry.

The Whole illustrated with Copper-plates and Representations cut on Wood.

Non asseveravi quæ vastitas hujus Scientiæ contineret, cuncta me dicendum, sed quædam: Nam illud in unius hominis prudentiam cadere non poterat; neque enim est ulla disciplina aut ars quæ singulari consummata sit ingenio.

COLUMELLA, Lib. v. c. i. p. 166.

L O N D O N :

[Printed for W. Frederick in Bath.]

And sold by J. Hinton, in Newgate-street; W. Johnston, in Ludgate-street; T. Field, in Pater-noster-row; J. Brotherton, in Cornhill; P. Valliant, in the Strand; Mess. Dodder, in Pall-Mall; Mess. Wilson and Saunders, Seedmen near Durham-yard in the Strand; and H. Bradley, in Dublin. MDCCLXIV.

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PAGE 1. l. 17. for has exceeded, read *might exceed*. — P. 28. for state-man, read *statesman*. — P. 32. l. ult. for con-temperunt, read *consumperunt*. — P. 33. l. 10. after needy, add a semicolon: And then add *such* contributors. — P. 45. l. 8. for state, read *estate*. — P. 55. l. 27. for Kat's, read *Kat's*. — P. 56. l. 18. for pointed, read *jointed*. — P. 60. l. 6. for carry, read *carries*. — P. 72. l. 12. for Mendon, read *Mendon*. — P. 75. after territory, add a semicolon thus: — P. 78. Note 2d, for biza, read *bize*. — P. 81. The reference of the Note belongs to the word *navigation*, l. 12. — P. 85. for subtract, read *subtract*. — L. 8. p. 100. For Rourray, read *Roworay*. — P. 114. l. 20. for interest, read *interest*. — P. 118. Note, for upright ground-plot, read *upright, and ground-plot*. — P. 131. l. 3. for sun-shine, read *sun-shiny*. — P. 160. Note, l. 7. for state, read *estate*. — P. 210. l. 10. put the comma after the word *particularly*, and dele the comma after *lucerne*.

ERRATA in ESSAY II.

IN the Running-title, from p. 15. to p. 139. add ESSAY II. — P. 13. l. 21. for la Mème, read *le Mème*. — P. 14. l. 5. read. *ce qu' il y a de certain, ce*. Ibid. l. 6. for grand, read *grande*. — P. 18. Note, l. penult. for dedie, read *dedi*. — P. 19. l. ult. for Alfafa, read *Alfalfa*. — P. 21. Notes, for Soleilles, read *Soleillis*. — P. 27. l. 4. dele colon after sunshine, and read *after* with a small *a*. — P. 41. Notes, for guéras, read *guéres*; for prêt, read *prêt*, and for restant, read *restent*. — P. 43. l. 3. for Fertilibus, read *Fertilitas*. — Ibid. Note, l. 21. for plant, read *plants*. — P. 49. l. 7. for voisseaux, read *boisseaux*. — P. 58. l. 19. for natural roots, read *lateral*. — P. 61. l. 18. for rye-grass, read *ray-grass*. — P. 70. l. 16. for brushy, read *brashy*. — P. 77. Notes, l. 9. the parenthesis [i. e. *managing an estate*] must be inserted in the next line after the word SURVEYING. — P. 79. l. 3. for bufflo, read *buffle*. — P. 84. l. 32. for seed burning, read *second burning*. — P. 85. l. 10. correct the same mistake. — P. 91. l. penult. for plats, read *plants*. — P. 94. l. 1. for Matthiola, read *Matthioli's famous custer*. — P. 101. l. penult. for in, read *is*. — P. 120. l. 19. Notes, for 2, read *ii*. — P. 125. l. 1. for we, read *were*. — P. 130. l. 21. for some, read *same*. — P. 162. l. 19. for grown, read *grown*. — P. 163. for Mefra, read *Mefua*. — P. 169. l. 5. for cleaving, read *clearing*. — P. 185. l. 11. after rosemary, add plants. — P. 191. l. 3. for evericint, read *evincerint*. — P. 193. l. 17. for ventures, read *venture*. — P. 203. l. 1. for nectam, read *nec tam*. — P. 204. l. 12. for do-cible, read *docile*. — P. 211. l. 19. for we make, read *we must make*.





ESSAY I.

A

GENERAL INTRODUCTION;

SHEWING

That Agriculture is the Basis and Support of all flourishing Communities; — the antient and present State of that useful Art; — Agriculture, Manufactures, Trade, and Commerce justly harmonized; — of the right Cultivation of our Colonies; — together with the Defects, Omissions, and possible Improvements in ENGLISH Husbandry.

Εἰ μὴ γὰρ Φερσίπης ΤΗΣ ΓΕΩΡΓΙΑΣ ἰσχυρὰς αἰ ἀλλὰς τίχων
ἀνασταί.

XENOPHONT. *Oeconomic.* Kap. I E.





DIRECTIONS to the Book-binder.

E S S A Y I.

PLATE I. must front Page 102.

PLATE II. must front Page 143. *Ibid.*

PLATE III. to front Page 146. *Ibid.*

E S S A Y II.

PLATE IV. to front Page 93.

PLATE V. must front Page 191. *Ibid.*



ESSAY I.

The great Importance of Agriculture, its Defects, Improvements, &c. &c.

WHEN I say that these essays on husbandry are written in imitation of *Cowley's* essays on subjects of a like nature, I am inclined to hope that the reader will allow me to have chosen a very pleasing and instructive model.

One large part of the present work was originally nothing more than the substance of answers to several letters from curious gentlemen who requested the author to give them his advices and directions concerning the new foreign method of *transplanting* lucerne, and that as long since as the year 1757.

It is with some regret that we see works of this nature published annually in *France* and other countries, and dispersed through *Europe* with high reputation, when it is well known that *England*, if its inhabitants would apply themselves to carry on improvements in husbandry, has exceeded, and in all probability ever will exceed any other nation in the culture of land. So that what *Varro* said of *Italy* in antient times, may be justly applied at present, and with undoubted pre-eminence, to this kingdom: *Ecquam terram cultiorem vidistis? — Nullam arbitror esse, quæ TAM TOTA sit CULTA.**

Yet still there is room left for acquiring fresh knowledge in various branches of husbandry: And of course it is much to be wished, that some proper

A

per-

* *De Re Rust.* l. i. c. 2.

person or persons were appointed to execute amongst us what *M. Du Hamel* and others carry on with such uncommon success in a neighbouring kingdom :* And that public premiums from the government, or provincial subscriptions from individuals, might be allotted yearly to the best productions of grain, grasses, &c. in such manner as the several contributors and encouragers shall think fit to specify.

As *England* is so justly celebrated for its knowledge and industry in the culture of land, there are great reasons to hope that some public establishment will be set on foot for the improvement of husbandry, and then all writers of an inferior order, like myself, will, or at least ought to be best contented with submitting their few observations and experiments to the revision and correction of more experienced judges.

It is undoubtedly needless to urge how just a title agriculture has to claim the encouragement and protection of the state. — The annual produce of the lands in *England*, only, is supposed to amount to twenty millions *sterling*. — If husbandry therefore could

* *Samuel Hartlib*, a celebrated writer on husbandry in the last century, a gentleman much beloved and esteemed by *Milton*, in his preface to the work, commonly called his LEGACY, laments greatly that no public director of husbandry was established in *England* BY AUTHORITY; and that we had not adopted the *Flemish* custom of letting farms upon improvement. "If it pleases God" (says he) to bless these motions, and that, accordingly, the national husbandry of this commonwealth be improved, we may hope, through God's blessing, to see better days, and be able to bear necessary and public burdens with more ease to ourselves, and benefit to human society, than hitherto we could attain to." PREF. p. 2. 4^o. 1651. *Cromwell*, in consequence of this admirable performance, allowed *Hartlib* a pension of 100*l.* a year; and *Hartlib* afterwards, the better to fulfil the intentions of his benefactor, procured Dr. *Beati*'s excellent annotations on the Legacy, with other valuable pieces from his numerous correspondents.

could be improved but *one sixth* part more, (as upon the whole it certainly may†) what a glorious acquisition would this single circumstance introduce amongst us, ‡ and that by multiplying industry and wealth without increase of luxury? *Maxime pius questus, Et stabilissimus.* ¶

And here (if the reader can be induced to imagine that any thought is worth adopting from an old German author) I wish husbandry might be improved amongst us to such a degree, that, if *Julius Caesar* or our own *Fitz-Herbert* § “could return to life and re-visit *England*, they might confess, when they lifted their eyes towards the heavens, they recollected the same stars in their old situations and relative distances, but, upon casting their eyes down to the ground, saw a soil cultivated in a new manner, and enriched with such a variety of vegetables to them unknown, that they would gladly be informed what might be the name of this new country?”

The astonishment of a person, upon such a supposed occasion, may serve to put one in mind of what occurred to *Achilles* when he waked, after his mother *Thetis* had conveyed him in his sleep from

A 2 . his

† It has been asserted by an able writer, and I think proved, that *France*, with commonly good husbandry, might support many millions more of people than it maintains at present. *Police des graines à Berlin*, 12°. 1755. p. 12. The same, *mutatis mutandis*, may be applied to *England*.

‡ The improving a kingdom, in matter of husbandry, is better than conquering a new kingdom.” *HARTLIE'S Legacy*, p. 42. 3d edit. 4°. 1655.

¶ *CATO de Re Rust. in proöm.*

In urbe luxuries creatur: Ex luxuria existat avaritia necesse est: Ex avaritia erumpat audacia: Inde omnia scelera ac maleficia gignuntur. Vita autem hæc rustica, quam tu *agrestem* vocas, parsimoniz, diligentiz, justitiz magistra est.

TULLII Orat. pro Sext. Roscio.

§ *Antony Fitz-Herbert*, judge of Common-pleas, the father of *English* husbandry in the reign of *Henry VIII.* See more concerning him in this *ESSAY*, and *ESSAY II. Sect. 2.*

4 *The great Importance of Agriculture :*
his preceptor *Cbiron*. Most readers of classical knowledge will recollect the passage.

Cum pueri tremefacta quies, oculiq; jacentis
Infusum sensere diem; stupet aere primo.—
Quæ loca?—Qui fluctus?—Ubi Pelion?—Omnia versat,
Atq; ignota videt; dubitatq; agnoscere *matrem*.

“ Which verses,” as *Dryden* says, (speaking of another passage equally animated in the same author) “ would cost me a whole day to translate;” and therefore I shall modestly leave them to some abler hand.

All observing men must have remarked that our land has ever paid its grateful acknowledgments to the state, and the more its produce and profits are augmented by public encouragements and private generosities, the more cheerfully are its proprietors enabled to contribute their assistances towards the well-being and prosperity of the government.

Agrarian laws, well contrived and judiciously enforced, are the shining ornament of *codes* and *pandects*. Witness our own law concerning the exportation of grain, and the bounty annexed thereto.

It is certain that agriculture, beyond any other profession of gain, confers the greatest advantages on its own country; and those who consider it attentively through its several stages of operation, may compare it to the leaves of a tree which open, spread, grow verdant, die, and fall to the roots of the parent-trunk that produced them, where they turn to manure, and carry on re-production the ensuing year.

No one ever knew the advantages of husbandry, or the inconveniences that arise from its discontinuance, better than our master *Virgil*: For instead
of

of describing all the dreadful consequences of war in every kind, nay even without mentioning fire, sword, plunder, and famine, he only says in a few words,

—— NON ULLUS ARATRO
DIGNUS HONOS; *squalent abductis arva colonis.*

And by the way, though the cause may be different, yet the effects are equally hurtful in times of peace, if the art of agriculture be not justly encouraged and honoured.

To encourage this art therefore is to assist nature in her operations, for it is agriculture that determines the *physical* strength of any state: And is the stream that overflows the land with plenty and population, though the true source thereof may be unknown to us.

Quæ dat aquas, saxo latet hospita nympha sub imo. —

Simple and uncompounded in the beginning, it appears to contain no great matter that is interesting or striking; but on closer examination resembles those little elevations of earth which continue to rise imperceptibly, and at length close the farthest point of view in the landscape with a range of Alps that seem to touch the skies.

Agreeably to this, it has been asserted by the best writers, antient and modern, that agriculture is the support of states: The basis of commerce and independency.* Nor could any thing make us forget

A 3

these

* " In whatever age we find a country grossly ignorant of agriculture, we may be assured it must have been but thinly inhabited: And perhaps the swarms of people that issued from northern nations into southern climes were not so much a proof of

6 *The great Importance of Agriculture :*

these truths, but because they are common ones; mankind being naturally fond of novelty, and too apt to prefer the *showy* to the *useful*, or overlook what is *near*, in order to speculate upon that which is *distant*. Yet it is always best to prefer plain, obvious, and simple truths, as proving in the end most useful, as well as most universal. The wealth or indigence of a nation takes its decisive turn, in proportion as the earth is well or ill cultivated. Vegetable nature receives assistances from the precautions and encouragement of a wise legislator; industry awakens at the call, and undertakes with cheerfulness whatever is proposed with reason, and patronized by the power of a prudent administration.

Since arts and sciences have arisen amongst us to such high perfection, mankind seems to apply itself more to the *productions of art* than *those of nature*.† And hence it happens that the primitive source of wealth and the vital support of no less than the whole human species are both consigned to the management of very mean ignorant people. Nor is such injudicious conduct ever once reflected upon except in times of *scarcity*; and then a return of plenty soon banishes every melancholy reflexion. We attempt for the moment to remedy present grievances, but leave those very grievances, when they next occur, to take care of themselves.

Husbandry affords the only true seminary of soldiers and mariners, for it inures men from their early youth to heats, cold, fatigues and labour :

And

populousness, as that an uncultivated country is easily overstocked, and that at certain times it must necessarily be obliged to disburden itself of useless mouths it could not support "

Wallace's *Numbers of mankind*.

† *Natura est ars Dei — Liber unus divinitate plenus, divinarum speculum.*
Marfil. Ficin.

And is one main cause of health and strength. † — The establishment and propagation of all colonies is founded originally upon agriculture: And by the rules of agriculture the inhabitants cultivate the ground, and prove useful to the parent-hive from whence they migrated. — The produce of the husbandman's labours is the only merchandize which all the world is *obliged to deal in*. These and such-like considerations induced *Cicero*, after long experience, to recommend the reading of *Cato's* husbandry in a very strong manner: to his son *Marcus*; “of all the profitable arts,” says he, “no one art is preferable to agriculture; nothing is more useful, nothing more worthy of a man in a state of freedom.” *Omnium rerum ex quibus aliquid exquiritur, nihil est agricultura melius, nihil uberius, nihil homine libero dignius.*

It has been computed that a piece of ground consisting of three square miles, or nineteen hundred and twenty acres of commonly good land, will furnish food for 870 persons. Are we arrived, or not, to this degree of industry and populousness? — Might not *England* maintain one 5th more of diligent subjects than it supports at present? — War, navigation, and commerce can never dispeople a wise nation considerably, where agriculture flourishes in full vigour: For, as the waves of the sea are always ready to overflow a country that is situated in such a manner as to give them admittance, so wealth and population will enter into any kingdom that by human care is rendered qualified to receive and cherish them. †

A 4

On

† Ex agricolis viri fortissimi & milites strenuissimi gignuntur: *Cato de re Rust. in præm.* — *Minimèq; mali cogitantes.*

PLIN. Nat. Hist. l. xviii. c. 5. Vid. Xenoph. Oeconom.

† “That government or policy is best, cæteris paribus, that can supply food to the greatest number of people. — In every country

On the other hand, *depopulation* in a fertile country, or in land capable of being rendered fertile, is a sure consequence of *neglected* husbandry. Men naturally abound, when they have food enough ; and live tolerably at their ease. — The *physical* evils abovementioned, as also those of famine and epidemical distempers, soon repair themselves ; and *moral* evils (more to be dreaded, as they undermine the foundation and well-being of government) are to be rectified by the vigilance of the legislature. Governments are not rendered truly populous by the mere progress of propagation, but by the industry and labour of the inhabitants. Not to mention the enjoyment of all reasonable liberty both in mind and fortune — The poor peasant despairs of feeding his children, when he wants bread himself : Like the gardener who perishing with thirst can afford no water to nourish his plants. — Therefore whenever good lands, as in *Italy*, *Spain*, and such-like countries are thinly inhabited, sure it is, that husbandry and other useful arts of acquiring subsistence are neglected. Hence *Egypt* and *Palestine*; that once poured forth innumerable armies, are now a desert : And *England* and *Holland* (ill-peopled in antient ages according to *Cæsar's* account) are at present become nurseries of men. — Again, “ in some countries, says *Montesquieu*, that were once so famous for plenty, wealth, and population, we find no monuments thereof at present, except in antient geographers and historians.” *

It is certain, that *Spain* wants five millions of its pristine number of inhabitants, since she neglected agriculture as also handy-craft labours of all sorts, and

country there will always be found a greater number of inhabitants, *cæteris paribus*, in proportion to the plenty of provisions it affords,”

Numbers of mankind, pag. 14, 15.

* *Hist. de la Decadence de l'Empire Rom.* tom. I.

and possessed the wealth of *America*. So that *Spain*, though trebly larger than *England*, contains, at present, fewer inhabitants. Thus idleness, luxury, and migrations, will exalt a kingdom to imaginary wealth, and, at the same time, reduce it to actual poverty. Nay, if we consider only the *latter* of these *three* assigned causes, namely, the peopling and garrisoning, &c. of new colonies, it will be found according to the best political calculations, that a country cannot *arm* or *send abroad* more than one man out of an *hundred* without running the risque of greatly injuring its agriculture, commerce, manufactures, and population.† But the declension of *Spain*, or any other country circumstanced like her, shall be considered more at large in another part of this Essay. And therefore it may suffice to observe for the present, that, though it is death in *Spain* to export money, yet the riches of the *Spaniard* make wings for themselves and take their flight to other nations: So that *Spain* has a lesser share of her own money, than *France*, *England*, and *Holland* have of it. Neither laws nor penalties can confine treasure, when food, raiment, and other common necessaries of life are wanted. In this sense

Aurum

† Of this opinion is the writer last quoted. Experience has shewn perpetually, says he, that no *European* prince (in a trading country where agriculture is also encouraged) who has a million of subjects, can possibly, without destroying himself, keep and maintain above ten thousand soldiers and sea-men.—But the case was different antiently with regard to commonwealths: For this proportion between the soldiers and the rest of the people, which is now as *one* to an *hundred*, might in those times be pretty near as *one* is to *eight*." *Hist. de la Decadence, &c.* tom. I.

Partly for the same reasons, the *Prussians* and *Austrians* at present may afford *thirty* soldiers to our *ten*, merely because we are the more industrious nation, and can better employ our subjects.

Aurum per medios ire fatellites,
 Et perrumpere amat saxa potentius
 Ictu fulmineo.

“ Nature,” “ says *Locke*, “ has bestowed mines on several parts of the world, but their riches are only for the *industrious* and *frugal*. Whomever else they *visit*, it is with the *diligent* and *sober* only they *stay*. And if the virtue and provident way of living of our ancestors (content with our native conveniences of life, without the costly itch after the materials of pride and luxury from abroad) were brought into fashion and countenance again amongst us, this would do more to keep, and increase our wealth and enrich our land, than all our *paper-bells* about *interest*, *money*, *bullion*, &c. which, however eagerly we may catch at, will not, I fear, without better husbandry, keep us from sinking, whatever contrivances we may have recourse to. 'Tis with a kingdom as with a family, spending *less* than our own commodities will *pay for* is the sure and only way of growing rich. — Till then, we in vain, I fear, endeavour with noise and weapons of law to drive the wolf from our own to one another's doors: The breed ought to be extirpated out of the island. For want, brought in by ill management, and nursed up by expensive vanity, will make the nation poor, and spare no-body.”*

People are naturally increased by industry in husbandry; and the self-same industry falls by degrees into trade and commerce. Whatever else enriches a state, is not a constant feeding stream,

(Tho' deep, yet clear, tho' gentle, yet not dull,
 Strong without rage, without o'er-flowing full;)
 but

* *Considerat. on lowering interest*, &c. p. 35. vol. II. fol.

but a momentary impetuous torrent; more destructive than fruitful. — It was a received opinion amongst the antients, that a large, busy, well-peopled village, situated in a country thoroughly cultivated, was a more magnificent sight than the palaces of noblemen and princes, in the midst of neglected lands. † It is of great use therefore to find full employment for country-labourers and keep them at home: And so much the rather, as it may be observed in general, that almost every peasant who leaves his native abode or district, becomes afterwards an unprofitable member to society. The country is deprived of a labourer, and, if he finds himself obliged to return thither, he seldom gives his mind cordially to labour. — Therefore (says an observing foreigner) “the loss of a peasant, industrious in husbandry, who breeds up his family in the same occupation, is, though it be not perceived, of greater detriment to the community than the death of two or three well-dressed footmen.”

Rome was ruined more by neglect of agriculture, and giving no attention to *useful* trade and commerce, than by the invasion of barbarians. Her soldiers could be but little depended on, when they had no home, no profession, (but that of plunder and devastation) with nothing to lose. On the other hand, whilst the cultivation of the earth was kept in full vigour, the people of *Israel* multiplied and flourished; but degenerated into sloth and luxury under a negligent prince, in many other respects renowned for wisdom. — Read all histories of all ages, and you will find industrious nations the most populous as well as the most virtuous.

In-

† Fundi propter culturam jucundiores sunt multis quam regiè polita ædificia aliorum: Cum hujus spectatùm veniant villas, non (ut apud Lucillum) ut videant pinacothecas, sed operothecas. *M. Varro de Rê Rust.* l. i. c. 2. p. 47.

Industry is the *vis motrix* of husbandry; and therefore an antient *English* writer observes, "that a single uncultivated acre is a real physical evil in any state." But, if men will extend this principle, then the breaking up and bringing into culture large portions of ground, formerly waste and neglected, will be an acquisition of value to every state; for such tracts of ground properly managed (even upon supposition they can never be made equal to the best soils) will afford additional employment and subsistence to a considerable number of people.

It is certain, from sacred writings, that the people of *Israel* manifested no great uneasiness concerning scarcity or famine. Though they were shut up within narrow bounds, (nor was the country assigned them famous for fertility) yet no nation upon earth, occupying the same extent of ground, was more populous; for agriculture was held by them in high esteem, and carried to all the perfection they could give it; besides which, their supreme Legislator had promised them abundant harvests as natural rewards of their industry and obedience.*

Such are the effects of industrious diligence: And a nation thus employed may be compared to a piece
of

* *If ye will hearken to his judgments, and keep them, I will love thee, and bless thee, and multiply thee; he will bless the fruit of thy land, thy corn, and thy wine, and thine oil, the increase of thy kine, and the flocks of thy sheep, in the land which he sware unto thy fathers to give thee. Thou shalt be blessed above all people: There shall not be a male or female barren among you, or among your cattle.* DEUT. c. vii. v. 12, 13, 14.

The Lord thy God bringeth thee into a good land, a land of brooks of water, of fountains, and depths that spring out of valleys and hills; a land of wheat and barley, and fig-trees, and pomegranates, a land of oil and honey; wherein thou shalt eat bread without scarceness. Ibid. c. viii. v. 7, 8, 9.

If you hearken diligently to my commandments, I will give you the rain in due season, the first rain, and the latter rain, that thou mayest gather in thy corn, and thy wine, and thine oil. I will send grass in thy fields for thy cattle. Ibid. v. 13 — 15.

of tapiftry-work, where a certain texture of threads and an union of colours, imperceptibly interwoven and blended together, represent agriculture, trade, commerce, and the mechanic arts. In mixing and harmonizing these consists the great skill of the workman: And, except due care be taken in this point, the richest materials will be weak, unpleasing, and uselefs. — Therefore though trade, commercial arts, and husbandry should be all encouraged and supported in wise governments with scrupulous attention, yet still the scale may be allowed to preponderate in favour of agriculture: But *that* in so slight a degree as only to be perceived by a few persons of most discerning judgment; for the people employed in manufactures, artizanship, &c. are starved in times unprosperous to their business, if they are not supplied with the common necessaries of life by the generous industry of the cultivator; nay, even in more prosperous times care must be taken to supply our fellow-citizens with food convenient, and *that* food at a moderate price, for fear of being under-sold in the works of our labour by other nations.

But with us, says *Columella*, speaking of the *Romans*, (though the remark will hold good by way of expostulation with the present age) “*all trades and occupations of life are taught young people, excepting agriculture.*” And hence it happens, that as
opinion

* Atqui ego satis mirari non possum, quod qui ædificare velint fabros & architectos advocent; qui navigia mari concredere, gubernandi peritos; qui bella moliri, armorum & militiæ gnaros—Sola res rustica, quæ sine dubitatione proxima, & quasi consanguinea sapientiæ est, tam discantibus egeat quam magistris. — Agricolationis doctores qui se profiterentur, neque discipulos cognovi.—At sine agricultoribus nec consistere mortales, nec ali posse, manifestum est. Quo magis prodigii simile est, quod accidit, ut res corporibus nostris, vitæque utilitati maxime conveniens, minimam usque in hoc tempus consummationem haberet.
 idque

opinion and *custom* are the two *sovereigns* of the world, and as our ancestors neglected to cultivate their lands in person, or establish sufficient laws for the encouragement of husbandry, we, their descendants, adopt the same ideas and conduct without hesitation. Hence the art is little thought of, or esteemed in general; for our parents, not positively, but indirectly, infused into us a distaste for it, and the government has not thought fit, in some instances at least, to awaken the husbandman's attention by a proper number of rewards and inducements.

✓ All states owe more to agriculture than any other profession of life. Thus, for example, it will be found upon a near examination that grain of every kind, flesh-meat, wine, beer, oil, (and, in short, whatever the merchant and husbandman vend either at home, or abroad:)—The timber, cordage, sail-cloth and provisions, used in navigation; vegetables, alimentary or medicinal, as likewise fruits; fewel, wax, tallow, honey, hops, saffron, and the productions of the dairy, with an infinite number of *etceteras*, all proceed originally from the cultivating hand or watchful care of the poor peasant. — It is much the same in regard to the manufacturer, who in general exercises his industry upon the productions of the cultivator, or the creatures bred up and supported by him. — Thus *art* stands indebted to the husbandman and peasant for the materials she works upon; and that almost from the highest to the lowest instance; wherefore upon the whole the main business of every well-regulated government is to take care that the source which supplies all these assistances may be rendered as copious and permanent as possible: And that it may always increase

idque sperneretur genus amplificandi, retinendique patrimonii, quod omni crimine caret.

De Re Rust. in primis.

crease in proportion to the industry, trade, and populousness of any nation.*

Yet these are not the only assistances and advantages which agriculture affords to various industrious members of society in their several trades and employments. The exporter or merchant cannot hope for great demands and quick returns, except he can furnish foreign markets at a moderate rate; and, as the manufacturer must gain a livelihood and other profits which are to be considered as the just result of his labour, one may venture to assert that the *price of goods* is principally founded upon *that of provisions*. Which single circumstance may be looked upon as an incontestable proof that trade and commerce depend on the good cultivation of the earth: And, of course, whoever encourages the *latter* may be looked upon as the patron and promoter of the *former*.

It is therefore a prime *arcanum* of government to maintain agriculture in full vigour and prosperity, care being taken that grounds reputedly useless may be rendered useful by cultivating something properly adapted, and congenial as it were to the nature of the soil: (Which by the way was the grand secret of *Flemish* husbandry so much admired by our ancestors in the beginning and middle of the last century.) To which may be added the draining of fens and morasses; inclosing commons; cleansing waste tracts of land from heath, briars, shrubs, and furze; diligent search for coals, minerals, &c. public and private encouragements for planting timber-trees; and, above all, the bringing wild native plants and grasses into culture and use,† and the in-

* GABRIEL PLATTE's *Discovery of infinite treasure*, 4^o. 1656. PREF.

† *Hartlib* says, "we have in *England*, growing wild, 23 sorts of trefoil, one of the wholesomest, best-tasted vegetables that
cattle

introduction of foreign ones for the better and more abundant support of cattle. For it is not sufficient that lands should be cultivated; it is necessary likewise, that they should be well, properly, and vigorously cultivated.

Hence the true genius of animating agriculture must reside in him, or those, that hold the reins of government in any flourishing state or kingdom; as also in the nobility and gentry of all denominations; nor should rewards be wanting, nor public premiums, nor marks of favour. For agriculture, in a word, as it is the most useful, so it appears to have been the first employment of man. And, indeed, it is a noble occupation to employ usefully the gifts which God has deposited for us in the hands of nature, and bestow them, when perfected by our industry, for the support of human kind.

Sacred scripture beautifully represents a king in this character, namely, *Uzziab*;* — *Homer*, conformably to the simplicity and virtue of antient ages, represents a king standing amongst the reapers and giving them directions by pointing with his sceptre. † — *Ovid* has described a prince with great justice,
who

cattle can feed on: And yet only two sorts are admitted into husbandry."

I will not dispute but that those two sorts are well selected; but many of the *other* kinds will prosper, where *these* will not.

Dr. *Merret*, in his *Pinax*, enumerates 26 known sorts of trefoils, which are natives of *England* and *Wales*. And many more might still be discovered, if we gave our attention to find out new kinds of wholesome food for grazing animals.

* 2 *Chron.* c. xxvi. v. 10. *Hate not husbandry which the most High hath created.* ECCLES. vii. v. 15. *The profit of the earib is for all, the king himself is served by the field.* Ibid. v. v. 9.

† Έσ δ' ἐπίθαι τίμαθ' βασιλῆος· ἐῖθαι δ' ἔριθαι
ἤμων, ἐξίας δεσπῆνας ἐν χερσὶν ἔχουσις.
— Βασιλεὺς δ' ἐν τοῖσι σιωπῆ
Σκηπτήρον ἔχων ἐστῆκεν ἐπ' ὄγμω γυθόσων κῆρ.

who encourages religion and cultivates the arts of peace:

Quæritur interea quis tantæ pondera molis
Sustineat, tantoque queat succedere regi.
Destinat imperio clarum prænuntia veri
Fama Numam. —

——— Animo majora capaci

Concipit; & quæ sit rerum natura, requirit. —

Conjuge qui felix *Nympha*, * *ducibusque Ca-*
manis

Sacrificos docuit ritus, gentemque *feroci*

Affuetam bello, *pacis traduxit ad artes.* —

Metam. l. xv.

Under this head I will give the picture of a prince who makes it his study to encourage religion and agriculture at the same time. It is a sketch drawn by a poet of our own country :

Our isle, indeed, too fruitful was before :
But all uncultivated lay
Out of the solar walk, and heav'ns high-way ;
With rank *Geneva* weeds run o'er,
And cockle, at the best, amidst the corn it bore.
The royal husbandman appear'd,
And plough'd, and sow'd, and till'd :
The thorns he rooted out, the rubbish clear'd,
And blest'd th' obedient field.
When straight a double harvest rose,
Such as the swarthy *Indian* mows ;
Or happier climates near the line,
Or paradise manur'd, and dress'd by hands divine.

Dioclesian, according to the account left us by
Ælius Spartianus, found more true greatness and so-

B

lid

* *Egeria*.

And happiness in his little villa to which he retired, than ever he had enjoyed, even on the imperial throne; and when a friend once persuaded him to re-assume his greatness, "Ah, proconsul," said he, "if you could but stay a month with me, and see how my fields and garden thrive and prosper, you would never talk and judge so remotely from the truth of things as you do at present!" and *Constantine IV.* abridged the *Geoponic writers* himself, † or at least caused an abridgment of them to be published, and, perhaps, revised it.

Xenophon, in his *book of economics*, bestows due encomiums on a *Persian* king, who examined, with his own eyes, the state of agriculture throughout his dominions, and in all such excursions (according as occasion required) bountifully rewarded the industrious, and severely discountenanced the slothful. In another place he observes, that, when *Cyrus* distributed premiums with his own hand to diligent cultivators, it was his custom to say, "My friends, I have a like title with yourselves to the same honours and remuneration from the public; I give you no more than I have deserved in my own person; having made the self-same attempts with equal diligence and success."*

Xenophon, in another part of the same treatise, informs us, that when *Lysander* brought presents to *Cyrus* from the states of *Greece* that were in confederacy with him, the prince received him with all imaginable courtesy and humanity, and, amongst other things, shewed him his gardens, which were called the *paradise of Sardis*. The ambassador, who
was

† *Greek* writers on husbandry. In the next *Essay* we shall speak more concerning them and their works; parts of which are still extant: To which will be added some account of the emperor *Constantine IV.*

* *Oeconom.* c. 4. sect. 16, &c.

was equally charmed with the plan and execution of the whole, expressed himself in raptures concerning the *man* who had shewn such genius in the design, as well as skill in the cultivating part. *Cyrus*, having observed him with some pleasure, spoke to this effect: "You see in me," said he, "the person who conceived, disposed, and adjusted all this; I can even shew you a considerable number of trees that were planted with my own hands; for, whenever I find an interval from public business, it is my custom to labour till the sweat comes upon my brows." *Lysander*, amazed with this declaration, surveyed the prince again, and seeing him dressed not only with propriety, but splendor, and having already been witness to his politeness and elegance of manners, "O king," cried he, "you are truly fortunate, in possessing so fine a genius, and employing it in so useful a manner!" †

Our author concludes this narration with remarking, that a truly great prince ought to hold the arts of war and agriculture in the highest esteem; for by such means he will be enabled to cultivate his territories effectually, and protect them when cultivated.

Such was the character *Xenophon* gave of one of the most amiable and prosperous princes that ever adorned the pagan world. There are modern princes who may equal *Cyrus* in his military capacity, but are totally ignorant or regardless of matters of agriculture.

But nothing affects the heart more pleasingly and naturally than the account which *Homer* gives us of old king *Laertes*,* who, though divested of wealth, power, and grandeur, retired into the country and lived happy on a little farm, purchased, in all probability,

C 2

† *Oeconomic.* c. 4. sect. 20—25.

* *Odyssey*, l. xxiv.

bability, with money gained by his labour and industry. "The good man's fields," says the poet, "were in excellent culture, and *Ulysses* found him hard at work, digging round the roots of a plant, and expecting his servants from the woods with thorns to form a quick-set fence."

Plutarch, who, in this respect, seems to have wanted a taste for true simplicity, considers the whole passage relating to *Laertes*, as mean and degrading: But *Cicero* refers to it with approbation; for in his *Cato major*, speaking of the innocent amusements of old-age, he illustrates his assertions by this very example: *Homerus Laertem desiderium lenientem, quod capiebat e filio, colentem agrum & stercoreantem facit.* And, by the way, the *Menedemus* of *Terence* is the very copy of *Laertes* in *Homer*: A strong instance that *Terence*, who could be no ill judge of a well-drawn character, thought *Homer's* an exact representation of human nature, and the applause with which that comedy was received, shews that all *Rome* was of the same opinion.

Having thus proved on the one hand, that agriculture, in the opinion of the wiser ancients, is an occupation and amusement not unbecoming the highest class of men; it may be observed, on the other hand, that it carries with it many more advantages in all well regulated governments than have been hitherto spoken of.—"If we are desirous therefore" (says a sensible author upon this occasion) "that a tree" (by which he means the common-wealth) "should be enabled to furnish good fruit, we must not limit our attention to the mere cultivation of its branches, namely, trade, commerce, manufactures, &c. but, on the contrary, ought always to persevere in improving the soil, and nursing the roots that collect the nourishment;" by which he makes an allusion to the encouragement of

Its *Defects, Improvements, &c.* ESSAY I. 21
of agriculture: "For on *that* depends the combined strength and vigour of the allegorical tree we are now describing."*

Mr. *Wallace*, in his ingenious dissertation before referred to, is of the same sentiments with *M. du Hamel*; and as I think it not the less unfair, for being common, to adopt another writer's notions for one's own, I shall transcribe, once for all, five or six short similar remarks on the present topic, which may corroborate what shall afterwards be advanced, and serve to vindicate me from being thought to maintain any novel opinions upon this subject.

"Operose manufactures of linen, wool, and silk, toys and curiosities of wood, metals, or earth, elegant furniture, paintings, statues, &c. and all the refinements of an opulent trading nation, tend to multiply men's wants, make the most necessary and substantial things dearer, and, in general, increase the expences of living. † — In proportion as taste increases, men's wants increase. ‡ — Where manufactures abound, perhaps five § acres will only

B 3

keep

* *DU HAMEL*; *Culture des Terres*. Tom. V. *en pres.* p. 2. This beautiful allusion seems to be borrowed from Lord *Verulam*: Si arborem solito fructuosiore fieri cupias, de ramis medicandis frustra cogitaveris: Terra ipsa circa radicem subigenda, & gleba latior admovenda, aut nihil egeris.

De Augment. Scient. l. ii. p. 61. fol.

† *Numbers of mankind*, p. 23.

‡ *Ibid.* p. 30.

§ Five acres, per head, appear in my judgment too many, even where manufactures flourish greatly. The *Romans*, in their calculations and assignments of land, allowed only a couple of acres to each person, but that allowance was over-scanty, their acre being somewhat smaller than ours. But, upon the whole, regard must always be had to the perfection that agriculture is arrived at in any country.

Nor will this assignment of five (or rather four) acres, per head, any ways clash with my calculation in a subsequent part of this essay, because Mr. *Wallace* speaks of land at an average

22 *The great Importance of Agriculture:*

keep a man; where the taste is more simple, much less may suffice. * — The antients had an advantage over the moderns; trade was more confined, and agriculture more encouraged. † — The discovery of the two *Indies* have increased depopulation. ‡ — Lastly, to *import* elegant manufactures, in the room of elegant ones *exported*, is doing nothing." §

In consequence of these remarks, we shall observe, that manufactures, trade, and commerce, (by which we mean the true commerce of the antient *Tyrians* and *Phœnicians*, *that of aconomy*) and also the mechanic arts in general, render every state wealthy and flourishing; but agriculture is the true foundation of all. ¶ — It is *that* alone which feeds a nation,

as it runs, *cultivated*, or *uncultivated*. For if the good land be tolerably well managed, and if we speak of *bread only*, one acre of wheat will supply two persons during the whole year.

* *Numbers of mankind*, p. 25.

† *Ibid.* p. 96.

‡ *Idem*, *ibid.*

§ *Ibid.* p. 26.

¶ "Whilst agriculture continues in good health," says *Xenophon*, "every other art grows strong and flourishing." *Oeconom.* ch. xv. and in another place, speaking on the same subject, says, "that art is most worthy to be approved of by all wise men, which brings the greatest convenience and profit to the state."

"Agriculture is one of the noblest and most necessary parts of industry belonging to a common wealth: The first ground of mutual trading between men and the well-spring of wealth in all well-ordered societies."

HARTLIB's *Epistle Dedicatory*, prefixed to *Sir Richard Weston's discourse on the husbandry of Brabant and Flanders*, 4^{to}. 1655. p. 4, 5.

SAMUEL HARTLIB, a *German* gentleman by birth, was the great promoter of husbandry during the times of the commonwealth, and much esteemed by all ingenious men in those days, *Milton* addressed to him his *Treatise on Education*, and *Sir W. Petty* inscribed two letters to him on the same subject. Lond. 4^{to}. 1647, 1648. — Of his pension from *Cromwell*, on account of his advancing the art of agriculture, we have already spoken,

About

nation, and makes it populous. And, though the former ought generally to be looked upon as *efficacious means* that tend to the enrichment of any state or kingdom, yet these very means derive their *original efficacy* from the supplies and assistances of the latter; which, like a large river, carries wealth and

C 4

plenty

About the time when this author flourished seems to be an era, when *English* husbandry rose to high perfection; for the preceding wars had made the country-gentry poor, and, in consequence thereof, industrious; tho' sometimes the reverse of this happens in many kingdoms. But these wise men found the cultivation of their own lands to be the very best post they could be fixed in. Yet, in a few years, when the restoration took place, all this industry and knowledge were turned into dissipation and heedlessness; and then husbandry passed almost intirely into the hands of farmers.

The famous work attributed to *Hartlib*, and called the *LEGACY*, was only drawn up at *Hartlib's* request, and, passing thro' his correction and revision, was published by him; it consists of one general answer to the following query, namely, *what are the actual defects and omissions, as also the possible improvements in English husbandry?*

The real author of this work was R. CHILD. To it are annexed various correspondences from persons eminent for skill in agriculture at that time; as *C. D. B. W. R. H. T. Underhill, Henry Cruttenden, W. Potter, &c.* as also the *Mercurius Latificans*, and 20 large experiments by *G. Plattes*: Together with annotations on the legacy by *Dr. Arnold Beati*, and replies to the animadversions by the author of the *Legacy*.

Hartlib writ a little treatise on *Setting Land*, which is much esteemed; and some attribute to him *Adam's Art revised*, tho' that work seems to belong more properly to *Sir H. Platt*.

He also published *Sir R. Weston's* famous discourse of *Flemish* husbandry, without even knowing the author's name at the time of the first publication; and afterwards, in order to enlarge and better explain it, annexed *Dr. Beati's* annotations to it. This is all I know concerning his (*Hartlib's*) performances in agriculture. He writ, besides, *a true and ready way to learn the Latin tongue*, 4^o. 1654. *A vindication of Mr. John Durie*, 4^o. 1650, 3 sheets; and published *Tawisse's* *doubting consciences resolved*, 8^{vo}. 1652.

Blythe tells us, that *Hartlib* lodged and maintained *Speed* in his house, whilst he composed his book of improvements on husbandry.

Improver improved, p. 177.

plenty along with it, embellishing its borders, valleys, and a wide tract of country round it, with lively verdure and delightful landscapes; all which derive their richness and beauty from a single spring, which, by degrees, forms itself into an immense river, being fed and increased with numberless little currents and rivulets.

At the same time that these remarks are made by me, I have industriously avoided the taking notice of numberless passages which the antients have left us in regard to the happiness of a life passed in agriculture, as may be seen particularly in the writings of *Homer, Hesiod, Xenophon, Cato, Cicero, Virgil, Pliny the elder, Columella*, and others, who write sincerely from their heart in better ages. Agriculture is now the drudgery of the lowest part of mankind, and not the amusement of the brightest and most elegant genius's. These beautiful scenes of fairy-land appeared only in the earlier ages of rural simplicity: For the country *now* has adopted, from the higher world, its proportionable share of frauds, circumventions, over-reaching and artifices. For these reasons, we shall represent husbandry, at present, to be just *such* as it really is: Or, in other words, as being little more than matter of public and private *utility*.

Utility, therefore, being in our days the main object of human pursuits in agriculture, it is with justice, that the antients called the *earth* our *common parent*: For *she* not only feeds the tradesman, manufacturer, and artizan, but affords them materials to exercise their industry upon: By the exchange or sale of which men find resources wherewith to supply the second collateral necessaries of life; and, perhaps, it may be worth remembering, *that one million's worth of things vendible, being productions from our earth, and raised by our own hands at home, will, when exported, bring a nation more real gain than the sale*

sale of three millions worth of goods in manufactures, provided the materials manufactured are purchased from abroad.

From hence, as well as many other parts of the present work, it appears, that the fruits or vegetable productions of the earth are the *true real fundamental riches* of any country. All that *art* can add to *nature* establishes only a sort of wealth by *mutual convention* or compact, subject to vicissitudes of time and the caprices of custom. Agriculture alone can stand its ground amidst these revolutions: For the cultivations of the earth must always be attended to. Nay, so active is this first principle of human subsistence, that, if it be depressed in one country, it must naturally rise in another. When it subsides in part, the state will feel some sensible disorder; but, if it sinks intirely, the government will gradually sink with it. This made a great and observing genius say, almost two centuries ago, “that wheat, and other useful grains, like the flux and reflux of the ocean, will force their way in some place or other: If you check them in *Europe*, they may break forth in *Tartary*, or the *West-Indies*.”*

A sensible *French* writer has luckily hit upon the same original notion; “agriculture, destroyed by various causes, traverses the earth, flying from place to place, where it is oppressed, and taking up its rest where it is permitted to breathe freely. It reigns, at present, where nothing was formerly to be seen but desarts; and where it once reigned, there are now only desarts.”†

In every sort of work where man is concerned, and particularly in agriculture, which is the main occupation of man, the expences must be deducted before we calculate the profit. This is a plain simple truth, established upon common sense: And the

* MS. Note of *Gabriel Plartes* upon *Googe's Husbandry*.

† *Histoire de la Decadence*, &c. Tom. I.

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the neglect of attending to it has proved detrimental to many nations, which, being flattered with the shewy appearances of things, have preferred riches acquired by the tradesman and artizan (points highly valuable beyond all contradiction) to riches procured from the productions of the earth, our common parent, which supplies materials to the tradesman and artizan, either mediately or immediately: — And, that no offence may be given on this subject, an example shall be taken from our neighbours the *French*.*

The manufacturers of *Lyons, &c.* send abroad (more or less) every year, as many different sorts of workmanship in silk, as sell for 15 millions of livres; and *Paris* supplies foreign countries in goldsmith's work, jewelry, clocks, watches, gold and silver lace, embroideries, and a multitude of toys and trifles, commonly called *clinquallerie*, to the amount of 10 millions of livres annually; yet still the previous out-goings ought first to be deducted; for great part of the raw silk is bought from other nations; the gold and silver likewise are imported, upon which the artist shews his skill: And the stipend of workmen makes a considerable abatement. Nay, what is still more, these very people, thus employed, however dexterous they may be in their way, yet are of a genius absolutely limited, so that, upon a cessation of business in their proper department, they are unable to turn their hands towards carrying on the general and necessary labours of society, in order to procure subsistence for themselves or others. Of course, when their respective occupation stops, or is stopped, they must either remove themselves elsewhere (perhaps into other countries) or suffer extreme poverty at home. Which short comparison alone is sufficient to show that there is
some

* *Memoire du Marq. de Mirebeau pour concourir au Prix, &c.*
P. 254.

some little superiority on the side of agriculture in the long-run, and upon the whole.

Indeed, it may be retorted, that the consumption of provisions, occasioned by manufactures, advances the price of the husbandman's commodities; * agreed: — But at the same time it augments the price of labour, raiment, and almost every common necessary of life. All, therefore, we contend for is, that the two occupations may be *justly harmonized*, but that the scale may preponderate a *little* in favour of husbandry; lest, by any accident, some branch of trade may be checked or stopped; — for provision must be found for our fellow-subjects, and that justly, when they are willing to work, but cannot find employment; nevertheless, in governments rightly managed, there is no need of a competition or parallel between trade and husbandry, for in all cases they mutually aid and assist each other.

It is the same in the several branches of agriculture, compared with themselves: They reciprocally strengthen one another. Thus for example (to give one principal instance out of many) pasturage supports the cattle which are absolutely necessary for the cultivation of corn, and affords rich manures to carry on its vegetation with prosperity. — And again, the supreme institutor of husbandry has arranged things in such a manner, that no one principal branch should interfere with another in point of time. The preparation of the earth for receiving spring-corn, or grasses, is completed early in the year; then comes on the season of making hay; next succeeds an interval for summer-fallowing, as also for horse-hoeing and (in some countries) cleaning

* “ Though the value of labour will become higher, as manufactures increase, it will not compensate the greater expence of living. For this is only *one* article, and will not enable the lower and greater part of mankind to furnish themselves with such variety as growing manufactures render seemingly necessary, and difficult to be purchased.” *Numbers of mankind,*

ing the vineyard; afterwards all hands seem to be at leisure for carrying on the great work of harvest; which is closed by the vintage; then the sowing of wheat takes place, as also the season for winter-fallowing, felling of wood, repairing fences, carrying out, and spreading manures, &c. The whole is closed by a sort of pause and remission from labour, as winter is the time for a general preparation, in order to renew our labours with success and vigour the ensuing spring.

But to return from this short digression.

How far soever men may languish for the acquisition of great wealth too suddenly, certain it is, that gold, silver, diamonds, &c. drawn out of the mine, neither can, nor ever will enrich a country like the profits made by trade and agriculture; both which every wise legislature should cautiously guard and take care of as the eyes and heart of the political body, always remembering that each of them has a child's share in the affection and esteem of their foster-parent, who is to discover no undue partiality to one or the other, any farther than that agriculture ought to be considered as the *clær-born*. *Colbert* half ruined husbandry in *France*, by making an attempt to *disinberit* agriculture, and *adopt* trade; whereas, in truth, he ought to have encouraged both, and caused them to have flourished at the same time with all possible lustre. And here *Mr. Locke's* advice deserves to be written in the statesman's memorandum-book, with letters of gold; "he that would make the lighter scale preponderate to the opposite, will not so soon do it by adding increase of new weight to the emptier, as if he took out of the heavier what he adds to the lighter; for then half so much will do it." *

Upon the whole, it is never best for a country to acquire wealth too expeditiously. Riches, thus obtained, are like acquisitions made, not by patient

* *Considerations on lowering interest*, p. 7.

progressive industry, but by gaming or lotteries. — A weak mind is soon over-set with an inundation of wealth. So that, perhaps, it might be better for society, if sometimes over-grown fortunes (either in trade or otherwise) were not acquired too suddenly: For then there would be more equality, and less corruption of manners.*

It is highly prudent to place all the important truths above-mentioned in the best lights we are able; for some address and much delicacy are required in handling a subject of so nice a nature: Especially if one is conscious of dissenting ever so little from the commonly received notions of mankind. In *such a case*, it may be said with *Livy*, *Invidus, quasi vulnera, attingo.*

In addition, therefore, to what has been observed incidentally, though agriculture may bring less gold into a kingdom than trade and commerce do, yet it produces not only money (as in cases of exportation, &c.) but money's worth, or something more valuable to a nation than money; as, for example, food, increase of subjects, and many other blessings and advantages. — Of course, an industrious well-peopled nation (if the alternative is to be chosen) had better be without large sums of wealth, than suffer a diminution in its populousness; which latter must happen, when provisions, raised by agriculture, are rendered dear, or trade feels any considerable check or reduction. It is true, a large quanti-

ty

* Scripture warns against aiming to get rich too soon, or too compendiously: for great possessions thus suddenly acquired, throw men naturally into thoughtlessness and luxury. — *When the Lord hath given thee houses full of good things, which thou fillest not; and wells digged, where thou diggest not; vineyards and olive-trees, which thou plantedst not; — when thou shalt have eaten and be full, then BEWARE lest thou forget the Lord which brought thee forth out of the land of Egypt, from the house of bondage. DEUT. VI, 10, 11, 12. And again, According to THEIR PASTURE, so were THEY FILLED; they were filled, and their heart was exalted; THEREFORE have they FORGOTTEN ME. HOSEA XIII. V. 6.*

ty of money, or abundance of paper-credit in a country, carry with them a dazzling appearance, but the conclusion drawn from thence may chance sometimes to prove equivocal : Nor are they a real proof of solid permanent national wealth or strength, except agriculture joins its true concurrence : *That* being the only profession, which, if rightly managed, is subject to no change or variation, except for a moment. *Much increase of riches and inhabitants, says Solomon, is in the strength of the ox,** or, in other words, the prosperity of husbandry. From whence it follows, that a wise people would sooner be masters of the mountainous fields in the canton of *Berne*, than of the palace and treasury of *Deblia*. —And, at the same time, it has been observed, perceptibly enough, by the great writers of antiquity, when they have been considering public œconomics, that cities may be rendered unprofitably populous, when they drain the country of its due number of inhabitants, be the trade or commerce of a nation as great as may be imagined.

To explain the matter still farther, *one hundred pounds* gained by a farmer, including the work of servants, day-labourers, women, and children employed by him, brings more benefit to the community *than three hundred, or twice three hundred pounds* acquired by the work of a single artist, occupied in matters of mere superfluity and ornament : Tho' the *latter* has the appearance of being a more industrious and useful member. The *former* affords employment in part, or in the whole, to near 20 people, but the *artist*, circumstanced as above, calls in the assistance of no one. — All such sudden wealth, gained from the luxury and folly of others, is a meteor rather than a sun : It darts a momentary blaze, but has neither duration nor that kindly warmth which

* *Prov. xiv. v. 4.*

which feeds and enlivens nature. — Therefore, without talking figuratively, rich luxurious immoral states finish their career of glory like the *Rhine*, which shrinks into a rivulet before it loses itself in the ocean.

Of course, *that* profit which maintains most people, is of greatest advantage to any government; but when the earth is cultivated to its full extent, and we have still a sufficient number of men for useful trades, commerce, and manufactures, as also for the supply of our navy, armies, &c. then the arts of ornament and elegance may take place, *yet still with moderation.* *

It is a point incontestable, that the first occupation of mankind, according to scripture, was *that* of agriculture.

As far backward as profane history can afford us any light, the wise and sober heathens directed the employment of their lives by the patriarchal example and model, passing their days in simplicity and industry. The prince, the rich man, and the peasant, with a small difference of more and less,

* “If there are more people in any state than the lands can support with the best culture, then trade alone can make them flourish.” — “Industry, trade, and commerce may enrich and people a country where agriculture is neglected, but then the food must be brought from abroad.” — “The fine arts ought never to take place in a country, till the earth be cultivated to the utmost.”

Numbers of mankind, p. 22, 25.

“Indeed, if it can ever be proved, that a few artizans, &c. can produce more by the vent of their labours, and upon easier terms, than a larger number of men employed in agriculture, then a particular nation may *gain* in wealth, but *lose* in population.”

Idem, p. 22.

The effect of commerce is wealth, suddenly acquired; the consequence of such wealth luxury, and that of luxury the perfection of the elegant arts.

MONTESQUIEU.

less, pursued the same end by the same means. But now, as an ingenious and sensible author laments, † a considerable number of the great and opulent not only abandon their fellow-creatures in the country, but consider them almost as inferior beings of another species: As *bewers of wood and drawers of water*; whom they partly neglect and partly despise; when, at the same time, they feast upon the animals that these poor laborious people have nourished, riot in wines that their rustic hands have pressed, and sleep at ease upon *that very down* which came first from some *miserable cottage*.

To such of the great and opulent as are here described (tho' still there are reasons to hope that the number of them is not large) it is no ways our intention to address the following essays, but apply ourselves rather to the sensible, reflecting, and compassionate, who possess large tracts of land, and have many husbandmen and labouring peasants dependant on them. ‡ — These great and good persons cannot help recollecting that they owe not only their bread, but the delicacies of their table; the delicious flavour of their wines, fruits, and garden-vegetables; the raiment that cloaths and adorns them; the fire that warms them; the tapers that yield them light; the softness of their sleep; the magnificence of the equipage that draws them; and a part of the medicines that give them ease: — That they owe them, I say, to the care, industry, perpetual labours and attentions of their poor neglected fellow-creatures, who want almost every comfortable blessing which they supply abundantly to their superiors. For the
main,

† *Du Hamel; Cult. des Terres.* Tom. VI. *Pref.* p. 1, &c.

‡ *Apud majores nostros summi viri, clarissimique homines qui omni tempore ad gubernacula reipublicæ sedere debebant, in agris quoque colendis aliquantum operæ temporisque contempserunt.*

tain, that these careful pains-taking drudges require, is coarse cloathing enough to keep them warm, and humble food sufficient to pacify the demands of hunger; and thus (in many countries at least, or, in other words, in every part of *Europe* but *England*) they rarely taste of that wheat which their hands have sown, or the flesh of the cattle which they have bred up and nourished with so much care and anxiety. *Blessed is he who shall consider such poor and needy, industrious contributors to the ease and well-being of those who are more fortunate and opulent; the Lord shall deliver him in the time of trouble!*

Asking pardon for this short apostrophe, which appears not to be void of reason and humanity, it must still be remembered, in order to pursue the subject we are undertaking, that whenever nations become *populous*, and food grows *dear* and *scarce*, it is *then expedient to attempt discovering some new improvements in husbandry*,* which *Arcana* the supreme Father of all seems to have reserved in store, in order to reward the industry and diligent searches of his faithful children, and supply those wants and demands which naturally present themselves, when nations are rendered *populous, merely by being virtuous, laborious, and frugal.*

Mankind, at first, lived chiefly upon the spontaneous productions of the earth, freely reached out to them by the bounteous hand of nature. † But,

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when

* "As people increase, let invention increase; and thus by industry food may be multiplied. — Even as twenty hives of bees, being all industrious, do live as well as if there were but one hive in the same garden."

Gabriel Platter's discovery of infinite treasure, 4^o. p. 23, 1638.

† The picture of this progressive life is partly copied from *Parro*. — *Gradum fuisse naturalem, cum homines viverent ex iis rebus quæ inviolata altro ferret terra. Ex hac vita in secundam*

when societies began to grow more numerous than such supplies of food could well maintain; recourse was had to the spade, and industry employed it well in order to augment the quantity of sustenance which the earth was able to produce. Mankind still multiplying, and fresh demands increasing, the plough was called in, as an happy succedaneum; but when the whole together could not suffice, and nature at length grew languid and exhausted under continual efforts, the husbandman allowed his lands a *fallowing*, and the advantages of rest and repose were thought of, in order to recruit and enrich the soil. From whence it follows, that new discoveries ought still to be attempted, in proportion as the want of provisions increases in any flourishing country. For it avails little to find a nation populous, if you have not food sufficient to support the community upon easy terms. Plausible theories, upon this occasion, are little more than ingenious amusements; a series of well-made experiments can alone establish matters of fact. For, though a dextrous artist may give shrewd guesses by the help of a correct eye, yet, in works of moment and difficulty, he should always have recourse to his *rule*.

Therefore what we want chiefly in husbandry, is a *series of experiments, judiciously made, and faithfully related*.

“Reason hath deceived me so many times,” says that excellent writer on agriculture, *Gabriel Plattes*,

dam descendisse pastoritiam, cum propter utilitatem ex animalibus, quæ possent sylvestria, deprehenderent, ac concluderent & mansuescerent. In quæ primò non sine causa putant oves assumptas & propter utilitatem & propter placiditatem. Tertio denique gradu a vita pastorali ad agriculturam descenderunt; in qua, ex duobus gradibus superioribus retinuerunt multa, & quo descenderunt ibi processerunt longe, dum ad nos perveniret.

De Re Rúst. l. ii. c. 1. p. 74. a. 74. b.

Plattes,* "that I will trust reason no more, unless the point in question be confirmed, and made manifest by experience: — Without *which*, no knowledge in husbandry is perfect; for experience admitteth no imposture. †

This is a very frank and honest declaration, and the author, in order to prove his sincerity on the occasion, composed a treatise, intitled, *Art's Mistress, containing his own experiments for fifty years*; but it was never published, so far as can be learned at present; which may be attributed to the hurry and confusion of the civil wars, or to that general inattention and carelessness which took place at the restoration.

About the same period, an *uncle and a nephew* collected another series of *husbandry-observations and experiments for seventy-four years successively*; but there are some reasons to fear, that the last-named *MS.* has either perished, or slept in the same obscurity with the foregoing one. Not but that there may be copies of each *MS.* still extant; and, if such be the case, it is much to be hoped that the possessors of them

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will

* This author may be considered as an original genius in husbandry. By the known times of his life and death, it is pretty certain, that he began his observations in the latter end of queen *Elizabeth's* reign, and continued them through the reigns of *James and Charles I.*, as also during three or four years of the common-wealth. See more concerning him, ESSAY II.

† Etenim experimentorum longe major est subtilitas quam sensus ipsius. — Itaque eò rem deducimus ut sensus tantum de experimento, experimentum de re judicet.

Francisci de Verulum Instaur. Magn.

The same author, in order to excite a spirit of improvement, gives the following consolation to all such as are of an enterprizing genius:

Nemo animo concidat, aut quasi confundatur, si experimenta quibus incumbit, expectationi suæ non respondeant. Etenim quod succedit magis complacet: Et quod non succedit, sæpenumero non minus informat.

De Augmth. Scient. l. v. c. 2.

will cause them to be published, which may be ventured upon with little risk; for experimental writings (supposing the experiments to be fairly and honestly made) will bear publication in any age; since time, fashion, and language can never affect truth and matter of fact; and what is new and instructive, will always carry its own weight with it; *opinionum commenta delet dies, nature judicium confirmat.*

But to resume the point we were before considering. If men will not be wanting in their inquiries, searches, and diligent endeavours, there are reasons to think that God will inspire them with means to feed and maintain a number of inhabitants and useful animals one third greater than what we have at present; * of which lucerne affords a proof no ways contemptible, in regard to cattle; whereas, on the other hand, husbandry, as it is negligently or ignorantly practised in some parts of this and other kingdoms, will be found in many such places to diminish the quantities of food and value of estates, rather than increase them.—Here certainly is full room for improvement.

It is therefore that *Solomon* recommends industry with so much vehemence to all those that cultivate the earth: † For, says an ingenious author (whilst he is considering the passages alluded to in the notes, *God seldom rains manna upon the slothful, or feeds them miraculously.* ‡ And by the way, according to the all-wise appointment of Providence, it is the same with

* *Rerum natura sacra sua non simul tradit: Initiatos nos credimus; in vestibulo ejus hæremus. Illa arcana non promiscuè omnibus patent: Reducta & interiore sacrario clausa sunt.*

SENECÆ Question. Natural. l. vii. c. 31.

† *Prov. chap. xiii. v. 2. c. xv. v. 19. c. xxii. v. 5. c. xxiv. v. 31.*

‡ *Platter's practical Husbandry improved, 4^o. 1656.*

with the *human mind*, as it is with the *earth*; for education and good agriculture make the like improvements upon either. * The wild herb derives a savage nature from the soil round it. The man born in ignorant countries is uncivilized and unenlightened. Transplantation into more kindly ground improves a plant, † and unwearied culture increases those improvements. Thus, likewise, it is with *man*. — Instructions exalt the powers of a docile mind, and industry, in teacher and learner, supplies the place of diligent cultivation in husbandry. ‡

Another circumstance of a different nature ought to be mentioned, which is, that we recommend upon the present occasion, *a more correct and accurate sort of agriculture* than what is commonly made use of. Our intentions in so doing are two-fold. (1.) Tho' the out-goings are something more considerable than in the ordinary course of husbandry, yet the returns sufficiently counterbalance the expences, and that by one third at least, in clear profit; besides which, the tenant and proprietor will soon find the advantages of cultivating lands in this manner. The *former*, for a reason already assigned: The *latter*, for another reason equally obvious, which is, that the income of his estate will not *sink* at a new *taking*; for lands, cleared from weeds, and brought by diligence into good heart, may be long

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con-

- “ Natural abilities need pruning, &c. like natural plants.”
BACON'S *Essays*, vol. III. fol. p. 371.

† Exuerint sylvestrem animum, cultaque frequenti
In quascunq; voces artes haud tarda sequentur.
Necnon et sterilis, quæ stirpibus exit ab imis
Hoc faciet, vacuos si sit digesta per agros.

VIRG. *Georg.* II. v. 51.

‡ Nam ut ager quamvis fertilis sine cultura fructuosus esse non potest, sic sine doctrina animus.

CICERONIS *Tusculan.* 2.

continued in the same condition upon cheap and easy terms. — (2.) The repeated industry and diligence, necessary to be used in *this peculiar sort of husbandry*, will afford increase of employment to labouring-men, and also to women and children, who could otherwise gain next to nothing. In proof of which, a tract of land, planted with vines, lucerne, &c. will employ and maintain more country people, than doubly, or, perhaps, trebly the same quantity of ground sown with corn. Nor can there be any reason for discouraging or discontinuing these minute advantageous labours till a kingdom is found (upon some other accounts) to abate in its populousness. Hence it is that all inventions which perform the work of twenty people, with one pair of hands, are, upon the whole, detrimental rather than useful, in a well-peopled country, except you can have sure and quick vent for what commodities you *thus* produce: Whilst on the contrary, (at least in the present instance) the culture of *new* plants for husbandry-uses (or, in other words, for the better support of cattle) transplantings, horse and hand hoeings, weeding, digging, setting, drilling, breaking up, and meliorating barren lands (or, to speak more properly, *lands reputed to be barren*;) draining, peat-cuttings, making compost-dunghils, &c. ought all to be encouraged; as the owners gain much money by such undertakings, and employ more work-people at the same time.* To which we shall only subjoin one general remark, namely, that *in any country where there is full consumption at home, or commerce for exportation, the best use*

* “ Those machines which are designed to abridge art, are not always useful. If a piece of workmanship is of a moderate price, such as is equally agreeable to the maker and the buyer, those machines which would render the manufactory more simple, or, in other words, diminish the number of workmen, would be pernicious.”

use the land can be put to, is to cultivate THAT crop, whatever it be, which produces the greatest profit VALUED IN MONEY.

Thus I have known an acre of carroways equal in profit (all expences balanced) to five acres of wheat. And thus buck-wheat in *Germany*; and rye in *France*, make as good, and sometimes better returns than fields of pure wheat. — So that, in a very honest sense of rural œconomics,

— *Lucri bonus est odor ex re Qualibet.* —

I shall now only add, by way of concluding this former part of the present essay, that, let the advocates of *new husbandry* argue as long as they please against the use of manures,* yet one prime intention, in the method of culture, which we here recommend, is to multiply manures in quantity, as well as enhance their qualities, since all those who have cultivated the earth in all ages, have looked upon *them* as the solid foundation of good agriculture. Hence it was that we have turned our thoughts more particularly to the cultivation and improvement of grasses, whether natural or artificial; † since the multiplication of cattle will help to produce a multiplication of manures or dressings; and thus the productions of the earth are both cherished and augmented. — At the same time, the in-

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crease

* See this point considered more at large in the last Section of ESSAY II.

† “It is a misfortune,” says *Hartlib*, “that pasture-lands are not more improved. *England* abounds in pasturage more than any other country, and is therefore richer. In *France*, acre for acre, the land is not comparable to ours: And therefore *Forbes*, chancellor to *Henry VI.*, observes, that we get more in *England* by standing still, (alluding to our meadows) than the *French* do by working; (that is, cultivating their vineyards and corn-lands.)”

Legacy.

And

40 *The great Importance of Agriculture :*

crease of cattle increases the quantity of food for man. — Cattle not only enrich, but assist us also in various instances : For the soil is chiefly prepared for husbandry-uses by the strength of their labours — they are multiplied with ease, and require less care and attention than the culture of plants. Their instinct (in conjunction with the vigilance of their keeper) protects them from numberless accidents. They search their food and drink without a guide, and return at evening in like manner. They live longest in *that* way of life which approaches most to a state of nature. — The suggestions of nature supply them with more salutary medicines than their masters can give them, — They are more lively, and in better temper, when permitted to feed without doors, provided they are supplied with a sufficient quantity of wholesome food. For the sake, therefore, of this *second* principal branch in rural oeconomics, it were to be wished, that all lovers of agriculture would endeavour to introduce, amongst us, *new sorts of vegetable food for cattle*, in order to support them more plentifully, and consequently augment their numbers : And in like manner we should attempt to discover the most effectual method of destroying *weeds*, which are the defrauders and poisoners of all grass-fields. Nor ought we to neglect making experiments on *compost-dunghills*, the cheapest and most universal in their effects, of all manures : It being easy to collect them in the most solitary desolate places where men have not the power of purchasing such dressings as are to be procured in the neighbourhood of rich populous towns. Of course, no reasonable person will oppose the free use of them ; for the constituent materials are almost

And a judicious experienced writer, in our own times, observes, " that no part of husbandry is so much neglected in *England*, as the true culture of grasses,"

Miller,

most as easily procured, and lie as much at common command, as air or water :

Quid prohibetis aquas? Usus communis aquarum est.

It may be observed, further, that compost-dung-hills cost little more than the labour of collecting *what* is mere matter of nuisance in our fields and court-yards. And here, indeed, it may be worth observing, in what manner the supreme Being produces great and strange effects from causes seemingly mean and without value: Since many of the things, intended by him to fertilise the earth, are little less than an offence and incumbrance to us, if not removed from our houses, and the places near our houses. Thus the husbandman converts filth and dirt into wealth, more easily and effectually than any chymist. And, indeed, who could imagine that a new-mown field of grass, or a plantation of strawberries, owed their fragrance and sweet taste to the hearth and chimney; to sinks and gutters; and the very riddance of stables and pig-sties? We will now proceed to the second part of this essay.

From the multitude of books published on the subject of cultivating the earth, one would have imagined the *art* to have been more studied than it really has been; since upon the whole *it* continued in a sort of declining condition from the days of *Virgil* and *Columella* till the time of *Constantine IV*, and then lay in a kind of dormant state till about the middle of *Henry VIIIth's* reign, when it was rather revived than improved.

Indeed, about that time, judge *Fitz-Herbert*, in *England* (better known amongst us, as author of another excellent work, called *Natura Brevium*) *Fatti*, *Stefano*, *Agostino Gallo*, *Sanfovino*, *Lauro*, *Tarello*, &c. in *Italy*, published several considerable
books

books in agriculture ; but our countryman was the first, if we except *Crescenzio dell' Agricoltura* (whose fine performance was printed at *Florence* in 1478) and *Pier Marino*, the translator of *Palladius de Re Rustica*, who made his work public in the year 1528.

In the same century appeared *Matthioli's* commentary on *Dioscorides*,* as also a translation of *Theophrastus on Plants*, by *Biondo* ; and another of *Columella*, by an unknown hand.

Such of these *Italian* writers on husbandry, as did not concern themselves with translations, made the antients of their country their text and model, and are looked upon to be excellent in language, and no ways defective in experience and knowledge. On the former of which accounts, I have sometimes known collections of these authors works made in *Italy*, not for the sake of acquiring knowledge in husbandry, but merely on account of reading the pure *Tuscan* style. Mean while, *Fitz-Herbert* shone, † with equal lustre of truth, though not of lan-

* This noble work was first published in *Italian*, and five impressions were sold off in a few years : But the exquisite beauty of the prints, cut on wood, has made the copies extremely scarce. The *Roman* edition, in 2 vol. folio, 1560, is a very fine one ; yet, in some respects, must give place to the *Valdgrisi* edition at *Venice*, ten years before. The drawings of the plants were made by *Giorgio Liberali*, an ingenious young painter ; but, who the engraver or cutter was, I never could learn distinctly at *Rome* or *Venice*. Common fame mentions one *Theodosto Riccheli*.

† See more of this author in the notes to the next ESSAY, SECT. II

Fitz-Herbert's books of agriculture soon raised a spirit of emulation in his countrymen. I have seen a list of several *English* writers on husbandry, who were some of them his contemporaries, but have never been able to procure a sight of their works, nor obtain any material intelligence concerning the authors. For the sake of the curious, I shall give a transcript of their names, as it was minuted down, in queen *Elisabeth's* reign, by that famous husbandman, *Barnaby Googe, Esq;*

Sir

Language: For the *Italian* tongue was then in its meridian of glory, and the *English* had declined from the days of *Chaucer*, rather than advanced. Yet our countryman kept the field without a rival.

At length, in queen *Elisabeth's* reign, several husbandry-writers copied *Fitz-Herbert*; *Mascal*, *Markham*, and others, in the times of *James* and *Charles I.*, compiled from all; yet none had the gratitude to mention or acknowledge their first instructor. † So that (if we except only the occasional writers

Sir Nicholas Malber,
John Somer (canon of *Windſor*)
William Lambert [I am ſince informed, that he writ on the management and diſeaſes of caſtles]

Henry Brockbull,
H. King, D. D.

Henry Denys,
John Hatche,

Nicholas Yearzwort (query if not *Nicaſius Yearzwort*, whom *Anthony Wood* mentions as a writer on husbandry)

Captain Bingham,
Thomas Wettenball,

Richard Deering,
M. Franklyn,
Richard Andrews,
William Pratt,
Philip Partridge,
Henry Daſforth.

N. B. From this liſt it appears, that the *English* contributed as much towards the revival of agriculture, as the *Italians*; and (translations from the antients excepted) began as early. The *Flemings* and *French* made no figure till about a century afterwards.

† One writer particularly, not long after the reſtoration, tranſcribed the larger part of both *Fitz-Herbert's* books, almoſt verbatim, without ſo much as informing the reader, or making the leaſt apology for this freedom, but calling his *Plagiarism* the *Epitome of Husbandry*, 12^o 1669. He ſigns himſelf *S. B.* [*Samuel Blagrave*; or, as others ſay, *Billingſly*.] This tranſcript (now valuable by accident, as *Fitz-Herbert's* books are very ſcarce) reaches to the end of page 181, and the remaining chapters are taken with the ſame liberty from *Mascal*, *Blythe*, and an *Italian* author, who writ a treatiſe, called, by the tranſlator, *the Heroic Excellence of Horſemanſhip*. — Indeed, the copying of *English* writers on husbandry, one from another, has been ſo fervile and notorious, that there is hardly a miſtake in the antient authors laſt mentioned, as alſo in *Googe*, *Plattes*, &c. which is not faithfully preſerved in modern works upon the ſame ſub-

44 *The great Importance of Agriculture :*

ters on *Englisch* husbandry at *that* period, agreeably to what we have mentioned in the preceding note) we had little or nothing that resembled a systematical body of agriculture, but *Fitz-Herbert's* two books for the space of one hundred years; and then some new and great lights broke in upon us from the admirable writings and discoveries of *Barnaby Googe*, *Lord Bacon*, *Sir Hugh Platt*, *Gabriel Plattes*, *Sir Richard Weston*, *Hartlib*, *Robert Child*, *Dr. Arnold Beati*, *Evelyn*, and several others.

France, about the year 1600 (and not sooner) made considerable efforts in reviving husbandry, as appears from such large works as *les Moyens de devenir Riche*, and the *Cosmopolite*, by *Bernard de Palissy*†; *le Theatre d' Agriculture*, by *de Serres*; *l' Agriculture & Maison Rustique*, by *Mess. Etienne & Liebault*, &c. &c.

The *Flemings*, about the same period, dealt more in the practice of husbandry, than in publishing books upon the subject: So that questionless their intention was to carry on a private lucrative trade without instructing their neighbours; and hence it happened, that whoever wanted to copy their agriculture, was obliged to travel into their country, and make his own remarks; as *Plattes*, *Hartlib*, and *Sir R. Weston* actually did. Their principal, and, one may add, their very just idea of husbandry consisted in *this*, namely, to make a farm resemble a garden as nearly as possible. Such an excellent principle, at first setting out, led them of course to undertake the culture of *small estates only*, which they

subject; which will appear to every candid reader upon examination.

One may say, of *Fitz-Herbert's* husbandry, what *Sir P. Sidney* applied to *Chaucer's* poetry: *I marvel how in those misty times he could see so clearly, and how others, in such clear times, could go so blindly after him.*

† A poor potter, in the reign of *Henry IV.* of *France*.

they kept free from weeds, continually turning the ground, and manuring it plentifully and judiciously.

Having thus brought the soil to a just degree of cleanliness, health, and sweetness, they ventured chiefly upon the culture of the more delicate grasses, as the surest means of acquiring wealth in husbandry, upon a small state, without the expence of keeping many draught horses or servants.

After a few years experience, they soon found that *ten* acres of the best vegetables for feeding cattle, properly cultivated, would maintain a larger stock of grazing animals, than *forty* acres of common farm-grass. And the vegetables they chiefly cultivated for this purpose were lucerne, sainfoin, trefoils of most denominations, sweet fenugreek, buck and cow wheat, field-turnips, and spurrey, by them called *Marian-grasse*.

The *political* secret of their husbandry was, as we have observed before, *the letting farms on improvement*.

Add to this, they discovered eight or ten new sorts of manures. They were the first, among the moderns, who *ploughed in* living crops for the sake of fertilising the earth, and confined their sheep, at night, in large sheds built on purpose, † whose floor was covered with sand, or virgin earth, &c. which the shepherd carted away every morning to the *compost-dungbil*. Such was the chief mystery of the *Flemish* husbandry.

Of

† It appears, from *Shakespeare*, that sheep, in his time, were thus housed at night by the *English* farmers:

The turf mountains, where live nibbling sheep;
And flat meads *shut*'d with stover, them to keep: i. c.

Shelter at night under cover. Stover is wheaten straw.

Tempest, act 4.

Of living *English* authors, on matters of husbandry, nothing needs be said in this preface, since we shall testify our just esteem for them in many parts of the following essays; and, of those that have died within our memory, it may suffice to mention *Tull*, who, though an enthusiast in his way, gave great proofs of an extraordinary original genius. It is true, fancy and judgment, matter of fact and speculation, make their appearance alternately throughout his work; yet he had fund sufficient to hazard much, and leave plentiful remains for posterity. Hence the *du Hamels** and *de Chateauxvieux*** have derived their knowledge; improving some things, altering some, and expunging others: So that at present, from *their* example, all the civilized nations in *Europe* are attempting to light their torches from an *English* taper. *Tull*, therefore, upon the whole, seems to be the person, according to *Varro*, *cui nostra etas desert rerum Rusticarum omnium palmam*.

For this and other reasons, it may be said, perhaps, without laying ourselves open to the imputation of insular vanity, † that foreigners, upon the whole,

* * * These two foreigners may be considered as a couple of disciples bred up and formed in the *English* school of *Tull*. Like their master, they are both good scholars, and men of parts. *M. du Hamel*, in particular, enjoys several collateral advantages which *Tull* wanted, as the assistance of ingenious friends, persons of rank and station; and, above all, the countenance and patronage of his royal master; so that, perhaps, it may be asserted, without flattery, that this gentleman, and the marquis *de Tourbilly*, with regard to improvements in agriculture, have conferred a greater acquisition of valuable ground upon *France*, than any of her generals in the late war.

Concerning *M. de Chateauxvieux*, who seems to inherit a great share of *Tull's* inventive genius, see a note in the next essay.

† A writer, valuable for his antiquity and great insight into human nature, describes insular prejudices in a very short masterly manner. The words are spoken by *Minerva* to *Ulysses*, when

whole, have allowed the *English*, with one voice, to be the first nation of *Europe* in regard to husbandry: And, indeed, few, or no countries, in every respect, can boast such large tracts of lands, so well cultivated, as ours. It remains only, that we always endeavour to keep to the same height of pre-eminence, in the culture of lands, that we possess at present; that we watch the proceedings of our neighbours with a jealous eye; taking care, at the same time, that they never gain an advanced march upon us. "For it is a right attention" (say foreigners) "to agriculture, which gave rise to the greatness, riches, and power of *England*." †

Indeed it is observed in the same treatise I am now referring to, "that *England*, about the year 1621, was obliged to draw great part of its wheat from *France*, but recovered herself from that lethargy at the restoration"; which remark may be true in the first instance, but is not set forth fully and clearly in the second instance, any further than what relates to the law promulged in favour of the exportation of corn. We will therefore give a sketch of the whole affair upon a larger scale; the real history of the case being as follows:

Judge *Fitz-Herbert*, as has been observed elsewhere, revived the agriculture of the antient *Romans*

when he landed at *Phœcia* [now *Corfu*.] The expressions are strongly marked, and I shall leave them to work their way in the language of the original:

Ἄλλ' ἴθι σίγην —————
 Μὴδὲ τι τῶν ἀνθρώπων προλήσσειο μὴδ' ἐπίειπε
 Οὐ γὰρ ξείνους δίδω μάλ' ἀσθύνεις ἀνίχομαι,
 Οὐδ' ἀγαπαζόμενος φίλους ὅς κ' ἄλλοθεν ἔλθου,
 Κηνοὶ δοῦσαν τόγῃ πτωχίζουσι —————.

ΟΔΥΣΣ. Η.

† *Dissertation Prelim. aux Memoires Oeconomiques de la Suisse.* A Zurich, 1760.

mans in our country, and gave the first (or, at least, one of the first) original works of that kind to *Europe*, for the *Italians*, in general, began by translations from *Columella*, *Palladius*, &c. and the *Geoponic* authors. At the end of queen *Elisabeth's* reign, *Fitz-Herbert's* writings, by some unknown fatal concurrence of accidents, fell into a sort of obscurity. They were even forgotten, except by a few chosen genius's who made great, but unsuccessful attempts during the reign of *James I.* † (agriculture and rural œconomics not being held in much esteem, either by that prince, or his ministers: If we except the endeavours made towards establishing a silk-manufactory) and, when the patron of every useful and elegant art succeeded him, the morning of his reign gave the promise of a calm, clear, glorious day: But the noon of it was turbulent and stormy, and the evening closed with tempests and devastation.

Our fatal domestic wars changed the instruments of husbandry into martial weapons; but, after the death of *Charles I.*, artful avaricious men crept into the confiscated estates of the nobility, gentry, and clergy; and as many of these new incroachers had risen from the plough (or some low condition of life nearly allied to it) they returned with pleasure to their old profession, being chiefly animated by the love of gain. *Hartlib*, *Plattes*, *Blythe*, and others, seized

† During a part of the reign of *Elisabeth* and *James I.*, *France* exceeded *England* in the management of country-affairs, called, by the antients, *œconomics*: [Which, perhaps, was owing to the writings of *Des Serres* and *De Palissy*.] For *France*, at that time, allowed a free exportation of corn. *Colbert* hurt agriculture by encouraging manufacturers too much, and prohibiting the out-going of corn, under pretence of better subsisting his manufactures; but *Sully* had taken the other method, and had nobler, as well as juster views. *Memoire du Marq. de Mirabeau adressé à la Société de Berné, en 1760.* p. 271, 272, &c.

ed this favourable disposition of the common people, and encouraged it by writings which have not since been equalled; nor was *Cromwell* wanting to lend his assistance.

But a total change of things, as well as the very cast and manner of thinking, joined with universal dissipation, and a false aversion to what had been the object and care of mean despised persons, soon brought the culture of the earth into disrepute with the nobility and gentry; which single circumstance, at any time, will throw a damp upon agriculture: For the farmer loves to be encouraged, animated, and rewarded by his superiors. — It is true, the ministry, after the restoration, did all that was in their power to stimulate and sharpen the husbandman's attention, which ought to be related, with pleasure, to their lasting honour. Perhaps, some of them had struck upon the idea, by reflecting on the bad management they had observed in *France* and *Spain*, whilst they attended *Charles II.* in his exile.

England formerly suffered periodical scarcity and famine, almost as frequently as her neighbours. *Exportation of wheat* was first allowed about the year 1661, under several restrictions; one of which particularly was, that no wheat should be permitted to be sent abroad, except it sold at home below the price of twenty-four shillings a quarter.

* The advantages of such permission were soon perceived: For wheat, in three years, increased to such a degree in its culture, as to sink one third in price; so industrious were men to raise what they had free and prompt vent for. Pleased with such

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* This and the two next paragraphs are extracted from a little book, intitled, *Avantages & Desavantages de la France & de la Grande Bretagne par rapport au Commerce*, 12°. 1754.

promising beginnings, and in order to dispose of superfluous plenty, the ministry granted a new encouraging liberty of exportation, till the said grain rose to two pounds eight shillings a quarter. At the same time, a duty was laid of five shillings and four pence a quarter on *imported* wheat, which duty, in the year 1670, was advanced to sixteen shillings (or near one third the value of a quarter) which amounted in effect to a prohibition.

The government had reason to be satisfied with these prudent measures, and extended its views on the subject immediately after the revolution, by allowing a bounty of five shillings a quarter upon wheat to the exporter. *This was the secret spring that gave new motion to agriculture, and preserved that superiority we justly boast of at present.*

At the time abovementioned, and in two successive reigns,* a proportionable gratification was allowed on exported rye, barley, malt, oat-meal, &c. So that, in the year 1750, the bounty-money amounted to 325,405*l.* and, when this bounty-money ran so high, the price of grain, at home, was extremely moderate. Thus, supposing the government to grant 200,000*l.* every year, by way of gratuity, to encourage cultivators, the nation, in general, will gain 1,500,000*l.* from the single article of exporting corn.

Besides, whatever promotes the culture and produce of corn (as these laws naturally do) multiplies cattle necessary for labour, and increases the quantity of food for man, and manures for the soil: So that to promote tillage is, in other words, to encourage pasturage; the first advances the second, and, afterwards, they mutually assist each other. Nor does

* Vth of queen *Ann*; III^e. of *George* II.

does hardly any tract of ground in the world lie so commodious for exportation of corn, as *England*; for scarce a village of it is situated farther than 70 miles from the sea, so that all cultivators, with a little variation of more or less, enjoy the benefits of this national blessing; and, let *Du Hamel* and *Intieri* contrive government-magazines for grain, with the sagacity of *Vitruvius* or *Palladio*, yet still the best public granaries are vast tracts of country covered with corn.

England, in a fruitful harvest, can produce corn enough (upon supposition that none was sent into foreign countries) to support its inhabitants for four years. This is sufficient argument for exportation, whose great advantages will appear from the following remark; which is, that *England*, in five common years, namely, from 1745 to 1750 inclusively, shipped off, in grain of all sorts, to the amount of 7,405,786 pounds *sterling*, which, as has been observed elsewhere, is equivalent, in national advantage, to 21,000,000 in money, raised by manufactures exported, when the materials are not our own production. Besides which, the freightage of almost all the grain abovementioned* was paid to proprietors of *English* bottoms: And the care of raising this overplus of corn gave employment and subsistence to abundance of people. † — States that have no laws, prohibiting the exportation of corn, are always best provided with bread: And again, when they forbid free sale and exportation, they live in such a casual precarious manner as to seem, without speaking figuratively, a sort of rent-charge upon Providence. — From whence one may fairly draw two conclusions: That states which purchase

* About 633,650*l.*

† *Avantages & Desavantages de la FRANCE & de la GRANDE BRETAGNE par rapport au Commerce*, 12^o. 1754.

exported corn from us, are, to a certain degree, *our tributaries*: And that every country, of moderate fertility, which buys such corn of us, either neglects husbandry, or has not sufficient hands to employ in it.

Rome, though mistress of the world, happened not to understand this good policy: For by prohibiting the exportation of grain on the one hand, and giving no encouragement to trade and commerce on the other, she subsisted literally from hand to mouth, or, in other words, procured food for her subjects in a forced precarious manner; whilst *Carthage, Tyre, and Athens* (countries originally less fertile than the *terra potens ubere gleba**) enjoyed food of all useful kinds in great abundance. And thus it is, that the same liberty of exportation † (which, as we have observed, sharpens human industry, to such a degree, as to render half-barren countries fertile) supplies *Spain, Portugal, the south of France, Genoa, and the other sea-coasts of Italy,* with foreign corn. The same liberty makes its way over the barriers established by sovereigns, and spreads from *Dantzic, Stetin, and Hamburg,* over the vast inland tracts of *Germany.* Nay, *Holland* is a public reservoir of imported corn, whilst its own morasses are quite unfavourable to such production. — But the best of all public granaries or magazines, the cheapest, as well as most useful, and least dangerous, is only to be established on the basis of a full and free exportation of corn.

On

* *Italy. VIRG.*

† The reader may see the full advantages of it set forth at large, in a scarce curious work, intitled, *Le Detail de la France, 1695.* (The author was *Pierre le Pésant, Sieur de Bois Guilbert,* advocate-general of *Rouen*) See also the *Memoirs of the Count de Boulainvilliers,* fol. tom. I. p. 286.

On the other hand, without this liberty of exportation, a plentiful harvest, when nature bestows all her bounty for the support of man, affords, at the same time, but a melancholy prospect to the laborious cultivator ;

———— *Inopem me copia fecit.**

And this is often the case with husbandmen, if they cannot disengage themselves from the superfluity of plenty, at a tolerable profit. But, as nature never intended to bestow her blessings in vain, a permission of free vent and exportation makes this particular inconvenience an universal convenience, and, therefore, seems to be pointed out to us by Providence, that none of God's creatures, even in their own private thoughts, should repine at plenty, and wish for a certain degree of scarcity.

This makes it highly expedient for governments to promote and encourage the exportation of corn ; for, otherwise, years of abundance (except some physical accident intervenes) are usually followed by years of scarcity ; partly from the natural vicissitudes of things, and partly because the cultivator is dismayed with the low price of

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corn,

* *M. Du Hamel* has calculated and proved, that a little farmer, with no money before-hand (and that more particularly in countries where exportation is prohibited) must, with all his care, be greatly injured in a cheap year of corn, in so much, that he cannot retrieve his affairs, except with extraordinary difficulty. Something of this sort may be observed even in *England*.

It is a remark, likewise, made by foreigners, that in some years of plenty, in countries where there is no exportation, it is better economy in the husbandman to fatten kine, hogs, and fowls, with corn of an inferior kind and quality, than sell the said grain at a market-price. Which observation may sometimes (but very rarely) hold good in *England*.

corn, and, of course, neglects to sow one third of his lands that are proper for producing it. For it is the price, and not the quantity of grain, that animates the husbandman, and sets the plough in motion.

Next to allowing *exportation of corn, draining of fens and morasses, and recovering lands from the sea,* may be looked upon as the capital improvement in *English* husbandry: And, as the effects of this noble undertaking continue in a good degree of strength to the present hour, it may safely be asserted, that *England* has gained, for more than a century past, half a million a year, at least, from the said single improvement; not to mention the acquisition (if one may so speak) of so much land in fee-simple: For land, recovered to husbandry-purposes, is the same as conquering a new country. Now if my account stands right (and it comes from the best authority extant) our kingdom, in the space of a few years, till the year 1651 only, had recovered, or was on the point of recovering, in *Lincolnshire, Cambridgeshire, Huntingdonshire, and Kent,* 425,000 acres of fens and morasses, which were advanced in general, from half a crown an-acre, to 20 and 30 shillings. So that perhaps few Statesmen and Generals have better deserved a statue or monument from this country, than *Vermuyden*, the principal undertaker*.

Nor is *inclosing downs, beats, and commons,* less useful than draining fens. For thus barren lands, or lands next to barren, are rendered highly advantageous to society, and more people are supplied with food: Property becomes better secured, or at least profit; and the cottager, if he be industrious,

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* He was a *Fleming* by birth, and a Colonel of horse under *Cromwell*, but had before served in *Germany* in the thirty years wars.

receives as much from his ground as the ground is intrinsically worth. Whereas in the wild, and, as one may say, uncultivated state of nature, those proprietors that have a great live stock, consume all the herbage in the latter end of spring, and the beginning of summer, favouring their own pasturages, and having a secure retirement for their cattle, when the lands in common can afford no more food, whilst the poor peasant's only cow or horse have no place to retreat to. Such considerations induced one of our ancestors to observe, at a time when all *England* was divided into parties for and against this very article, "That the poor man who is Monarch of but one inclosed acre, will receive more profit from it than from his share of many acres in common with others*." And therefore it was both generous and politic in a neighbouring King, about 2 years ago, to give up for the sake of the poor, more than two hundred thousand waste acres, to be divided into small parcels for the emolument of the community: Which ground (supposing it to be of an inferior quality) will afford food for forty thousand new inhabitants. From whom and their descendants will arise a considerable national strength, as well as increase of population in half a century.

Yet *Kat's* rebellion in *England* may be called a rebellion against inclosures; nor was it the first time that the populace did not see their own true interest.

I will only add under this article, that many *Royal forests* and *chaces* (with the consent of our most Gracious Sovereign) might be applied to much better husbandry uses than they answer at present: The more profitable part of the timber being still

* FULLER'S *Holy State*.

preserved: New plantations of timber-trees might also be made, and various common fruit-bearing trees, as apple-trees, walnut-trees, cherry-trees, pear-trees, &c. might be placed in the new divided fields at a distance of threescore feet in every sense. Thus the trees will prosper exceedingly, and incommode, as little as may be, the corn or grasses underneath. *Quickset hedges* properly planted, weeded, and pruned, (three plants deep at least, and disposed in the following manner ) will make a sort of impenetrable fence, which at the same time will be neat, beautiful, and lasting. Every three square * miles, thus inclosed and cultivated, would give birth to a new industrious village, and increase both agriculture and population.

As to *grass-commons, downs, heaths, and wilds*, (after the soil has been examined with a pointed screw-borer) many of them will be found to contain large tracts of land that will yield good corn, &c. and produce crops of artificial grasses, superior in quality to what the same earth yielded formerly, and (to say the least that may be said on this subject) in a fourfold greater quantity.

Arable common-fields in half the parishes of *England* are another great impediment to the advancement of agriculture. Trespasses and injuries must be committed, even though the various occupiers are the honestest people in the world, and endeavour to act by their neighbours precisely as they would wish that their neighbours should act towards them. At the same time the several proprietors can seldom agree upon a proper general revolution of crops, nor will they often consent unanimously to give the great field in question its year of repose
at

at stated periods.—I shall say nothing of the defenceless condition of their dividends, be they small or great.—Thus the apparent liberty which the freeholders enjoy, in the present instance, is a real slavery: And productive of losses, vexation, or at least perpetual little uneasinesses.—But as it is next to impossible to convince the lower sort of people that they are prejudiced; or that they counterwork their own true interests; I think *M. du Hamel* and myself may lay aside our lamentations upon this article: However *England* (Heaven be praised!) boasts an happiness to which *France* is a stranger; for, if the freeholders of any parish with us concur unanimously in petitioning the Legislature to have this grievance removed, they find themselves redressed with speed and cheerfulness.

It may be said that the *inclosing and dividing of common-fields* will (by rendering the ground more manageable and convenient for culture) contract the national husbandry-labour, and consequently many strong useful hands may want work.

This objection has its weight: And, in another part of the present Essay *, I have espoused the opinion, speaking of machines in spinning, &c. where one person performs the work of ten or twenty, but in the particular case now before us I see nothing to fear; because the reducing into culture one million of waste acres at least (a work which still remains to be carried into execution) and upon which concession a part of my plan is founded) will find supplementary employment for the several peasants that may be debarred from the means of gaining a livelihood by the inclosure and division of common fields into distinct shares.

Add to this, that the *new* husbandry requires *one third proportion more of hands* than the *old* husbandry:

bandry: And therefore a part of it at least (for I have never recommended the whole to common farmers) seems to be reserved by Providence as a succedaneum for assisting countries when they become very populous †.

Having thus far considered the removal of some few national impediments to husbandry, it is at least a small satisfaction to observe, that Noblemen and Gentlemen who have great landed possessions, are, in the sense of agriculture, a sort of incontrollable Sovereigns. They may make many of the aforesaid improvements in their own demesnes; and possibly the example will have no small influence on their neighbours.

I will now return to the general state of husbandry in *England* about the time of the Restoration and some years afterwards; when *Evelyn* in the last century, and *Tull* in the present, opened a new sphere for the minds of mankind to range in: Since which period several good improvements have been made in *English* husbandry: and various useful hints have been suggested occasionally by Mr. *Miller*, wherever he had opportunity to consider the culture of artificial grasses. Nor must we here omit our own *English* *Linneus*, Dr. *Hill*, who, in the *Continuation of his complete Body of Husbandry*, has turned his thoughts particularly towards discovering and introducing new sorts of vegetable food for the support of cattle, in imitation of the late practice in Sweden. Considerable attention also has been paid to the ingenious and very curious remarks upon grasses, by Mr. *Stillingfleet*, who has given us these northern discoveries in more full detail.

In *Scotland* many ingenious persons have formed themselves into societies for the advancement of agriculture, which, if carried on with zeal and industry, may

† *Essay* II. *Sec.* the last.

may prove, in time, an article of great importance to that nation. Dr. *Home* has given his countrymen most of the assistance that chymical experiments can afford, and the late Duke of *Argyle*, with some others, have performed as much, or more, in the practical parts. But concerning the defects and omissions in *Scottish* husbandry, as also the causes that occasion them, together with the manifold improvements that remain to be carried into execution, I shall refer to a candid and sensible account lately published by a writer of that country who must be a good judge of the matter in question*.

Ireland, as long ago as about the middle of the last century, began to make no inconsiderable figure in the art of agriculture. The soil, in many places, is rich, deep, and manageable. The land of few countries seems to be more proper for the culture of flax and hemp, and no nation expends more money with foreigners for the materials of sail-cloth, cordage, &c. than *England*. Now hemp succeeds no where better than in a *well-drained morass*: And consequently might be raised in *Ireland*, with great success, and equal profit. I mention only this single instance, because it seems to be of great importance both to *Irish* and *English*; Being certain, in other respects, that every useful sort of grain or grass might be made to flourish as well in *Ireland* as in *England*.—*Tacitus*, with great justice, made much the same remark in ancient times: *Solum, calumque, cultus & ingenia hominum haud multum a Britannia differunt.*

Indeed the *French*, with all their boasted refined politics, prohibit their subjects from making amel-
corn

* WALLACE'S *Numbers of Mankind*, p. 150—159. See also a *Dissertation on the chief obstacles to the improvement of land in Scotland*; published at *Aberdeen*, 8vo, 1769.

corn into starch and hair-powder, under pretence of always wanting bread :) though one pound, thus manufactured, (all expences deducted) sells for more than two pounds of the said native amel-corn reduced to flour, and applied to making bread. But the example here alledged, carry with it no sufficient reason why a nation should send its money abroad in order to purchase *that* which may be raised at home by its own subjects.

Ireland, it must be confessed, had a wretched method of husbandry, and strong prejudices in behalf of *that* method till about the middle of the last century, when *Blythe* alone, (who then lived in *Ireland*, was sufficient to open mens eyes by his incomparable writings. But the truth is, that he, and many other *English* Officers and soldiers of *Cromwell's* army, being enriched by military grants and settlements, first laid the right foundations of husbandry in that kingdom; since which period, a certain spirit of improvement, more or less, has been promoted and carried on with such zeal and constancy by the Nobility, Gentry, and Clergy, that they may seem to cast a silent reproof on the nation that was their first instructor. So that if they go on thus for one or a couple of centuries more, and are, at the same time, powerfully and generously encouraged, it may perhaps be said, with no small degree of propriety,

Thus old *Romano* bow'd to *Raphael's* fame,
And scholar of the youth he taught became.*

In proof of this, the transactions of the *Dublin-Society* for encouraging husbandry are now cited by all foreigners in their memoirs relating to that sub-

* *Dryden's* Epistle to *Congreve*, who was a Gentleman of *Ireland*.

subject †; And having mentioned *Blythe* during the interregnum, it would be injustice in me to overlook a Gentleman of *Ireland* ‡ who, by his generosity and activity (all circumstances being rightly considered) has done more towards encouraging agriculture, manufactures, and employing the industrious poor, than any subject of superior rank and fortune, either in his own or other countries.

Yet, upon a cool revision of the state of agriculture in *Ireland*, it will be a great point gained, if the Nobility and Gentry animate themselves so far, as to carry husbandry to such lengths as the nature of present circumstances will admit: Which so long as they continue, will prove an insuperable bar to the bringing culture and commerce to its utmost possible perfection, in that country. — Nevertheless, even as things now stand, if the soil of this latter kingdom were duly cultivated, and exportation of corn allowed, with a bounty annexed, *Ireland* might be brought to maintain two millions more of inhabitants than it does at present.

Upon the whole I can only say that, if *Ireland* was incorporated with *England*, in the manner some have suggested, the *vis unita* of the *British* empire would be equal, if not superior to any one Power in the world. Nor is it of much consequence to our common Parent and Sovereign, nor to his subjects, where the strength lies, supposing it can be exerted whenever it is wanted. It is a pleasure to see united kingdoms resemble (in some degree at least) the *united kingdom of the universe*, where the sun *shineth upon all*, and the dew *falleth on all*.

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† Especially on the subject of raising and managing flax. See, amongst others, the *Mémoires Oeconomiques Rurales de Berns*. Tom. I. 160. 387. Tom II. 305.

‡ Dr. Samuel Madan.

We will now cast our eyes on the present condition and improvements of agriculture in other parts of *Europe*, and mention some few particularities, that may not be known to the generality of readers.

I rather chuse to undertake this task, as I had opportunities of observing, for many years, the actual state of husbandry in *France, Switzerland, Italy, Germany*, and the annexed provinces of the House of *Austria*.

After the peace of *Aix la Chapelle*, almost all the *European* nations, by a sort of tacit consent, applied themselves to the study of agriculture, and continued to do so, more or less, even amidst the universal confusion that soon succeeded. The *FRENCH* found, by repeated experience, that they could never maintain a long war, or procure a tolerable peace, without they raised corn enough to support themselves in such a manner, as they should not be obliged to submit to harsh terms on the one hand, or perish by famine on the other. Their King (in imitation of a laudable policy in *Cbina* *, where every person that has made any remarkable improvements in husbandry is created a Mandarin of the eighth class) vouchsafed to give public encouragement to agriculture, and has been present at the making of several experiments. The great and rich, of various rank

* The Emperors of *Cbina*, by way of setting an example to their subjects, plough a few turns once every year, and sow several sorts of grain and grasses useful in husbandry: Their Deputies of the provinces do the same, as also the Nobility. Reports are made at Court of the success and good management of the cultivators, and such as excel in agriculture are ennobled for life.

Agreeably to this *Hyde* tells us, that, amongst the ancient *Persians*, the Kings quitted their grandeur one day in the year, and eat with the husbandmen, in order to shew their regard for the art of agriculture. *De Relig. vet. Persarum*.

It is therefore a received political maxim in *Cbina*, whenever an individual does not work, that then some correlatives individual in the kingdom wants bread.

rank and stations, followed *this* example: The very Ladies put in for their share of fame in such a commendable undertaking; nay, even aged King *Stamislus* (like another *Dioclesian* in his retirement from a throne) amuses himself with husbandry in the solitudes of *Lorrain*, and has even corresponded on the subject.

FRANCE gave a wise attention to husbandry, even during the hurry and distresses of her last war. Some prize-questions in rural oeconomics were *then* proposed annually, particularly by the two Academies of *Lyons* and *Bordeaux*. Many alterations for the better were made by the Society for improving agriculture in *Bretany*.

Since the conclusion of the peace, matters have been carried on with great vigour. The University of *Amiens* has made various proposals to the public, for the advancement of husbandry; whilst the *Marquis de Tourbilli* (a writer who goes chiefly on experience) has the principal direction of a *georgical* Society established lately at *Tours*.

That at Rouen likewise deserves our notice*: Nor have the King and his Ministers thought it unworthy of their attention. The Archbishop of the diocese is one of the members. †.

I will add nothing farther on this subject, except that no longer ago than in the year 1761 there were *thirteen* societies existing in *France*, established by Royal approbation, for the promoting of agriculture; and these *thirteen* Societies had *nineteen* co-operating Societies belonging to them, whenever it hap-

* See *Deliberations and Memoires de la Societ  Royale d'Agriculture de la generalite de Rouen*, 8vo. Tom. 1. 1763.

† This humane and considerate Prelate (*M. de la Rochefaucault*) destroyed, when he first came to his diocese, a large warren of hares and rabbits, which he found on his demesnes, merely because they did great damage to the neighbouring husbandmen.

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happened that a district was too large to be effectually taken care of by one Society.—If our nation is not in a lethargy, I think *this* may be sufficient to awaken it.—A stolen march occasions the worst sort of defeat either in war, or political administration.

In the year 1756, his most Christian Majesty issued out an edict, by which he exempted from land-tax, (that is to say, in fields newly broken up) for the space of twenty years, all cultivators of madder in drained marshes and other waste neglected grounds. [But at the same time let it be remembered that public encouragement in *France* was given to the draining of fens and bogs, first in the year 1607, and then in 1641.]

As a proof that something has been done in the culture of madder, the Board of Agriculture, held at *Beauvais*, made it plain, in the year 1762, to all persons concerned in *dying*, that madder raised in *that* district, and (contrary to common custom) used, when the roots are fresh gathered, gave a finer tincture than the *Zeeland* madder, and went farther, in a proportion of 8 to 5.

August 16, 1762, it was also ordered in Council that no tax, for the space of *twenty* years, should be levied from grounds newly broken up; provided the said grounds had lain twenty years in an uncultivated state.

Many other encouragements have been since given to the cultivators of lands: And, if I mistake not, all packets and letters of correspondence to and from most of these Societies lately established, are exempted from the payment of postage.

Nevertheless it is not remote from my purpose to observe, as I am here speaking professedly of *French* agriculture, that the husbandman in *France* must pay six per centum interest for money; which circumstance

stance greatly retards all improvements; whereas in the canton of *Berne*, an adjoining country, he only pays four, and sometimes less; but then, on the other hand, labour is cheaper in *France** than in *Switzerland* or *England*: And the vineyard, in the two former countries, employs abundance of aged men half past their work, not to mention women and children.—But this may happen in our country also, if the *new husbandry* takes place in part only; and concerns itself no farther than in raising artificial grasses, and keeping them clean, which will afford as much employment for the weak and aged as the culture of vines.

I may add farther that the farmers in *France* have more the appearance of vassals in *Hungary* and *Poland*, than of free tenants. The estates they rent

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* The price of a man reaper in *France*, two years ago, was ten pence a day, and that of a woman-reaper half as much: Whereas, in many parts of *England*, the farmer paid two shillings, and two shillings and sixpence to the men, as likewise proportionably to the women, and allowed them ale.

In some instances I am inclined to look upon the *French* as defective in what we call *rural oeconomics*: For in *Anjou*, and many other districts of *France*, the farmers give the taker or thrasher a seventh part of the grain thrashed, which appears to me unthrifty management; since a brisk taker with us will thrash eight bushels of wheat a day, week after week; and a seventh part of a quarter of wheat, by way of wages, is beyond the quantum meruit of the labour.—Besides, when a work-man is paid upon this footing, he will never thrash clean, that being loss of time and profit to himself; for the ripe corn *beats* out apace with the first ten or twenty strokes of the flail, but it requires much patience, drudgery, and honesty, to work all the wheat clean from the straw.

As *France* is warmer than *England*, and wheat is there sown earlier than with us, it is my private opinion, that a good thrasher may disengage the grain from the husk, more easily than our work-men can, and make greater riddance in a day.—Thus much we know from experience, that drilled wheat is thrashed with more facility than wheat commonly sown; because the plants, by having room, air, and sun-shine, acquire greater maturity.

are too small. The occupant looks neither so contented nor so *warm*, in every sense, as the *Swiss*, *Bohemian*, *Saxon*, or *Austrian* boor; but seems to have sprung, like a mushroom, from the soil beneath him. The *res angusta domi* hinders him from *using what he approves*. His waggons, ploughs, and other instruments of husbandry are contrived more for cheapness than quick dispatch of labour: The strength of his working cattle is mean and contemptible. His *leases* also are of too short a duration for a tenant to aim at making improvements; which affects both *him* and the proprietor of the soil. Yet many encouragements under this article have been allowed, since the conclusion of the war.

A farther collateral defect still remains. It was bad policy in *Colbert* and his successors to tax the exportation of the husbandman's cattle, as also the exported productions of his farm, such as cheese, butter, dried fruits, &c. and at the same time exempt from duty the works of manufacturers.

Nor does *France* foresee one inconvenience in her boasted schemes of agriculture at present: For, when she has discouraged the increase of vineyards, and augmented the culture of corn, there will be found a deficiency of able-bodied men to carry on the work, as also of strong labouring cattle. Not but that her cattle may be enlarged in size, and multiplied in number, by cleansing, breaking-up, and inclosing large tracts of waste land, and raising artificial grasses, where the soil is capable of receiving them. But the *first* difficulty it is not in her power to remove at present: And it is highly problematical, whether ever she may be enabled to get over the *second*.

There is another remaining obstacle, *instar omnium*, which will never be surmounted till the *French*

writers of husbandry have eradicated the prepossessions and folly of a whole nation.

Permit me also to observe, in the second place, that one may venture to pronounce, without prejudice, that agriculture, *cæteris paribus*, will always flourish most in *free governments* and *Protestant countries*; and, not to go far for an illustration, it is highly probable, that the canton of *Berne* (a soil more mountainous, less manageable, and inferior to *France* in natural fertility) will, in a few years, exceed that country in husbandry-improvements, tho' *France* had gained a march of eleven years before the *Swiss* began to move. I shall say nothing of the number of holidays in *Popish* countries (as *M. de Frontefosc*, a *French* author,* has prevented me on that subject) but return to my more general design.

The art of agriculture, at present, is publicly taught both in *SWEDISH*, *DANISH*, and *GERMAN* universities, where the professors † may render their respective countries great service, if they understand the practical parts as well as the speculative ones, and can converse to advantage with the farmer and peasant, or with *Virgil* and *Columella*.

ITALY, likewise, has not been inactive. The *Neapolitans*, of the present age, have condescended to return back to the first rudiments of revived husbandry, and began to study afresh the agriculture of *Crescenzo*, ‡ which had been published in the year 1478. The people of *Bergamo* have pursued the same track, and given the world a new edition of the *Ricordo a' Agricoltura di Tarello*, which was

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* *Memoires sur le Fites*, par l' rapport à l' Agricult. 8°. 1763.

† They are called *Professores Oeconomici*.

‡ A new edition, in 2 vol. 8°. was published at *Naples*, in 1724.

first printed at *Mantua* in 1577, and afterwards, twice at *Venice*, in the years 1622 and 1629, but, at length, became almost as rare as a manuscript.*

— Nay, with regard to *NAPLES*, in particular, the late queen, † daughter of the late king of *Poland*, founded work-houses for employing the poor in every province of the kingdom, which houses are now become flourishing manufactures, insomuch, that one can hardly see a beggar in the streets. ‡

The duchy of *TUSCANY* has kept an equal pace with the kingdom of *Naples*. A private gentleman, of late years, left his whole fortune to endow an academy of agriculture. The first ecclesiastic in that duchy is president of the society, and many of the chief nobility make the members. — Even *FERRARA*, a small territory in the Papal dominions, has contributed its just contingent, and made some laudable attempts in matters of husbandry :

Major in exiguo regnabat corpore virtus ;

Agreeable to the observation which *Statius* made upon little *Tydeus*. — Indeed, this country affords room for admitting several good improvements in agriculture, and particularly in what relates to the draining of fens. The soil, in itself, is rich and deep, but the lands are so poorly inhabited, that hardly a sufficient number of hands can be found to mow the meadow-grass, of which there is great abundance.

Ani-

* The present new edition was printed at *Bergamo*, in 4°. 1756.

† This princess scarcely used a ribband, or a pin, but what came from *England*. A captain of our nation, who constantly freighted to and from *Naples*, gained a little fortune, by supplying her with millenary goods and trinkets.

‡ This passage was written in the year 1758.

Animated with a desire, that the people, under his government, should excel in husbandry, his SARDINIAN majesty has sent subjects to learn the practice of foreign countries, and made many attempts to establish a better kind of agriculture amongst his people.

In POLAND, where a natural fertility of soil seems to dispense with the necessity of calling in improvements, *M. de Bielowski*, grand-maréchal of the crown, has made abundance of successful attempts to introduce the *new husbandry* amongst his countrymen; and procured the best instruments for that purpose from *France*, and other parts of *Europe*.

The HOLLANDERS give little attention to agriculture, if we except only one single collateral instance, which is the draining of fens and morasses, and that proceeded more from self-preservation, than any particular turn towards husbandry. Nor is their soil, in truth, good for much, unless it be the producing of a coarse ordinary luxuriant grass. Nevertheless, these people (at least, in former ages) were a pattern of *industry*. Even, at present, they raise little corn, yet contrive to provide enough for themselves and other countries. Without timber of their own, they use more than any nation of the same extent of territory: And that particularly in ship-building and repairing their dykes and sea-breaches. They raise neither hemp or flax, nor encourage a breed of sheep for wool, yet manufacture more of all these materials than any people, except the *English* and *French*. They have no wine, yet consume a greater quantity than those nations that cultivate the vineyard, and, at the same time, supply many northern countries. Thus, where industry prevails,

————— *Omnis fert omnia tellus.*

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In some points, indeed, they are more industrious than can be justified ; witness their incroachments on the *British* fisheries, and many other instances, which it may be needless to mention : Since *Dryden* observed, near a century ago, that the *Dutch* wanted to possess, in effect, all the lucrative traffic of the world :

The *Streights*, the *Guiney-trade*, the herrings too ; —
Nay (to keep friendship) they shall pickle you.
Well may they call themselves an antient nation :
For they were born e're manners came in fashion ;
And their new common-wealth has set them free
Only from honour and civility.

In the year 1759, a society established itself at *BERNE*, in *Switzerland*, for the advancement of agriculture and rural oeconomics : Which society consists of many ingenious private persons, as also some of great weight and influence in the republic ; most of them men of a true cast for the improvement of husbandry, being enabled to join the practical parts with the theoretical ones. They have already given us two large volumes in 8vo.* They have appointed premiums as marks of distinction, and propose to continue this their laudable undertaking every year.

The *Canton* of *BERNE* seems to be a tract of land no-ways unfortunately circumstanced, all things considered, for receiving improvements in agriculture : For, though the soil, in general, is harsh and mountainous, yet the zeal of the governors and industry of the inhabitants may greatly counterbalance those original defects. Add to this, that the government is mild and equal ; the religion of the people sincere and plain ; the rich are restrained by sumptuary laws ;
the

* The title is *Recueil des Memoires concernant l' Oceanomie Royale de Berne*, à Zurich, 1760, 1761.

the peasants are parsimonious, frugal, robust, sober, and fruitful; in the latter instance particularly: Far beyond any thing that can be found among most of the inhabitants in the western parts of *Europe*. Their taxes are small, the purchase of land moderate, and the interest of money not high. Their possessions are circumscribed and bounded, which follows, by a sort of analogy, from the very nature and principles of their republic: And this circumstance contributes to render the country both strong and happy. It is farther remarkable, that no one territory in *Europe*, of the same size, abounds so much in springs, rivers, and lakes; (with few, or no very large morasses at the same time) nay, great reservoirs of water are frequently found on their highest mountains. — The inhabitants, without any assistances from the ocean, are no-ways ill situated for selling to their neighbours whatever they can produce; being placed, in a sort of central point, between *Italy*, *France*, and the Empire. It is their business, at present, to advance tillage so far, as that they may be enabled to supply their own wants to the full, and send some corn into neighbouring countries every year. For this country, almost half a century ago, raised more grain, generally speaking, than its inhabitants could consume; and, at that time, one of the best authors, who has written concerning them, pronounces the *Switzers* to be some of the ablest husbandmen in *Europe*.* But, be that as it will, the genius and cast of their soil leads chiefly to pasturage and the improvement of artificial grasses, as well as all other sorts of vegetable food for the support of cattle, the sale of which, of late years, has been the principal trade of *Switzerland*. And as to improving the breed, not only of cattle, but draught-horses especially, public

* See the account of Switzerland, in 1714, [by Stanyan.]

care has been taken, by calling in all assistances from *Holfstein* and *Friseland*.

It has been observed already, that the greater part of land, in the canton of *Berne*, is harsh and mountainous, but exceptions for the better are not uncommon.

Finer corn-countries can hardly ever be seen than in the *Argaw* and other districts. Almost the whole *Pais de Vaud* is as beautiful as the best parts of *Berkshire*, nor much unlike them; particularly near the lake of *Yverdun*, and in the tract of land between *Mendon* and *Morat*.

Some water-meadows, of natural grass, have been mown for hay three times in a year: * But the grass that grows on the sides of the *Alps*, and on the tops of some of them (where, sometimes, you see lakes and large plains) gives a delicious aromatic taste to milk, which will hardly be found in other countries. — A great number of vallies, even in the *German* province, are equal in fertility to the *Campania Felix*, and, perhaps, superior in the beauties of landscape. But, as the names of many of them have escaped my memory, the assertion may be corroborated by a collateral proof, — The valley of
Lis-

* The *Swiss*-cheests, called *gruyères*, are well known at most of the polite tables in *Europe*. They are much inferior to our north-*Wiltshire* and *Gloucestershire* kinds, having a rancid taste, and being full of air-holes, which contain an acrid moisture in them. This is not owing to any defect of the milk, which is delicious; but may arise from various causes; such as keeping the cream too long in hot weather, or not being provided with excellent rennet; to procure which, I hardly know any operation more nice and difficult. Much also may be attributed to want of skill in the dairy-woman, or a neglect of keeping the dairy-vessels perpetually clean with scalding water.

But the cheese, called *Schopziger*, (made principally in the canton of *Glaris*) has, in its kind, no equal: And, perhaps, the power of the juices of the six vulnerary herbs mixed with it helps to correct that acrid fetid leaven, which ferments in the *gruyère*,

Lindenthal, or valley of lime-trees, near *Glaris* (not indeed in the republic of *Berne*, but in a neighbouring Protestant canton) exceeds most prospects that a traveller can behold in regard to alps, rocks, woods, torrents, cascades, the bridge of *Bantenbruck*,* and fine meadows. This beautiful valley, in its finest part, is about 8 miles long by 3 or 4 broad, not to mention the slopes of the mountains which will take half a day in ascending: So that the whole is just as much as the human eye can command distinctly.

According to my own observations, what the people of *Switzerland* want chiefly at present, is to perfect their instruments of husbandry; — to import the finest and choicest seeds of all useful sorts from other countries, but more especially grass-seeds; — to lessen (in a small degree) their quantity of vineyards, as well as the passion for planting new ones; and obstruct *in part*, but *not intirely*, the migration of their subjects. The reason of this restriction shall be assigned hereafter, when we speak of the natural affection which the *Swiss* bear their native country.

Again, if the republic of *Berne* applied itself still more to the culture of corn, there would then be less need of magazines in most of the *bailliages*; nay, if a bounty was extended to such corn as was sent to neighbouring countries (whenever wheat and other kinds of grain bore a low price) the inhabitants would find the good effects thereof, from the highest to the lowest: And as all manufactures, or any other objects of trade and gaining a livelihood, are trebly advantageous when the materials wrought upon are produced at home, it might not be amiss,
if

* This bridge consists of one large arch, which connects two very high alps, covered with ice and snow. Beneath it runs a raging torrent, about 400 perpendicular feet under the bridge.

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if they manufactured their own wool, goat's hair, &c. and employed themselves more in raising flax; for the *Swiss*-linens are found, by experience, to be the most durable of any in *Europe*. Nor see I any *physical* reasons, why they might not raise mulberry-trees and breed silk-worms in some parts of their country, and carry on a business equal to the crape-manufacture at *Zurich*, which all travellers know and admire. — It is a great damp likewise to their trade, that a stranger is incapable of exercising his art, in cities and towns, by reason of the exclusive privilege of the inhabitants, which reduces the number of ingenious workmen into narrow bounds, and makes the produce of their labour not only dear, but of an indifferent quality. — On these accounts, one fourth part more money goes out of the country than ought to do.*

Such, according to the best of my judgment, are the *Corrigenda*, (or if that expression may appear somewhat too harsh) the few points which deserve to be re-considered with respect to the trade and agriculture of the republic of *Berne*.

The soil of *Switzerland*, in general, is, perhaps, that very sort of soil, which a sober, sensible, industrious nation ought to wish for. It pours not forth its vegetable productions spontaneously; but there is a force of nature in it sufficient to produce great returns, if virtue and diligence are the cultivators. Its very mountains are its fortifications; nor are ambitious neighbours fond of conquering a country, that will yield them nothing, *except by the sweat of*

* Under this head, *Stanyan* observes, who was eight years the *English* resident at *Berne*, that the *Swiss* have not uses and calls enough at home to occasion a full circulation of great sums of money, which lie partly dormant.

of their brows.† And this leads me to run the hazard of giving vent to a private conjecture, namely, that most republics at present (which, by the way, are always situated in a sort of waste ground, with respect to the countries adjoining) owe their duration more to the difficult unmanageable spot of earth on which they were established, than to any particular excellence in their form of government.

The sagacious *Machiavel* seems to think, that a rich soil tends to lessen the industry of people that inhabit it; and, if a nation like that of the *Switzers*, is contented with the portion of land it enjoys, and meditates no future acquisitions of territory, then a tract of earth which yields its productions with *some difficulty*, will, in the long-run, make its inhabitants a wealthy, happy, and powerful community.

In process of time, therefore, the canton of *Berne* may be brought to answer the description of an old geographer, who compares a country, walled round with rocks and mountains (like *Bobemia*) and circumstanced interiorly as *Switzerland* is, to a large piece of lawn, edged round, for strength's sake, with a selvage of coarse canvas. For the vales in *Alpine* countries make ample amends for the deficiencies of such parts of mountains as are truly barren.

Nature, in this case, in order to excite human industry, seems to have contrasted want and plenty, like shades and lights in the same picture. I have set before thee poverty and wealth, says she, stretch forth thy hand unto whether thou wilt! Nay, thus much may safely be inferred, that a rich soil, easy to be cultivated, naturally inclines the inhabitants to

† Scilicet omnibus est labor impendendus, & omnes Cogendæ in sulcum & multa mercede domandæ.

to indolence and remissness: And hence it is, that travellers of the best sense have remarked, that the cause of there being so many savage nations in *America* is the fertility of the earth, and the vast supplies of animal food, without care or trouble.

“ Observations of this nature,” says *Burnet*, “ surprized me yet more in the country of the *Gri-fons*, who have almost no soil at all, being situate (situated) in vallies, that are washed away, as it were, with the torrents that fall from the hills; and yet these vallies are well peopled, and every one lives happily and at ease under a gentle government; whilst other rich and plentiful countries are reduced to such miseries, that, as many of the inhabitants are forced to change their seats, so those who stay behind, can scarce live and pay the grievous impositions that are laid upon them.

“ On the contrary, *Lombardy*, which is certainly the beautifullest country that can be imagined, the ground lies so even, it is so well watered, so sweetly divided by rows of trees, in a vast extent of soil, above 200 miles long, and an 100 broad, in which the whole country is equal to the loveliest spots in *England* or *France*, and has all the neatness of *Holland* and *Flanders*, but with a warmer sun and a better air, caused by the nearness of the mountains; so that it seems the most desirable place in the world to live in; yet, after all, the government is so excessive (excessively) severe, that there is nothing but poverty and beggary over all this rich country; so that a traveller, in many places, finds almost nothing to subsist on, if he does not buy his provisions in the great towns, and carry them with him.”

And thus, in *Portugal*, where the soil is richest (as on the northern banks of the *Duero*) there the inhabitants are poorest.

Thus

Thus too in the canton of *Berne*, though the *Pais de Vaud* is, in its nature, by many degrees, a deeper and richer country than the *German* province, yet the best husbandry, and, upon the whole, the best crops are to be seen in the latter; so that in the *better* soil the husbandmen are generally poor, and in the *worse* soil it is not very uncommon to find a farmer worth ten thousand pounds; and that, for a plain reason, because the *German Switzers* are most industrious.

I am far from exhorting their excellencies, the governors of the republic, to restrain their subjects from going into other countries, or entering into foreign services, if such migrations are not too frequent and too numerous. For the *Swiss*, from a natural affection to their native country (a passion unknown and unfelt in the same degree by any other people) always return to their beloved original community: And like industrious bees (which, as *Pliny* says, *nihil norunt nisi commune**) bring back their little acquisitions to the public hive, at noon or evening. By making migrations in the earlier parts of life, they not only observe the agriculture, trade, and manufactures of other states, but divest themselves from the prejudices of their own country, and lay in, at the same time, such a stock of military knowledge and practice, as to form and instruct a militia of 50,000 men, that can be brought into the field at a month's warning; a corps respectable to the most warlike powers now in *Europe!* for every 10th man, at least, has been a regular soldier, and each *bailliage* (or *bundred*, to use the *English* expression) can produce its *Fabricii* & *Cincinnati*: †

Or,

* *Histor. Natural.* l. xi. c. 5.

† Plurimis monumentis scriptorum admoncor, apud antiquos. no^ros fuisse glorie curam rusticationis, ex qua Q. Cincinnatus obsessi consulis & exercitus liberator, ab aratro vocatus ad dictaturam

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Or, in other words, officers of experienced service and veteran commanders We speak this in particular of the canton of *Berne*.

It may farther be observed, that the severe frosts in *Switzerland* improve the soil: And the waters of their lakes and rivers are rendered more prolific in meadow-lands, &c. by being chiefly snow-waters. A spring wheat might not be unuseful to them, for reasons obvious to those who know their winds* and frosts in winter, and their powerful heats in summer. But, perhaps, even this suggestion may be needless, as their wheat is much protected in winter by the deep snows that fall, which not only guard and cover it, but serve to manure it.—Setting aside therefore this consideration, it may suffice to observe, that, as the country, here spoken of, has a moist, black, spongy earth, near its lakes and rivers, the inhabitants ought to be particularly diligent in searching for PEAT: (Which I have taken notice of, more or less, in many of the low moory grounds throughout the whole XIII cantons :) For peat will afford the inhabitants abundance of fuel, and its ashes will manure their upland grasses, † and all legumi-

turam venerit, ac rursus fascibus depositis (quos festinantius victor reddiderat quam sumpserat imperator) ad eosdem juvencos & quatuor jugerum (about 2 acres and 3 quarters *English*) avitum harediolum redierit. Itemque C. Fabricius & Carius Dentatus, alter Pyrho finibus Italice pulso, domitis alter Sabinis, accepta quæ virum dividebantur captivi agri, septem jugera [4 acres †] non minus industrie coluerit quam fortiter armis quaesierat. Et ne singulos intempetive nunc persequar, cum tot alios Romani generis intuear memorabiles duces hoc semper *duplici studio* floruisse, vel defendendi vel colendi patrios, quaesitosque fines.

COLUMELLA de Re Rust. l. i. c. i.

* The wind, called *la biza*, which blows from the north-east, is a black, harsh, cutting wind, being doubly more severe than wind from the same quarter in *England*.

† Peat-ashes are improper manures for grasses that grow in water-meadows, there being too great a sameness between the soil

guminous plants to great perfection. Indeed, I had neither leisure nor convenience to make any experiments, either on the fewel or the ashes of peat, when I was in *Switzerland*; but if the peat be of the prime sort, or even of an inferior kind, hardly any thing can be found that will contribute so cheaply and effectually to the sparing their woods; and the rather, as a scarcity of timber and firing is justly apprehended by their best writers. Nothing will afford more comfort to the poor, or better carry on the improvement of two-thirds of their pasture-lands.

That republics are better calculated than monarchies, for the advancement of agriculture, is partly true; for most republics (from natural reasons, rather than any strange concurrence of circumstances) are generally situated in a neglected barren soil: And there it is that art and industry make the most shining improvements in husbandry. Add to this, that the common-wealth we are now speaking of, and others of *Switzerland* in a lesser proportion, are living proofs, that there is, in such sorts of government, something analogous to the advancement of agriculture. The inhabitants are free from ambition (at least for a considerable time after the first establishment of their community;) Liberty gives them scope to exercise their industry, and equality excites emulation: For suddenly acquired fortunes out-strip, over-shade, and starve the lesser ones; whilst luxury keeps always in proportion to the inequality of fortunes.—Besides, small shares of property are better distinguished, secured, and bounded: And, at the same time, more capable of admitting a correct and accurate husbandry.

Praise

soil and the manure: For all manures, says *Columella*, “act by contrariety.”—They are also unfit for such up-land grounds as are shallow, gravelly, and apt to burn.

*Praise great estates — but cultivate a less ;**

Add to this, that liberty reigns more in places of difficult cultivation that require improvement, than in others which nature seems to have most favoured ; for liberty, in a rich plentiful country, falls naturally into licentiousness. — Not but that agriculture may be carried on with great success in *monarchical* governments ; — but more especially if they are *free Protestant* governments ; — of which *England* (to go no farther) gives a plain example. And thus, in antient times, *Alexandria* flourished as much when the *Seleucidæ* reigned, as *Tyre* did under a republican administration.

The reader, in all probability, may be inclined to think, that I have dwelt too long upon the present state of husbandry in *Switzerland*, and in the canton of *Berne* particularly : But every good Protestant must feel great regard for this industrious community, and wish it all prosperity, both civil and religious. *He that tilleth the land, (that is effectually, and not superficially) shall be satisfied with bread.* †
I shall therefore only add, by way of encouragement to this wise people, in their present attempts towards reviving and improving the art of husbandry,

* *Virgil*, here alluded to, seems to have well illustrated the sentiment of an old *Carthaginian* writer on husbandry ; *Imbecillio rem agrum quam agricolam esse debere.*

Colunella relates an instructive story upon this occasion : “ *Resert Græcinus in libro de vineis, ex patre suo sæpe se audire solitum, Paridium quendam duas filias, & vineis confutum habuisse fundum, cujus partem tertiam nubenti majori filix dedisse in dotem, ac nihilo minus æque magnos fructus ex duabus partibus ejusdem fundi percipere solitum. Minorem deinde filiam nuptui collocasse in dimidia parte reliqui agri. Nec sic ex pristino reditu detraxisse. Quod quid conjicit ? Nisi melius scilicet postea cultam esse tertiam illam fundi partem quam antea universam.*”

De Re Rust. l. IV. c. 3.

† *PROV. xii. 11.*

dry, that *Switzerland* is capable of being rendered truly rich, like *Japan*; that is, it may possess, in itself, most of the useful and necessary things conducive towards human well-being.—Its governors also seem to think (and that very justly, according to my opinion) that the source of real riches consists in the culture of the earth, which feeds the manufacturer as well as the artizan, and gives them an infinite number of materials to work on. Nay, history tells us, that the *Egyptians*, whilst they gave their attention to agriculture, had little need of turning their thoughts towards navigation.

Having proceeded thus far in an account of agriculture in general, and its present state in *Switzerland*, more particularly, it may be worth observing, in the next place, that *Linnaeus*, and his disciples, have performed great things in the north of *Europe*, and particularly in discovering new, profitable, wholesome, and well-tasted food for cattle.* *Sweden*, at the same time, has augmented a commerce that had been long cramped within narrow bounds, and bestowed successful labours on a soil, which, before was looked upon as cold, barren, and incapable of melioration; of this the late memoirs, published at *Stockholm*, will be a lasting monument.

Denmark follows the like example, as also many courts throughout all *Germany*. His *Danish* majesty encourages, in particular, the manufacture of wool, and has sent three persons into *Arabia Felix*, to make remarks, and bring over such plants and trees as may be useful in husbandry, building, &c.

At the same time, the duchy of *Wirtemberg*, (which is a country no-ways unfavourable to corn and pasturage) has not failed to contribute its assistances towards the improvement of agriculture:

F

Having,

* *Joseph. contra Appian.*

Having, two years ago, communicated to the public its *aeconomical relations* from the press at *Stuttgart*.

Nor have the ingenious of LEIPSI^c,* and HAN-OVER, † been inattentive to this great art of supporting human kind, and that amidst all the rage and devastations of war. How truly might the inhabitants of those countries have said, for many years past, to the *English* husbandman?

— *Nos dulcia linquimus arva,
Nos patriam fugimus. Tu, Tityre, lentus in umbra
Formosam resonare doces Amaryllida fylvas.*

Nay SPAIN, naturally inactive upon these occasions, in spite of all the prejudices of a bigotted religion, has invited *Linnaeus*, with the offer of a large pension, to superintend a college founded, for the sake of making new inquiries into the history of nature, and the art of agriculture. Certainly there is great room for improvement in that naturally rich, but neglected country. The very *Moors* that were banished from thence (to the amount of near 800,000) were better husbandmen than the native *Spaniards*: Being remarkably eminent for the knowledge of plants, which, in all probability, they derived from the *Cartbaginians* and *Arabians*. For one fourth of the names of useful plants now in *Spain* (whether medicinal or husbandry plants) are of *Arabian* or *Moorish* extraction.

The

* *Journal d'Agriculture à Leipzig*, 8vo.

† *Recueils d'Hanovers*, 1759, en plusieurs Parties. The same spirit is kept alive at the university of *Göttingen*: The last premium was allotted to him who furnished the best dissertation on the nature of smut in corn, and laid down the surest rules to prevent it. His late majesty *George II.* founded this society in 1751, and a premium is given every half-year.

The inhabitants of *Spain* are too lazy and proud to work. Such pride and indolence are death to agriculture in every country.—Want of good roads and navigable rivers (or, to speak more properly, the want of making rivers navigable *) have helped to ruin the *Spanish* husbandry. To which we may add another discouraging circumstance, namely, “that the sale of an estate vacates the lease: *Venta desbaze renta*. Nor can corn be transported from one province to another.

The *Spaniards* plant no timber, and make few or no inclosures. With abundance of excellent cows, they are strangers to butter, and deal so little in cows-milk, that, at *Madrid*, those who drink milk with their chocolate, can only purchase goats milk.—What would *Columella* say (having written so largely on the *Andalusian* dairies) if it were possible for him to revisit this country? For certain it is, that every branch of rural œconomics, in the time of him and his uncle, was carried to as high perfection in *Spain*, as in any part of the *Roman* empire.

Though the *Spanish* husbandmen have no idea of destroying weeds, and scratch the ground instead of ploughing it; yet nature has been so bountiful to them, that they raise the brightest and firmest wheat of any in *Christendom*. I have sowed it in *England*, and never tasted finer bread than what was made from its

F 2

flour.

* When a company of *Dutch* contractors offered *Charles II.* of *Spain* to make the *Tagus* and *Muncanares* navigable, from *Lisbon* to *Madrid*, the council of *Castile*, having long deliberated on the proposal, made, at last, this remarkable determination: “That, if it had pleased God that these two rivers should have been navigable, he would not have wanted human assistance to have made them such; but, as he had not done it, it is plain, he did not think it proper that it should be done. To attempt it, therefore, would be to violate the decrees of his Providence, and amend the imperfections which he designedly left in his works.”

flour. Such as propose to sow it with success in this country, should venture it into the ground before *Michaelmas*.

If the *Spaniards* would vouchsafe to open their rich silver-mines (in *Andalusia* particularly) so much extolled by *Polybius*, *Livy*, *Strabo*, and others, they would do better, than make migrations into *America*. Mines at home render the labouring peasants hardy, and are a sort of manufactures.

I will say nothing of two other large civilized nations in *Europe*, which have adhered to the old military system or antient *Gotbic* trade of *conquering* and *depopulating*; or, in other words, conquest abroad, and depopulation both at home and abroad: — “Now war, says an ingenious foreigner, makes men slaves, and slaves cease to think; desiring to excel in nothing, nor caring to labour any farther than they are compelled.”

ENGLAND alone exceeds all modern nations in matters of husbandry, but to say *it* has made all possible improvements upon this occasion, or is peopled to the full extent *it* can admit of, are assertions that deserve to be queried and examined: Always supposing that the inhabitants are truly industrious, and that trade, manufactures, and agriculture, are steadily pursued, and strenuously supported.

ENGLAND, as nearly as can be calculated (without including *Scotland* and *Wales**) contains about thirty-four millions of acres, and maintains, at the highest computation (higher, I believe, than the real truth) six millions and an half of people. Some modern writers compute, that the present inhabitants amount to no more than five millions and an half.

Out of these thirty-four millions of acres, we will discount, or set apart, nineteen millions for forests and woods

* *Wales* alone is thought to contain four millions two hundred thousand acres.

woods, downs, commons, wastes, barren lands, neglected lands, towns, high-ways, upland-pastures, water-meadows, orchards, rivers, &c.

From the remaining fifteen millions of acres, we will deduct a third part for fallow-land each year,* and then there will be left ten millions of arable acres *de facto*.

From these ten millions, let us subtract one fourth part of the grain raised, for feeding and fattening cattle, &c. (comprehending what is destroyed by birds, insects, and the like :) And another fourth part for malting, distilling, and seed-corn; and then the residue will be five millions of acres for making bread, or raising leguminous crops like field-pease, or cultivating field-potatoes, &c. which supply the place of bread.

Five millions of acres of wheat, barley, and rye, will, at an average of three quarters *per acre*, produce fifteen millions of quarters.

Three quarters of wheat, &c. will keep two persons in bread a whole year, supposing they were to live almost intirely on bread: † Such an allowance being pretty near two pounds a day to each person. Nor can this proportion, which is allotted them, be looked upon as parsimonious, but rather bountiful, especially if we take into the account sickly persons as well as healthy: And children and infants with men and women.

Therefore, as one acre of corn feeds two persons each year, of course, five millions of acres will af-

F 3

ford

* We are sensible this allowance is too great in fact, but it is what ought to be in all countries where husbandry is rightly managed.

† It is not uncommon in *Barbadoes*, for an acre of yams, set in rows, to afford food for four men all the year round, allowing to each man four pounds a day. Perhaps the same might be said of potatoes cultivated according to the rules of the new husbandry.

26 *The great Importance of Agriculture:*

ford sustenance to six millions and an half of people, setting aside the over-plus corn for exportation. — Not to mention that the *English* eat doubly more flesh than any other nation of the same size.

But, if the culture of corn could be improved so, as that the crops in general might be rendered *one sixth* part better than they are at present, of course we could feed more inhabitants, or enlarge the quantities set apart for exportation. — Or, in addition to this, if the inhabitants of a kingdom are sober, diligent, and industrious in their several occupations, and supposing trade, manufactures, and agriculture thoroughly attended to, *THEN one million* more of waste neglected acres might be inclosed, and receive the improvements of a just cultivation; which would augment the quantity of exported corn, or afford food to many more mouths, if the nation, by its industry, &c. should have the good fortune to increase the number of its inhabitants. And this seems to be the *me plus ultra* of our populousness and plenty: At least, till greater improvements may be discovered.

The island of *Barbadoes* gives us some notion how far populousness may be carried on, and the inhabitants supported with food: For, though this island is but a small matter larger than the county of *Rutland*, yet it has been known, since the beginning of this century, to have subsisted an hundred thousand inhabitants, when, at the same time, it contains but one hundred and six thousand, four hundred, and seventy acres of land, which is little more than one acre to each person. — But, whilst I say this, I ought to acknowledge, at the same time, that the island, here spoken of, draws some supplies of food from the neighbouring islands and continent; as *London*, no longer ago than in the beginning of the last century, received all its fruit and garden-stuff from
Flem-

Flanders; and *Holland*, at present, subsists chiefly on corn raised in other countries. Yet still the populousness of *Barbadoes* is surprisngly great, being, probably (if we except great cities and the district round them) as well peopled as any spot of land, of the same size, in the known world.*—But here let it be observed, once for all, that *great numbers* of inhabitants are the *glory* or *curse* of any country, according as the people are virtuous and diligent, or abandoned and lazy. In the latter sense,

Suis & ipsa Roma viribus ruit.

Thus have I endeavoured to make provision, either for increase of populousness, or exportation of grain. The same fields, better managed, will (as I apprehend) more than answer the first demand; but if it should be objected, that five millions of arable acres will but just suffice this our nation increased, perhaps one sixth in its number of inhabitants, and that exportation of corn must then cease;—this we deny;—for so long as free exportation is allowed, and grain bears a quick vent (being, in such a case, a species of commerce) the consequence will be, that another million of acres, above specified, will be broken up for corn, than which nothing is more feasible.

As to the *commonage* or pasture of these waste acres, the improvements, made in the culture of artificial grasses, will supply the loss, and that very abundantly, even if but one *third* part of *M. du*

F 4

Hamel's

* Permit me to observe here, in a note, that the territories of the children of *Israel*, from *Dan* to *Kadesh*, upon the northern bounds of *Arabia Petræa*, were not above 120 miles in length, and about 80 miles in breadth, from the *Mediterranean* to the eastern desert, yet, when *Joab* numbered the people, there were found to be 1,300,000 fighting men, besides women and children.

Hamel's observation is verified, namely, that *one* acre of lucerne, &c. being inclosed, and rightly managed, is equal to *twenty-four* acres of ordinary downs, heaths, and commons. †

These, and other considerations of a like nature, induce me to specify some certain *desiderata* in *English* husbandry: Nor may it be amiss, at the same time, to mention a few successful inventions and improvements that have been very lately made in several parts of *Europe*. For, wise as mankind may flatter itself to be, we are not absolute masters of physic, agriculture, and such-like sciences as depend on experience, observations, and experiments. Some things are reserved by Providence, as incitements and rewards for human industry, even to the end of the world.

From many experiments of my own making, I am highly persuaded, and in part convinced, that there is hardly a spot of ground, in our island, of any tolerable depth (excepting mere rocks, quagmires undrained, or land filled with some arsenical, or other poisonous matter) but may be managed so, as to answer some useful purposes of husbandry; being capable to be raised from one shilling an acre, clear profit, to ten shillings at least, and, in many instances, to a far greater proportion. Nature, with a small variation of more or less, has been almost equally bountiful to all her *industrious* children in all places. I lay some stress on the word *industrious*, because it is evident, that the richest soils in themselves, if the cultivator is indolent and unattentive, do not always produce the largest and best crops. In this sense let us compare *England* and *Sweden* with *Italy* and *Louisiana*, and we shall soon find that the scale preponderates, in favour of art and labour. Nature, ever generous and beneficent, has
given

† ESSAY II, Sect. ii.

given (to a certain degree) all necessary things to all places : Or, at least, has substituted a possibility of raising equivalent things for *those* that may be wanted by men or cattle. Thus wheat, grain, and grasses of most kinds, may be called, more or less, *universal growers*, provided they are cultivated with diligence and skill; and though Providence has made no provision for *want of industry*, yet it has had a tender regard for that sort of ignorance which arises from the circumstances of things : And therefore (to instance only in one example out of a thousand) where wheat does not grow naturally, or has not been raised by human industry, there are to be found sufficient succedaneums to make amends for its absence; as maize, rice, panic-grass seeds, and the roots of the cassava. — Yet, even here, art and industry make a new creation : For wheat has been found, by experience, to prosper no where better than in *Cbili* and *North America*.

But to dwell something longer on a notion that may appear, in the eyes of many readers, to be of a particular cast.

The supreme Being, in consequence of the malediction upon the earth, pronounced at the fall, seems to have appointed *industry* (in itself a virtue) as the only human means of alleviating the weight of such malediction. This being granted (and some traces of the doctrine appear, in many writers on husbandry, who were not Christians, as *Hesiod*, *Virgil*, *Columella*, and others) it seems to me, that all meliorations and improvements, in the culture of the earth, are divine rewards, proposed, and reserved for man, as the retribution of his diligence. And if diligence is to be encouraged every-where (God's punishments for remissness and rewards for industry being *universal*) it is certain that every soil is capable of being improved by human application, and made

made to answer some œconomical purpose, with regard to the well-being of mankind. It is therefore I have asserted, that almost all earths (excepting those above excepted, and they have their collateral uses too) may, in an husbandry-sense, repay the cultivator for his labour and charges. For, let a tract of ground be of what quality or mixture soever the most unbounded imagination can figure to itself, there is *one*, or there are many *useful* productions *congenial* to that very particular spot, and which would fail of succeeding *equally* in what we commonly call better ground.

Here the *desideratum* in agriculture is to compose a list of such soils as consist chiefly of one predominant substance, and of others again, that are made up of various mixtures (those mixtures being accurately specified :) Regard must be likewise had to mountains, uplands, vallies, and morasses, heat, cold, aspects, lightness, and stiffness of earth, &c. &c. and then the *profitable* crops (for such may always be found) *peculiar* to these very places are to be enumerated, together with rules for culture and the relative application of manures. These are discoveries in husbandry worthy of another *Verulam*; for it is no matter *what* crops we raise, provided they are *vendible* and *profitable*.

Nor is it improbable, but, if those essays should have the good fortune to fall into the hands of *Linneus*, or some of his disciples, that the undertaking may be completed one time or other, however extensive and tedious the manifold experiments may appear to be. It is true, neither a *Frenchman*, nor an *Englishman*, can submit to employ ten or fifteen years in composing an hundred pages; yet, perhaps, a *Swede*, or a *German*, may be endued with proper patience and fortitude. And thus much I dare venture to pronounce, that such a work, faithfully

fully and judiciously executed, will survive (and that with reputation) an infinite number of modern folios.

Our fellow-creatures may possibly arrive to higher perfection, one time or other, in the *culture of wheat*, notwithstanding it has been the constant employment of mankind ever since the world began: For, at present, a return of *seven for one* makes the common produce at an average throughout all *England*:* Nor is any *European* nation, upon the whole, more successful than ours in this point. Yet the two *Ulloas* (*Spanish* authors of great credit) assure us, that wheat in *Chili* often produces a crop of one hundred fold: † So that probably the soil proves better than ours, or greater space is allowed the plants. But then the misfortune is, that the husbandman in *Chili* has no vent, except amongst his few neighbours, and no exportation for the grain thus raised; which of course, reduces it to so low a price, that three *arrobas*, or one bushel and one gallon of wheat, *English* measure; are usually sold for two shillings nine pence three farthings, and sometimes for two shillings and three-pence.

We are not, perhaps, as yet sufficiently instructed in the economy that may be used as to the quantity of seeds that ought to be sown, or the right manner of keeping plants clean, and allowing them
space.

* Since writing this passage, I am more confirmed in my opinion, from the produce of a crop of wheat raised, last year, by that excellent husbandman, *Bellingham Boyle, Esq;* of *Rathfarnham*, near *Dublin*, who, from 16 lbs, or near a peck of seeds sown, reaped about 50 bushels of grain; which crop may be computed to have made a return of near two hundred pecks for one; on which account, the first premium was adjudged to him, by the *Dublin Society*, Nov. 18, 1763.

It is natural to imagine, that this was performed upon the principles of the *NEW HUSBANDRY*.

† *Voyages to South America*, vol. II. p. 245.

space.* We are guilty, probably, of omission or remissness, in not repeating ploughings, harrowings, and horse and hand hoeings; as also in the make and construction of husbandry-instruments; and the right preparation and application of manures.—We have done much, but not all that can be done, nor even the best that can be done in cultivating *new sorts of herbage for the support of cattle*: Nor are we curious enough to know, or diligent enough to destroy not only such *weeds* as are troublesome to the husbandman, but such as are always hurtful, and many times fatal to grazing animals. — Nor have we ever given due, or, perhaps, common attention to the *nature of each sort of water* which those creatures drink. This is an article of the highest importance, and falls under the chapters of *desiderata*, which *Columella* mentions, with regard to himself and other lineal successors of *Virgil*:

Nempe ea quæ quondam *spatiis exclusus iniquis*,
(Cum caneret lætas segetes, & munera Bacchi,
Et te, magna Pales, nec non coelestia mella)

Virgilius nobis *post se memoranda reliquit*. †

De Cult. Hort. l. x.

Perhaps we have not been sufficiently inquisitive and diligent in importing and introducing amongst us *new sorts of corn*, and particularly *that kind of wheat* which may be sown in spring: Which necessary

* See more on this subject in the next ESSAY, with an *experiment* for knowing the full extension of the roots of plants.

† *Columella De Cultu Hortorum; Rei Rust. l. x.*

The passage in *Virgil*, here alluded to, may be seen in the 147th and 148th verses of the *fourth Georgic*;

*Verum hæc ipse equidem spatiis exclusus iniquis
Præterco, atque aliis post me memoranda relinquo.*

rary *succedaneum* ought much to be sought for, when the latter end of autumn, or the winter ensuing, prove unfavourable to common wheat: Or, when we had not the power, by reason of some particular hindrances or difficulties, to sow it in *September* or *October*.—Now there is a *wheat*, cultivated in *Dauphiné*, *Languedoc*, *Flanders*, and near *Seville* in *Spain*, which may safely be sown in spring: That being, indeed, the proper time. I had once two bushels of this *Spanish* sort, sent me by my ingenious and worthy friend, *Philip Stanhope*, Esq; at present, his majesty's *Envoy Extraordinary* to the diet of *Ratisbon* and the circles of the *Rhine*; but not knowing *then* that it was a spring-corn (and, by the way, *M. du Hamel* fell formerly into the same mistake) I ventured it into the ground soon after *Michaelmas*, with other wheat from *Germany* and *Courland*; and, even then, about one third of the *Spanish* feeds survived the winter (which proved a mild one) and produced the best corn for bread I ever tasted.—Such corn must be sown in *England*, about the middle of *February*:* For it is a vernal, or spring-wheat.

Syrian wheat succeeds very well in *Germany*, and the *Swedes* have cultivated, with good success, several sorts of *buck-wheat* that were brought from *Siberia*.

If *maize* can be raised amongst us, on terms moderately easy, † it well deserves our attention, being an wholesome grain, and of so nourishing a nature, than an *Indian* savage can carry as much on his back as will support him during an expedition of six weeks

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* This is not the species of *Spanish* wheat taken notice of, p. 83.

† In the years 1760 and 1761, very good *Indian* corn was raised in the field by ——— *Debany*, Esq; at *Hungerford-Park* in *Berkshire*.

continuance. You may see vast fields of it on the banks of the *Rhine*, even in tracts of land where common wheat is cultivated with difficulty: And, in *Piémont*, the inhabitants live chiefly on it; nor does any food answer better in feeding and fattening cattle.

Maize, in *England*, may be managed after another fashion. The grains must be sown thick, and under furrow (in such manner as field-pease are sometimes sown) in light warm ground, thoroughly ploughed, manured, and made fine; and, tho' such plants cannot be expected to produce corn, yet they may be mown when 2 feet high, and given green to cattle, or made into hay. Either way they afford excellent forage.

There is another point of great consequence, tho' perhaps it be unknown at present, which deserves well to be considered by my ingenious countrymen: *There are many useful succulent annual plants, that draw their nourishment more from the air and influences of the atmosphere than from the earth*; and these seem to be intended by Providence for the advantage of poor shallow lands, either as a crop, or a manure, to be ploughed in. — Some farther verifications of this fact will be of great importance to agriculture.

The first hint of this improvement was suggested long ago to mankind by *Xenophon* * and *Var-*

ro.

* The original passage, in *Xenophon*, is as follows:

“What I think,” says *Ischomachus*, “highly necessary to acquaint you with, is, that, in such a case, you ought to sow your crop when the ground is moist, and when it receives most benefit from the influences of the atmosphere: And *then*” (that is, when the herbage is come to its due size, and before it begins to form its seeds) “you are to turn it under furrow with the plough, which will greatly enrich the soil, and give it as much strength as a good stercoration would do.”

ro. † So true is it, that there are but *few things new under the sun*. Two years past, a *German* nobleman revived this idea, after it had lain dormant for such a number of centuries; or, to do him justice, perhaps, struck upon it in the same original manner that *Xenophon* and *Varro* might do. Either way, great honour is due to a person of quality, who loves, knows, and studies agriculture in the midst of a court.

Nor have we imported half so many sorts of *leguminous plants* from *Asia*, and the districts round *Constantinople* in particular, as doubtless we might have done; nay, what hitherto has been introduced and cultivated, seems chiefly calculated to augment the luxury of great mens tables, instead of relieving the wants of the poor, or procuring a variety of wholesome food for cattle.

The *Swedes*, to their honour be it spoken, have taken most pains under this article.

As to the *algarobale* of *South America*, one species of which is cultivated in *Spain*, and called *Valencia*: As also the *Calevanche-pea* (or bean rather) of *Canada*, *Mary-land*, &c. they may be considered more at large by writers who shall hereafter treat of new and wholesome food for cattle. I have raised the *calevanches* in an *English* field, but as the seeds were old and damaged (for a little insect attacks the germinating eye of the bean in about the space of a year or sooner) I drew no very favourable consequence from my attempt: Nevertheless, some of the few plants that came to maturity, sowed themselves, and

† *Varro* is still more explicit: ——— Rectius enim in tenuiore terra, ea seruntur quæ non multo indigent succo, ut *citrus* & *legumina*. ——— Quædam etiam serenda, non tam propter præsentem fructum, quam in annum prospicientem: Quod ibi subsecta atque relicta terram faciunt meliorem. Itaque *lupinum*, cum nondam filiculam cepit, si ager macrior est, pro stercore inarare solet. L. i. c. 28. p. 60. b.

and survived the winter. Fame says, that the *calevanche* is originally an *European* plant; if it be, it is a sort of lentil.

It is remarkable, that, next to the care of horses, we have been more curious in the breed of dogs, than in that of *kine, sheep, swine, and goats*: Which are animals of much greater use to society. As to buffaloes, used in ploughing, where oxen are necessary, and the *Spanish* race of sheep, in order to obtain good wool, we may, one time or other, speak more distinctly; nor ought the present *Swedish* breed of sheep to be neglected, whose fleeces are equal in fineness to those of *England*, and the variety likewise of the breed may help a little.

There are *cows* likewise, in various parts of the *Indies*, that give a larger quantity of milk than ours, yet live harder, and content themselves with more penurious diet. And why may they not thrive as well with us as *Chinese* hogs, which are to be seen, at present, in almost every farm-yard in *England*, and, when mixt with our own breed, are preferred, even by country-people, to any other sort of swine: Not only because their flesh is better tasted, but because they require less corn to fatten them?

The *goats* of *Angora** and *Tripoli*† (whose hair can-

* *Angora*, one of the chief cities in *Anatolia*, is famous for its fine remains of antique buildings, as also for a breed of *sheep* and *goats*, whose wool and hair are not to be equalled, according to *Strabo's* account. — As to the *goats* in particular, *M. de Tournefort* tells us, that their hair is 8 or 9 inches long, finely curled, and of a dazzling whiteness. Many rich stuffs are made with it, but chiefly camblets. The common price of it, after the natives have spun it (by which they gain their subsistence) is not dear, if it be purchased on the spot: But an *oke* (or 25 lbs. weight) of the very prime sort, for the uses of the grand Signior and the Seraglio, often sells for 5*l.* sterling.

A print of the *Angora-goat* may be seen in *Tournefort's Voyages*, tom. III. p. 334.

† This was the *Cynphian* breed, so much extolled by the ancients:

cannot be equalled in manufactures for camblets, &c.) have been made denizens of *Sweden*, and the *camel*, some years ago, became familiarized to the climate of *Saxony*: Nor ought the honest laborious *ass* to be forgotten, in order to propagate a larger sort of *mules*: Especially in such parts of our kingdom as are stony and mountainous, and where few roads have been improved by erecting turnpikes.

It is certain, that a mule will struggle through the drudgery of hard service, better than a horse: He is also longer-lived, and kept at half the expence.

Every traveller that has made the tour of *Italy*, may remember, that all the stones, employed in building the duke of *Tuscany's* magnificent palace^m at *Florence*, were brought from the quarry (which, indeed, lay where the garden is now) by one mule: And, by way of preserving the memory of this useful drudge, there is a figure of it, in metzo-relievo, on one of the walls of the gate-way.

There is a farther use for mules in our country. It is a matter of some surprize to me, that, when mechanic artists have been encouraged to make chairs and sofas in such a manner as to promote not only ease, but a sort of luxuriousness in ease, no one person of fashion, in cases of extreme weakness, nephritic disorders, &c. has had courage enough to introduce the *Italian* practice of travelling in a sedan-chair or litter, carried upon shafts by two mules, and conducted by a muletier on foot; no

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fore

*Nec minus interea barbas intènaque membra
Cynipbii tondent birici, setasque comantes.*

VIRÖ. Georg. III. v. 311.

*Non hos lana dedit, sed olentis barba mariti:
Cynipbio poris planta latere finit.*

Mart. l. xiv. E. 94.

• Palazzo Pitti.

sort of land-conveyance being so cheap, safe, and steady; — so capable of being continued day after day; — and (all things considered) so expeditious. For the mule-driver, and his cattle, will travel, with pleasure, 40 miles a day, for a week together, in mountainous rocky roads.

Would not this be a more compendious and natural conveyance than to post our fellow-creatures in relays, at various stations, in order to carry a sick person, perhaps, one hundred miles or more, in a sedan-chair; or construct a sort of cumbersome hospital or lazar-house upon wheels, tottering in the air, and liable to be overturned (with no small danger) every hour; when a couple of mules and a muletier would dispatch the same business with ease to themselves, and satisfaction to the sick or infirm person thus conveyed?

A friend of mine proposed, some years ago, to send from *Spain* to *Ireland* a couple of asses 15 hands high, which, it was computed, would cost him one hundred pistoles each. Not to mention the difficulty of conveying them thence, against the laws of the country. Nor did the gentleman here mentioned, who has few equals in solid or polite literature, look upon this slight circumstance, relating to rural oeconomics, to be in any degree beneath his attention.*

It is some small neglect also in public management, that *corn* is allowed to be sold by *measure*, rather than *weight*: Since it would be very easy to state the just weight of what is now called a bushel of good corn. A public ordinance of this kind would have excellent effects: The purchaser would not be defrauded of his due proportion in flour, and the husbandman would find it his interest to plough,

* The person here meant, is *Joseph Henry*, Esq; of *Strassan*, near *Dublin*.

plough, fallow, and weed effectually: To procure fresh seed from a considerable distance, and raise the fullest, largest, smoothest, and heaviest grain. I have observed, numberless times, in wheat, sold by *measure*, a difference of ten pence in five shillings a bushel, between plump, sound, clear-rinded corn, and that which was shrivelled, diminutive, parched, and husky & such, in a word, as is usually gathered from lands of moderate fertility, that have received neither rest, nor proper manures; being ploughed superficially, and sown too late in the year; being also the produce of seed raised by the husbandman on his own lands, or purchased too near home. — This shews the great expediency of bringing *Spanish* and *Sicilian* wheat into vogue, for a bushel of good *Spanish* wheat usually weighs *ten* pounds more than a bushel of good *English* wheat: The difference being as 73 to 63.*

Our nation has complained, uniformly, for two centuries past, of the scarcity of *timber and fire-wood*, yet neither the public nor individuals have done much towards alleviating these just apprehensions. It is true, our nobility and gentry, of late years, have shewn unwearied diligence and skill in cultivating trees of foreign growth; but, in most attempts of this kind, the *ornamental* has taken place instead of the *useful*. Nevertheless we need not be afraid of exerting our best endeavours in the *latter* instance; for there are many trees, both advantageous and profitable, which remain still to be removed from their native countries, and familiarized to our climate:

Cælum, non animum mutant, si trans mare currant.

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But

* See more in *Hartlib's Legacy*, p. 15. 4^o. 1651, and in *Melissworth's Considerations of improving Agriculture*.

But without repeating the complaints of many of my sensible countrymen upon this subject; and notwithstanding that national evils rarely happen so soon, as mens fears predict they will happen; yet certain it is, that some public care should be taken for encouraging the raising of timber-trees and wood for fewel. We are now almost arrived to that univereal massacre of woods and forests, which an ancient poet describes:

*Nusquam umbrae veteres. Minor Otibrys, & ardua fidens
Taygeta; exuti viderunt aëra montes.
Jam natat omne nemus. Ceduntur robora classi —
Ipsam jam puppibus equor
Deficit, & totos consumunt carbasa ventos.*

STAT. Achill. I. v. 426.

The *cloud-capp'd* forests, by old bards renown'd,
Now only wave upon poetic ground:
Taygetus contracts her sylvan shades,
And *Otibrys* has her day-light and her glades;
The alpine larches rush into the main,
And sport exulting on the liquid plain:
Old *Ocean* groans beneath th' unusual weight;
Nor have the heav'ns a wind for ev'ry freight.

In the year 1750, a representation was made to the *French* king, requesting him that he would cause to be planted a large part of the forest of *Routray*, which yielded one production that was useful. Of course, by way of commencement, three thousand waste acres were set apart for this purpose, and planted with birch-trees and resiniferous pines, where the birches failed: For the ground was remarkably dry, sandy, and barren. In such a soil (if lands so circumstanced deserve the name of a soil) it has been observed, that the pines abovementioned will grow,

even though the earth be incapable of bearing any other tree. Nor should one be afraid to venture the larch (one of the most useful trees) to take its fortune in such-like barren tracts, which otherwise may be called a sort of rent charge on the community, being like the land of the *Cyclops*, mentioned by the ancient classic poets.

Waste forests in England appertaining to the crown, and waste tracts belonging to individuals, might be peopled with resinous trees at no great expence; and would supply the neighbourhood with hop-poles, spars for gates, laths, rafters, timber for building, and other carpenters work. Nay, masts might be taken from such plantations for small ships.

These trees, after 20 years growth, will be capable of yielding resin, and continue to do for the space of 20 years longer. From this resin is produced the oil of turpentine; and poor people, in alpine countries, make candles with it. An industrious peasant may extract in a year, from four or five thousand trees, one hundred, and sometimes one hundred and twenty quintals of resin.

When the 20 years for producing resin are expired, such trees as have been bored (for the timber of them is of no value) are condemned to the fire; and thus the pitch and tar are extracted, and from them the mariner works up his oakum. The waste wood may also be charred; and such charcoal (amongst other uses) will be particularly serviceable to smiths: For it takes off the sharpness of the coal-furnace, and makes the iron more ductile and manageable in the hands of a curious workman.

The seeds of these resiniferous pines may be procured from abroad, *at best hand*, for about three pence a pound, with some abatement, if purchased, by the bushel or quintal. They must be procured and brought over in such manner as we shall give advice concerning larch-seeds.

In a commercial kingdom like ours, enriched by such an extensive navigation, it behoves the government to take care, by the means of rewards and penalties, that fresh successions of timber may be raised for the sake of posterity. For we much want, what the *Roman* poet describes,

Sylvæ frequens trabibus, quam nulla ceciderat ætas.

Relative to this purpose, there is a passage in *Xenophon*, that well deserves to be taken notice of: "If the *Athenians*," says he, "had inhabited an island, and, in addition to this, had enjoyed the empire of the sea, they would have been able, as long as they possessed such advantages, to have annoyed others, without being reciprocally annoyed by them."* We leave the reader to judge how far this prophecy may be verified, in regard to *England*.

We will now return to the culture of useful trees.

The *apbernoussi*, or *arkemoussi* of *Switzerland*, *Trent*, *Carniola*, &c. might probably thrive to great advantage in our bleak, barren, rocky, mountainous tracts of land: Even near the sea, † and in north or north-easterly aspects, where something of this

* *Xenophon*. De Republ. Athen.

† If the *arkemoussi* will not thrive near the sea, there is, in particular, a *maritime* pine on the coasts of *Tuscany* near *Pisa*, and in many parts on the sea-coasts of *France*, *Spain*, and along the shores of the *Adriatic*, which well deserves to be propagated where plantations of them are wanted on the sea-coast, or when other plantations there stand in need of being guarded and protected from sharp and boisterous winds.

The timber of this tree has many uses. The tree itself affords its share of resin, and grows to a considerable size. There are three known sorts in *Europe*.—Fine prints of them, cut on wood, may be seen in *Matthioli's Commentary on Dioscorides*, l. i. c. 74. and in *Du Hamel's Traité des Arbres & Arbrustes qui se cultivent en pleine terre*, 4. tom. II. pl. 28. &c. à Par. 1755.

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this kind is much wanted. It is a species of pine or pinaster which grows on alps, and in alpine countries, where one would think it impossible that any tree could vegetate and prosper. The timber is large, and has many uses, especially within doors, or under cover. The branches resemble those of the pitch-tree, commonly called *spruce fir*:* But the cones are more round in the middle, being of a purplish colour shaded with black. The bark of the trunk or bole of the tree is not reddish like the bark of a pine, but of a whitish cast, like that of the fir. The husk, or sort of shell, which incloses the kernels, is easily cracked, and the kernels are covered with a brown skin which peels off: They are about as large as a common pea, triangular like buck-wheat, and white and soft as a blanched almond, of an oily agreeable taste, but leaving in the mouth *that* finall degree of asperity, which is peculiar to wild fruits, and not unpleasing. These kernels make a part sometimes in a *Swiss*-dessert:— They supply the place of mushroom-buttons in ragouts:— And are recommended also in consumptive cases on account of their balsamic oil.—Wainscoting, flooring, and other joiners work made with the planks of *apbernoussi*, are of a finer grain, and more beautifully variegated than deal, and the smell of the wood is more agreeable. From this tree is extracted a white, odoriferous resin. †

The *apbernoussi* is of an healthy vigorous nature, and will bear removing when it is young, even in dry warm weather. The wood makes excellent fir-

G 4 ing

* This tree is not called *spruce* from the *German* word, which signifies *Prussian*, but because the *French* in *Canada* gave it the name of *la Perusse*.—The leaves of it are put into beer.

† The curious reader may consult, on this and the like occasions, a very scarce piece, *De Arboribus Coniferis*, written, about 200 years ago, by *Pietro Belloni*, or rather *Belon*; for I am inclined to think he was a *Frenchman*.

ing in stoves, ovens, and kilns, but is dangerous to be used on the hearth or in grates, being apt to splinter and fly to a considerable distance.

That I may be as distinct as lies in my power, with relation to this valuable *European* tree,* (at present, little known to my ingenious countrymen, and not to be found in some of the best books on planting and gardening) it may be just worth while to observe, that it is the *pinus Cembra* of *Matthioli* and *Linnaeus*, the *pinus foliis quinis* in *Haller*, the *larix semper-virens* in the *German Ephemeris*, the *libanus Carpathius* of some writers, and the *pin a cinque feüilles*, N^o. 20. in *Du Hamel*.—The common people in, and near *Italy*, sometimes call it *cirmoli*.

A poetical writer, in the last century, who was passionately fond of agriculture, appears to have painted a forest of mountain *apbernoussi's* with as much justice and sublimity, as if he had sketched out the description at the feet of the *Swiss-Alps*; †

Sublimi feriunt rotantes vertice nubes. —

*— Quantum despicunt montana cacumina valles,
Tantum ILLÆ stantes in summo, montibus ipsi
Altius assurgunt; sic stabat turba gigantum,
Sic superinjectâ frondoso Pelio Ossâ
Stabant terrores superùm. †*

— On forests, forests rise,
Till the top branches touch the dewy skies. —

As

* There is a most beautiful print of the *apbernoussi*, cut on wood, in *Du Hamel's Traité des Arbres & Arbustes*, &c. tom. II. pl. xxxij.

† The poets were always struck with this beautiful part of an alpine landscape. *Homer* paints it in on one word, *σινοειφ. νικ.* *Iliad.* 2.—*Caput piniferum Atlantis.* *VIRG. ÆN.* 4. 249. *Rupes pinifera.* *LUCAN.* 2. 431. *Piniger Oibrys.* *VALER. FLAC.* 6. 393. *Nutant mutata cacumina montus.* *STAT. THER.* 6.

‡ *COULEIUS de Plantis*, l. vi.

As *Alpine* cliffs o'er shade the vales below,
 So these hang nodding o'er th' aerial brow
 Of *Alps*. — Earth's giants thus provok'd the fight,
 [While *Pelion* groan'd o'er-pil'd with *Ossa's* height]
 A terror to the gods! —

Since writing thus far, I learn from good authority, that the *apbernoussi* grows in great abundance on the most mountainous and coldest parts of the *Briançonnois*, where it is called, by the natives, *alviez*. It bears some resemblance to the white *Canada-pine*, which is better known in *England* by the name of *Weymouth-pine*.

The *horse-chestnut* is originally a native of *Great Tartary*. The *cedar*, with many useful *Siberian trees*, [and here let me no-ways forget, for the sake of cattle especially, some specimens of *cytisus*, the growth of *Siberia*, which were lately sent to me] have not disliked their removal into *Germany*; and, probably, out of fifty sorts of trees, which *Kalm* and others have transported lately from *North America* into *Sweden*, some may prove of great conveniency to human kind, and, in all probability, will soon grow reconciled to our earth, air, and sunshine. For *Du Hamel* justly observes, "that most trees which prosper in one country, will thrive in another country of the same latitude." Nor ought we, in *England*, to neglect attempting to cultivate the *acorn-chestnut* of *North America*: Which has the leaves of a common chestnut-tree, but the fruit resembles an acorn in shape, as does also the cup that holds it. It has the taste of a good chestnut; so that (if there were not certain objections to the contrary) one might almost pronounce it to be the *true poetical acorn*, which fed mankind in the age of simplicity.

If one of the best proclamations *James I.* ever published, relating to *mulberry-trees* and breeding
 silk-

silk-worms,* had taken any effect on mens minds, it is probable, we might have established some manufactures of *English* silk, at least a century ago. — And as there was always a difficulty, both here and in *Switzerland*, in bringing the mulberry-trees to bear leaves soon enough in the year for feeding silk-worms (since otherwise the young ones might be hatched, without having food prepared for them) of course, if the late discovery of an ingenious *Swede* be faithfully related in a treatise, intitled *Rural Oeconomy*, † this defect may be alleviated, by cutting the branches close, and pruning the mulberry-trees in the manner of shrubs, by which means the leaves will be produced a fortnight sooner, and the young shoots will be more tender and nourishing than those that are older. It is probable, the mulberry-trees, so much taken notice of, lately in our accounts from *Holstein*, *Denmark*, and *Sweden*, are cultivated according to this method. But I am assured the *Chinese* take a better course: They sow or drill mulberry-seeds as we do pot-herbs, and cut the young green herbage at one year's growth for the silk-worms when they are newly hatched; which proves a tender succulent food, and frees them from the diseases which old harsh leaves are apt to occasion. — Mulberry-trees grow wild in *South Carolina*, as also in some parts of *Canada*, and probably might be cultivated with little expence and labour, to such a degree, as to supply the *English* manufacturer with a considerable quantity of unwrought silk.

Things *seemingly* trifling and inconsiderable ought, by no means, to be neglected in *Rural Oeconomics*. ‡ — Our

* It is preserved by HARRIS in his *Legacy*.

† Abridged in *French*, and published at *Zurich*, 1761, 80.

‡ This shall be exemplified by an instance that appears to be trivial. — “Most of our notable house-wives,” says the *Swedish* author

—Our ancestors condescended to turn their thoughts to the management of *bees*; and the author of the *Aeneid* made it the favourite as well as finishing part of his immortal *Georgics*. — There have been more books published formerly in *England*, on *bees and apiaris*, than upon any single subject in husbandry. — Sugar, it is true, with the boldness of an empiric first discredited, and then promised an alternative by way of supplying those streams of honey which flowed naturally through our *Canaan*. The enchantress prevailed with the usual art of foreigners, and thus we sacrificed our health and simplicity for elegance and luxury.

Every cottager, however poor, may provide himself with *bees*, and neither nature, art, nor laws, have prescribed any bounds to these innocent wanderers, whom

author abovementioned, “have long despaired of success in rearing turkeys, and complained that the profit rarely indemnifies them for their trouble and loss of time. Whereas little more is to be done (continues he) than to plunge the chick into a vessel of cold water the hour, or, if that may not be, the day it is hatched; forcing it to swallow one whole pepper-corn, and then restoring it to the mother. From that time it will become hardy, and fear the cold no more than a hen’s chick.—After which, it must be remembered, that these useful creatures are subject to one particular malady whilst they are young, which carries them off in a few days. When they begin to droop, examine carefully the feathers on their rump, and you will find two or three, whose quill-part is filled with blood. Upon drawing these the chick recovers, and thenceforwards requires no other care than what is commonly bestowed on poultry that range the courtyard.

“These articles are too true to be denied: And, in proof of the success, three parishes in *Sweden*, for many years, have annually gained some hundred pounds by rearing and vending turkeys.”

Rural Oeconomy, p. 739.

[Our countryman, *Markham*, knew this distemper in the year 1631, and advises likewise, after the feathers are plucked, to examine if there be not a little core in the flesh beneath, and, if there be, to squeeze it out, and rub the wound with an infusion of salt in water.]

whom all mankind considers, in the light of cosmopolites.* They have a tacit right to seek their food wherever they please, and will thrive and multiply, not only in cultivated places, such as plains and meadows, but even in forests and deserts. An aged man or woman, unable to perform an hard day's work, may take care of an hundred hives : And, last year, a person in *Sweden*, who keeps bees only for amusement, sold their honey and wax for 50 *L. Sterling*.

A particular friend of mine, a learned dignitary in the church, who has amused himself at leisure hours with the management of bees, has observed to me, that the main objections which country-people have to the nurturing of bees, are, the expences of feeding them in winter, and the casualties of sickness, &c. to which these delicate creatures are liable in that season.—In order to obviate both which objections in part, or in the whole, he observes as follows : Namely, that most persons usually chuse a wrong situation and aspect for placing their hives ; making it their choice, as much as possible, to fix them so, as to front the noon-day sun. Now the gleams of sun-shine in winter, especially in clear freezing weather, waken the bees in their natural torpid state, and tempt them to make excursions till the frost benumbs them. In such weather I have seen bees sunning themselves upon the snow till they have lost their lives ; for the return of a casual and deceitful warmth tempts them to make little excursions. For these reasons, the gentleman abovementioned recommends a well-guard-

* *Solæ apes in omni genere animantium communem omnibus sobolem habent, unam omnes incolunt mansionem, unius patriæ glandantur limine, in commune omnibus labor, communis cibûs, communis operatio, communis usus & fructus est.*

Aristot. Hist. Anim. l. ix. c. 40.

guarded situation as to the north and east, but, at the same time, advises, that the mouth of the hive should rather front the east, than the sun at noon-day; for, in such a case, the bees would not be tempted, in bright winter-days, to range abroad, nor be wakened so often out of their dosing state; and, such being the case, they would, of course, require less food. This being premised, it may be observed farther, and that for the sake of the poor, that an industrious day-labourer, and his wife, if they live in a cultivated country well stocked with trees, may clear five or six pounds yearly by keeping bees, and that without losing more than a single hour now and then from their necessary employments, except once a year at swarming-time.

Bees may be multiplied to what number we please, if care be taken to supply them with a good quantity of vegetable food near home. It is well known these industrious insects will travel a great way for the sake of completing their day's work: So that I have known them make a tour of two miles a turn, twice or thrice in a day, in order to lade themselves with the rich plunder of a field of buck-wheat, till at length they have almost sunk beneath their burthen, not being able to get into the mouth of the hive. What they want, in clearness of eye-sight, is made up by a most exquisite sense of smelling, which *Lucretius* long ago took notice of:

———— *Ideoque per auras*
Mellis apes, quamvis longe, ducuntur odore.
 Lib. iv. v. 683.

Virgil, in recording the skill and industry of the old *Corycian*, mentions particularly his management of bees:

Ergo

*Erga apibus factis idem atque examine multo
Primus abundare; Et spumantia cogere pressis:
Mella fabis.*

Next to buck-wheat, bees are very fond of alder-buds for 6 months of the year, and one dark-coloured part of the bloom of vetches and other leguminous plants; as also maple-flowers, dandelion, thyme, honey-dew'd oaks, heath, white garden-poppies, turnip and rape flowers: But particularly the flowers of viper's bugloss, which beautiful and singular plant* those who have a large apiary should cultivate on purpose. Nay, bees will extract sweets from vegetables that are not very wholesome to mankind; or well-tasted; as field-poppies, stinking may-weed, henbane, murrain-weed, and the flowers of rue, whilst they partly neglect the rose, primrose; clove-gilliflowers, and the bloom of wheat and barley. [But this is related *ex fide aliorum.*]

As to buck-wheat, it is observed, that in certain lands of *Brabant*, called *Kempen* (and not the lands belonging to the *Abbacy of Kempton* in *Germany*, as an ingenious foreigner relates by mistake) the husbandman raises buck-wheat in small fields near home, and places round them, under the hedges, a great number of bee-hives, from whence he draws much profit, for no plant affords these insects a better supply of materials for making honey.

This

* This plant, assisted by the culture of a skilful gardener (let him only be careful in what sort of soil he raises it) may receive, perhaps, almost as many improvements as the auricula did. Its branches will rise to an height of 3 feet: And no vegetable would better adorn flower-pots in large chimneys; for, if the water is changed, it continues blowing near a fortnight after cutting. Its *ultra-marine*, blue colour, is the finest that can be seen, and the stalks are garnished with flowers from top to bottom.—There is reason to think, that dyers might extract an useful tincture from the roots. This plant grows wild in bare brassy soils.

This experiment may be tried in almost every place; but I relate not the fact from my own knowledge, any farther than that bees are very fond of sucking buck-wheat flowers.

It is much to be lamented, that *one* good nursery-man, or seeds-man, (I wish I could find a *more proper* word whereby to express my idea) is not encouraged to settle in each county of this kingdom, that lies above sixty or eighty miles from London. The country gentry, and their tenants, would soon feel the advantage of such an establishment: And each nursery-man, of this kind, *ought to have an honorary stipend* from the government. It is not our intention that he should employ himself (*that* being more properly the gardener's business) in raising ornamental exotic trees, choice fruits, flowers, and flowering shrubs; but in producing *such* trees, fruits, and plants, as are only profitable and useful in rural oeconomics: As timber-trees of all sorts, foreign and domestic; wood for joiners, cabinet-makers, &c. apple-trees for cyder; common eating-fruits for markets; sets for live-hedges, &c. and that he be careful to cultivate all sorts of plants which afford wholesome food for cattle; that every diligent cultivator, in the neighbourhood, may know where to apply for a stock of young trees, sets, or seeds near his own home, and upon easy terms. Such provincial nursery-men should be under the inspection of the national directors of husbandry, and should be nominated and removed by them.

When James I. formed his laudable scheme of encouraging the culture of mulberry-trees throughout England, for feeding silk-worms, he pathetically exhorted the nobility, gentry, and clergy, by letter, to purchase seeds of the best kinds, and bestow them on their neighbours; and some, I believe, were procured and distributed at his own expence.

pence. In like manner, the king of *Prussia*, the other day, supplied his husbandmen with seed-corn ; and with good reason, for nothing great and extensive can be effected in agriculture, except the sovereign of a country lends his encouragement and assistance as well as protection.

London, very improperly, is at present the nursery for all *England* : But, without mentioning the expence, difficulty, and hazard of carriage, there is an objection remains, that appears, in my judgment, to be *instar omnium*, which is, that the trees and plants, removed from the environs of our metropolis, pass from a warm manured artificial soil into a common, cold, neglected earth : For such, in general, is the difference between a field close by *London*, and an ordinary country field ; whereas, in all transplantings, one would naturally wish to remove from a *poorer* into a *richer* earth ; but not *vice versa*.

It may be observed also, occasionally in passing along, that, as the soil of almost every county has its general predominant cast and temperament, it is not improbable that trees and plants, removed only ten, twenty, or thirty miles, will assimilate better with the nature of the soil, than if transported to a distance of one hundred or two hundred miles.

That they will take root sooner is self-evident. Nor does this remark interfere with what I have recommended in another place concerning the advantages of procuring seed-corn or grass-seeds from a far greater distance ; which seems to arise from the all-wise appointment of Providence. We can easily dispense with the absence of some particular trees, but not so easily with the want of wheat, grasses, and leguminous plants : Which (making some few exceptions here and there) I have already called *universal growers*, provided they are cultivated

ted by the *hands of the diligent*.—In case they degenerate, or yield a scanty produce, the fault must be laid on man's remissness and inattention; *yet had I planted thee*, says scripture, *a noble vine, wholly a right seed; but then thou art turned into a degenerate plant of a strange vine unto me.* JEREM. iii. 21.

Quick-set hedges, better, perhaps, than what farmers now commonly use, are of great antiquity. *Homer* mentions them; * *Columella* treats of them professedly. Nor is it much to be doubted, but that several quick-set fences and hedges might be brought into use as well as those of white and black thorns. Witness the holly-hedges in *Scotland*, and those of *wild service*† in *Sweden*: Not to mention the barberry-tree, privet, yoke-elm, and spindle-tree; ‡ (all of common *English* growth:) And, where slighter fences are wanted, *French* furze, eglantine, or wild rose, and even goose-berry bushes.—At the same time, truncheons of willows might be set in the form of a *St. Andrew's cross*, in moist damp places.—As to the *mimosa*,|| brought of late years from *Panama* to *Jamaica*, one may have some reasons to doubt its thriving in our colder climate; though, if I mistake not, experiments have been made upon it lately in *Sweden*, in order to raise a strong substantial fence.

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* ODYSSEY, book the last: Where the poet describes *Larcius* employing himself in husbandry, and taking care of his garden.

† I am inclined to think, that the wood of the wild service is preferable to box for engraving prints upon: As it is sufficiently hard, yet at the same time mellow and less brittle. Nay, some engravers at *Rome* have assured me, that *Marc Antonio* cut several prints on *this* wood.

‡ *Euonymus*.

|| The *English*, in *Jamaica*, call this plant the *thorned sensitive*.

Nevertheless it is more probable, that the passion-thorn of *North America* may be applied successfully to such purposes: (See a print of it, Plate III.) Nor ought it to be forgotten, that *Hartlib* recommends the *locust-plant* upon like occasions; and for one reason, amongst many, which renders it highly acceptable to the generality of husbandmen, and that is, because we shall find it to be a very quick grower.

But no fence, of the solid permanent kind, pleases me so much as the *horn-beam hedges* in *Westphalia*, and other parts of north *Germany*; this being the sort of fence which best answers *Columella's* definition of a good hedge:

— Neu sit pecori, neu pervia furi.

De Hortis.

When the *German* husbandman erects a fence of this nature, he throws up a parapet of earth, with a ditch on each side, and plants his horn-beam sets [raised from layers] in such a manner, as that every two plants may be brought to interest each other in the form of a *St. Andrew's cross*. — In that part, where the two plants cross each other, he gently scrapes off the bark, and binds them with straw thwart-wise. Here the two plants consolidate in a sort of indissoluble knot, and push from thence horizontal slanting shoots, which, form a sort of living palisado, or *chevaux de frise*. So that such a protection may be called a rural fortification. These hedges, being pruned annually, and with discretion, will, in a few years, render the fence impenetrable in every part. It is not uncommon in *Germany* to see the sides of high roads thus guarded for ten miles together: And it were to be wished, that all lovers of husbandry, in *England*, would follow the
same

same example. Even upon our great turn-pike roads, it is a melancholy, and, to say truth, a slovenly sight, in a land famous for agriculture; to find, sometimes, no mounds or fences at all (though the adjoining fields are rich, arable, and pasture lands) or, at best, to meet with gaps and shards every hundred yards, large enough; not only for a sheep, but even for an elephant to enter. Of this foreigners see very glaring instances, not twenty miles from our metropolis.

I am the rather inclined to recommend horn-beam hedges managed as above, because this tree is not delicate in point of soil, but will thrive on ground seemingly barren. Its wood is preferable to that of the yew or crab for yoke-timber, mill-cogs, heads of beetles, or handles for tools. If the horn-beam be judiciously pruned, it will send forth lateral shoots, even from that part of the stem which is within 3 inches of the surface of the ground. It is, moreover, a speedy grower, and, by the irregularity of its stubborn horizontal branches, deters cattle from browsing the leaves, or attempting to force a passage through.

It may also be observed, that certain remains of Gothic sovereignty, called *laws for the better preservation of game*, are very prejudicial to the well-being of husbandry: (At least, according to the tenour of these laws, in most countries, as well as the manner in which they are enforced.) For, if any person has an equitable right to game, it ought to be the occupier of the ground, who keeps and maintains the creatures we are speaking of. But this is a trifling expence, or damage, in comparison of the losses which the cultivator sustains from an inundation of sportsmen, unqualified by law, and void of compassion to the poor husbandman. Indeed, all gentlemen, of humane dispositions, make their tenants

and other farmers some recompence for such waste and depredations committed.

I shall say little in this place concerning *public granaries*, notwithstanding the late excellent discoveries and improvements made by *Du Hamel, Pezunas, Intieri*, and others; because, upon the whole, I think public granaries quite *detrimental*, rather than *useful*, in a free state like ours. *National* and even *provincial* magazines of corn will naturally produce *monopoly*: And an undue fear of famine,* joined with much anxiety about hoarding up grain, (which will put a stop to exportation) is one of the surest methods I know of bringing on a dearth. † Nay, supposing the care of national magazines was committed to the management of the most sensible and best principled men that can be found, yet how few would engage in such an undertaking without proposing to themselves some sort of recompence for their trouble? And, of course, the oeconomy of a private merchant must not be expected from public undertakers, or at least from their successors.

On the other hand, free vent and exportation awakens the farmer's industry, and surprizingly multiplies the culture and production of grain; but the effects of a contrary practice may be seen, with half an eye, by all travellers in the *Roman* ecclesiastical state, where the husbandman raises no more corn, than just so much as he thinks sufficient to supply

* *Metus in deteriora semper inclinatus est interpres.* *LIVII Hist.* l. xxvii. sect. 44.

————— *Plurima versat:*

Pessimus in dubiis augur, timor. —————

STAT. Theb. l. ii. v. 5.

† La crainte de manquer des graines, & les precautions qui en resultent, entraînent dans l'écueil que l'on veut éviter.

Police des Graines, p. 23.

ply the uses of his own family: * All beyond that point is labour thrown away for the sake of other people:

Sic vos non vobis mellificatis apes. —

Nothing hurts a nation like ours, where free sale and encouragement is allowed the cultivator of grain, except it be some sudden unforeseen scarcity, † for I will not call it *famine*; since famine can rarely happen in a country where corn is cultivated, not only for domestic, but foreign uses. Men will naturally raise enough (and, perhaps, something more than enough) of any production, whose sale is open and certain: And if some disastrous scarcity should happen once in 15 or 20 years, from the inclemency of seasons; it will seldom last longer than one year; And as some corn (the produce of a former year, in a country where agriculture flourishes) may always be supposed to remain in hand, it will, of course, help to make some amends for any present deficiency.—Nor are these short periodical scarcities so terrible, in truth, as some have represented them: For observing persons have remarked, when a scarcity has prevailed in one part of a kingdom, and not in another, that labouring people have thought it worth while to quit a plentiful district, and resort to one where provisions are scarcer, in order to procure better wages. —

Sicily transported an immense quantity of corn each year to *Italy*; and, for that very reason, the

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* When a *Roman* husbandman raises a crop of corn, an agent of the *Pope's* granaries fixes the price at so much a bushel, which price the poor husbandman cannot dispute, nor has he the liberty to sell to any other.

† We have shewn before, that such years of deficiency often succeed years of plenty from assigned reasons.

Sicilians suffered no famine, but the *Romans* frequently.

In the next place, it is never advantageous for a nation that corn should *bear too low a price*. What the manufacturer gains by keeping his workmen cheaper (I mean beneath a certain moderate price) is over-deducted by the losses the husbandman and landlord sustain. A good price of corn animates the cultivator, and procures plenty: Whilst plenty naturally increases population. —

Those who have opportunities of perusing any *MS.* chronicles of *English* agriculture with care, will find that the art of husbandry flourished most, when corn kept longest upon an equality of price: — And to this remark common good sense will suggest another: Namely, that to prohibit, cramp, or tax any production or commodity, is to operate against its activity.

Yet, though I declare my sentiments thus freely against *provincial* or *national granaries*, it shall, however, be acknowledged, that the new foreign method of constructing granaries is wonderfully ingenious, and admirably well contrived; (such receptacles for keeping corn being cheaper built, and containing five times more grain in the same space, as well as answering every other intention much better than the buildings contrived by our ancestors for the same purpose :) And, of course, I recommend the use of them earnestly to gentry, farmers, &c.* for their private advantage and emolument; being for promoting, as much as lies in my power, the convenience and well-being of individuals, and only desirous to put society upon its guard against *what-ever* may terminate in *public monopolies*: Which are the curse of all free industrious communities.

But

* See an upright ground-plot of these ventilating granaries in the *Traité de la Construction des Graines*, 12^o. p. 206, by *M. du Hamel*.

But the private granaries here described and allowed (by which I mean stocks of corn laid up by individuals) can scarce possibly degenerate into any monopoly, but, on the contrary, enrich the vender (by whom we ought to understand the cultivator) and prove advantageous to the buyer. Nor see I any reason why husbandmen should not be encouraged to make the most of their industrious profits, and reap the fruits of their prudent foresight, whilst they act upon honest principles, and render service to the community.—And, though all men have an equal liberty to erect granaries for the productions they raise, yet still it is our fault, if there are regulators, commissioners, or monopolizers amongst us; nor can we accuse the cultivating individuals in this case of avarice, extortion, or making an unlawful profit. The husbandman here, in common with the rest of the society, is only the merchant of his own productions; every man allows he ought to gain something, and that he is guided by interest like the rest of his neighbours.

No part of natural history is less studied than the discovery of *water-colours* for miniature painting, washing prints and maps, and, above all, useful *tinctures for dyers*. Here opens a new field for the ingenious naturalist and chymist to walk in.—The *American* isles are almost totally exhausted of their *indigo*; and something may soon be wanted by way of *succedaneum*—Now many plants, says an ingenious foreigner* (that, like the *anil* † and several others, contain a deep green juice) have in them

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* *Reflexions sur l'Agriculture*, 1760. 8°. p. 27. [Ecrites par un Gentilhomme dans le Service d'une Cour de l'Allemagne]

† *Anil* is the old *English* name for the *Indigo*-plant. See the *Index to Lovel's Herbal*, printed in 1659. *Morrison* also gives the same name to *Indigo* in his book of plants, published at *Oxford* in the last century. *Linnaeus* calls this plant *indigofera*.

likewise a blue tincture, if we could discover the means by a proper fermentation of discharging a certain yellow cast that eclipses the blue.

Of the prime sort of *Indigo*, a native of *Mexico*, which is held in the highest esteem, I am not enabled to give the reader a true drawing; nor can I say that any attempts have been made to raise it, either in our colonies or the *French* ones. But there is a second very useful sort (and concerning this more shall be said immediately) which, I believe, grows wild in *South Carolina*, as well as in *Louisiana*, and some of the better parts of *Canada*.^{*}—Now, provided the *Guatimalla*, or *Mexican* sort, may not happen to succeed in this our newly-acquired country, or in case it requires more care than planters are willing to bestow, then the *wild* Indigo (for I give it this name in contradistinction to the manured cultivated *Guatimalla-Indigo*) may be raised and encouraged in *Canada* without the least fear of ill success; which may be proved, if it were necessary, beyond all contradiction.

The *French* colonists of *Canada* (whilst they had opportunity) were very remiss in this respect; for, instead of bestowing due culture on their own *native plant*, they have, without variation, procured seeds from the islands.

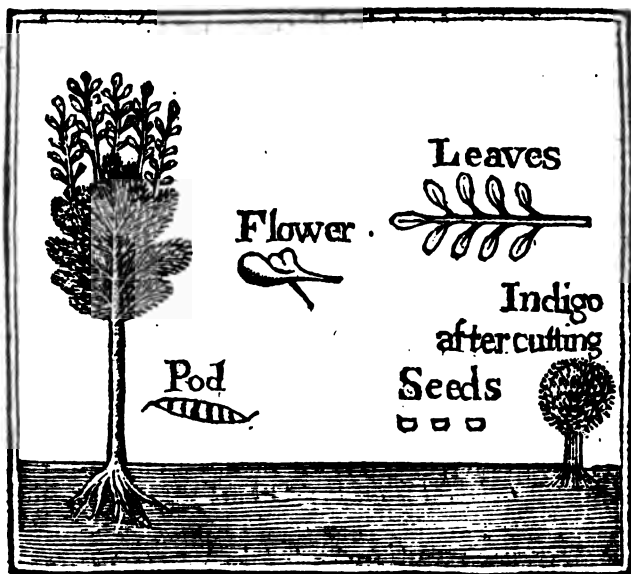
It is much to be believed, that the Indigo-plants, on the continent of *Louisiana* and *Mexico*, are of the same kind. My reason is, they are reported to agree

* The writer of these Essays is sensible that many of the vegetables, taken notice of in this article relating to *Canada*, are, at present, only natives of *Louisiana*; but flatters himself, that he is so far experienced in matters of culture, as to pronounce that almost any vegetable which flourishes in *Louisiana*, may, with due care and management, be cultivated successfully in the better parts of *Canada*: And here, by *Canada*, he means all the land which the *English* formerly claimed under the denomination of *Carolina*.

gree in size, juiciness, and a more lively colour in their green leaves.

We have here given a faithful representation of the native Indigo-plant of *North America*, drawn upon the spot, by *M. du Pratz*.

The INDIGO-PLANT; *leaf, flower, pod, seeds; and its appearance after cutting.*



But, however, setting aside the raising of this sort of Indigo which I have called *wild*, merely from compliance with the common manner of speaking, as it has never been cultivated by just rules of art, it may sufficiently reward our colonists, till such time as ingenious cultivators from *England* have examined more thoroughly into the matter, to raise, what is more generally called, the WILD INDIGO of the *French* and *British* islands.

This

This plant affords a colour very nearly equal to *that* of the other. Being of an hardy nature, no great attention is required in its culture; and, as it is a larger plant, will produce equal profit to the proprietor, with small expence and less care.*

I am convinced that one of the most advantageous methods of raising an Indigo-plantation is to manage it as lucerne is sometimes managed, that is to say, drill the seeds in lines with intervals of 3 feet 4 inches, keep the field free from weeds, and make use of the hoe-plough thrice a year. This will produce a larger and finer crop than by making the rows 15 inches asunder, which is the common practice in the *English* and *French* islands.

An acre of rich land, well-managed, will, as I am informed, afford 500 lbs. weight of Indigo in 12 months, and 10 *English* labourers are sufficient to manage 20 acres, and employ themselves occasionally on other matters.

There is also some reason to think, that the shrub called *tuna* (I give it the name of a shrub, though it rises to an height of 10 or 12 feet) might be raised with success in the warmer parts of *Canada*.† Some say, that in the fruit of the *tuna* the insects breed, of which *socbineal* is made: Others only assert, that these

* There is also a little shrub called the *bastard-indigo* (*amorphæa, Linnæi*) which many have thought may be raised in *England* in an open garden; more, perhaps, for curiosity and its singular appearance, than as any object of real advantage. Some of these plants in *France*, though exposed to the air, supported the winters of 1753 and 1754. It is true, many of the branches were destroyed by the severity of the season, but the plants pushed forth with vigour at spring, and formed an agreeable bush. In the cold season it may not be amiss to spread some mulch over the roots.

† Coxe's *History of Carolana*, p. 84, 86. See also *Virginia and Carolana, truly and rightly compared*, by Edward Williams, 4°. 1650.—N. B. Our original *Carolana* (of which the two *Carolina's* are a portion) contained the southern parts of the present *Canada* and *Louisiana*.

these insects feed on the flowers and fruit of the *tuna*. The flowers are of a beautiful colour; sometimes of a deep red, and sometimes of a paler: But then the latter are striated and shaded with crimson lines of a stronger and richer tincture. The fruit is large and juicy: The juice being blood-red.

I am informed, that this vegetable is a species of *cañus*,

But how are these or an hundred such-like improvements to be expected from banished criminals of our own country, and negro-slaves from *Africa*? Which latter may be called God's free creatures as well as ourselves, though they are deprived inhumanly of their liberty, without having given any previous offence, so far as we know, either to individuals or the laws of society.

To these remarks, founded on humane and religious motives, I shall add a prudential one taken from the elder *Pliny*. "It is the worst oeconomy possible," says he, "to employ slaves and criminals in the culture of lands; agriculture will never be carried on successfully by men of desperate lives and fortunes." *Coli rura ERGASTULIS pessimum est, & quicquid colitur a DESPERATIS.** What can we expect

* *Hist. Natural.* l. xviii. c. 6. *Dryden*, almost a century ago, has painted this ill policy of ours in the strongest colours:

Here let my sorrow give my satire place,
 To raise new blushes on my *British* race;
 Our sailing ships like common-shores we use:
 And thro' our distant colonies diffuse
 The draught of dungeons, and the stench of stews,
 Whom (when their home-bred honesty is lost)
 We disembogue on some far *Indian* coast:
 Thieves, pandars, pailiards; sins of ev'ry sort;
 These are the manufactures we export:
 And these the missions our zeal has made;
 For (with my country's pardon be it said)
 Religion is the least of all our trade.

HIND and PANTHER, part II.

pect from husbandmen, continues he, *damnatis manus, inscriptis vultus? — Honeftis manibus omnia Letius proveniunt, quoniam & curiosius fiunt.* †

The *Jopbora* of *North America* (let it be observed, I speak not here of any other sorts of this plant growing in warmer countries) has been thought, by a nobleman of *Germany*, one of the best judges of agriculture I know, to be capable of being raised in *English* and *German* fields. It is a leguminous plant, and consequently may afford excellent food for cattle, either green or dried. Its *stamina* differ from those of *diadelphian papilionaceous* plants. Some imagine it to be a species of *ervum*.

The *wax-tree* † also might have its oeconomic uses in our colonies in *Canada*; and possibly, nay probably, it might be raised in *England*. For this tree is not delicate in point of soil, situation, or climate. It has the appearance of growing, as well in the deep shade of woods, as in open sunshine; and seems to be equally contented with warm countries or colder ones: Prospering without much visible degree of alteration in the parts of *Canada* near new *Orleans*, or in other parts of *Canada* where the

† The president, *Montesquieu*, makes another remark on this subject, which deserves a place in the notes.

The *Romans*, says he, being accustomed to tyrannize over human nature, in the persons of their slaves, had a very imperfect idea of that virtue we distinguish by the name of humanity. Whence proceeds the slavish cast of mind in the inhabitants of our colonies, but from their constant severity to an unfortunate class of mankind? When barbarity prevails in civil governments, what natural justice or harmony of manners can be expected from the individuals?

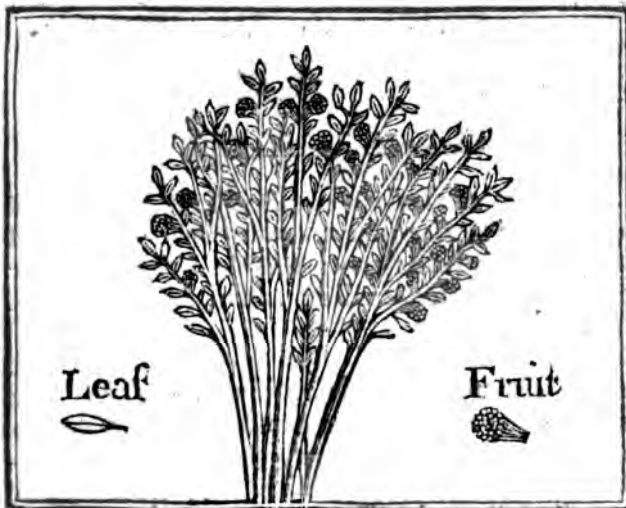
Hist. de la Decadence, &c. tom. ii. 206.

† We have given prints not only of the Indigo-plant and this tree, but of the *ayac*, *copalm*, and *saffiras*, as also of the *salsaparilla*, *passion-thorn*, *esquine*, and bearded *liane*, together with the *plat de bois* and *achetchy*; representations of none of which being as yet to be found in our herbals. As to the *Jopbora*, I have never been able to procure a drawing of it (I mean the *North-American Jopbora*.)

the winters are as severe as in *Denmark*: And, between which two places of growth, there is a difference of more than twenty degrees of latitude.

But supposing the wax-tree should happen to dislike our *English* climate (where, perhaps, its culture may be little more than matter of curiosity) yet still such an objection ought to have no weight with our cultivators in some parts of *Canada*, where this vegetable is of native growth, and arrives to a great degree of perfection even in its wild uncultivated state.

The WAX-TREE.



This tree, which, in truth, deserves rather to be called a shrub, has no one principal trunk or bole, but consists of upright branches or suckers issuing from eyes or buds in the root. These suckers seldom rise higher than nine or ten feet; and nothing can be easier than gathering their bunches or clusters.

of

of fruit, for the stems are as flexible as the shoots of an osier.

The leaves have the same shape with those of the common laurel in our kitchen-gardens; * but they are of a thinner contexture; nor is their colour so strongly marked. The fruit grows in bunches, and forms an assemblage not much unlike a tuft or tassel: From the middle part of which bunch issues forth a number of stalks about two inches long; and each of those stalks bears, at its extremity, a sort of little pea, which contains, underneath its skin, a shell and kernel: The wax lying between the skin and the shell. All which may be better comprehended by a section of the fruit in its natural size.



Two sorts of wax are extracted from the fruit of this tree: The one of a yellowish-white colour, and the other of a pale green: But the former sells for more money than the latter, and that by one half at least.

It is true, formerly the *French* colonists knew not how to separate these two sorts of wax. They threw the fruit and stalks into a cauldron of boiling water: In consequence whereof, the wax soon detached itself from the shell which it covered. They then carefully took off the stalks and shells: And, as the water grew cold, the wax fixed; which they moulded into cakes of a faint-green colour: † And even

* *Hist. de la Louisiane par Du Pratz, 1758, tom. II. p. 37.*

† The *French*, capricious in their taste, dislike this greenness. People of other countries may, perhaps, think a green wax-candle as agreeable as a white one. Questionless, it is more comfortable to the eyes.

even this wax blanched in less time than the wax of bees is found to do.

But chance, the parent of discoveries, soon pointed out a better method. "The nuts and stalks are thrown into an empty vessel (in this case, says my author, * I would recommend a glazed earthen jar) and boiling hot water is poured upon them till they are quite covered. In a short time, or to use his own words, whilst a man may say a *Miserere*, you must pour this water into another vessel that is quite cold; and, in proportion as the liquor cools, the wax fixes itself. This is the yellowish white wax, which will be well blanched, after it has been exposed to the clear air for the space of six or seven days. Then the self-same water is returned upon the fruit and stalks, which are boiled till there is reason to think that all the rest of the wax is separated from them. This is a second effort, which draws forth the green colour by the force of infusion and boiling: And, of course, there is no reason to think, but that the wax, first extracted, must be the purer and more genuine wax.

"The inhabitants of the *French* islands prefer these wax-tree candles to the bees-wax-candles of *France*: For, being firmer and harder, they are not apt to grow soft in warmer climates. Of course, they are more durable in burning; and of this the reason will appear in the next paragraph.

"When the whole process is performed, the remaining water has its uses: For it contracts such an astringency from the fruit and stalks, that, if it be properly mixed with melted tallow, it will bring such candles to the consistency of common bees-wax. — Besides which, it is an admirable specific in dysenteries, and its effects are more certain than those of the *ippokekoana*, provided the body of the

* DU PRATZ, *as supra*.

the patient be rightly prepared to receive the medicine."

Thus far proceeds my *French* relator: — Yet one inconvenience still remains; and it is almost an inconvenience *inftar omnium*: For, though these candles are as hard as can be wished, yet, at the same time, they are so brittle; that they instantly break to pieces, not only by falling, but if they are handled roughly. If art can supply this defect, all is done that needs be required.

I would propose, therefore, that a certain quantity of goat's suet* (a very common and cheap commodity in *Canada*) should be dissolved and incorporated with the melted wax: Which, as I flatter myself, will produce two collateral advantages; and; at the same time, remove that grand inconvenience which no one hitherto has been able to get rid of: For the goat's suet, far from impeding the burning of the candles, will rather assist it: And being, when it is melted, as white as snow, will help to absorb the yellowish tinge in the wax: And lastly, in all probability, it will change the brittleness complained of into an adhesive consistence.

This I know, from good authority, that goat's suet is of so binding a nature, as to make a necessary ingredient in two famous *Italian* cements for joining the pipes of aqueducts, and lining the bottoms and sides of cisterns; which secrets are supposed to have been lost almost one hundred and sixty years. †

I shall

* Candles made of goat's suet are whiter than wax-candles; they burn as sweet, and almost as long: Giving, at the same time, a clear steady light, without sharpness.

† These cements were brought much into use by one *Balbini*, an *Italian* architect; he was not the inventor of them. — They withstand the frosts. — I procured the receipts in *Italy*, and believe them to be genuine.

I shall conclude this article with observing, that Providence seems to have provided the continent of *North America* with the wax-tree, to answer many economical uses of bees-wax: For, though there is no want of bees in that vast tract of country, yet the race of bears there is so numerous, and of course so destructive to the bees, that by a sort of instinct they form their hives in forest-trees, or burrow in the ground like wasps and hornets.

It is highly probable, that *vines* might be multiplied and grasses improved by right culture in some of our colonies: But the native vines of our new acquisition, *Canada*, stand a better chance to be carried to a good degree of perfection. Very considerable are the sums which we send annually to *France, Spain, Portugal, &c.* upon this account. Nay, I have been assured, from the best authority, that even *Ireland* alone expends 3000 *l.* a week in *French* clarets.

Robert Child, the true author of the famous *Treatise on Husbandry*, commonly called HARTLIB'S LEGACY, animated by an enthusiasm which stood, as it were, in the place of knowledge (for *Canada*, at that time, was very imperfectly known to us) saw, at least, a century ago, the notable improvements that might be made, and the considerable advantages that might be drawn from a right management of vineyards upon that vast continent (a large part of which formerly belonged to us, and was comprehended in the old *Carolana*.) I am pleased to tread in the steps of so great a genius:

———— Ire per omnem
(Sic amor est) heroa volo.————

STAT.

Vines grow wild in *Canada* (particularly in the parts near the *Mississippi*) and that almost from the
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southermost extremities of that country to 300 miles northwards. Other accounts* assure us, that they extend farther, even to 40 degrees of north latitude : Particularly from the south-west coasts of lake *Illinois* to the banks of the river abovementioned ; a tract of country equal in size to one third of *England*. In many of these parts the vines are so numerously dispersed, that a man can hardly walk 200 paces without finding them.

Three sorts may be rendered useful for making wine and brandy : The *fourth* sort is rather a matter of curiosity.

(1.) The first sort grows on the rising borders of dry healthy pasture meadows. The fruit of it bears some resemblance to one species of *Burgundy* grape. But as the edges of dry meadows, in this country, are skirted with thickets and forests, whose shade and drip are equally hurtful, only a passable wine is made from it in its present wild state.

(2.) The second kind is much commended by the *English* writer above cited, † and that as long ago as in the year 1651. A *French* author of repute confirms, from his own knowledge, every particular of this account, in a relation published in 1758. This is the vine that bears the currant-grape, and perfectly resembles that of *Corinth* in its wood, leaf, manner of growth, and the sugary taste of its fruit. Of course, a right management of it might save the out-going of much money to the *Archipelago*, for a species of dried fruit so highly acceptable to the common *English* palate. The greenness of its leaves and fruit make no real objection against it ; remove the cuttings of this vine from immense shady forests (for it naturally seeks to climb up trees by

* Decouverte de HENNEPIN. Voyage du Baron la Hontan, &c.

† See HARTLIE's Legacy.

by way of support) and plant them (trellice, or cradle fashion) in a vineyard properly prepared, which enjoys an airy sun-shine exposure, and the leaves and fruit will soon acquire that true colour and taste which are the consequences of being thoroughly ripened. For, if one of these vines, by pure chance, happens to grow in a dry field unencumbered by woods, its grapes are well-coloured and luscious.—Of its wine, at present, no judgment can be formed in its wild uncultivated state of nature.

(3.) The *third* sort bids the fairest for making a rich delicious wine, of any grapes in this country hitherto known to us: And doubtless our knowledge, at present, in this article, is extremely limited. It is of the *muscadel-kind*, and grows on the slopes of hills and other dry elevated grounds in the southermost parts of *Louisiana* and *Canada*. The grapes are found to be extremely wholesome. They are of an amber colour, and have a rich sugared taste. Experience has already shewn, that excellent wine may be made from them, upon condition they are cultivated according to art.

(4.) The *fourth* sort is of an uncommon nature, and hardly merits to be called a vine, except from a similitude of leaves and wood. It produces only two grapes upon a stalk, and each grape contains a single stone, or rather a kernel. This fruit has much the size, colour, and *flesh* (as the *French* call it) of a violet damask plum.*

Upon the whole, it is certain, that a considerable part of this vast country is of a nature connatural, if I may so speak, to the growth of vines. At the same time, all travellers agree, that some of the native

* This corrects a gross mistake in *Hennepin* and *la Hontan*, who say, that the bunches of grapes in *Canada* are so extremely large, that one or two prime grapes in a bunch are equal in size to a middling plum.

sive grapes of *Canada* are of an excellent taste in their wild uncultivated state, whenever a branch gets free from the shade and droppings of trees, and enjoys air and sun-shine! Though, at the same time, the root cannot share the advantage of heat. Not to mention the unwholesome moisture dripping from the shade above, and the violent suction of stronger roots (its next neighbours) which continually oppresses and defraud it: Yet *Hennepin*, *la Hontan*, and others, found the *must*, expressed from the best of these grapes to be extremely good, and preserved it in calabashes, or gourds, many days. *—Now we all know the improvements which right culture may make on any vegetables which have natural good qualities. — So that industry may render the future and present difference of the *Canada* grapes as great as *that* we perceive between a wilding and the finest cultivated apple. In proof of this, many travellers have observed, that the *auricula*, in its native state and situation, at the feet of the *Alps*, hardly exceeds, in beauty, a common primrose, or cowslip; and yet diligence and right management, in the space of twenty years, propagated this plant over the whole western parts of *Europe*, and brought it to exhibit the richest colours imaginable.

But we are not obliged to rely intirely on the improvement of the native *Canada* vines: Since new sorts (the growth of other countries) may be carried thither. The *French*, at the distance of a league, more or less, from our present territories (or, in other words, where nothing lies between us and them, but the river *Mississippi*) have raised vineyards from cuttings of the best vines in old *France* with all imaginable

* “The vines of *Canada*, by the assistance of good culture, might afford wines capable of vying with many of the best *European* sorts.”

nable success.* But these vines, and their produce, are so well known in our kingdom, that it may be needless to say more upon that head.

At the same time, why might not good cuttings be procured from *Portugal*, *Spain*, the island of *Madeira*, *Italy*, and *Hungary*? — This last country alone, without mentioning the vintage of *Tokay*, will be found to produce three or four sorts of wine, which may be thought to approach very nearly to, if not equal, the best productions of *France*, having, at the same time, a firmer body, and, of course, being better enabled to bear the passage from *North America*.

Nor might it be amiss, by way of experiment, to transport into *Canada* cuttings of vines † from *Baccharab* and *Hockbeim*, &c. in the lower Palatinate of *Germany*; which, in all probability, might make a return, in a few years, far superior to the first expence and trouble. My reasons for suggesting an attempt of this kind may, perhaps, be obvious to

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every

* *M. du Pratz*, gives a remarkable instance of the fertility of vines in *Louisiana*. I shall subjoin the passage in his own words:

“ Je ne puis m'empêcher (dit-il) à ce sujet de rapporter ce qui arriva dans cette capitale [la Nouvelle Orleans] à un habitant, par où l'on pourra connoître quelle est la fertilité de la Louisiane. Il avoit planté dans son jardin une traile de muscat, dans le dessein d'en faire par la suite un berceau. Un de ses enfans entra avec un petit negre dans le jardin qui se trouva, ouvert par hazard; c'étoit au mois de Juin, tems où le raisin est déjà mûr en ce pays. Ces deux enfans attaquèrent une grappe de muscat; & n'espérant pas avoir le tems de la manger sur le lieu, ils réunirent leurs efforts pour l'arracher & l'emporter. Ils en vinrent à bout en cassant le bois d'ou pendoit la grappe. Le pere survint, & après le bruit ordinaire en pareille occasion, il coupa, & tailla ce sarment cassé. Comme on avoit encore plusieurs mois de belle saison, le cep poussa de nouveau bois, & donna encore du fruit qui mûrit, & fut aussi bon que le premier.”

Hist. de la Louisiane, tom. II. p. 17.

† All cuttings of vines, removed to a great distance, ought to be packed up with fresh moss in an hog'shead, bored through in numberless places with a gimblet.

every curious cultivator. For it is well known, that the wines produced from these *German* grapes (however excellent they may be) seem to have something of a natural, agreeable, savage wildness and austerity, which may not be unsuitable to the genius of the *Canada* climate.

There are also some excellent vintage-grapes in *Switzerland*, *Croatia*, and *Friuli*, one kind particularly in the last-named country, which produces a wine that resembles *Madeira* in taste, strength, and colour. A wine, says *Pliny*, which preserved the empress *Livia* to the 82d year of her age, who attributed her longevity to drinking this wine and no other.*

It no-ways avails us to remark, that the *French* have made little or no wine in *Canada*, since this proceeded from the natural good policy of the mother-country: Which had wine enough to supply her home consumption, and answer the demands of her neighbours as well as the few gentry of her colonies. *Nor is it ever right or useful in foreign settlements to cultivate any commodity which can be raised, and that abundantly, in the parent-kingdom.* But the case is widely different, when the possession of *Canada* is transferred to *England*.

As the matter before me, relating to our colonies, may be looked upon as almost a new subject to the generality of *English* readers (it being of no small consequence to a trading nation like ours) let me ask leave to enter, for a short space, into a more minute detail: And particularly in relation to cattle, and the culture of some useful vegetables not hitherto much taken notice of. And, amongst other national settlements, I treat of *Canada*, the more at large, because it does not appear to me, that much pains have been taken to extract any very material and

* It was then called *vinum Prosecanum*, and now *Prosecco* wine; from a small village of that name near *Trieste*.

and national advantage from it. Whether the acquisition will ever fully answer the ends proposed, in a commercial or husbandry sense, is more than I know; I am partly dismayed by the old *Carthaginian* reason, *Colonus imbecillior est quam ager*. And, therefore, some lesser acquisition, fully, vigorously, and effectually cultivated, might have proved more really profitable to our nation. *Virgil's* authority, in this matter, carries a sort of sanction with it:

————— *Laudato ingentia rura;*
Exiguum colito. —————

Yet still I am inclined to believe, that some notable advantages may be extracted from it, if colonies of sober, skilful, industrious peasants could be settled there instead of negro-slaves and transported felons.*

The *horned cattle of the beeve-kind*, in this country, are full as large and strong as ours, though different from them in the make of their bodies and their hair. They abound so much in some parts of *Canada*, that hitherto it has been hardly possible to reduce their numbers. The hair, or rather the wool, both of the males and females, is long and curled: So that it may be manufactured into a warm durable sort of cloathing.—Of the flesh of the bull, in its wild state of nature, we shall say nothing: The flesh of the cows is succulent, well-tasted, and nourishing. Their udders and teats resemble those of a mare or doe. Nor are they of a savage disposition in their wild state; for it has been observed, that, when the natives shoot their calves in hunting,

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* *M. du Pratz*, after 16 years residence in the *French* colonies of *Louisiana*, observes, that hardly any person goes to these settlements or continues there, who understands or applies himself to the cultivation of the earth, or collecting and procuring such things as are the object of commerce. *Hist. de la Louisiane*, tom. III. p. 341.

they will remain, for some time, with their young, and lick the hands of those that flea them. — As to the milk of these kine, I have never been able to procure any certain information; but there is little or no reason to be doubtful concerning its good qualities. — The male-calves will be made gentle and tractable by castration, and, at three years of age, will prove highly serviceable in cultivating the fields. This is the main point I contend for.

It may be added farther, that the flesh of these creatures will be improved both in quantity and quality, when they are made tame by the husbandman; supplied regularly with food and litter, and then fattened according to the rules of art.

Where there is grass sufficient, as certainly there is in all the fine parts of *Canada*, it is almost self-evident, that a *breed of horses and sheep* might be easily brought from *Mexico** and encouraged: Especially when art is called in to assist nature, and the culture of grasses is greatly improved. Besides, it may be worth remarking (so great is the divine care and bounty in supplying variety of food for these useful creatures) that the introduction of horses and sheep into a country that affords us naturally nothing but kine, will occasion little or no deficiency of pasturage in the proprietor's fields; for these three species of grazing animals eat not always the *same* plants, nor plants of the same age, nor the *same* parts of the *same* plant. *Lucretius*, with that exquisite elegance and descriptive justness peculiar to him, has painted all these several sorts of husbandry animals, as grazing quietly and without envy in the same field.

Sape

* *M. du Prat* bought *Mexican* cows at *New Orleans*, in *Louisiana*, for about fifty shillings apiece. He bought also *Spanish* barbs, jennets, and sheep, at a reasonable price.

*Sæpe etiam ex uno tondentes gramina campo
 Lanigeræ pecudes, & equorum duellica proles,
 Buceriæque greges, sub eodem tegmine cæli,
 Ex unoque sitim sedantes flumine aquai,
 Dissimili vivunt specie. —
 Tanta est in quovis genere herbæ materiæ
 Dissimilis ratio. —*

L. ii. v. 659.

The patient ox, mild sheep, and fiery steed
 In the same tracts of grass delight to feed:
 One common stream their thirsty wants supplies,
 They sleep beneath one canopy of skies:
 Each leads a life peculiarly his own,
 And eats what Heav'n assigns his kind alone:—
 For herbs (and nature thus sustains no waste)
 Give diff'rent parts for food of diff'rent taste.

It may be observed farther, that neither horses nor kine bite so near the ground as sheep can: And that from the size and make of their mouths and teeth.—Nay, what is still more remarkable, the closer sheep bite, the finer-tasted the natural grass becomes; it also grows thicker and shoots faster.

Such is the peculiar care and bounty of Providence! All grass, if shorn, or fed, before the seeds are formed, grows the faster for being cut or grazed! But, after the seeds are formed, it begins gradually to exhaust and impoverish the ground.

The goat and chevreuil are original natives of *Canada*, and ought to be encouraged. For, besides being as generally useful as any other graminivorous animal, they rob none of them in point of food: Despising richer pasturages, and browsing on plants that have harsh, acrid, deleterious, and even poisonous qualities. How beautifully has the author, last-cited, described these circumstances in goats
 and

138 *The great Importance of Agriculture :*
and swine with all the charms of his diffused poetry!

*Barbigeras oleaster eò juvat usque capellas,
Diffluat ambrosia quasi verò & nectare tinctus ;
At nihil est homini fronde hac quod amarius extat.
Denique amaracinum fugitat sus, & timet omne
Unguentum : Nam setigeris subus acre venenum est
Quod nas interdum tanquam recreare videtur.*

Lucret. l. vi. v. 970.

The savage olive charms the goats harsh taste,
Its branch ambrosia, and its juices nectar ;
But bitterest of bitter is its touch
To human lips. — The ravenous swine eschew
Odorous marjoram, and arts perfumes :
(So elegant to man !) — Thus what revives
Our senses, is coarse nauseousness to them,
And painful luxury !

But to return from these pleasing pictures drawn by the hand of the venerable father of *Latin* poetry ; all our ideas of improving the culture of the land and commercial interests of our colonies, however promising and advantageous they may appear to be, can never be realized effectually,* till persons skilled in every branch of rural oeconomics are settled in those colonies by public appointment : And, in such case, an account of the experiments and improvements ought to be printed every year. A board of *agriculture*, therefore, seems to be as necessary as a board of *trade*.

This is the main point which I contend for.

Of

* Nostro quoque vitio accidit qui rem rusticam pessimo cuique fervorum velut carnifici noxiæ dedimus, quam majorum nostrorum optimus quisque tractaverit.

COLUMELLA, l. i. in *Præm.*

Of the advantage of the *fur-trade* I shall say nothing, as it is well known to every commercial man. Indeed, one great *defideratum* is here wanted, which is to kill the nits which breed in the skins, long after the animal is dead to which the skins belonged.—To get over the last inconvenience may not be difficult: (If there were occasion, I think one might name a remedy:)—But to hinder *France* from being universal mistress and arbitress of fashions, language, &c. and *disgracing* furs as she has already done, is a work of labour, perseverance, and spirit. Too much time has elapsed: Men wear her fetters with pride, and, as they fancy, with a becoming grace:

————— *Volentes*

Per populos dat jura, viamque affeſtat.—

It was certainly an oversight, at the peace of *Sto la Chapelle*, to give up the *Roman* language (which lay fair, neutral, and common to all *Europe*) and tacitly allow the *French* tongue to be the standard-language of the western world; and so much the rather, as it will generally appear from history, that the adopting a neighbouring language paves the way to the introduction of a foreign power, sooner or latter. — But to return from this short digression.

The colonists of *Canada* might carry on a considerable trade with the *bides* of larger horned cattle, and, as they have no want of bark for tanning, might prepare these hides at home with tolerable perfection. Nor need we mention the skins of elks, chev-reuils, goats, and kids which might be dressed in the same place after the same manner. Pasturage is so abundant here, that the old wild bulls have frequently in them one hundred, and sometimes one hundred and fifty pounds weight of tallow:

And

And it is good œconomy to kill them; for, being unwieldy with fat, and incapable to fly, or make resistance, they always fall a prey to the wolves, which are small, and unable to destroy them, when they are young and strong.

As to *timber*, the sorts of it, either for house or ship building, cabinet-making, vaneering, &c. are not to be numbered. The *Canada-cypress* is one of the most stately trees in the known world. It works easy, with a fine polished grain, and yet is almost incorruptible in earth or water, nor will the worms at sea venture to attack it. The *cedar* of this country might be applied to various useful purposes. Wrought into palisadoes and pales, it will last considerably longer than our best oak; and, as worms never enter it, it may be very useful for planking ships. †

Maize may be raised in *Canada* to what quantity we please, for it grows there naturally in great abundance. A spirituous liquor may be extracted from it, or it may be made into malt.—*Hops*, at the same time, are natives of the country, and grow chiefly in the ravines or hollow-ways of mountainous lands, from whence sets may be taken at pleasure, and plantations formed *ad infinitum*. Experience also shews, that *barley* may be raised here with great ease.

It

† The *French* in this country have discovered 2 kinds of pines, and 4 of firs: White and red cedar-trees, red oaks, the white-wood, female-clouded maple, 3 sorts of walnut-trees, red elms, abundance of beech-forests, and cherry-trees finely veined, and of an excellent grain for cabinet-makers.

The white-wood, besides its other uses, affords a thread in the inner pellicules of its bark, which may be manufactured like hemp.—And thus a plant called *cabuya*, or *pita*, which grows in great abundance on the mountains of *Peru* near *Lima*, gives us a very fine strong thread. *Voyage de Dom. John & Ansh. Ulloa.*

The white-wood tree (*bignonia*) is of a large growth, and yields abundance of shade. The leaves resemble those of a laurel.

It is possible to raise as much *rice* here as can be desired, which would save the out-going of considerable sums of money from *England* to the *Levant*. Nor might it be a bad *succedaneum*, when corn is dear.

The *olives* preserved for eating, or pressed for oil, are acknowledged by natives of *Provence*, settled in *Louisiana* and *Canada*, to be equal in goodness to those of their own country.

Silk might be procured here in great quantities, for the country abounds with mulberry-trees, both white and red, which grow naturally in the upland grounds. This silk is as strong and fine as that of *France*. Nor is any thing more easy than to raise plantations of these mulberry-trees, where silk-worms may be found in great abundance.

Cotton might be made another article of commerce; not the *tree-cotton*, but the *cotton-plant*. The wool of this cotton is not so long, nor so soft as the former; but is white and fine, and may be turned to good account. Mills ought to be made to separate the seeds from the down, and in that consists the whole difficulty of this manufacture. †

Indigo (in addition to what I have observed in another place) may be raised here to as great perfection, at least, as in the *American* islands; but, whether it can be ever brought to vie with the *Mexican* indigo, is a point to be excepted for the present. Nor will these plants admit of more than three cuttings in one year, whereas those of the islands are cut four times: But then the colour of the plant's juice in *Canada* is more lively (being less tinged with a brownish yellow) and the produce of leaves more abundant.

Raising *tobacco* is a favourite branch of agriculture in our *English* colonies. It is a native of *Canada*,

† The cotton, here spoken of, is called, in our colonies, *French cotton*.

wada, and the inhabitants have made use of it from times immemorial for smoking in their sacred calumet of peace. This plant (of which *Canada* produces two sorts) is of a large growth, even in the wild state of nature; and has a pleasing strength, without being heady. — When rightly cultivated and cured, it is thought neither the *Oronoko* nor *Virginian* sorts will exceed it.

No soil is better qualified to bear *saffron*; which will prove a very profitable merchandize, if sent only to *Mexico*, where the *Spaniards* have a great demand for it.

The *wild hemp* of this country (which usually grows near the lakes) is of a large sort, and fittest for making cables and strong cordage. *Flax* has been sown here with good success.

It is possible that painters may procure from hence some *new sorts of colours*. I will mention only the *foot-black*, which may be extracted in abundance from the larch and other resiniferous trees with which this country abounds. — Miniature-painters, washers of prints, and especially dyers, may find a new supply of colours. In the latter instance; we will just take notice of a couple of vegetables, the *ayac-wood* and the *achetchy*: Both which, as I am informed, are found in some parts of *Canada*, as well as in *Louisiana*.

The *ayac-wood* is a little tree, the decoction of whose chips yields a fine yellow colour. The leaves, boiled and squeezed, give the same colour, but of a paler cast. (See a print of this tree, PLATE III.)

The *achetchy* is a small humble plant, about seven inches high, and grows only under the shade of large trees in forests. The shoots of its root, which are numerous, are about 3 lines diameter, and full of a bright juice, resembling, in colour, the blood of a pullet. As the natives are not fond of yellow, they use *ayac* for a ground-colour, and afterwards the

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Plate III.

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W. Hillbert sculp.

the *acetchy* for a second tincture. If the thing dyed passes through these two operations, what was originally white, and then yellow, becomes a bright scarlet: And the hair, or wool of the *Canada* wild beeves, which is naturally of a chefnut colour, is transfuted into a brown red.

Nor will medicinal vegetables be wanting, whenever a skilful naturalist or physician shall examine the productions of this immense tract of country. The *salsaparilla*,* in particular, is equal in goodness to that of *Mexico*. The *sassafras* tree (which is an ever-green) grows to a large size, insomuch that the bole or trunk has been sometimes found to measure more than two feet diameter. The *esquine* has the same sudorifical virtues with the two former trees, and a decoction of its roots is famous for encouraging the growth of hair. It is a little shrub, armed with prickles, resembling a thorn-bush, and one species of *liane*.

There is a species of *liane*, called the *bearded*, being armed with little fish-hooks about an inch long in the shank, and as large as an horse-hair, which lay hold of any tree that grows near it, but particularly (by a kind of sympathy, as it were) on the copalm tree. So that if a plant of this species of *liane* grew one foot, for instance, from any common tree, and two feet from the copalm tree, its branches would forthwith diverge towards the latter. A decoction of this plant is of singular use in curing fevers, so that some prefer it to the quinquina.

The fruit of a third sort of *liane* is remarkably good in some obstructions, and a fourth sort is known by the natives to cure the wounds given by poisoned arrows.

Ano-

* See prints of the *salsaparilla*, *sassafras* tree, *esquine*, *bearded liane*, *plat de bois*, and *copalm tree*, in PLATE III.

Another plant, named, by the *French*, *plat de bois*, having a flat root like a tea-saucer, or the *Norway* and *Swedish* turnip, called *napper*, is a more powerful sudorific than any of those abovementioned, and preferred by the natives in cases of emergency.

But the glory of the *North-American* forests is the *copalm tree*, which grows in such abundance, that Providence seems to have placed it near at hand for all that want it. No one, as yet, knows one fifth part of its medicinal uses. Its balm, which, if I mistake not, is called, in *France*, *copabu*, is a most excellent febrifuge, and of sovereign use in dressing green-wounds and ulcers.

It may be needless to mention the various sorts of *marle*, *gypsum*, and *fine clays* in *Canada*; which latter may be used for making porcelain, earthen vessels, bricks and tiles.

Bricks have been sold, in some of the *French* settlements, for ten shillings a thousand, which is as cheap as they can be bought for in any village in *England*. — *Salt-petre* is very common; *iron-mines* have been discovered in *Louisiana*, nor is it much to be doubted, but that they may be found in *Canada*, as also *lead*, *copper*, &c. and many other valuable minerals. Nor will the search after them be difficult or expensive, if the borer be made use of. Such grounds are particularly to be examined as stand high, and where the few vegetables it produces are meagre, crooked, yellow, and cankered, or, to use the poet's words, it must be a sort of land

Where half an acre's corn is half a sheaf. †

Much might be done both here and in our other *American* settlements, if men were animated with the true spirit of industrious cultivation. But it has been observed, ever since the foundation of modern

dern colonies, that the *English* and *French* (for it may be needless to mention the *Portuguese* and *Spaniards*) have chosen generally to adopt the old barbarous practice of culture from the natives. And why? Because it is more lazy, as well as more compendious. As therefore, at present, we hardly know the *actual* productions of our *American* settlements, how is it probable we shall be acquainted with the *potential* ones, except chosen persons, as before suggested, are there settled; being men of approved skill in agriculture, and every other part of natural knowledge, which supplies food to man and cattle, as well as materials for arts, trade, and commerce? — *France* has not been inactive in making some discoveries of late years; but the *Danes* and *Suedes* seem to me to have taken a turn of a more practical advantageous nature to society; employing themselves (and that successfully) in cultivating at home all the new useful sorts of trees in the forests of *Canada*, whilst the *French* were occupied in settling the figure of the earth.

Some or other of our colonies might also supply us with great quantities of hemp and flax, masts for ships, and various sorts of timber for solid or elegant uses; to which may be added pitch, tar, resin, &c. and, as for precious stones, ambergrise, pearl-fisheries, silver-mines, gold-mines, and the like, it is much better to leave the *Spaniards* to search for them; seeing the produce of their labour, by supplying them with the necessaries of life in the way of trade, must ultimately tend to enrich *ourselves*. — Nor may it be amiss always to remember, with thankfulness, that, where Nature has denied mines, she generally gives a deep rich soil, which affords more useful wealth to the industrious cultivator. It was in a rocky barren tract of land, with here and there some sickly herbs, thinly dispersed (as on the mountains of *Potosi*) where *Quid* tells

us, that *Oreades*, after a long pursuit, is reported to have found the *demon, Famine*:

Devenit in Scythiam, rigidique cacumina montis,
(Caucasum appellans.)

Quæsitamque Famem lapidoso vidit in agro,
Unguibus & raras vellentem dentibus herbas.

MET. viii. v. 800.

I will now return to some improvements of husbandry in the *European* methods of culture, and here I will first mention the cultivation of the *larch-tree* (or *larix deciduis foliis*) concerning which it is reported, by authors of reputation, in this, the last, and the preceding century, that old larch-timber is, as it were, impenetrable to the strokes of an ax: Others assert, that, if it be buried 3 months in the drain, or sink of a dunghil, and then steeped in a river 3 months more, it will become hard like stone, and resist putrefaction for many ages: But (allowing for some little hyperbole in these cases) thus much seems certain: No timber will prove more useful for ship-building, in part, at least, if not in the whole; * and no common wood, in foreign

* We have spoken with this precaution, because the ingenious author of the *Treatise sur la Disette des Bois*, published two years ago at *Zurich*, remarks, that very large beams of this wood, in case they are not thoroughly seasoned, are apt to warp, after being hewn and squared; which seems, at first sight, to disagree with what will be said about picture-boards, &c. but this, in my opinion, implies no contradiction in the two assertions, as it is natural enough to think, that large beams will be more difficult to dry than planks, boards, or smaller pieces of timber.

Virgil and *Horace* probably meant the larch-tree, when they said,

————— *Dat utile lignum*

Navigiis pinas. —————

Quamvis Pontica pinus,

Sylva filia nobilis.

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reign countries, bears an higher price than that of the larch-tree. It has likewise (besides its durability) another most valuable quality in house-building: Which is, that no timber is so unapt to take fire, or consumes so unwillingly; infomuch that there is some difficulty to burn a large cleft of it, even on the hearth.*

Mr. *Miller*, than whom few writers are more cautious and accurate, or have taken greater pains, seems to doubt this fact, from the apparent improbability that a resinous wood should be unapt to take fire: And, indeed, it seems to be a just and sensible query; nor can I satisfy his doubt from my own observation; for, though I have lived a considerable time in countries where this wood is common, yet, as the inhabitants use neither hearth or grates (but stoves only, where the fire is concealed) I happened not to make any remarks on the subject. But *Matthioli* (first physician to *Ferdinand*, archduke of *Austria*, and king of the *Romans* in 1554)

K 2

who

And, for the same reason, the conquerors, at the *Isthmian* games, were crowned with pine-branches as a *maritime honour*.

A modern classic speaks of the larch-tree as follows:

Non illam immerito colit, & sibi vindicat unam
 Neptunus, plantarum aliàs non magnus amator;
 Illa solo stabili, & natali colle relicto,
 (Quo ventosa diu jactato vertice bella
 Irasusit juvenis) montes habitare marinos
 Gaudet, & æquoreis occurrere nuda procellis:
 O frustra generi plantarum hominumque negatas,
 Disclusaque solo, & donatas piscibus undas!
 Naturæ superant ars atque industria leges,
 Arboribusque virisque fit altera patria pontus.

COULEIUS de PLANT. l. v.

* There are other sorts of wood, which are, to a certain degree, incombustible, or, to speak more properly, very unwilling to take fire. Thus I am assured, from good authority, that the timber of the *sassafras*-tree cannot be burned alone, but some other wood must be mixed with it.

248. *The great Importance of Agriculture:*

who lived at Gratz in *Stiria*, observes to this effect, in a country where there are abundance of iron-works, and consequently a great consumption of fuel. His words are these:

“ Unwilling as this wood may be to take fire, yet it is no-ways difficult to burn it in kilns, glass-houses, and furnaces belonging to iron-works, when once the inside of these receptacles is rendered intensely hot. Such is the practice in the iron-works of *Stiria* and the bishopric of *Trent*, where this wood is of singular use, when there is heat sufficiently fierce and strong to penetrate it forcibly *.”— And here it might appear incredible to the reader, if one were to tell him (on pretty good authority received from natives of those countries) how long a lump of larch-wood, thoroughly red-hot, and taken out of these furnaces, may be kept alive, if it be covered closely with embers and ashes.

Yet still from appearances, as well as common probability, I am inclined to favour Mr. *Miller's* opinion, which seems to be strengthened by M. *de Hamel*, who tells us from accounts transmitted to him, “ That the resinous substance in larch-trees is looked upon to be very combustible; and therefore there is a public order in the district near *Briancon*, that houses built with such timber should never join, but stand at a certain distance †.

“ Houses built with this timber,” continues he, “ look quite white at first, but, in two or three years, the outside turns black like charcoal, whilst all the joints and chinks are closed with resin extracted from the pores of the wood by the sun's heat; which resin forms a kind of varnish.”

* Comment. in *Dioscorid.*

† *Traite des Arbres & Arbustes qui se cultivent en plaine Terre*, tom. I. 4^o. p. 336.

“ nish hardened by the air, and of a bright polish
“ no-ways unpleasing to the eye.

“ This exudation, considered as a glue, binds
“ together the frame-work of houses, and enables
“ them to resist the violence of winds; whilst, in
“ the mean time, as a varnish, it becomes imper-
“ vious to rains, which slide off immediately
“ from it.”

Experience alone can lead us to adopt the true opinion.

Many palaces are built at Venice and in other parts of Italy with this timber; but under water it almost petrifies, and is capable of supporting a surprising weight. It is also of singular use in strengthening the wooden frame-work of bridges, or, where there is occasion, to mortise wood into walls or earth.

Upon this wood *Raphael* and other eminent masters chose to paint their pictures; for, besides being extremely solid, it admits a fine polish, or firm smoothness, which contributes to throw forth the colouring with uncommon lustre:

— *Annis non expugnabile lignum:*

Illustrat pictoris opus. —

It is likewise thought to be inaccessible to the attacks of worms. On these accounts, as well as not being liable to warp when sawn and well seasoned, the modern *Italians* use it for back-boards to place behind fine drawings, when they frame and glass them; as also for picture-frames, table-frames, &c. because no other wood gives gilding such force, brightness, and, as it were, a sort of natural burnishing; and this is the main secret why *Italian* gilding on wood is so greatly preferable to ours; which has often a tarnished spongy cast, and looks like gilt gingerbread. And again, if my

memory deceives me not greatly, the *Italians* prefer it before all sorts of wood for making the wheels of post-chaïses, &c. as being very durable and unapt to crack.—No boards make better wainscoting, or take paint better: Not to mention (if that circumstance be true) their natural security against fire.—No wood affords such durable pipe-staves for casks, which, at the same time, preserve the good taste of wine to admiration.

In the country of the *Grisons* *, the inhabitants make shingles † of this timber, which last from generation to generation. This application of it in our kingdom would be invaluable, for covering barns and other ordinary out-houses. The very look of it would be beautiful and husbandman-like; for the roof would lie smooth and regular, generally speaking. Neither rains would rot it, nor winds ruffle it, nor might it be apt to catch fire. Whereas thatch is always liable to these accidents, and, though it be cheap at first, is dearer in the long-run than tiling or slating ‡, being for ever in disorder, and repaired in unsightly patches: Not to mention its harbouring sparrows, hurtful insects, and being continually covered in the inside with cobwebs, dust, and all sorts of foulness, to the great detriment of corn and hay.

Nor is the larch-tree without its medicinal uses. The best sort of agaric is gathered from its bark; and the same bark, upon incision made, yields the purest *Venetian* turpentine.

It is a farther advantage, that, this excellent tree dislikes a rich, moist soil, and thrives best in such

* *Difette de Bois*, à Zurich. 1761. p. 160.

† Shingles are boards used in the manner of tiling: Those of the *Grisons*, I am informed, are nailed down to the rafters, being half an inch thick, and the superficies one foot square.

‡ In a part of *England*, where high winds are frequent, I have known the thatch of a small farm and out-houses cost the landlord, at an average, 40*l.* in twenty years.

such poor lands as may be easily and profitably spared for plantations; namely, cold, meagre, gravelly, or stony lands, provided the roots can find depth to penetrate downwards. It grows slowly, the first four years; but, in twenty years, will exceed a fir-tree, in girth and height, that is doubly older.—A plantation of 100,000 larch-trees was raised lately in a little district of *Germany* called *Wernigerode*.—Nor is there any reason for doubting, that this tree will not thrive to admiration in *England*; for some of them, about forty years ago, came to full size and perfection near *Cbelmsford* in *Essex*: And Mr. *Miller* mentions others of a considerable growth at *Wimbleton* in *Surry*, which produced a large quantity of cones every year.

What obstructs the removal or transplanting of young larches, about three years old, is the violent force of the sun's heat in some countries: But, with us, in this temperate climate, there is not much to fear in that respect, provided we proceed with common caution: For no plants are more impatient of the sun's heat; and of course thrive even upon the *Apennine* mountains, where they multiply themselves into forests by the falling of their cones.—Of course, some advise us to bury a whole cone at a depth of three inches, and not sow single seeds. The same persons also observe, That, when an old larch-tree rots almost to the ground, the finest, healthy, young plants spring from the stumps. But this is related on the authority of others.

To which may be added, That the branches of the *larch* afford a thick pleasing shade. The whole tree, when alive and growing, smells odoriferous; and even the timber has an agreeable scent, when felled, sawn, and applied to domestic uses. The leaves, in spring, are of the most lively verdure that one can behold. The flowers are male and

female. The former are a sort of catkins; the latter are not only singular, but beautiful, being of a purple-violet colour. The cones are finely tinged with purple, and have almost as pleasing an effect as the flowers.—The colour of the wood seems to depend on the age of the trees.

Lastly, It is commonly said, that the larch-tree differs from the pine in this respect, that, when the new leaf comes out, the old one is thrust off.—Those, who are desirous to procure the kernels for seed from the bishopric of *Trent*, or the duchies of *Stiria*, *Carinthia*, and *Carniola*, would do best to enquire for the tree under the name of *larga*, and not *lariche*. It is best to have the seeds brought from abroad (without the cones) in winter: For heat dissolves the resin, and hurts the future vegetation of the seeds or kernels. *M. du Hamel* mentions another way of saving them for sowing*.

The larch is the only tree, of the resinous kind, that can bear the severity of winter *without its leaves*. Therefore care must be taken not to plant it with clumps of ever-greens.—A healthy larch will afford, for thirty or forty years, seven or eight pounds of resin at each time of boring; which may be once a year: But trees that have been thus wounded from time to time, are held in no esteem by the architect or carpenter.

The bark of the young trees is used by tanners.

Lastly, the cedar of *Libanus*, one of the largest of all trees, is an ever-green larch-tree. It sometimes extends its branches eighteen feet horizontally, and forms so thick a covering, that one can hardly see to read a book of small print under its shade.

In the same view may be considered a species of *Juniper-tree* in the *Antillas*, which *Linnaeus* and *du Hamel*

* *Traité des Arbres, &c.* tom. I. 4^o. p. 333.

Manel look upon to be a larch or cedar. It is one of the largest and tallest trees in those parts of the world. The planks are of a mahogany-colour, close-grained, firm, odoriferous, and excellent for wainscoting and cabinet-work.

I have been assured also, that the *red pine* of *Labradore* is as good wood as any the world affords for building ships. The *French* have long known this secret, and save the out-going of much money to *Russia* and *Norway*, as they can procure the said timber upon easier terms.

The rope-osier of *America*, if it could be brought to thrive in some of our colonies, might have its uses. The best account of it is to be found in the *Voyage down the River of the Amazons*, published at *Paris* in the year 1747*.

As

* " The plants, which draw the attention of most new-comers, says he, by their singularity, are the *lianes*, or a kind of osiers, which serve instead of ropes, and wherewith *America* abounds in all the hot and woody countries near rivers. They have this property in common to them all: That they grow up winding round the trees and shrubs they meet, and, being arrived at a very great height, shoot out threads or filaments, which falling down, in a perpendicular line, work themselves into the earth, take root afresh, grow up again, ascending and descending alternately. Meanwhile others, being carried obliquely by the wind, or by some chance, fasten frequently upon neighbouring trees, and form a confusion of cordage, hanging down, and extending every way; which yields the eye a prospect very like that of a ship's tackling. There are hardly any of these *lianes* which have not some particular quality ascribed to them: Some of which have been very well confirmed, as is that of the *ipecacuana*. I have myself seen in several places one kind, which emits a very strong smell, plainly resembling that of garlic, and of course easily known. There are some as large as a man's arm; some choak the tree round which they cling, and make it actually die away, by winding themselves so hard about it; which has caused the *Spaniards* to call this plant *matapalo*, or wood-killer. Sometimes it happens, that the tree withers away, rots, and wastes, as it stands; so that there remains only the arabasque fret-work of the *lianes*, which forms a kind of wreathed column, self-supported, and transpierced through and through, which art would find it very difficult to imitate."

As the introduction of a true spirit and right use of agriculture into our colonies (those of our new acquisitions in *Canada* and *Florida* particularly) may be of singular use, first to the colonists themselves, and then to the parent-country from whence they migrated, I am in hopes the reader will be prevailed upon to excuse the detail I have given, not only from the importance of the subject, but likewise from its novelty. I have, at least, in this excursion, the excuse of *Lucretius* to plead :

— *Juvatque novos decerpere flores.*

And now it may be high time to think of returning to my native country.

We are not so careful in our own country, as perhaps we ought to be, in chusing, sowing, and diversifying grass-seeds; nor in cutting hay at seasonable times, and curing it well. *North-America* alone produces abundance of grasses, which might afford cheap as well as plentiful sustenance for cattle; but we are not sufficiently instructed in the nature, qualities, and culture of these vegetables: And indeed, in the present and all similar cases, we seem to want courage and perseverance; for one miscarriage (however injudiciously the attempt was conducted) is cause sufficient for disheartening a whole county at least for a century. What *did not grow*, and what *cannot grow*, are terms convertible in the mouths of the *great* vulgar and the *small*.

Therefore, to advance agriculture to any notable degree of improvement, better heads and better hands must co-operate with those of the farmer and common cultivator. But, whenever *these latter* exert that industry, and attain that knowledge, together with such a tractable disposition and desire of excelling, as even the *gardener* possesses (who is a

man

man no more enlightened originally than themselves) then husbandry will arise to a greater degree of perfection. And if (according to the idea of a wise prince in *Germany* about a century ago *) a little book was composed, containing the plain solid incontestable foundations of husbandry (to which prints cut on wood might be added, by way of catching the attention) and poor men's children were obliged to read it over to their masters and mistresses in country-schools, something of a ground-work might be laid, in order to guard them against habitudes and prejudices, whilst, at the same time, the mind would be set to work in searching after truth, and acquiring knowledge; for many a great genius in husbandry, without knowing his own powers, lives and dies in a poor cottage †. Perhaps this scheme may be best realized in *Ireland*, where protestant charity-schools are frequent, as well as large, and under a very exact and careful regulation. Besides, it is in the power of the governors of *sub* schools to give orders, that such a book should be read by the young people. Happy shall I think myself, if the present hint may prove of any the least use to that nation!

Lord *Molesworth* has left us a slight sketch of his thoughts upon this subject; and as the pamphlet ‡, which contains the passage, is become scarce (and the rather, as it was printed in *Ireland*) I shall just give an extract from it:

“ As

* “ E souverain” (says a judicious anonymous writer) “ vrayment grand homme par ses vertus civiles, changea par ce moyen tout à fois la face des ses etats.”

† Two very useful tracts of a different nature might be recommended to these schools; the one is Archdeacon *Welsbman's Husbandman's Manual*, pr. 2d. and the other is Dr. *Hildrop's Husbandman's Spiritual Companion*, pr. 1s. both which pamphlets seem to be copied from a treatise of *Flavell* s.

‡ *Some Considerations for the Promoting of Agriculture and Employing the Poor*, 4^o. *Dubl.* 1723.

“ As to agriculture, I should humbly propose,
 “ that a *School for Husbandry* were erected in every
 “ county, wherein an expert master of the me-
 “ thods of agriculture should teach, at a fixed
 “ yearly salary; and that *Tusser’s* * old book of huf-
 “ bandry should be taught to the boys, to read,
 “ to copy, and get it by heart; to which end it
 “ might be reprinted and distributed.—I doubt
 “ not but some such method as this would make
 “ husbandmen, and prevent the increase of the
 “ poor.”

Schools for poor folks children are established on an excellent footing in some parts of *Germany* and *Holland*. The children work one part of the day, and read and write the other part of the day interchangeably, in such proportions as the governors, masters, and mistresses think proper. In consequence of this, that worthy citizen *Thomas Firmin* (the friend of *Tillotson*) assures us, that the children of *Norwich*, in the time of *Charles II*, from the 6th to the 10th years of their age, earned 12000*l.* a year more than supplied them with food and raiment, merely by knitting fine jersey-stockings †. And thus children, at *Nuremberg*, make toys for *English* children of the same age to play with.

Under this article something may be remarked, in regard to the education of rich men’s children, as well as those belonging to poor men. *Cowley* wished to see a college founded, in each of our universities,

* *Tusser’s* book is written in *quatrains*, or stanzas of four verses each. Lord *Melfavort’s* idea is a good one; but the poem is very obsolete, and of course too hard to be understood by children, or even grown persons, being published before the year 1577. Some may think it too long; for it contains more verses than *Virgil’s Georgics*.

† *Some Proposals for Employing the Poor*, 4^o. 1681, p. 3.

I would recommend this scarce valuable treatise to all lovers of national œconomy. Hence arose the idea of parish work-houses.

universities, for promoting the knowledge of agriculture *; and perhaps that wish was formed upon reasonable expectances of some success: For, according to the best of many men's observations upon the subject, the proper time to infuse that useful part of natural philosophy, called husbandry, is in the earlier stage of life, when there is curiosity and impatience after knowledge. And, if practice here could be joined with theory, amusement in the fields, enjoying the open air, exercise, and activity agree well with the turn and cast of young people; not to mention a revolution of perpetual variety, which is very engaging at their age.

On the contrary (for I am only reciting here the opinions of others) one of the best judges of agriculture now in *Europe* has observed to me, "That little societies, established in different provinces or counties of the same kingdom, being settled at a considerable distance from each other, and placed so as to comprehend the whole kingdom in particular districts, with one or more general directors, who should be obliged to publish every year the result of the several improvements and experiments, would be infinitely better than reading speculative lectures, as is the custom in some foreign universities."

It is one point gained, without doubt, to be enabled to read the husbandry works of *Cato*, *Varro*, *Virgil*, and *Columella*, with taste and knowledge. It may open a new walk on classical ground; and in all probability give young men certain pre-dispositions in favour of agriculture: Yet still the whole, combined together, will produce but slight effects, except we call in the assistances of practice and experience.

Something, in one shape or other, ought certainly to be done; and the complaint of *Columella* should

should be removed, if possible; who says with some degree of warmth, *Agricolationis doctores qui se profiterentur, neque discipulos cognovi.*

The society for promoting agriculture, lately established at *Berne*, seems to me to be the best contrived for answering its intentions of any society of the like nature in *Europe*. The *Dublin* society, though founded on a narrower basis, both as to objects and correspondents, deserves to be spoken of with great esteem. That of *Tuscany* has its merit, provided the Transactions of it were published periodically.—*France* has done much, but not enough to content those of her patriotic subjects who consider agriculture in a commercial light. And hence it is, that one of her writers observes, (whether truly or falsely I shall not take on me to determine) “ That the ministry has not had the
“ good fortune, for a century past, to understand
“ some very material maxims of administration;
“ and that the modern *French*, like the old *Gauls*
“ at *Rome*, seem to have been deficient in their
“ political arithmetic.”

The respectable patriots in *England*, that form the *Society for Encouraging useful Arts*, seem determined (to their honour be it spoken) to contribute all that lies in their power towards the advancement of agriculture. Such munificence and attention to public prosperity may be called truly royal, as it would cast a lustre even on the greatest kings and emperors. Nay, so extensive is the generosity of the persons here mentioned, that, in all probability, they would bestow more premiums in matters of husbandry, if new and proper objects of culture should be suggested to them; which appears from the proposals to the public this present year, where, amongst other things, they have excited all lovers of husbandry to make experiments on *lucerne*, and three or four other sorts of vegetable food, for the
better

better support of cattle. Nor is it to be doubted (for this I speak partly from the success of my own experiments) but that various new useful attempts remain still to be made upon fifty plants and upwards for the like purposes *; many of which are natives of our own island, and others may be introduced amongst us from abroad with little hazard; not to mention the varieties of sorts under the same generical name: As for example in *trefoils*.

But, in truth, societies ought to be established for promoting the well-being of agriculture *only*; since *that art alone will demand the whole attention of a considerable number of sensible persons*; whilst, at the same time, experience and matter of fact are the only safe and useful groundwork upon which they can proceed.

In conjunction with these assistances, the natural philosopher, the mechanist, and the man of fortune (who can best bear the hazards of an experiment) must all join with the laborious husbandman, in order to advance the art of agriculture. For what improvements can reasonably be expected from a poor uninstructed farmer, who cannot wait for *eventual gains*, however probable; but thinks only of paying his annual rent and acquiring a sustenance from day to day; plodding on slowly and heavily in the beaten track of his ancestors and neighbours, like a beast of burthen, overladen and disconsolate!

*Qui solus arva
Gramina, communemque petit defendere campum †.*

—Men rarely cultivate an estate well, or even according to the best of their capacity, except they are invested with the property of it, or enjoy a tenure

* See Postscript.

† *Statii Theb.* l. iv. v. 403.

160 *The great Importance of Agriculture:*

nure of some duration in it. Encouragements, therefore, for industrious and careful tenants, should be thought of by landlords. Rack-renting hurts the proprietor of the land sometimes immediately, and always remotely; so that a *shrewd* farmer, in many cases, as things now stand, gets more by continually harrassing the ground, than by giving it the assistances of repose and manures; he gains by *desolation*, and loses by *improvements*.*

It were to be wished therefore, that some scheme could be hit upon (not much unlike the *Flemish* one formerly mentioned) of rendering lands advantageous to the proprietor and tenant; since, otherwise, when the latter has brought one farm into a downright consumption, he flies from thence, and plays the vampyre upon a new one. In this case, the earth, like a tender child, often loses by changing her nurse.

So that, to resume the point just before touched upon, when taxes are multipliable on the produce of land, or increase of live-stock, as in *France, Italy*, and the hereditary dominions of the house of *Austria*; or where the landlord is rigid in raising his rent upon every new improvement, as sometimes happens in *England*; there it is prudent, in the farmer, not to make shew of gaining much wealth, but,

* In some parts of *England*, the inhabitants have a strange old proverb upon this occasion:

He that havocks *may fit*,
He that improves *must fit* :

Or, in other words, the tenant that *racks* the land, may continue in the farm till he has worn out the soil: But he that *improves* the state, must pay an advanced rent, or be obliged to quit.

In *Italy*, when the husbandman's time of holding is almost expired, it is his custom to ruin the vineyard he rents, by forcing the trees to bear till they become barren. Such treatment is called, by the neighbourhood, *Lascia podera*, or *adieu farm*.

but, on the contrary, appear to be poor. And, alas! too often,

Pauper videri vult Cinna, & est pauper.

Thus have I given a slight sketch of the present state of husbandry, both at home and abroad, which may be matter of some little instruction and amusement.—Of many other actual as well as possible improvements a fuller notice may be taken, hereafter, by myself and others.—Once more, therefore, it is to be hoped, that our *beloved country* may always continue to take the lead in matters of agriculture, and that a time will come, when we shall not only make conquests abroad, but over our own soil.

The grand secret of managing an industrious flourishing state is to harmonize agriculture, commerce, and manufactures; giving to each fair scope and attention, and never exalting one to the *manifest detriment* of the other. The prince that shines in these respects will do an honour to human nature, and his reign will be remembered by posterity, like that of another *Titus*! A most illustrious sovereign made this remark from his own experience: *The king's favour, in matters of agriculture, is as dew upon the grass.**

In the ages of true greatness and simplicity, the culture of the earth, and *that* of the state, always proceeded hand in hand. Many centuries afterwards, skilful persons were sent, at the expence of the public, to explore the vegetables of distant countries, and rewarded with due honours, when they returned home. In some public triumphs at *Rome*, the new-discovered fruits and plants were carried in the close of the procession. And, when the *Romans* subdued *Carthage*, they made a present of all the libraries they found there to their allies,

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* *Prov.* xix. 12.

excepting only the husbandry-writings of *Magro*, which consisted of two and thirty treatises, and which, by order of the state, were translated into *Latin*.

Several plants took their names from great and illustrious personages, who first discovered their uses and virtues. As *gentian*, from a king of *Illyria*; *hyssop*,^a from a *Macedonian* prince; *circea*,^b from *Circe*, the daughter of the sun; and *mitridatida*, from *Mitridates*, king of *Pontus*. I might also mention the *eupeperium*,^c the *artemisia*,^d the *exporbium*,^e *belenium*,^f and twenty others. Nor need we take notice, that several illustrious *Roman* families took their names from words used in agriculture.

It were to be wished, that the same ambition continued fashionable at present, and that ingenious and industrious moderns would turn their thoughts once more to the study of plants, not only as matter of food, &c. for men and cattle, but in a medicinal sense: Since the simple physic of vegetables appears to many to be the physic reached out unto us by the hand of our great Creator and Preserver: And therefore (says *Linnaeus*) "the learning of *Galen* and *Dioscorides* may have done much, the no-learning of the *Indian* savage has done more." For, though the former hunted nature at large, like high-ranging spaniels, yet the latter followed the scent slowly and patiently, close to the ground.

Thus much I have thought proper to advance in favour of husbandry, and every other branch of rural

^a *Leafe-Strife.*

^b *Enchanter's night-shade.*

^c *Aggrimony.*

^d *Mug-wort.*

^e *Gum-tistle.*

^f *Elicampam.*

ral oeconomics; but my encomiums shall be restrained within due bounds; *Pessimum genus inimicorum Laudantes*, says *Tacitus*; and *Virgil*, on this account, desired to wear a chaplet of *baccharis*, by way of preservative against those *qui ultra placitum laudârint*.*

For, if agriculture be represented as supplying every thing, then commerce and manufactures must decline. Again, if the two latter become the public passion, the dearness of living, joined with a neglect of husbandry, may frustrate our expectancies, and mens. minds will be too much turned towards ambitious delusions. Nor can much be expected from any country where avarice is the main motive of action, † and where not money's worth, but ready money must be had immediately, and in great abundance. — It is an heavy misfortune, when men want to grow rich too soon, and acquire great wealth, not progressively, but *per saltum* †. These are visions conceived in the groves of *Utopia*; or on the banks of the *Mississippi*. — Spain laboured under the same delirium; as soon as she took possession of the *West-Indies*. Examine what she was: Reflect on what she is: And then draw the conclusion. †

An *English* writer, of some eminence, perceived these mistaken notions in the *Spaniards*, above a century ago.

“The riches of *Spain*,” says he, “are much increased, but it is disputable, whether that circumstance

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* *At si ultra placitum laudârint, bacchare frontem
Cingito, ne noceat vati mala lingua futuro.*

† *Nimirum alii subiére ritus: Circâque alia mentes hominum detinentur, & AVARITIÆ TANTUM ARTES COLUNTUR.*
Plinii Hist. Nat. l. xiv. in Proöm.

‡ See note, pag. 29.

‡ It is remarked by *Montesquieu*, “That it is happy for all trading powers, that God has permitted the *Spaniards*, *Turks*, and *Portuguese*, to be in the world; for, of all nations, they are the most proper to enjoy large tracts of country with insignificantæe.”
Hist. de la Decadence, tom. II. p. 206.

stance will turn out to her greater damage or advantage.—The people of that kingdom are so very much exhausted already, that the *possession of it is not now kept without great difficulty*, and yet the consumption goes on daily; and, were the passage to the *Indies* a little more open and cheap, many more would pass thither, and *Spain would fall under the sword of the next invader*, for want of hands to defend it.

“Nor is *Spain* considerably enriched by these treasures of *America*, they being yearly drawn out again by the neighbour-nations who supply *Spain* with necessaries.

“The depopulation of *Spain* is mostly attributed to the banishment of the *Moors* and their wars abroad, and *these* have had their share in it; but the *American* plantations seem to have been the principal cause.—But, however this depopulation came upon *Spain* at first, nothing is more certain, than that *America* has much increased it; so that, as far as a man may judge of future things, the possession of this country will pass, in a few generations, to another people,” (quere, if not the *French*) “or, at least, will become an accession to some other crown.”*

The author then continues to observe, with great good sense, that, in proportion as trade and migrations increase, care, at least, should be taken to cause population to increase: So that, for example, if manufactures, &c. were augmented one third, the number of subjects, likewise, should be augmented one third; “otherwise,” says he, “the de-

* “What chiefly ruined *Spain*, after its acquisitions in *America*, was plunging the crown so deeply, says an old author, in the gulphs of brokers and money-changers: So that most of the revenues of it stand engaged for payment to this very day. *Raleigh's Epilogue.*

delusion is a very wonderful one, and may be understood, when it is a little more felt."†

It was a query proposed to this nation, in the reign of James I, "whether our colonies had not dispeopled us visibly, and thrown a damp upon the culture of the earth? *England*, says my author, began its plantations near an hundred years after *Spain*, and, consequently, the effects thereof are not yet so visible as in the other kingdom. But our inhabitants are sensibly wasted already, and it has a very ill effect upon our tillage and husbandry in all the southern parts of the island.—So that, as the *trade of England grows* by the plantations, the *lands of England fall*; the gentry and nobility sink, and the *security and strength of the kingdom abateth*."

Certain it is, that the dearness of provisions and expensive manner of living in *England* raise the price of our workmanship very considerably, tho', at the same time, all foreigners agree, that the work is neatly executed;—that it is more durable, and well worth the increase of price, if the inhabitants of poorer countries could afford to give it.

"What foreign manufactures want," say foreigners, "in solidity and goodness of materials, &c. they make amends for by taste, fancy, and a succession of variety; not to mention that most people chuse to buy *two* things of the same sort instead of *one*, if the *former* can be purchased at or near the same price as the *latter*:" Besides (continue they) "we indulge our caprice with novelty, and keep pace with the fashion:"—(Now fashion, by the way, is nothing more or less than an ostentation of splendor, and that with as much and sudden variety as possible.—) However, all these arguments carry their weight and influence with nine-tenths of mankind, though they may not be sufficient to convince a philosopher!

There is no dispute but that our commerce and manufacturies have made glorious advances within these forty years ; but has population attended them *æquis passibus*?—If this be not the case, do we not seem to fall under *Heylin's* predicament? Since it rarely happens, that industry, frugality, temperance, and increase of health, are the attendants of new and great acquisitions in riches. But, if God should be pleased to bestow the true spirit of moderation and humility upon any people, then increase of subjects and numberless other blessings would ensue of course. — Yet, on the other hand, it is much to be feared, notwithstanding all our vast augmentation of trade, that the culture of the field is too much neglected, and that our populoufness diminishes rather than increases.

This is plain, without appealing to registers and calculations, though the fact, from them, could be made clear beyond contradiction. Nor need we have recourse to the accidents of war, or the number of lives that must be lost in an extensive navigation: These are small partial considerations, and, at the same time, unavoidable. It may suffice to observe, that an increase of luxury, in rich and poor, together, with an unlimited abuse of spirituous liquors and tea, in the common people, are, of themselves, sufficient to produce the depopulation here complained of.

I have been well assured, by one of the most experienced practical judges of trade in *England*, that as much superfluous money is expended on TEA, SUGAR, &c. as would maintain 4 millions more of subjects in BREAD.

The calculation given to me was a very moderate one, the tea being only charged at 5s. a pound, and the sugar at 7d.

One million of pounds of tea, at least (not including contraband-tea) is drank annually in *England*,

land, and 8 millions of pounds of sugar are consumed with it.

We may add further, that the money, sent abroad for tea, is buried in a gulph from whence it never returns: † Nor is the whole body of the *English* nation advantaged by this intercourse of trade, but only a certain number of individuals. A tax, therefore, on such *oriental luxury*, if the expression may be used (with proviso it relieved the poor from the burthen of some other impost upon the immediate necessaries of life) might be called, in effect, a tax founded upon moral prudence and parental kindness!

But to resume the point I was before treating of.

Though trade, commerce, and manufacturies cannot be too great in a frugal industrious people, (for society must always have this proviso in view) yet, at the same time, care must be taken to supply a sufficient succession of hands, and proportionable attention ought to be given to agriculture, for food must be found for artizans and manufactures, since men cannot feed on gold, but bread. — Nay, what is still more, provisions must be supplied in such plenty, that other nations may not purchase the same common necessaries upon *much* easier terms; For, if that be the case, they will undersel us in foreign markets. — Our goods, therefore, should be better than theirs, but not in an extraordinary proportion; for then it will be difficult to find purchasers,

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Wealth,

† “The merchant,” says *Locke*, “may get by a trade, like that to the *East-Indians*, which makes a nation poor.”

Trade with the *East-Indians*, as far back as the times of the *Romans*, has ever been matter of disadvantage to the party trading with them; for we carry specie thither, and bring none in return. Commerce with the *Africans* is upon a different footing: The natives set an high value upon *European* trifles, and every civilized state that traffics with them, receives an high price in return.

Wealth, acquired by trade (and trade naturally calls for application and attention) is of ten times a more permanent nature, than wealth raised suddenly from mines of gold and silver, &c. or beds of diamonds. But the same, or a smaller stock of riches, procured by the means of agriculture, is still more durable to the acquirer as well as more advantageous to society; first, because it is more slowly and painfully earned; and, secondly, as it is matter of home-production; whilst many of the materials the manufacturer and artist employ their skill upon, are first purchased from other countries, which diminishes the nett national profit.

Generally speaking, where mines are found, the land is poor and barren; *which seems to be a lesson from Providence.* To which may be added, that a sudden great influx of wealth creates new imaginary wants; and matters of false elegance, luxury, and superfluity, must be sought for and imported from other nations, which, in effect, makes foreigners, more or less, proprietors of the mine. For which reason, the wise policy of the *Chinese* takes care that the subterraneous riches of their country should remain quiet and undisturbed in the bowels of the earth; and this is the secret which raises their agriculture and trade to an high pitch of perfection.

Upon these accounts, I would, in the gentlest and modestest manner, admonish my countrymen to check their impatient desires a little, in wishing to be masters of *Peru*, *Cbili*, or *Mexico*, in this conquering age. Indeed, it can never be denied, but that the acquisitions of *Spain* were very great, for a small number of years after she first discovered *America*. But, at the same time, the conquerors did not consider that there is an *interior* and *physical defect* in such riches, which lose a part of their value, in proportion as they are multiplied; and this appears from the augmentation naturally caused in the
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the price of provisions, &c. "As the specie of *Europe* soon doubled," says the Baron de Montefquieu, "the profit of *Spain* became by one half less valuable, as the mines yielded about the same quantity of wealth every year.

"In double the time the specie still doubled, and the profit still diminished another half.

"It diminished even more than an half, if we consider the migration of subjects to be employed in the mines, the loss of lives, and the expences of digging, refining, and importation to *Europe*." — And thus the "charges, which stood before, as one to sixty-four, became as two to sixty-four, as the specie grew doubled in quantity, and diminished one half in value.

"If we proceed doubling and doubling, we shall find, in this progression, the cause of the impotency of the wealth of *Spain*.

"It is about two hundred years since the *Spaniards* began working their *Indian* mines. I suppose, the quantity of specie, at present, in the trading world, is, to *that* before the discovery of the *Indies*, as *thirty-two* is to *one*; that is, it has been doubled *five* times; in two hundred years more, the same quantity will be, to *that* before the discovery, as *sixty-four* is to *one*; that is, it will be doubled once more. — In this progressive state, the same mines, in that tract of time, will hardly defray the expences of working them. And, if mines should be discovered so fruitful as to give a much greater profit, the more fruitful they may prove, the sooner the profit will cease.

"I have frequently heard people deplore the blindness of the court of *France*, which repulsed *Columbus*, when he made the proposal of discovering the *Indies*. This, though perhaps without design, proved, in the end, an act of the highest wisdom.

Spain

Spain has behaved like the foolish king,* who desired, that every thing he touched might be converted into gold : And who was obliged to beg of the gods to put an end to his misery.

“ The companies and banks, established in many nations, have given a finishing stroke to the lowering of gold and silver, as a sign or representation of riches : For, by *new fictions*, they have multiplied, in such a manner, the *signs* of wealth, that gold and silver, having this office only in part, are become less precious.” †

Nevertheless, these reasonings hold not in force against all mines, for such as are found in the *mother-country*, like manufactures which are wrought upon materials of our own production, are known to be of great use and advantage to the community.

Of such nature in *England* are the lead-mines and tin-mines of *Derbyshire* and *Cornwall* ; the gold and silver mines of *Germany* and *Hungary* ; the iron-mines of *Stiria*, and those of quick-silver in *Idria* : For though, in truth, they hardly produce more than one half of what defrays the expence of working them ; yet, at the same time, they are the means of employing a great number of labouring people, whom they render bold, robust, and hardy. These people, also, consume a large quantity of superfluous commodities. But still one proviso must be always borne in mind : Which is, that such labours ought never to draw men off from the culture of the field ; for a nation cannot be truly rich that neglects the surface, and seeks for wealth in the bowels of the earth. — “ The culture of the soil,” says *Montesquieu*, “ is the greatest of all manufactures, and the truest source of riches.”

This

* *Midas*.

† *Esprit des Loix*, tom. II. l. xxi. c. 18.

This train of thinking brings to mind the imperfect remembrance of a short story or fable in an old *Spanish* novel-writer; which may serve to explain my meaning in a more instructive, and, at the same time, a more agreeable manner, than I could pretend to give it, without calling in the assistance of another hand.

When or where I met with this fable I cannot say; but flatter myself, that the design and manner of the author are represented in the following narration with tolerable exactness, at a distance of thirty years from the time of reading it:

In the age of the American adventures, about the year 1550, when all Europe proposed to grow rich in a moment, a Spanish gentleman, one Don Gregorio de Brice, being acquainted with some of Orellana's companions, lately returned from the River of the Amazons, procured intelligence of a small island, called by the natives Rhadamilla. This little spot of land was represented to be the true Hesperides of the antients; for it abounded with woods, rivulets, pasturage, and gold-mines. Nay, the very stones were reported to have a mixture of gold in them.

Animated with this relation, Don Gregorio turned his whole estate into money, and fitted out a ship, persuading his younger brother, Don Estevan, to join with him in the adventure. The latter was a man of a cool head, and totally devoid of ambition and avarice, but complied from mere affection to his brother, whom he loved passionately, having no other relation.

*In the voyage Don Gregorio touched upon the coast of Barbary, and purchased slaves to work in his mines: Estevan bought only a couple of score of sheep and a dozen of goats, with two males of each kind. Being asked the reason, his answer was, You, my brother, are a second Cain, a man of a bold enterprizing genius: I will imitate the humble Abel, and turn pastor; for
meat.*

meat and cloathing must be thought of, as well as the acquisition of precious metal. It shall be my business to act the part of proveditor general for you and your labourers, who may possibly find gold to be neither eatable nor drinkable. I will therefore supply the company with food, and you shall pay me for it out of your vast treasures.

Upon this Don Gregorio laughed; but a slight air of contempt was intermixed with his laughter. Ah, brother, said he, you have no spirit, no elevation of sentiment; that mind of yours runs too much upon vulgar matters. . . . The man that has a mine of gold commands every thing that this sublunary world can afford. —No, no—replied an old mariner from the bay of Biscay, shaking his head; there is a dash of good sense in Don Estevan's proposal.—It is sometimes necessary to eat, as well as grow rich.

At length the ship reached the desired island. A gold mine was found according to expectation, and the produce thereof made it worthy to be called a Potosi in miniature. Meanwhile Don Gregorio gave himself little concern about bodily sustenance, living in a great measure by imagination, and feeding upon the hopes of future abundance: But his associates had not sublimity of fancy enough to relish such fictitious aliment; for, after having worked all day, they were just able to support life with a few small fishes hard to be taken, and some ordinary fruits and vegetables, such as could be found in the neighbouring woods and vallies. During this interim, the strew'd sensible Biscayner, already mentioned, missed little of occasioning a mutiny without intending it: For, having found no supper in the fields, not even a salad of trefoil-leaves and thistle-roots, he set his foot on a lump of gold which lay in the but, and broke out into the following exclamation: Fatal deceiver of mankind! said he, what art thou in thyself?—Gladly would I exchange twenty such lumps of metal for as many pounds of the worst mutton fed upon Estremadura turnips!

The

The rest of the crew conceived the same indignation that the Biscayner did; but Don Estevan composed the disorder by assuring them, that to-morrow he intended to kill a lamb and a kid three parts grown, in order to give a bountiful repast to the whole society.

This he continued thrice a week, and from that time matters went on very comfortably. For Don Estevan fed the men well, and clothed them with the wool of his sheep and skins of his goats. His brother gave an equivalent in gold for all that was purchased; and that with a certain justice and nobleness of soul, quite peculiar to an old Castilian.

After three years thus spent, the men petitioned to return to old Spain, alleging, amongst other things, that their ship (though a new one, when they set out) would never be able to sail home, in case they stayed another winter. Their wealth, though of great value, was easily stowed, and a prosperous navigation soon carried them to the Canaries. As the weather still continued fine, Don Estevan proposed to his brother to settle their accounts; but, when the whole debt due to the former was fully perused, Don Gregorio changed colour, and, letting the papers fall, O Estevan, cried he, I am a bankrupt—I am undone!—But my brother has gotten what I have lost, and that is sufficient!

You are only mistaken, my dear brother, said Estevan coolly, but not undone. You wanted to acquire that wealth instantaneously, which Providence decrees to man under the condition of earning it by little and little, with long perseverance and moderate desires! — To gain riches in a moment is not industry, but gaming.—You acknowledge the error, and it is my business to repair your loss. One third therefore of our acquisitions is for ever yours; a second part shall be reserved for myself; and the residue distributed to the ship's company. It is likewise but a proper acknowledgements to the bounty of Providence, that the slaves should have their liberty, and end their days in quiet with
you

you and me, as they were always our fellow-creatures, and at present our fellow-christians.

∴ The moral of this novel, or fable, speaks itself.

Yet, in all these remarks, we would by no means intend to be understood; that the bringing great sums of money into any kingdom is the infallible means of augmenting the prices of common provisions, or an irresistible temptation that necessarily produces luxury, idleness, wants real or imaginary, provided, at the same time, the nation thus described be truly industrious, and perseveres in its industry, after such wealth is imported. — Nevertheless, the consequences above-mentioned (at least as things usually happen) are highly probable, and much to be guarded against by salutary regulations of the legislature, and prudent precautions in individuals. All we insist on is, That *such ill consequences are in no sense necessary and unavoidable ill consequences*, it being an allowed maxim in the schools; That the use of any thing (provided a regulation may be introduced) ought not to be superseded on account of the abuse of it.

In proof of this let it be remarked (but still under condition a nation preserves its diligence in husbandry, trade, mechanic arts, &c.) that provisions were reasonably cheap at *Athens*, even when agriculture, painting, and sculpture were in high vogue, when works of elegance bore an extraordinary price, and artists had attained surprizing perfection. There was a magnificence also on some public occasions in the expences of the state. Yet the same state (nor is it ever spoken of by the antients as an act of parsimony) allowed a couple of *Aristides's* relations, that were reduced to great poverty, one drachma* each per diem, by way of maintainance: Which shews, that, in the midst of so much public wealth and splendor, the provisions

* Seven-pence three-farthings.

ions necessary for well-supporting life were purchasable on easy terms. The *Prytaneum* gave his two daughters a portion of 3000 drachmas* each, which was their whole fortune, for their father left them nothing. They allowed the son 100 *mine* of silver, † as many acres of cultivated land, and half a crown and one penny a day, by way of pension.

At the same time *Gelon*, who possessed only a part of *Sicily*, offered the *Greeks*, in the *Persian* war, a supply of 200 galleys (of that sort called *triremes*) and a land army of 28,000 soldiers, cavalry and infantry, under engagement to maintain them with corn gratis, provided he had the power granted him of commanding this body of auxiliaries. Which shews, that there was great opulence and populousness in his territories, and abundance of corn at a moderate price.

Thus the kings of *Agrigentum* and *Syracuse* had great riches, together with powerful fleets and armies, and yet supplied the *Romans* with bread at an easy purchase.

Pomponius Atticus, a person of known rank and fashion, received the best people of *Rome* at his table, where the entertainment may be supposed to have been genteel, but not luxurious; when, at the same time, as appeared by his diary of expences, he spent no more in house-keeping, than about 2*l.* a month: ‡

About the time of the battle of *Marathon*, provisions bore near the same moderate price in *Italy*, as in *Greece*. An ox was valued at 10*s.* 6*d.* and a sheep at 4*s.* 3*d.* or thereabout.

The elder *Cato*, who was cotemporary with *Scipio Africanus*, never expended more than 100 *drachmas* (or 3*l.* 4*s.* 7*d.*) on a suit of cloaths, even when he was

* About £. 96 2 6.

† £. 322 18 4.

‡ C. Nepos in Vita Pompon. c. 13.

¶76 *The great Importance of Agriculture :*

consul or general : And the provisions for his ordinary table, at dinner, usually cost 2s. Yet *Greece* and *Italy* were then very rich, and individuals gave incredible sums for matters of ornament and rarities.

It may now be proper to exemplify these truths by modern instances. Much money is possessed by the *Chinese*, yet agriculture is maintained in full vigour, and more respected by the government, than any other employment. Hence it happens, that provisions are cheap among them, and field-labourers are no where hired at more moderate wages. To which may be added a second policy of state, which is, that much money enters the kingdom, and very little finds its way abroad ; nor does the nation vend any commodities, but those of its own growth or production ; which secret in directing the manufactures and artizans of any country is inestimable.

It is probable, that the price of provisions, in *England*, is not so much enhanced by the quantity of wealth abounding in it, as from other assignable reasons which I shall forbear to mention. Corn is much cheaper than it was in half the last century, or during the whole of the preceding one. And great plenty of corn helps to lessen the price of butchers meat. Rye and barley bread, at present, are looked upon with a sort of horror, even by poor cottagers, and with some excuse ; for wheat now is as cheap as rye and barley were in former times ; and therefore the yeomanry of this kingdom, about one hundred and thirty years ago, mixed both these vegetables with wheat to make bread. But the very name of this mixture is now forgotten ; * Whilst the pure flour of wheat, made into bread, was hardly tasted but at court, and in the houses of the nobility

* It was called *maslin*-bread, quasi *miscellane*.

bility and prime gentry, where it bore the name of *cheat*.

True it is, that most articles of subsistence are dear in *Holland*, where money is plentiful: And the wonder is they are not dearer; *Holland* is a body kept alive by the medicines of state-policy; it consists of a small spot of ground, and that ground is of an intractable nature, averse from agriculture.

On the other hand, money is scarce in *Italy* and *Germany*, but common useful provisions are dearer there than with us; nay, if we take quantity and quality both, few travellers will find a country where bread and butchers meat, upon the whole, are cheaper and better than in *England*. Of course, from all that has been said, wealth, in prudent governments, blessed with industrious subjects, needs not necessarily entail scarcity and dearth on the common useful food, fit and convenient for supporting life.

If it be asked, why corn is cheaper and more abundant in *England* now, than it was fourscore or one hundred years ago, the answer is plain, because the legislature has wisely, in that respect, granted the liberty of exportation, which gives new life to the cultivator.

All these remarks lead me back to observe, that *Spain* was not merely ruined by the acquisition and importing of *American* gold, but by neglecting agriculture and the other arts of gaining subsistence at home. Hence arose the true ruin of *Spain*; money will not promote propagation; men can feed on bread, but they cannot feed on gold; nor were the *Spaniards* catholics enough, in this sense, to eat the deity they adored. But infatuation dazzled that nation, and so it may many others: Aiming at too extensive a power, "*Elle trocqua ses hommes* (says a spirited author) *contre des lingots, et aima mieux moissonner des metaux, que des graines.* Enivrée de ses richesses, les

arts utiles furent méprisées: La pesanteur des impôts les acrasa; & son peuple découragé se livra à la vaine gloire & à l'indolence."* — To which may be added

- a combination of other causes arising from mis-judgment and ill management; as persecutions and expulsions on the one hand, and permitted migrations on the other; the celibacy of the religious orders; the exemption of the nobility and gentry from taxes, and transferring the intolerable weight upon the poor and laborious. All which, combined together, made a writer of their own country observe (for no persons are clearer-sighted than the sensible part of the *Spanish* nation) "that the people who sailed to *America*, in order to return laden with wealth, would have done their country much better service to have stayed at home, and guided the plough: For more persons were employed in opening mines and bringing home money, than the money, in effect, proved worth." †

Colbert rather depressed than promoted the interests of *France*, when he conceived a project of enriching it by establishing a vast number of manufactures, ‡ flattering himself at the same time, that, by making the productions of his manufactures subservient to luxury and falsely-refined elegance, he should multiply the wealth of his own nation by supplying and feeding the extravagance and vanity of other nations; but some part of the folly happened to stick where it took its rise, and became infectious at home; which shews, that luxury is an unfortunate fashion in any country, though, at the same time, it prescribes the mode to foreigners, and induces them to purchase such merely ornamental elegancies as are the workmanship of our own artists. Under the idea of

* *Police des Graines*, p. 227.

† *Albyterio*.

‡ *Memoire du Marquis de MIREBEAU, pour concourir du Prix*, &c. 1761.

of hoarding up great store of provisions for the support of his work-folks (and that principally by obstructing the free vent and exportation of oorn) this minister had the applause of the poor, who naturally favour any scheme, real or imaginary, that promises to lower the price of bread; for their understandings can rarely see deeply into the truth of things, any more than the advantage of a nation in general, or of themselves upon the whole. In like manner the historians and poets loaded the prime minister with panegyrics, as the true father of the people, and made no ceremony to depreciate the wiser conduct of *Sully*. But alas! it never truly appeared, that trade and commerce, even in their most flourishing state, enriched a kingdom like the solid revenues that proceed from a right and effectual cultivation of the earth. Thus, though the *French* nation was intoxicated with the hopes of immense riches, and though they supplied all *Europe* with silks, embroideries, and expensive trifles, yet the fund of real wealth was deficient at bottom. Famine made its appearance frequently, and almost periodically. The proprietors of landed estates (for they, with others at first, ran into the universal notion of admiring the project) thought themselves very happy, after a considerable tract of time, to advance their rents a *sixth* part, though money bore *one third* a greater value than before. Imposts and taxes were increased immoderately: And a considerable part of the lands (not being found, or, at least, not believed to answer the expences of cultivation) was overlooked and neglected by little and little, and, at length, degenerated into waste and desolated tracts of country. All which may suffice to shew, that the cultivation of the earth ought not to be superseded by a passion for commerce. The secret is to encourage both, and that equally, without partiality.

One might expatiate more upon this subject, but the present age is not disposed to relish a discourse upon such a topic. Agriculture is held in small esteem; * the prosperity of a country is looked upon as independent of its assistances. Depopulation is not dreaded: The increase of the poor (a natural consequence in manufacturing countries) is not regarded. Men would be rich too compendiously; the returns of the earth are slow, laborious, and over-scanty; whilst great fortunes, acquired too suddenly, destroy equality, the foundation of liberty. — Nay, the helps of agriculture must always be called in to support manufactures, either at a flourishing, or languishing period; — since, in the latter case, at least, not the ravage of war will be found to produce more poverty than may be seen in a manufacturing town, when any unforeseen unfortunate accident stops the vent of the manufacture. But I shall leave a full examination of these points to writers of greater spirit and understanding. The Marquis de Mirebeau (in a land not very famous for freedom) speaks thus on the occasion: “*Les maux politiques*” (dit-il) *sont tous contagieux: Peut-être que l’épidémie est dans notre voisinage. A tout hasard je parle à l’univers. Que ceux qui ont suscité ma voix, me pardonnent l’extension de mes organes!* †

But these topics are far beyond my strength to undertake. I tremble to touch them, as *Dares* did, when *Entellus* threw down upon the ground, before the combatants, the gauntlets of *Eryx*. It may become

* “Certainly we are all afraid” (*Thys Blythe*) “lest our plenty should be our ruin, or else men that study so much to get estates at second-hand one from another, would rather strive to gain them at first-hand out of the earth.”

Improver improved, 4^o. 1653, p. 127.

This remark seems to be copied from *Columella* :

Supereſt unum genus liberale & ingenuum rei familiaris augenda quod ex agricultura contingit. L. i. in Proœm.

† *Mémoire pour concourir au Prix, &c. 1761, p. 264.*

come me rather to say, with one of the most useful and sensible writers among the antients,

*Sed quid ego infræno voltare per æthera cursu
Passus equos audax, sublimi tramite raptos?*

* * * * *

*Me mea Calliope cura leviore vagantem
Jam revocat, parvoque jubet decurrere gyro,
Et secum gracili connectere carmina filo,
Quæ canat inter opus musa modulante putator,
Pendulus arbutis, olitor viridantibus hortis.*

COLUMELL. *de Hortis*, v. 216, &c.

How durst I rashly urge my steeds to rise,
And whirl th' advent'rous chariot thro' the skies?—
Me my *Calliope*, with tender care,
Recalls, to trifle in a safer sphere:
Me short excursions suit, fore-warn'd to tread
A modest path, by tim'rous fancy led,
And spin plain georgics of an humbler thread: }
Nature's effusions! uninform'd by art,
Untaught by books, and recent from the heart,
The pruner's ditty; which he chaunts with glee,
Imbosom'd in the foliage of a tree!*

Here, therefore, I shall stop my course, having imbarqued on a gentle stream, but finding myself approaching, by degrees, to the main ocean. Besides, without entering deeply into these great national difficulties, my meaning is partly different

M 3

from

* As *Columella* lived not a great many years after *Virgil's* time, it is very extraordinary that this beautiful poem, on the *culture of gardens*, which seems to be a continuation of *Virgil's Georgics*, according to *Virgil's* own plan (as may be seen in a note to page 92) has never yet been translated by any of our celebrated *English* poets. I suppose, what deterred them was the not being experienced in matters of culture, and the difficulty of assigning the true names of the plants which our author treats of.

from that of the *French* writer above cited; consequently I shall repeat what has been before mentioned by me, and continue to remark, that agriculture, trade, and commerce, must be all cherished, counter-balanced, and harmonized in every well-governed and flourishing state; and, when such is the case, any industrious and virtuous nation may dispense with the absence of *Potosi*, and all its mines. “For those riches,” says *Montesquieu*, are of a bad kind, “that depend upon accidental circumstances, and not upon the industry of a people, and the cultivation of their lands.”

When the wealth of the kingdom of *Bambouch*, in *Africa*, was discovered, about the year 1716, the land gave earnest of abounding as much in gold as *Peru*, *Mexico*, and *Brazil*: For gold, according to the relations of the first adventurers, might be collected and gathered up without digging; and, as *Ovid* said of the earth, when touched by *Midas*,

————— *Saxum quoque palluit auro:*

But the soil was harsh, scurfy, and unprolific, hardly affording the common necessaries of life; so that the inhabitants were half starved, and extremely miserable.

Nay, what is still more remarkable (as will appear upon perusing the author last cited) “no lasting, solid, and useful wealth can be expected, even from the fine arts themselves,* if they supply, in general, the ornaments of luxury; and more especially, if we live in an age, like the present one, made up of calculations, tariffs, interest, stocks, and agios. † All such political heat is of an hectic nature,

* See the same proposition confirmed in the *Numbers of Mankind*.

† *Laxitas mundi, & rerum amplitudo damno fuit. — Postquam nil magis ornabat quam census, & captatio in questu fertilissimo,*

ture, and, at length, circulates tainted juices thro' the blood."

"In the midst of the darkness," continues he, "of this universal idolatry, agriculture might have been extinguished, if its nature had been capable of such extinction: But, as the art we are here speaking of submitted with resignation to her boisterous invaders, so humility and modesty concealed her in part from the disdainful eyes of her conquerors. And, indeed, what better terms could *she* expect, being of a mild, benevolent, communicative disposition, desiring nothing but what she had dearly earned by her labours, subsisting solely on the gifts of the heaven and the earth, and naturally endued with so much diffidence, as never to presume to reason, except from experience and matters of fact? — Nevertheless, as reproduction, according to the uniform revolution of nature's laws, is the child of putrefaction, agriculture, the common and necessary mother of all, will again assume a second life; and shake off the yoke of servitude. Thus she revived, in the last century, amongst the

— "*Penitus tota divisos orbe Britannos.*"*

From this passage of *Virgil*, it seems natural to observe, that our nation appeared, in the poet's eyes, to be as far removed from the true knowledge of agriculture, as from the *then* civilized and cultivated parts of *Europe*. Nor does it appear, that he had any notion of our kindly temperament of air, or of the strength and richness of our soil.

But our countryman, *Cowley*, *Virgil's* lawful successor in georgical writings, has supplied what the

M 4

great

tilissimo, pessum icere vitæ pretia.—Cum voluptas coeperit vivere, vita ipsa desit. Plin. *Hist. Nat.*

* *Memoire du Marquis de MIREBEAU*, adressé à la Société de Berne, 1760, p. 230—235.

great master was not enabled to mention; and gives us no unpleasing picture of the natural good qualities of our happy island, with respect to husbandry; so that, if I here make a slight digression, it will probably be pardoned me upon easy terms, being a sort of tribute justly due to one's native country.

Cowley's description is as follows; and I, the rather, cite the passage at length, as the poem is scarce, and printed separately from our author's works :

*Herculeas metas inter magnique Columbi
Fulvum orbem, medio longè jacet INSULA ponto,
FORTUNATARUM pulcherrima; quam beat ingens
Naturæ favor, & mira indulgentia cæli.
Non illic placidum, constans, solidumque serenum
Importuna cobors, venti pluviæque laceffunt.
Solus odoratis alarum molliter auris
Plaudit bimum Zephyrus, facitudoque incubat anno,
Non ILLAM tristi nubes lacrymosa macràque
Pascit aquâ, tacito saturat sed rore benignus
Æther, & succis vitalibus astra saginant.*—
Perpetuum & nullo violabile frigore regnum
Occupat hic modicis defensa caloribus æstas, †
Ditior autumnus, vere & formosior ipso; —
Hic locuples nullis conturbat mensibus arbor,
Sed frondes simul & flores fructusque ferentem
Omnis læta videt, videt omni Cynibia vultu;
Plurima nec tribuens, quædam negat invida, more
Nostrati; hic eadem semper fert omnia tellus. ‡*

Of

* In the age our author writ, all plants were supposed to be under planetary influences. As opinions are changed, we have varied the idea in our translation.

† Αλλ' αἰεὶ ζεφύρου λυγροτάτης ἀνίας
ὤλαιος ἀνίνου ἀναπύχου ἀδρόπυτος.

But from the breezy deep the blest'd inhale
The fragrant murmurs of the western gale.

Homer.

‡ COULEIUS *de Plantis*, l. v. v. 50.

Pope.

Of which the reader may be pleased to accept this imperfect translation :

Between th' *Herculean Streights* renown'd of *old*,
 And a *new* world, whose earth is ting'd with gold,
 A beauteous ISLE emerges in the west,
 Happiest of ev'ry island, styl'd the *blest* !
 Heav'n gave it softer skies and *milder* air,
 And nature nurs'd it with a mother's care :
 Nor storms, nor tempests, break its calm repose ;
 But the whole year in equal tenour flows :
 Whilst *Zephyr* gently spreads his roseate wings,
 Or broods prolific o'er congenial springs.
 No acrid moisture, no malignant rain,
 Falls from the flatt'ring skies, and falls in vain ;
 But soft'ring show'rs refresh the peasant's toil,
 And air's soft influence vivifies the soil.
 Here sullen winter abdicates the throne,
 And seeks *Cimmerian* realms, by birth his own ;
 Perpetual summer reigns perpetual king,
 Richer than autumn, lovelier than the spring.
 The trees are cloath'd with verdure all the year :
 At once they bud, they blossom, and they bear :
 Nature surveys with joy the prosp'rous plains ;
 She gives not *much* like *man*, and *part* detains ;
 The care of nature is unvarying care,
 And the same earth bears all things ev'ry year.

Our author afterwards observes (as a mark of divine favour on the one hand, and an incitement to human industry on the other) that most foreign vegetables may be naturalized in our happy island :

Plantæ alibi lætæ ———
 ——— *Hic nullo tempore cessant.*

I have already made some apology for my seeming partiality towards this author, whenever he
 I treats

treats upon georgical subjects; which he understood in a more elegant, as well as more scientific manner, than any man since the days of *Virgil*; and, by all accounts it has been in my power to collect concerning him, I may safely venture to inscribe to his memory the beautiful verses which *Stattius* addressed to his friend *Atedius*; (which can hardly be exceeded, except by *Cowley's* own verses consecrated to the memory of Mr. *William Harvey*.)

Tu cujus placido posuere in pectore sedem
Blandus honos: hilarisque (tamen cum pondere)
virtus;

Cui nec pigra quies, nec iniqua potentia, nec spes
Improbæ, sed medius per honesta & dulcia limes.
Incorrupte fidem! nullos experte tumultus;
Et secreta palam qui digeris ordine vitam!
Idem auri facilis contemptor, & optimus idem
Condere divitias, opibusque immittere lucem! —

But here a premature death cuts off a part, which one would wish that Providence had made his portion!

Hæc longùm florens animi morumque juventâ,
Iliacos æquare senes, & vincere perita.

Sylv. L. ii.

It is hard to say, whether *Cowley*, when he drew his picture of *England*, had *Homer's* description of the island of *Ithaca* in his eye or not: For he seems partly to have copied the account of the gardens of *Alcinous* in the seventh *Odyssy*; but certain it is, that our country-man's verses will suffer no disgrace, though they are placed in the same or next page with those of the *Grecian* poet. The passage relating to *Ithaca* will be found in the thirteenth Book of the *Odyssy*,

Odyssey, when *Minerva*, having cast a mist over *Ulysses's* eyes, describes to him his native country:

Thou seest an island, not to those unknown
 Whose hills are brighten'd by the rising sun,
 Nor those who, plac'd beneath his utmost reign,
 Behold him sinking in the western main.—
 Earth, not ungrateful to the peasant's pain,
 Suffices fulness to the swelling grain:
 The loaded trees their various fruits produce,
 And clust'ring grapes afford the gen'rous juice;
 Woods crown our mountains, and in ev'ry grove
 The bounding goats and frisking heifers rove,
 Soft rains and kindly dews refresh the field,
 And rising springs eternal verdure yield *.

POPE.
 I could

• ————— Ισασσι δὲ μιν μάλα πολλὰ
 Ἡμῶν ἄσπετα καίωσι σπέρς ἠῶν, τ' ἠελίω τι.
 Ἡδ' ὄσσοι μετόπισθε πολλὸν ζῶπον ἠερώνα
 Ἐν μὲν ἀρ' οἱ σίτη' ἀδισφάλο', ἐν δὲ τι οἴνο'
 Γίγασται· αἰὲν δ' ὑμβροὶ ἴχθυ, πεδῆλαιά τε ἴχθη'
 Ἀγρίβοι' δ' ἀγαθὴ κ' βεβήκο' ἔστι μὲν ἴδη
 Παισίν, εὖ δ' ἀρ' αἰμοὶ ἰσηπτατοὶ παρ' αἴσω.

ΟΔΥΣΣΕΩΣ.

What *Pliny* said of *Italy* may be applied with equal propriety to *England*; “Ergo in toto orbe, & quacunq; cœli convexitas vergit, pulcherrima est omnium regio, rebusque merito principatum obtinens, rectorix parentisque mundi altera; viris, fœminis, ducibus, militibus, servitiis, artium præstantia, ingeniorum claritatibus, jam situ ac salubritate cœli atque temperie, accessu cunctarum gentium facili, litoribus portuosus, benigno ventorum afflatu.—aquarum copia, nemorum salubritate, montium articulis, animalium innocentia, soli fertilitate, pabuli fertilitate. Quicquid est quo carere vita non debeat, nusquam est præstantius.”

“Salve, magna parens frugum, Saturnia tellus,
 Magna virum! Tibi res antiquæ laudis & artis
 Ingredior, sanctos ausus recludere fontes.”

VIRG. GEORG. II. 173.
 Nor

I could no-ways deny myself the pleasure of giving *Cowley's* description of our beloved native country; but, as some abatements ought to be made for the brilliant fallies of a poetical imagination, it may be worth while to remark in plain prose, That our country, in one particular respect amongst others, is as happily circumstanced as any tract of land upon the face of the earth: For it is not fertile enough to make men indolent, nor barren to such a degree, as even to deny grateful, if not ample, returns to the industrious cultivator. In a word, it enjoys the fortunate medium between fertility and barrenness, or (to speak more properly) between easy and difficult culture: Inclining rather to the side of difficulty, and affording opportunity sufficient for industry and improvements: Which is just the circumstance a person would wish for, who truly understands the good of his country. — Rich soils infuse ease and indolence into the inhabitants, and sometimes (in cases of war and danger) an undue fondness for the preservation of life; whereas a country, somewhat difficult to be cultivated (and where men are obliged to procure with labour what the earth refuses them either by spontaneous or even an easy growth) such a country, I say, contributes, by way of compensation, to render its occupiers industrious, sober, inured to hardships, courageous, and fit for military service. And hence it has been remarked in the *German* armies, that the *Saxons* (if you except such as live in the mine-districts of *Saxony*) the inhabitants of the duchy of *Magdeburg*, and the *Lower Palatinate*,
make

Nor ought we to forget here a similar passage in *Euripides*.

Ουρανὸν ὕπερ γῆς ἔχομεν εὐπεραμένον,
 Ἴν' εἴ ἄγαν πύξ, εἴτε χιτῆμα συμπίλιεῖ·
 Ἡ δ' Ἑλλάς, Ἀσία τε καλλίστα τρέφει
 Τῆς γὰρ διδάσκει εὐλαΐδα συνδύουσαν.

make not so good soldiers as those who are taken from parts of the empire, where the culture of the earth is more difficult.—Of this we have a plain proof in the last century. When the prince of *Phaltzberg* marched eighteen thousand *Lorrainers* into *Germany*, for the assistance of *Ferdinand II*, these elegant troops, during their half-year's campaign, performed nothing, but, having lost two thirds of their numbers, without exchanging a blow, returned ingloriously to their wonted indolence, ease, and plenty, in the rich plains and vallies of *Lunerville* and *Nanci*.

Indolence, without plenty, has been known to produce such effects as those last described. Thus the *Spanish* land-forces are pusillanimous, improvident, and inactive, having never been much accustomed, either to domestic or husbandry labour, whilst the natives of the self-same country, inured to the fatigues and dangers of a naval life, ascend, by degrees, to the true antient *Castilian* spirit of generous thinking and heroism.—

Having thus finished the greater part of my observations, with regard to the subject of my first Essay, I shall only take notice, that my second Essay (and whatever else I may happen to write, with regard to husbandry) is intended to be merely of a practical nature, or deduced from matters of experience in myself or others, care having been taken to admit no hypothesis, or even conjecture, without being specified as *such*: No chymical observations, or mathematical reasonings; and that from a persuasion, that husbandry receives few assistances, except from natural sagacity and matters of fact. Speculations and seeming conclusions, not founded on experience and practice, may be compared to a prism, which varies objects and colours, according to the guidance of the hand that holds it. — For these reasons, I have made husbandmen
(that

(that is to say, such of them as I have known to be men of experience, good observation, strong parts, and weaned from prejudice) my first and almost only critics through the course of this work: And have listened to their remarks, not only with attention, but docility; being sensible that many a great genius, of this sort, lives concealed in a thatched dwelling: And, therefore, we may compare such husbandmen to some of the oaks which grow on their farms; the bark is rough, thick, and knotty, but excellent sound timber lies concealed beneath it.

I only wish that I could have received written assistances from them; for there is more plain, strong, unadorned sense, more native truth, genuine beauty, and solid matter of fact, in the writings of *Gabriel Plattes, de Palissy, le sieur Giaque, and Peter Somer*,* than in the well-turned periods of a French academician.

I shall next observe, by way of caution to the reader, that we are too apt to give the name of modern improvements to antient practices of husbandry, upon their being revived amongst us; for many useful inventions have been (in great part, at least) lost, or forgotten unaccountably, *desidia rerum, internecione memorie indueta*; and hence it will appear, to all persons conversant in books of agriculture, that neither we, nor our neighbours in foreign countries, have made so many discoveries and improvements, for a century past, as one is apt to imagine at first sight. It is therefore the business of a candid writer to be just to the present age, and not unjust to preceding ages. — *Tull* has no right, or even pretension, of laying claim to

* The first of these had been a shop-keeper, the second was a potter, the third is a little farmer, and the fourth a day-labourer.

to the *drill-plough*,* which had been used in several *European* countries, almost half a century before he set pen to paper.—Nay, our ingenious countryman, *Gabriel Plattes*, seems to have had some idea of an instrument almost of a similar nature, during the reigns of *James*, or *Charles I.*, tho' his book was not published till the times of the common-wealth. And, indeed, I believe all good husbandmen, in all ages, had a notion that wheat should be sown or set at distances, and those considerable ones. *The main perfection of sowing*, says *Pliny*, is to disperse the seeds equally.† This notion he received from *Xenophon*.‡

—Nor owe we the *field-turnips* to *Tull*, but the *Flemings*: And that as long ago as in the middle of the last century.—The nature of all sorts of manures, was, at that time, perfectly well understood. —

Fold-

* An account of the *Spanish sembrador* was published by the Earl of *Sandwich*, soon after the restoration. See *Philosoph. Transact.* N^o. 62.

After all possible researches, I find it difficult to determine what nation claims the credit of inventing the *drill-plough*. It is certain, that Lord *Sandwich* is mistaken, in saying that *Luca-sello* invented it; he only was the first *Spaniard* that learned to manage it from an *Austrian* engineer, about the year 1660. See *Essay* II. Sect. 30. How long, therefore, the *Austrians* were in possession of this secret, before they imparted it to the *Spaniards*, is a circumstance not easy to be ascertained. Thus much may be depended upon, that *Hartlib* mentions a *drill-plough*, by name, nine years before the *Spaniards* boasted of their *sembrador*: See *Legacy*, p. 10, 1651; *Blythe* also knew it, and says expressly, that it ploughed, sowed, and harrowed, at one and the same time. *Improver improved*, 1653.

It is equally hard to ascertain, how long the *Chinese* have been in possession of a *drill-plough*, but, in all probability, for many ages. An exact model of one (where the contrivance is no ways contemptible) was sent to the keeper of the seals in *France* by father *d'Incarville*, and a print of it may be seen in the *Culture des Terres*, tom. II. p. 190.

† *Artis est equaliter spargere*, l. xviii. c. 24.

‡ *In Oeconom.*

Folding sheep, and wheel-ploughs, were thoroughly known in *England*, during the reign of *Henry VIII.*—*Columella*, and the *Greek* geoponic writers, saw the advantage of a *compost-dungbil*, and that, in all probability, better than we do.

Nay, in here and there an instance, our industry has been inferior to that of our predecessors: Or, at least, it may be observed, *Priscorum aut cura fertilior aut industria feliciofuit*. We plough less, and sow later than they did.* .. Marle (the most lasting and cheap of all manures, which may be found in numberless parishes throughout this kingdom) is known, and used much less, at present, than in the two preceding centuries. In a word, few manures of much consequence have been lately discovered, except peat-ashes; the sowing of which is confined within a circle of 20 miles diameter, though peat (of more or less valuable kinds) is to be found in most counties of our three kingdoms.

I shall finish my remarks under this article with one collateral instance, which is, that not only the idea, but actual introduction of *parish work-houses*, (“for the more profitable employment of the half disabled poor, or such as are too young or old for works of agriculture”) was a scheme, of which the honour is due to *Thomas Firmin*, a most useful citizen in these respects. † But, before *Firmin*’s time, many other national improvements of the like kind, which have since been secretly purloined by modern authors, may be seen, at large, in a scarce curious pamphlet, published in the year 1668, under the title

* No people venture wheat into the ground so late as the *English*. The *Spaniards*, *Italians*, and all the inhabitants along the coasts of the *Mediterranean*, and in the isles of the *Mediterranean*, sow it in *September*, and the beginning of *October*. The *Germans* and *Flemings*, from the end of *August* to mid *October*, and the *French* usually finish at the same time.

† *Some Proposals for the Employment of the Poor*, by T. F. 4^o. 1681, p. 80, &c.

title of ENGLAND'S WANTS; humbly offered to the consideration of all good patriots in both Houses of Parliament: "Where the proposer offers to contribute his utmost service, and to be ready, whensoever he shall be called by any committee appointed to debate or consider any of the said proposals."

But to return from *public economics*, in general, to matters of agriculture.

It is certain, we have shewn more skill than our ancestors, in the method of sowing grass-seeds *alone*, and not intermingling them with spring corn: * As also in the hand-hoeing of turnips; which practice agrees perfectly well with the present opinion of loosening the earth, keeping plants clean, and giving them room. To these two improvements may be added the new treatise of introducing into the field all annual crops in rows, such as favoys, winter cabbages, *German* or cabbage turnips, &c. for the better support of cattle in winter: As also the art of horse-hoeing; the improvements made by foreigners upon *Tull's* instruments of husbandry; the drill-rake of *M. Vandyfel*; the method of transplanting lucerne; and restoring old pasturages without laying them down in corn; as discovered and delivered to us by *M. de Cbateauxvieux*.

Upon the whole, "though it is certain that the antients and moderns have discovered much, yet it is no-ways certain they have discovered all." † — But one of the principal objects, in our new method of culture, is to recommend industry, neatness, and the extirpation of weeds, to all promoters of agriculture, in the strongest terms; "for, the more the *husbandman* thinks fit to imitate the practice of the *gardener*, in turning the soil and keeping the earth free from weeds, the better tast-

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* It were to be wished this practice was more universal,

† *Harlib's* Legacy.

ed will his crops prove, and the more luxuriant: To his own private emolument in particular" (according to a remark of Sir R. Weston) "as well as the advantage of society in general."

Notwithstanding I look with pleasure upon *geographical* writings, composed by scholars blessed with fine parts and lively imaginations, yet, at the same time, I take not the least offence at certain inaccuracies in style and *physical* knowledge, when I peruse the husbandry-writings of downright yeomen and farmers; whilst, at the same time, more fastidious critics may spare themselves the pains of giving vent to their remarks, merely because these plain sensible authors may never have heard who a critic is, nor would they regard him, if they heard his remarks.— The ΕΜΠΕΙΡΙΑ & ΑΤΤΟΥΡΙΑ* of *Dioscorides* are an irrefragable answer to these holiday-observers.— Such a plain practical author, as *Gabriel Platta*, pays his little contingent to the republic of knowledge, with a bit of unstamped real bullion, whilst the vain-glorious man of science throws down a heap of glittering counters, which are gold to the eye, but lead to the touch-stone.

As I have endeavoured to pay so much attention to experienced husbandmen, of course, I have shewn no great attachment to those ingenious writers whom foreigners justly style *agriculteurs du cabinet*. *Varro*, *Cato*, *Virgil*, *Columella*, and, perhaps, *Palladius*, were all perfect masters of practical husbandry; but sorry I am, to remark, that so much cannot be said of *Pliny* the naturalist (though he was very sensible of the fault here complained of †) nor of the *Greek geonic* authors. Therefore, though I have cited them occasionally, where more observing husbandmen are silent, yet the reader is always desired to call in the

* *Experience & ocular observation.*

† *Philosophis potius quam agricolis scripsisse possunt videri.*
Plin. Nat. Hist. L. xviii. c. 4.

the assistances of his own experience, in order to corroborate or invalidate many things they have asserted dispersedly through the course of their writings.

Indeed, the collector of the *geoponic* pieces (by some supposed to be *Cassian*) has made a very sensible apology upon this occasion, and we ought, in justice, to allow it full force: "Most relations of the superstitious and fabulous cast, says he, are delivered down to us from antiquity: And many of them deserve to be rejected as unworthy of belief; on this account, I exhort my readers to pay no regard or attention to them; since, for my own part, I only inserted them, for fear of being thought not to have read all that has been written upon the subject."*

The moderns, even in these more enlightened ages, have their superstitions, prejudices, and ignorances, in common with the antients. The terrors of the *bag* and *strew-mouse* are not as yet totally eradicated from country minds in various nations. Our farmers still believe a *change of species* in grain after sowing: And some of them assert, that a field of corn will always be blasted, if a *barberry-tree* grows † in one of the hedges that surround it; nay, no longer ago than the year 1749, I saw three witches hanging on a gallows upon the banks of the torrent *Sanna*, ‡ in the *Austrian* dominions,

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* Ταῦτα μὲν εἰρηται τοῖς ἀρχαίοις. Ἐγὼ δὲ ἵνα τὰ ἐπιμύθων ἀσχητῶ
 λίας, ἡγῶμαι, καὶ φικτὰ καὶ πῶσι παραμῶ μὴδ' ὄλος τούτοις προσίχθω
 τίς μὲν. Τίτιν γὰρ χῆρην αὐτὰ συνήγαγα, ἵνα μὴ δόξω τὸ παραλιμ-
 πάτω τῶν τοῖς ἀρχαίοις εἰρημῶν.

Geopon. l. i. c. 14.

† The same notion prevails in *France*, *Culture des Terres*, tom. I. p. 98.

‡ The *Sanna*, about 4 miles to the south-east of *Cilly*, falls into the *Savus*, a river well known to the generality of readers. On account of its violence, rapidity, and frequent inundations, it is called, by the *German*, *DIE SAW*, or the *wild saw*, which

for having raised tempests and hurricanes during the time of harvest (as the people alledged) insomuch that the crop was almost totally ruined.—The *Swiss*, though a well-meaning religious nation, think hemp will never prosper, except it be sown on *Good-Friday*.

In the next place it has been found, by long experience, that some address and management must be used, before you can make a convert of any common husbandman, or wean him from his antient habitudes and prejudices. Therefore lead him into all improvements gently. Bear a part of his charges in a new experiment, and take care that he begins *in small*. At first he may think meanly of your abilities in country affairs, and, like the groom and farrier, conceive a notion, that it is impossible for a gentleman to understand such matters. Outward respect preserved, he may, perhaps, laugh at you in private; as the *Roman* peasants laughed at *Horace*, *glebas & saxa moventem*; and the good people of *Ibaca* (if old *De Serres* may be believed) thought *Ulysses* discomposed in his intellects, when he sowed salt by way of manure.—Or, which is still stronger, and, perhaps, may be the real truth lurking at bottom,

which terrifies the husbandman, and ruins great part of his labours. When I had seen the ravages made by this torrent (at least, from *Laubach* to *Agram*, the capitals of *Carniola* and *Croatia*) I was almost induced to conclude, that the antient inhabitants had named this river *Die Saw*, in allusion to the description of the *Calydonian* boar in the story of *Medeager*:

*Sus erat, infestæ vindex, ultorque Dianæ.
Nunc matura metit fleturi vota coloni,
Et Cererem in spicis intercipit; area frustra,
Et frustra expectant promissas horrea messes.
Sternuntur gravidi longo cum palmite foetus,
Baccaeque cum ramis semper frondentis olivæ.
Sævit & in pecudes.
Diffugiunt populi, nec sese in mœnibus urbis
Esse putant tutos.*

tom, the husbandman and the bailiff both know full well it is not for their interest that a gentleman should be intelligent in matters of husbandry.

Gentle usage, experience, and profit, will soon bring men into better dispositions: But, be careful, they never discover that you have a sovereign contempt for their notions and practice in agriculture: For this will frustrate the effect of all your good lessons at once. Therefore, in the present case, nothing but time, kind persuasions, and matter of fact, can bring about a change of opinions. — We may observe farther, that it is not unreasonable to hope, and, at the same time, natural enough to conclude, from the *present* and *future* necessity of things, that agriculture will soon be better understood by us, and make considerable advances: Especially amongst that valuable set of men, *the country gentry of moderate estates*; who are the main support of every kingdom, and formerly abounded more in this country, than in half *Europe*. In ancient times, the same estates kept in the same family for a great number of years; but the misfortune, at present, is, that the transitions of property are over rapid, and too many family seats have changed their owners:

—— *Veteres jam migravere coloni.*

Of which the principal causes seem to be these that follow: An ignorance in country gentlemen (even to affectation) concerning the nature and culture of their own lands, their only true and real support: * A love for shew and expence beyond their circumstances; and a vain attempt to rival a set of people

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* It was *Pliny's* opinion, that a man of fortune ought to be looked upon as unhappy, who had a country-seat, and no estate round it: *Villa Luculli agro caret.*

198 *The great Importance of Agriculture :*

ple grown rich by manufactures and commerce, am-
 opulent in treasures deposited in public reservoirs
 where the payments are periodical and certain
 without the deduction of land-tax, * poor's rates,
 repairs, &c.—Happy are those, whose annual income
 is not liable to be affected with inclemency of sea-
 sons, losses, or frauds from tenants, or a circum-
 stance equally mortifying, which is having some-
 times no tenants at all! Almost every thing can
 hurt the land-holder, † and only few things hurt the
 moneyed possessor.

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* “ All taxes fall chiefly on the landed interest. — For every
 new tax the consumer must be raised one quarter in the price of
 the things taxed. It is plain the merchant, tradesman, or man-
 ufacturer, neither can, nor will pay this: For, if he pays a quar-
 ter more for commodities than he did, he will sell them at a
 price proportionably raised. The poor labourer and handi-
 craft's-man cannot: For he just lives from hand to mouth al-
 ready, and all his food, cloathing, and utensils, costing a quarter
 more than they did before, either his wages must rise with the
 price of things, to make him live; or else, not being able to main-
 tain himself and family by his labour, he comes to the parish, and
 then the land bears the burthen a heavier way. If the labourer's
 wages be raised in proportion to the increased rates of things,
 the farmer who pays a quarter more for wages, as well as all
 other things, whilst he sells his corn and wool either at the same
 rate, or lower, at the market (since the tax laid upon it makes
 people less forward to buy) must either have his rent abated, or
 else break and run away in his landlord's debt: And so the
 yearly value of the land is brought down. And who then pays
 the tax at the year's end, but the landlord?” *Locke's Considerat.*
on lowering Interest, p. 29.

“ When a nation is running to decay and ruin, the merchant
 and moneyed man, do what you can, will be sure to starve last.”
Idem, vol. II. p. 27.

† “ Taxes however contrived, and out of whose hand sooner
 immediately taken, do, in a country where the great fund is
 land, for the most part terminate upon land. *Whatsoever* the
 people is chiefly maintained by. *that* the government supports it-
 self on. Nay, perhaps, it will be found, that those taxes which
 seem least to affect land, will, most surely of all others, fall the
 rents. — And, tho' the land-holder pays not this tax immedi-
 ately out of his own purse, yet his purse will find it by a greater
 want

It was partly with a view to promote the well-being of such country gentlemen as have been above described, and another valuable class of people, called the *yeomanry*, that these Essays were composed; and here it is only to be wished, that men would come into the study and improvements of husbandry, merely from choice, and a principle of good sense and œconomy, instead of being compelled to do so one time or other by the urgency of their affairs, since, *then*, their attempts will be always languid, and, perhaps, insufficient to remove the distemper. It is too late to understand agriculture, when the land is gone, or going, upon which that art ought to be employed. Nay, the knowledge of it, at such a time, will afford nothing more than the poor consolation, which *Face* mentions in the alchemist, who, when the laboratory was blown up, and all visionary hopes evaporated, comforted himself and comrade with saying, “*That there was just mercury enough left to cure the itch.*”

At the same time that we advise country gentlemen to study agriculture, we desire them likewise, not to consider it as an illiberal or servile employ-

N. 4. ment,

want of money, at the end of the year.—This is a settled and lasting evil that will stick upon him beyond the present payment.”

Locke, ut supra, vol. II. fol. p. 27.

“ In all countries, whose fund is land, the public charge of the government will be laid upon land, and nothing else: There, at last, it will terminate. The merchant, &c. do what you can, will not bear it; the labourer cannot; and therefore the land-holder must.—Lay the taxes how you will (and that even in *Holland*, so famous for trade) the land every where bears the greater share of the burthen.”

Ibid. p. 29.

Whenever a nation declines from its antient prosperity, the land-holder feels the first symptoms of disorder, then the labourer, artist, and under-workman, and, lastly, the trader, the monied man, and the merchant. In this consists the difference; all suffer: Some a little sooner, and others a little later.

Ibid.

ment, for that would be to contradict the opinion and practice of all great, wise, and polite persons in antient ages; but one caution we beg leave to lay down as indispensably requisite towards explaining our meaning and intention throughout these *Essays*, which is, that above all things *they* hurt not their fortunes by extensive undertakings, or chimerical projects, at first setting out.—That not only self-opinion and private conjecture, but even reason, chemistry, and natural philosophy should become the disciples of *experience*.*—And that all experiments ought to be verified first *in small*, as well as repeated often, before men proceed to make attempts *in large*.

Agriculture would soon carry another aspect in this kingdom, if every gentleman were a true rural œconomist, according to the sense of the antient writers on husbandry: That is, if he applied himself seriously to understand the nature, as well as the different species of lands which he possesses, in order to prepare rightly his arable and pasture fields for the reception of such grain or grass-seeds as he proposes to cultivate, and, at the same time, knows when and how to apply those manures that are peculiarly adapted to the wants and demands of the soil. In particular also, he ought to understand the nature of his grasses and hay, in order to give each beast that food which is most nourishing, as well as most agreeable to its kind; till, at length, he acquires a degree of experience and knowledge, which will prove, upon the whole, a safe guide, and but rarely fallible.—From that moment he emancipates himself (almost as far as lies in his power, in the present instance) from false maxims, prejudice, the force of custom, and influences of other men in matters of husbandry.

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* XENOPHONT. *Oeconom.* c. 12. sect. 3, 4.

It is hardly possible, but that a gentleman must lose by husbandry, except he understands it: For, in case he is not so happy as to be master of the business, he plays with sharpers, and suffers accordingly. — But the affair of gentlemen being prime managers of their own estates in hand, without placing much trust in bailiffs or servants, shall be considered, more at large, in the introductory part of the next ESSAY. I will therefore, in this place, only mention one authority drawn from great antiquity.

Xenophon, in his *Treatise of Oeconomics* (which I take to be one of the plainest and most sensible performances amongst the writings of the antients) tells us it was a fixed rule, with one of the best husbandmen we have upon record, to be, as it were, the school-master of his own bailiff. — “When you stand in need of a good substitute and manager in husbandry-affairs,” says *Socrates* to *Ischomachus*, “do you, as in matters of architecture, &c. attempt to procure the most skilful person you can hear of in that way, or do you instruct some one of your own people, to the best of your judgment?” “Good *Socrates*,” answered *Ischomachus*, “I endeavour to teach them myself. For the man, to whom I thus entrust the management of my affairs, will know better, in my absence, how to carry on every work to my liking, than one who already supposes himself a master of all that I want to see performed. And, as it appears to me, that I have experience sufficient to set men to work, and conduct them through the progress of that work, I therefore conclude I am able to teach a person what I can do myself.”*

But the last argument our author touches upon, is a very important one: “It is impossible,” says he, “but upon some occasions we must call in the assist-

* XENOPHONT. *Oeconom.* c. 12. sect. 3, 4.

assurances of others; but, upon the whole, it is indispensably necessary to understand agriculture in our own persons, for we can never instruct a man to use the same diligence for another, that he would for himself."

However, it may not be amiss to remember, that, when any considerable improvements are made by a farmer, we are often persuaded to raise his rent too soon, and, like eastern monarchs, tax his industry, and punish him for growing wealthy. This is unkind, as well as impolitic usage: For, the more such an husbandman gains, the more, generally speaking, he becomes vigilant, frugal, and industrious. In proportion as the farmer thrives, the land improves: And this is the meaning of the *French* proverb, *Tant vaut l'homme, tant vaut la terre*. Such a man, being once placed above the reach of want, has the means of hiring better servants, and maintaining a larger stock of cattle; — making or purchasing manures; — trying experiments, or devising improvements. In proportion as he cultivates more land, he acquires more knowledge, and gains greater profit: Till, at length, he begins to love husbandry, and values himself on a profession which increases his little store, and gratifies his vanity into the bargain. Under such a cultivator, you see, in one place, waste lands rendered arable, or converted into artificial pastures; this is a true conquest: An acquisition and appropriation, which enriches his landlord and himself, but injures no man! In another place, he fertilizes a parched soil by floating it, or bringing little streams to run through it, feed, and cloath it with wholesome verdure; or else drains morasses, where abundance of the same water is a nuisance, and decorates the soil with rich crops of useful vegetables, as flax, hops, cole, rape, &c. instead of flags, moss, rushes, and brambles. — Such a tenant ought to be patronized,

nized, and not discouraged. For every estate, *brought thus into heart* (as the countryman expresses it) may be continued on the same, or a like footing, easily and cheaply, for a considerable number of years. So that the rent of the estate, when occupied by another, at this man's death, may be increased, in all probability, 10 per cent.

It is therefore of dangerous consequence to persuade great men, ministers, and princes, that poverty is advantageous to poor farmers, and that want and distress animate their activity; that necessity will make them docile and tractable, and that they may pass through the stage of life best, when they are laden with the heaviest burthens; whereas it is well known, that the poor husbandman can steer his course successfully enough without carrying such a weight of ballast.

Let us therefore charitably place this matter in another light, and, if farmers, who literally support the heat of the day, are so unhappy as not to share the esteem of the nobility and gentry, yet they have a claim, at least, to the favour of ministers, and the protection of princes; for, though there may be subjects of more conspicuous talents, yet two thirds of mankind will be found less useful to society.

In the next place, it may appear, by various remarks traced from the fountain's head, and supported by testimonies and authorities, that the kingdoms of *England, France, &c.* have made fewer husbandry improvements, for one hundred and fifty years past, than one is apt to imagine at first sight. This hint has been suggested by us already, and several opportunities shall be taken to enforce it occasionally.

In a word, it is my private opinion, that agriculture is, and ever will be, in an improvable state : * And sure the importance of the subject becomes understandings that are by a thousand degrees superior to mine; for men of the very first rate genius, in all ages, have written on husbandry. —

Varro, who flourished before *Virgil*, recounts, in the Epistle Dedicatory to his wife *Fundania*, fifty prose-writers upon that art (whose works were then extant) and two poets, namely, *Hesiod* and *Mene-crates*; not to mention (continues he) the immense work of *Mago* the *Cartbaginian*, written in the *Punic* language, but translated into *Greek* by *Cassius Dionysius* of *Utica*, and abridged afterwards in six books, for the use of king *Deiotarus*.

In behalf of my own Essays, I shall not presume to say a single word. If they are good, they will work their own way sooner or later; if they are bad, nothing can defend them. Besides, every apology, made by authors, is little more than arming an ill-natured critic to their disadvantage.

I had two principal intentions in writing this and the following Essay. The *first* was to exhort the inhabitants of my native country to carry on and maintain *that* superiority in husbandry, which they have hitherto possessed without a rival; and continue to advance, in proportion as our busy neighbours, the *French*, are emulous to overtake us: And the rather, as we must all be sensible, that industry, in agriculture, will render all nations more happy, populous, wealthy, and virtuous.

My *second* intention was to try, if it were possible, to enrich the poor honest industrious husbandman; and that particularly in the culture of lucerne. My attempts in this respect (in regard to them) have

* *Multum adhuc restat operis, multumque restabit; nec ulli nato post mille sæcula precluditur occasio aliquid adjiciendi.*

have not hitherto answered the earnestness of my wishes: For, after various and repeated trials, it is to be feared, from the very nature of the plant, that more industry and expence are required, than such persons are willing, or able to give. But, at the same time, there is good reason to hope, that future cultivators (with greater skill, and with the same kind intentions) may happily hit upon some expedient, which may effectuate, with cheapness and facility, what I have hitherto in vain sought for.

I have ever looked upon the poor laborious husbandman, as a most useful being in all societies; and happy would it be, if we could contribute to enrich him and the land-possessor at the same time; which must always happen, if husbandry be carried on in the manner it *ought* to be. I am here speaking chiefly of the lowest class of husbandmen, the little farmers, who rent 30 or 40*l.* a year. Such a man works and fares harder, and is, in effect, poorer than the day-labourer he employs. An husbandman, thus circumstanced, is, beyond dispute, a worthy object of our commiseration and assistance. He is an useful, though invisible, wheel in the machine of state.

Venerable *Thomas à Kempis* goes farther upon this article; *the poor husbandman*, says he, *who lives honestly, and cultivates his land industriously, is better than a proud philosopher, who neglects himself and studies the motions of the heavenly bodies.* Or, as the passage has been imitated by a modern hand:

The men of science aim themselves to show,
 And know just what imports them not to know;
 Whilst the poor peasant, that with daily care
 Improves his lands, and offers Heav'n his pray'r,
 With conscious boldness may produce his fate
 Where proud philosophers shall want a place.

Modern writers in agriculture, far from possessing the genius of *Virgil*, have neither his patience nor perseverance; for he, who had no equal in husbandry-writings (either as to matter or elegance of composition) employed seven years in composing and completing his *Georgics*, which, as some have computed, was almost the same thing, as if he had set aside a day for the finishing of each line. "Now, though the poets of the present age," says *Dryden*, "were to take the same pains, yet they can never expect the same immortality." — Nay the very language they write in, will not admit such sort of perfection. He built with marble, and they are obliged to use a crumbling, perishing kind of stone. But, without taking in such considerations, what *Paterculus* says of *Homer*, as an Epic-writer, may be applied to *Virgil* as a writer of *Georgics*: *Nec ante illum, quem imitaretur, neque post illum qui eum imitari possit, inventus est.*

Let the praise therefore of truly correct and spirited writings, in matters of husbandry, remain intirely in the possession of *Virgil* without a rival. — True it is, that we moderns may copy his industry, but can hardly expect, that one glimpse of his genius will shine upon us. *Stadius* has expressed our sentiments upon this occasion, both with respect to poets and writers on agriculture; and has told us the most that can be expected, which is only the little ambition of hoping to do well. His words are these in his epistle to *Marcellus*:

——— *tenuis ignavo pollice chordas*
 Pulso, Maroneique sedens in margine templi
 Sumo animum, & magni tumulis accanto magistri.
 SYLV. lib. iv.

Columella

Columella * and *Cowley* † were poets likewise, and have written on agriculture, without being equalled by any moderns, in point of judiciousness, exactness, and precision. For truth, in masterly hands, will always be truth, whether it be delivered in verse or prose; with this recommendation added in the former instance :

Gratior est pulcro veniens de corpore. —

Men of a cast and genius like the authors last mentioned are generally fond of country-retirements and solitude, and thus gain frequent opportunities of observing diligently the vegetable world. Thus *Virgil* in particular proceeds purely upon matter of fact, if we except the equivocal generation of bees in the fable of *Aristæus* ‡; for in truth he had fund enough to work upon from his own observations and experience ¶: Whilst *Pliny* and others entertain us with little more than anecdotes and hear-says.

Virgil was certainly a true master of practical agriculture: For he cultivated his own estate, till he was thirty years old. The first bent of his genius led him to husbandry, and in all probability the solitude and contemplation that attend such a life called forth his poetical powers.

And

* Lib. x. de Hortis.

† De Plantis.

‡ It was currently believed by men of the best sense in *Virgil's* time, that bees were of equivocal generation. *Ovid* records it in (what I had almost called) the divine speech of *Pythagoras*; and again mentions the fact in his own person.

Fast. lib. ii.

The passage first alluded to is as follows:

—Maſtatos obrue tauros,
(Cognita res uſu eſt) de patri viſcere paſſim
Florigeræ naſcuntur apes. —

Met. lib. xv. 364.

¶ Hence *Columella* calls him *Vatem VERISSIMUM*, velut
Oraculum. *De Re Ruſt.* lib. i. c. 4.

And here it must be acknowledged, that his countrymen have ever paid him due honours (and that with the most accurate distinction) not only as a poet, but as an *husbandman*: For his *Georgics* to this very day are the ground-work of all *Italian* agriculture, and his rules and precepts are followed (traditionally at least) by those who never read him, or heard of him. It is no-ways likely that he pitched on so humble a subject, with a view of displaying his superior talents in poetry; nor am I inclined to think, that he thought *Hesiod* so formidable a writer, as to be ambitious of eclipsing him: It rather seems probable, that he writ the *Georgics* from a *sincere desire to serve his country*,* at a time when intestine wars had thrown a damp upon agriculture; difficulties and discouragements bringing about disuse, till (which is natural enough) the art itself fell into neglect and contempt. Nor is it improbable, but that *Mæcenas*, who was a better politician than most people imagine, encouraged his poet in this undertaking. —

But, setting aside the last consideration as partly conjectural, the *same causes* produced the *same effects* in our country. The civil wars, during the reign of *Charles I.*, brought agriculture first into distress, and then into disesteem: But, the moment the fury of bloodshed ceased, a set of first-rate writers started up at once, not by compact, but (as it were) by natural instinct, in behalf of expiring agriculture. Nor have these authors been equalled since that period: Such, for instance, were *Hartlib*, *Plattes*, *Child*, *Beati*, *Blythe*, &c. *Cromwell* seized the lucky incident, and, as far as a certain penury of temper would allow him, was a *Mæcenas* too, for he bestowed a pension on *Hartlib*, and was generous, I believe, to some other husbandry-writers. In so doing he gained popularity like a man of parts, and

* *Ignarusque viæ mecum miseratus agricolas.* Georg. I. v. 41.

at the same time, proved serviceable to the nation, at least in this particular.

As the poets (agreeably to what has been before remarked) have expressed themselves so fortunately on several points of husbandry, I have extracted many passages from some of the most antient among them, as *Hesiod, Homer, Lucretius, Virgil, &c.* but then they are passages that relate intirely to agriculture, and perhaps may be found to be more concise and elegant than if they had been delivered in prose. That they are as true may be safely asserted.—New translations also are frequently substituted by us in the place of old ones; not from a vanity of writing verses, but merely to make the sense of the original intelligible, where it was of an instructive didactic nature. For some of the best poetical translators may happen, with all their knowledge of the fine arts, to be quite ignorant in matters of husbandry; of which we have seen numberless instances in the versions of *Virgil's Georgics*; nor can we except here the translation made by the *Great DRYDEN Himself*. And if the translator here spoken of had submitted his performance to the examination of an *Italian* husbandman (had *that* been possible) or even to the revivall of some plain *English* yeoman, instead of referring himself to professed wits and critics, the poetry of our *English Georgics* might have been a masterpiece of truth, as well as fine writing.

As to what is called the *NEW HUSBANDRY*, I have in many instances recommended it strenuously, adding only here and there a few dissuasives upon some particular occasions; and *that*, for a plain reason assigned by *Varro, Ne, in ea re, sumptus fructum superet.*—On this last account, I have been fearful of recommending it *universally* for the culture of corn: Yet, at the same time, it is incumbent on me to acknowledge, that I would al-

ways prefer *drilled* corn for *seed*; as the plants will have enjoyed more space, air, and sunshine, and the grain will be larger, healthier, and stronger. Bread particularly from *drilled* wheat will be better tasted than from wheat raised by random-sowing: The crop also at the same time being less infested with weeds—But, in the other parts of husbandry, relating to the food of cattle, I would recommend *drilling* or *transplanting*, as occasion requires, in the culture of lucerne, particularly sainfoin, turnips, burnet, carrots, trifolium fibrinum, fenugreek, (*Roman*); falsified cytibus, sweet melilot, and many other wholesome, well-tasted plants mentioned in my POSTSCRIPT.

Men, through the force of prejudice and custom, entertain unreasonable apprehensions of the difficulties, expences, and minute attentions that belong to the *New Husbandry*; but a few slight short trials will soon reconcile them to the practice of it: *Machiavel's* observation being as true in husbandry, as in politics; namely, “That things which *seem to be, and are not*, are more feared afar off, than when they are *near at hand, or actually experienced*.”

Some perhaps may imagine, that we have introduced too many passages from Scripture into these essays; but the truth is, we were desirous to intersperse some few important hints of a serious cast, and render these discourses on husbandry (incidentally at least, and so far as lay in our power) *THE GEORGICS OF THE MIND*, as *Lord Bacon* expresses himself*.

St. Paul has a very remarkable expression upon this occasion: *We are ALL GOD'S HUSBANDRY*. COR. iii. 9. Or, as the Supreme Being says elsewhere, with peculiar emphasis, *My vineyard, which is MINE, is before me*. CANT. viii. 12. *I, the Lord, do keep it; I water it every moment; lest*

* *De Augment. Scient.* lib. vii. c. 10. p. 196. folio.

why hurt it, I will keep it night and day. ISA. XXVII. 2, 3. *And now, O inhabitants of Jerusalem, and men of Judea, judge, I pray you, between me and my vineyard; what could have been done more to my vineyard, that I have not done in it?* JER. XXXII. 41.

I will add farther, that the fine images drawn from agriculture in the sacred Writings are innumerable; and the georgical history of *Boaz*, *Ruth*, *Naomi*, *Orpah*, &c. is a finer and more beautiful rural picture than is to be found in the episodes of *Virgil*. It is, in a word, a perfect drama: Being, according to the rules of *Aristotle*, “a natural representation of interesting events, acted, and not spoken*.”

Again, It may suffice to observe, that the drift and moral of these essays (and whatever else may be written by us upon the principles of the New Husbandry) is uniformly one: Namely, “That God, in consequence of the fall of man, has made the chief success of agriculture to depend upon industry.”

“The industry of agriculture is made the vehicle in Scripture of conveying to the mind every other sort of diligence of a more important nature.

It has been observed, that the very word made use of for *ploughing*, in the *Hebrew* text of the Old Testament, signifies, at the same time, *attention* and *labour* †. And hence, in all probability, was taken that remarkable expression in *St. Luke*: *No man, having put his hand to the plough, and looking back, is fit for the kingdom of heaven.* Chap. ix. 62.

This repeated industry seems to be inculcated by the prophet *Isaiab*: *The ploughman plougheth all day to sow; he openeth and breaketh the clods of his ground. When he hath made plain the face thereof,*

* In Poetic.

† See *Flavel's Husbandry spiritualized*, 10th edit: p. 83.

doth he not cast abroad the fitches, and scatter the cummin, and cast in the principal wheat, and the appointed barley, and the rye in their place? Chap. xxviii. 24, 25.

It may be remarked lastly, That all the ethic writers on husbandry, put together, have not given us such a picture of *industry* and *plenty*, as may be seen in three or four strokes only sketched out to us by the poor *herdsman* of *Tekoab*: *Behold, the days come, saith the Lord, that the ploughman shall OVERTAKE the REAPER, and the TREADER of GRAPES HIM that SOWETH SEED. The mountains shall drop sweet wine, and all the hills shall melt. — My people shall build the waste cities and inhabit them, and they shall plant vineyards, and drink the wine thereof; they shall also make gardens, and eat the fruit of them. AMOS ix. 13, 14. — Every thing where the river (of industry) cometh, shall thrive; but the miry places thereof, and the marshes thereof, shall never be healed, but be given to salt, (that is, shall be deemed barren.) EZEK. xvii. 9, 10."*

The industrious man's fields may be compared to the fleece of *Gideon* *. His lands are a paradise of neatness and plenty, refreshed here and there with artificial canals; whilst every thing that lies beyond the circle of his boundaries is confused, parched, and barren.

"Under the first law, in the prohibitions concerning food, the supreme Legislator rejected the *snail* and the *ass*, LEV. xi. 30. and there are not wanting writers who suppose this restriction to be partly emblematical; because these animals are emblems of sluggishness and stubbornness. — The neglected productions from the fields of the slothful and unthrifty *are like trees whose fruit withereth, or like trees without fruit; twice dead, plucked up by the*

* JUDG. vi. 37, 38.

the roots. JUDE v. 12. Whilst, on the contrary, under the hands of an industrious cultivator, the wilderness and solitary place shall be glad for him, and the desert shall rejoice and blossom like the rose. It shall blossom abundantly, and rejoice even with joy and singing. The glory of Lebanon shall be given unto it, the excellency of Carmel and Sharon. ISAIAH XXXV. 1, 2."

—————Pater ipse colendi

Haud facilem esse viam voluit, primusque
per artem

Movit agros, curis acuens mortalia corda,
VIRG. GEORG.

—————Genuit Tellus eadem quæ nunc
alit ex se;

Præterea nitidas fruges, vinetaque læta
Sponte sua primum mortalibus ipsa creavit.
Ipsa dedit dulcis fœtus & pabula læta,
Quæ nunc vix nostro grandescunt aucta
labore;

Conterimusque boves & vires agrorum:
Conficimus ferrum vix arvis suppeditati:
Usque adeo pereunt fœtus, augentque labores.

Jamque caput quassans grandis suspirat
arator

Crebrius incassum magnum cecidisse laborem;

Et cum tempora temporibus præsentia confert

Præteritis, laudat fortunas sæpe *parentum*.

LUCRET. Lib. II. v. 1155.



ESSAY II.

A N

ACCOUNT of some EXPERIMENTS

Tending to improve the

CULTURE of LUCERNE:

B E I N G

The first Experiments of the Kind that have
been hitherto made and published in ENG-
LAND.

From whence it appears,

That LUCERNE is an Article of GREAT Importance
in HUSBANDRY.

Κἄν με φάγῃς, — ἄνωγ' ἔτι παρκοφείσῃς.

ANTHOL.

We are to blame, that we have neglected Lucerne.

HARTLIB'S *Legacy*, p. 50, 1651.

Παρακαλῶμεν δὲ τῆς ἐνηυχομένης τοῖς ΥΠΟ-
ΜΝΗΜΑΣΙ τῆτοις, μὴ τὴν ἐν λόγοις ἡμῶν
δύναμιν σκοπεῖν, ἀλλὰ τὴν ἐν τοῖς πράγ-
μασι μετ' ἐμπειρίας ἐπιμέλειαν· μετὰ γὰρ πλείους
ἀκριβοῦς τὰ μὲν πλείω δι' αὐτοψίας γνόντες.

DIOSCORID. Lib. i.

TESTIMONIES
CONCERNING
LUCERNE.

I.

VIRGILIUS de *Medica*.

VERE fabis satio, tunc te quoque *medica* putres
Accipiunt fulci. —

GEORG. I. v. 215.

* MARCUS VARRO de *Medica*.

De *medica* in primis observes, ne in terram nimium aridam, aut variam, sed temperatam semen demittas. In jugerum unum, si est naturâ temperata terra, scribunt opus esse *medicae* sesquimodium. Id feritur ita ut semen jactatur, quemadmodum scilicet cum pabulum & frumentum feritur.

De *Re Rust.* Lib. i. c. 41.

II.

† COLUMELLA de *Medica*.

Ex iis (pabulorum generibus) quæ placent, eximia est herba *medica*; quòd cum *semel* feritur *decem annis* durat: Quòd per annum deinde rectè *quater*,
in-

* This account was written about 20 years after the birth of Christ.

† *Columella* composed his work in the reign of *Claudius*, about 50 years after the birth of our Saviour.

interdum etiam *sexies* demetitur: Quòd agrum stercoreat: Quòd emaciatum animal ex ea pinguefcit: Quòd ægrotanti pecori remedium est: Quòd iugerum ejus toto anno tribus equis abunde fufficit. Seritur ut deinceps præcipiemus. —

Cum fic terram subegeris, in morem horti areas latas pedum denùm, longas quinquagèntùm facito, ut per semitas aqua ministrari possit; aditusque utraque parte runcantibus pateat: Deinde *vetus* sterfus injicito, atque in mense ultimo Aprilis serito tantum, quantum ut finguli cyathi feminis locum occupent decem pedum longum & quinque latum: Quod ubi feceris, ligneis rastris (id enim multum confert) statim jacta femina obruantur, nam celerrime sole aduruntur. Post sationem ferro tangi locus non debet. Atque ut dixi ligneis rastris farriendus, et identidem runcandus est, ne alterius generis herba invalidam *medicam* perimat. Tardius messem primam ejus facere oportebit, cum jam seminum aliquam partem ejecerit. Posteaquam voles teneram, cum profluerit, desseces licet, & jumentis præbeas, sed inter initia parcius, dum consuescant, *ne novitas pabuli noccat*: Inflat enim, & multum creat sanguinem; cum secueris autem, sæpius eam rigato. Paucos deinde post dies, ut cœperit fruticare, omnes alterius generis herbas eruncato. Sic culta *SEXIES* in anno demeti poterit, & permanebit ANNIS DECEM.

De RE RUST. Lib. ii. c. II.

III.

* *PLINIUS de Medica.*

Medica externa etiam Græciæ, ut a Medis advecta † per bella Perfarum quæ Darius intulit: Sed vel in primis dicenda. Tanta dos ejus est, ut cum uno

* *Pliny* the elder writ about 70 years after the birth of *Christ*.

† Those who are more curious to know from whence *lucerne* first came, may consult *Theophrastus de Plantis*, lib. viii. c. 8.

uno fatu amplius quam xxx annis duret. Similis est trifolio, caule foliisque geniculata: Quicquid in caule affurgit, folia contrahuntur.—Solum in quo feratur, elapidatum purgatumque subigitur autumno: Mox aratum & occatum integitur crate iterum & tertium, quin diebus interpositis, & fimo addito. Poscit autem ficcum, succosumque, vel riguum. Ita preparato, feritur mense Majo, alias pruinis obnoxia. Opus est densitate seminis omnia occupari, internascentesque herbas excludi. Id præstant in jugera modia xx; cavendum ne adurat, terraque protinus integri debet. Si fit humidum solum herbosumque, vincitur & desciscit in pratum. Ideo protinus altitudine unciali herbis omnibus liberanda est, manu potius quam farculo. Secatur incipiens florere, & quoties restoruit. Id sexies evenit per annos; cum minimum, quater. In semen maturescere prohibenda est, quia pabulum utilius est usque ad trimatum. Verno feri debet, liberarique cæteris herbis: Ad trimatum, marris ad solum radi. Ita reliquæ herbæ intereunt, sine ipsius damno, propter altitudinem radicum. Si evicerint herbæ, remedium unicum est aratio, sæpius vertendo, donec omnes aliæ radices intereant. Dari non ad satietatem debet, ne deplere sanguinem necesse sit: Et viridis, utilior. Arescit furculose, ac postremo in pulverem inutilem extenuatur. De cytiso, cui & ipsi principatus datur in pabulis, affatim diximus inter frutices.*

HIST. NATURAL. Lib. xviii. c. 16.

IV.

† DIOSCORIDES de *Medica*.

Μηδικὴ ἴσικε μὲν ἄρτι Φυομένη τριφύλλῳ τῇ ἐν χορλοκοπίοις* προζύγουσα δὲ εὐνοφυλλοτέρα γίνεσθαι, καυλὸς ἀνιῖσα

* "Of this herb (*medica*) alone, and cytissus, *Amphibolobus* compiled one whole book." PLINY, *ibid.*

† *Dioscorides* flourished about the same time with *Pliny* the elder.

εἷσα τριφύλλω ὁμοίως, ἐφ' οἷς τὸ σπέρμα προσέφυκε φασκὶ
τὸ μέγεθος, ἐπεσραμμένον ὡς κεράτιον ὅπερ ξηραίνε,
μίγνυται ἡδύσματι χάριν τοῖς ἀρῦροῖς ἀλσί. Χλωρὸν δὲ
καλαπλάδιον ὠφελεῖ τὰ ψύξεως δόμενα. Ὅλη δὲ τῆ πῶς
χρῶνται οἱ κτηνοτρόφοι ἀντὶ ἀρρώστειας.

Βιβλ. Β. κεφ. ροζ'.

“ Medica cum recenter prodiit, foliis & caule
“ trifolio [pratensi] similis est, procedens vero folia
“ contrahit, caules edens trifolii, & fiquas comi-
“ culorum modo intortas, in quibus semen lentis
“ magnitudine dependet. Id ficcatum, juctundi
“ saporis gratia conditaneo fali admiscetur. — Herba
“ tota pro gramine utuntur qui pecora alunt.”

Ruellio Sueffionensi Interpr. 1549.

V.

PALLADIUS, de agris *medicæ* parandis.

Nunc (scil. mense Februarii) ager qui accepturus est *medicam* (de cujus natura cum erit serenda dicemus) iterandus est, & purgatis lapidibus diligenter occandus, & circa Martias calendas, subacto sicut in hortis solo, formandæ sunt areæ, latæ pedibus X. longæ pedibus L. ita ut eis aqua ministretur, & facile possint ex utrinque runcari. Tunc injecto *antiquo* stercore in Aprilem mensem reserventur paratæ.

De Re Rust. lib. iii. tit. 6.

IDEM, de *medica* serenda, et disciplina ejus.

Aprili mense, quas ante sicut diximus, præparasti, *medica* serenda est. Quæ semel feritur *decem* annis permanet, ita ut *quater* vel *sexies* per annum possit recidi. Agrum stercoreat, macra animalia reficit, curat ægrota. Jugerum ejus toto anno III. equis abunde

abunde sufficit. Singuli cyathi feminis occupant locum latum pedibus quinque, longum pedibus decem. Sed mox ligneis rastellis obruantur jacta semina, quia sole citius comburuntur. Post fati-
onem ferro locum tangi non licet, sed rastris lig-
neis frequenter herba mundatur, ne teneram medi-
cam premat. Prima messis ejus tardius fiet ut ali-
quantum semen excutiat: cæteræ vero messes
quam volueris cito peragantur, & jumentis præ-
beantur. Sed prius parcius exhibenda est novitas
pabuli, inflat enim & multum sanguinem creat.
Ubi secueris, sæpius riga. Post paucos dies cum
fruticare cœperit, omnes alias herbas runcato. Ita
& sexies per annum metis & annis X. poterit ma-
nere continuis.

De Re Rust. lib. v. Mens. April. tit. i.

VI.

DIDYMUS.

Lactantes boves cytiso aut *medica* nutriemus: sic enim connutritæ plus lactis habebunt.

Geopon. lib. xvii. c. 8.

VII.

DEMOCRITUS.

Bobus ægrotis prodest *medica* herba.

Ibid. lib. eod. c. 14.

VIII.

MATTHIOLIUS de *Medica*.

Hæc quondam in univèrsa Italia serebatur ad pe-
corum pabulum.—& (ut Plinius tradit lib. xviii.
c. 16.) uno tantum fatu plus tricenis annis perdu-
rat. Eadem, ut quidam referunt, abundat in
Hispania, ubi magna admodum cura colitur ad ju-
mentorum & pecorum pabulum; eamque alfalfam
vocant,

8 TESTIMONIES

vocant, nomine ab Arabicis corruptè mutuato.

Matthioli in Diosc. p. 330. fol. edit. 2. Lugd. 1562.

IX.

M. AGOSTINO GALLO *nella Seconda Giornata dell'herba Medica.*

Voi non potevate chiedarmi costa piu grata che il ragionar di questa preciosa pastura; perchioche non solamente è sempre sana à gli armenti; ma, essendo posta in terreno conveniente a lei rende fruto talmente, ché . . . (come dice anco Columella) un jugero Romano per l'ordinario debbe far le spese un anno à tre cavalli.— Questa singular pastura si segerà (fuor dal primo anno) cinque, sei, & anco fin sette volte ne gli altri seguenti.

Vinti Giornate dall' Agricoltura, 4to, 1550, p. 35.

X.

CASTORE DURANTE *della Medica.*

E cominciata (la *medica*) a ritrovarsi in Italia (1585*) dove si semina per il bestiaime. Ama luoghi humidi e netti, e seminasi d'Aprile & di Maggio. Ingrassa pascendola il bestiaime: ma non e darla in troppa quantità, perchioche generando sangue soverocchio strangolo il bestiaime. Ad ingrassare i cavalli non si ritrouva cosa migliore della *medica*.†

Herbario. Fogl. in Roma 1586, cum fig. ligni. pulherr. p. 279.

XI.

* In confirmation of this, *Matthioli* owns, in the year 1568, that he had never seen lucerne growing in *Italy*; and on that account there is no print of it in his Commentaries on *Dioscorides*.

† I have been assured in *Italy*, by curious botanists well skilled in agriculture, that the lucerne or *medica*, then introduced into husbandry at *Rome*, was not *that* species of *medica* whose culture is here recommended, but the *medica cochlearia*, or *snail*.

XI.

BARNABY GOOGE.

Among all sorts of fodder that is counted for the chiefest and best which the people of old time, and the *Italians* at present, call *medica*. No better food can be devised for cattle, wherewith they will better feed or sooner rise.

Whole Art of Husbandry, 4to, black letter, 1578, p. 37, a. 37, b.

XII.

DODOENS.

This is also an excellent fodder for oxen and kine, and for the same purpose was used to be sown by the antient *Romans* in old time.

Herbal. lib. iv. p. 360, fol. 1600.

XIII.

DE SERRES ON *Lucerne*.

Pour engraisser le cheval maigre, plusieurs moyens y a-il : mais de tous, les plus propres sont ceux du printemps, par le vert qu' on fait manger aux chevaux ; & du vert, l'herbe de la *Lucerne* est la mellieure : laquelle freschement coupée donnée au cheval, l'engraisse dans douze ou quinze jours : le purgeant, & faisant vuider, les trois ou quatre premiers

snail-lucern, vulgarly called in our seed-shops *snails*. What confirms me in this opinion is *Durante's* own print of it : Now *Durante* knew the archbishop who introduced it, and was patronized by him.

It is not to be doubted but that *this medica* affords very agreeable food to graminivorous animals. I remember I had about twenty fine plants of it in a flower-garden, but an horse broke in and devoured them all in a few minutes, tho' they stood in different beds. Indeed, it was an horse that had been long accustomed to the taste of the *other lucerne*.

10 TESTIMONIES

miers jours ; si bien, que par apres, il s'en rend dis-
post & gai.

Tbéatre d' Agricult. fol. dedié a Henri IV. 1600.

P. 985.

XIV.

SURFLET and MARKHAM.

There is not any pulse, or other feeding, which is more agreeable or more precious for feeding beasts than *snail-clover*, [lucerne:] So that it may seem to spring out of the earth . . . as a more especial favour from God, not only for nourishing and fattening herds of cattle, but also to serve as physic for beasts that are sick.

Country Farm. 3d edit. fol. 1616. p. 564.

XV.

SAMUEL HARTLIB.

There is at Paris likewise another sort of fodder which they call *la lucern*, which is not inferior, but rather preferred before sainfoin. Every day produces some new things concerning it, not only in other countries but in our own.

Legacy, 1650, p. 4.

Some account of lucerne, extracted from letters to *Hartlib*, about the year 1650, and sent to him from *France*.

This plant requires a rich ground, somewhat loose and light . . . not over-dry nor over-moist, but in a middle state between both, yet somewhat more inclining to moisture than the contrary.

“ Lucerne naturally doth not love dung . . . But,
“ where dung is made use of, it must be well rot-
“ ted, and used long before the sowing-time . . .
“ The first shoots of the seedling plants cannot
“ well

well endure the cold; and therefore the seeds must be sown about the beginning or midst of April.—One bushel of lucerne-seed † is to be sown on that space of ground which would require six bushels of wheat. It must be carefully weeded, especially in the beginning.—It is good for all sorts of cattle, and their young; but especially for horses, which are purged thereby and grow fat in eight or ten days time.—The hay must be housed;—it is much more feeding than any other hay.

Lucerne procures abundance of milk to cows. — You may save the seed after the second cutting, any year of its growth, except the *first* only.—The hay will keep good two or three years, and one acre is sufficient to keep three horses all the year long. ||—The hay is too rich and nourishing to be given to cattle, except in winter.—My friend, in *France*, has reason to think that lucerne will prosper admirably well in *England*."

1649, 1650.

XVI.

BLYTHE.

There is also *la lucerne*, another French grass, which is excellent fodder, and is rather preferred before St. Foin, being now of great credit amongst them [the French.] I can say little concerning it, only to provoke the ingenious both unto the search, experimenting, and communicating to public view; not one man being sufficient for the experimenting all discoveries that may be made here and elsewhere.

P

I am

† This, in the manner of sowing broad-cast way, agrees in the main with all the antient French accounts that I have seen, and amounts to an allowance of about 40lbs. of seed to an acre.

|| This calculation of antient and modern authors will be examined in the succeeding essay.

I am confident every age, nay, every day, will bring forth something or other worthy of our embraces.

English Improver improved, 3d edit. 4to. 1659
p. 188.

XVII.

WOOLRIDGE *ON* LUCERNE.

Lucerne is commended for an excellent fodder . . . It is good for all kind of cattle, but agreeth best with horses. It feedeth much more than common hay; so that lean beasts are suddenly fat with it, and causeth abundance of milk in milch beasts.— By eating this grass in spring, horses are purged and made fat in ten days time.

System of Agriculture, fol. 1668, p. 28.

XVIII.

M. DU HAMEL.

La Lucerne merite d'etre cultivée avec soin, non seulement à cause de la grande quantité des fourrages que cette plante fournit, mais encore parce que son foyen est d'une qualité supérieure à tout autre. C'est une suite inséparable de la nouvelle culture, de donner des productions plus parfaites; les plantes croissent dans une air qui circule autour d'elles avec liberté, cette circulation les maintient pures & saines, exemptes de toute atteinte de moisissure; car ces plantes frappées de rayons du soleil, le grand mobile de toute vegetation, parviennent dans toutes leurs parties à une grande perfection, soit dans leur substance, soit dans leur saveur: les bestiaux mangent ce fourrage avec avidité, & un sont mieux nourris que de tout autre.

Experiences sur la nouvelle Culture, tom. iv. p. 520.

On voit quel avantage il y a pour ceux qui ont des terres propres à produire de la lucerne, de pouvoir faire dans une même année trois & même jusqu'à six récoltes, d'un foin excellent qui convient à toute sorte d'espèce de bétail, chevaux, boeufs, vaches, moutons, qui tous le mangent en vert & en sec. Je puis assurer d'après mes propres expériences, que ce fourrage encoë vert & coupé avant la fleur, a rétabli de jeunes chevaux qui maigrissoient, sans qu'on peut en savoir la cause; & que les vaches, qui en sont nourries, donnent quantité d'excellent lait: le seul défaut de ce fourrage, lorsqu'il est sec, est d'être trop nourrissant, & trop appetissant pour le bétail, qui s'en goufle au point d'étouffer. Je scais que trois de mes correspondants sont parvenus à supprimer l'avoine à leurs chevaux, en leur donnant de la lucerne hachée en place de la ration d'avoine. Il y a cependant des chevaux qui ne peuvent s'accoutumer à cette nourriture.

La Même. *Elemens d'Agricult.* tom. ii. 133, 134.

XIX.

M. BERTRAND.

Je ne doute pas, que si notre oeconomie rurale étoit plus sagement administrée, nous ne pussions à notre grand profit augmenter considérablement nos fourrages, en établissant des lucernes, &c. & en un mot diverses sortes de prés artificiels, qui, bien menagés, donneroient à nos bêtes d'attelages une nourriture succulente, qui leur tiendroit lieu d'avoine, que plusieurs leur epargnent à leur grand dommage.

Essai sur l'Agriculture, 1760, p. 132.

XX.

AUTEUR ANONYME.

Mais que dirons nous si les oeconomes modernes nous assurent que d'un arpent de luzerne bien cultivée on peut nourrir quatre jusqu'à cinq bœufs — Nous changerons avec plaisir de proportion. Tout fois ce sera bien (*en Suisse*) le non plus ultra. Ce au il y a de certain, ce qu' on peut couper dans notre pais cette utile & grand. herbe de fourrage regulierement quatre à cinq fois & en Italie, six ou sept fois par an, suivant le temoignage d' Agostino Gallo, qui a ecrit an. 1550; † & Columelle dit, qu' un arpent de l'herbe medica peut nourrir trois chevaux. ‡ Que la culture de cette plante est recommandable !

Dissertation sur l'Agriculture à Zurich, 1761.

E X-

† A new edition of this work (which was intitled *Le Vinte Giornate d'Agricoltura*) was published at *Bergamo*, in quarto, 1757.

‡ This assertion is examined at large in the eleventh *Section* of the present *ESSAY*.

EXPERIMENTS

ON

TRANSPLANTED LUCERNE.

*Ipsa novas artes varia experientia rerum,
Et labor ostendit miseris, usúsque magister
Tradidit agriculis.*

COLUMELL. *de Cultu Hortor.* v. 338.

THIS Plant, superior to every other sort of vegetable food (either green or made into hay) that has hitherto been made use of for the support of cattle, has been the known object of cultivation ever since *Darius* first discovered it in *Media*, during his *Persian* expedition. By his means it passed afterwards into *Greece*, and thence to *Italy*, before the times of *Cato* and *Virgil*. Since which latter period, the curious in husbandry have propagated it more or less in various parts of the globe, almost from one pole to the other. But, notwithstanding the experience of sensible men, and the curiosity of ingenious ones, through so many ages, yet the method of cultivating it, by *transplantation*, was not discovered till very lately: And, upon this discovery, the following essay is grounded.

And, if in writing *this*, or the former ESSAY, I could be so happy as to contribute towards the en-

riching of only *one poor, honest, laborious husbandman*, I should think myself *over-repaid* for all my trouble. But, be that as it may, thus much is certain, that the author was obliged to answer so many inquiries, by way of letter, concerning the new method of cultivating lucerne, that he thought it best to impart to the public the little he knew on the subject, once for all; since every answer to the queries proposed (supposing such answer to be drawn up in a satisfactory manner) could be little less than an abridgment of the present treatise. It is beneath no good subject, says *Cicero*, to bestow a few leisure hours for the sake of enriching or adding to the comforts of his fellow-creatures: *Ut, si occupati profuimus alicuius civibus nostris, profuimus etiam, si possumus, otiosi* *. And hence a wise king remarks in the *Travels of Gulliver*, that the man who can produce *six* stems of grass, or as many ears of corn, instead of *five*, may be looked upon as no unuseful member of the community to which he belongs.

Virgil seems proud in having been the first who introduced georgical poetry into *Italy* †. *Lucullus* expressed satisfaction in being the person who naturalized the cherry-trees of *Pontus* in the *Roman* soil; nor is the author of this little, imperfect essay displeas'd in the attempt he has made to extend the *new* culture of lucerne from the banks of the *Rhône* to the borders of the *Thames*. But great thanks are due to *Bellingham Boyle*, Esq; who has brought lucerne to flourish happily in our sister kingdom of *Ireland*.

I take

* *Tul. Quæst.*

† ——— Sanctos ausus recludere fontes,
Acræumque cano Romana per oppida carmen.

Georg. II. v. 175.

I take it for granted, that most readers know that mankind has attempted to raise lucerne by *three* different ways. The *first* is by sowing the seeds promiscuously, or *broad-cast fashion*, with or without corn, in such manner as clover is sown.

And, if the husbandman thinks fit to adopt either branch of this two-fold practice, there is no dispute, (at least in my opinion) which of the two appears most reasonable, and consequently ought soonest to be preferred. I therefore pronounce in favour of the *latter*, as being the practice most agreeable to the nature of a cold climate like ours, where the soil abounds with weeds and foul grass.

The *second* method of sowing lucerne is *drilling* the seeds in rows, and keeping the plants clean by hand-hoings and horse-hoings.

This practice we are far from discountenancing, but rather commend it highly; especially, if the cultivator be master of a *rich* soil, with proper depth.

But, upon the whole, (so far at least as appears from our observations and experiments) we chuse to recommend to the public a third method of cultivating lucerne; which is raising the plants in a nursery, and pruning and transplanting them according to rules which shall hereafter be given.

I already know from experience, that *this* operation, at the first commencement of it, is the most troublesome and expensive way of going to work; but the crops will last longer, and prove more advantageous to the undertaker in the event.

With respect to the history of this valuable plant, since the time of *Virgil*, we shall observe as follows: There is no doubt, but that its culture continued upon a flourishing footing in *Italy*, till the irruptions of the *Goths* and *Vandals*, and then it was de-

stroyed, or, to speak more properly, allowed to perish by the neglect and ignorance of such savage invaders *. -- But as *Spain* suffered much less from the inundation of these barbarians than *Italy* did; and as the *Moors* were all lovers of plants, and to a certain degree herbalists; the culture of lucerne was faintly kept alive there, like a *Vestal* fire; and probably the sort we now have is a descendant from *Columella's* lucerne, who removed it from *Italy* and naturalized it in *Andalusia*, where that excellent cultivator was the cause of preserving the plant in question more or less genuine for many ages; much in the same manner as the purity of the *Greek* language was kept alive *plus minus* for several centuries by the colony at *Marseilles*. From *Spain* this *medica* returned to *Naples*, and thence to *Volterra* and *Scandiano*, being held in much esteem everywhere, but particularly near cities where land is scarce and dear. One *Hercules Cucco*, a nobleman, fond of husbandry, first raised it with success in the *Venetian* state, on this its second appearance, about the year 1550 †. Not long afterwards the archbishop of *Montigli* (who was also bishop of *Viterbo*) carried a parcel of the seeds to *Rome*; so that the culture of lucerne soon spread with rapidity over good part of the ecclesiastical state and all *Lombardy* ‡. In some few years a count, *Fabio*, taught the *French* to raise lucerne round *Paris*: Inasmuch that, in *Henry IVth's* time, it was as common (at least in the southern parts of *France*) as broad-clover is in our fields at present §.

About

* *Le Vinte Giornate dell' Agricoltura* di M. Agostino Gallo 4º. in Venet. 1569. p. 35.

† *Ibid. Giornat. II.*

‡ *Herbario di Castore* DURANTE. Fogl. in Roma 1585. p. 279.

§ De Serres; *Theatre d' Agriculture*, de die Roi Henri IV. fol. 1650.

About the year 1578, this plant found its way into Germany, and was cultivated in one of the loveliest parts of the whole empire, namely, the *Lower Palatinate*. At the same time the fame of it reached England,^b where all people admired it, and some few had the courage to make essays towards cultivating it; but their attempts were languid, and, as I conclude, unsuccessful, notwithstanding they had the practice of the antients to guide them, in the books *de Rebus Rusticis*. At length *Hartlib* attempted to excite the attention of the public afresh, in the year 1650. He did as much, circumstances considered, as a man of his great genius could do. But as there was no method of raising it at that time generally known, but the common practice used in cultivating clover, it of course miscarried in our climate.

Thus much with relation to the history of lucerne, and the progress of its cultivation. As to its nature and qualities, I shall beg leave to transcribe a few lines from a MS. poem, where the author, describing hay-making time in the province of *Andalusia*, expresses himself as follows: (And here I shall only observe that *alfalfa* is the old Spanish name for lucerne.)

Th' impatient mower with an aspect blythe,
 Surveys the sainfoin^c-fields, and whets his scythe.
Ynoisa, Agnes, Beatrix prepare
 To turn th' *alfalfa*^d-swards with anxious care^e;

(No

^a Conradus HERESBACH *de Re Rustica*, 8°. Colon. 1573. [At that time the Germans called lucerne *welschebolken*.]

^b *Barnaby GOOGE's whole Art of Husbandry*, 4°. Lond. 1578.

^c The best species of sainfoin, hitherto known, is in the province of *Spain* we are now speaking of.

^d *Alfalfa* (from the old Arabian word *alfalfat*) and *erwaye*, are the Spanish names for lucerne.

^e No plant must be turned so often, and with so much care, if we propose making it into hay.

(No more for *Moorish* farabands they call,
 Their castanets hang idle on the wall) .
Alfalfa, whose luxuriant herbage feeds
 The lab'ring ox, mild sheep, and fiery steeds:
 Which ev'ry summer, ev'ry thirtieth morn,
 Is sixtimes re-produc'd, and six times sborn!

Lucerne, rightly managed, is capable of supporting heat and drowth even near the equator, and perhaps under it. It may also be raised successfully in any climate where men and cattle can bear the rains and cold with tolerable ease: That is to say, in all countries between the sixtieth degrees, inclusively, of northern and southern latitude. —Indeed, there are some few small spots of ground that may prove unfavourable to its growth, not only in every climate, but perhaps in every district or parish: For instance, where morasses are found, or lands incommoded by stagnating waters, weeping springs, &c. as also lands that are tainted with metallic or arsenical matter; but such inconveniences are only local and casual, and the exceptions shall be specified in their proper place.

If you have variety of ground, make a well-conditioned deep soil your option (especially if you propose to drill the lucerne:) And, if there is a farther alternative of choice, let that soil be rather inclined to moisture than over-dry; but wet lands (especially if water stagnates in them) are always fatal to lucerne.

In raising lucerne, our master *Virgil* recommends a rich *patrid* soil preferably to all others:

—Te quoque, *medica*, *patres*
 Accipiunt sulci. —

Georg. I. v. 215.

Now

Now it is probable, that the *putris terra* of *Virgil*, and the *temperata* of *Varro*, † which we are advised to chuse upon this occasion, are what we call a *rich loamy earth*,* which contains a greater quantity of vegetable food than any other common soil. Its properties are to expand and crumble into small bits when dug or ploughed, † and yield a pleasing smell after rain : † possessing just that degree of cohesion between clay and sand, which is fittest for the nourishment of vegetables : for it hinders not the lateral spreading or perpendicular penetration of roots, and yet is not so weak as to be unable to hold the roots

† *De Re Rustica* lib. i. c. 41.

As it is my intention to give some short account of the ancient writers on husbandry, whenever I have occasion to quote them, it may just suffice to observe, that *VARRO* died about 27 years after the birth of *Christ*, being the most learned *Roman* of the age he lived in. He published his treatise of agriculture in the eightieth year of his age, and inscribed it to his wife *Fundania*. “ *Si homo est bulla* (says he) *eo magis senex. Annus enim octogessimus admonet me ut sarcinas colligam, antequam proficiscar e vita.*”

Virgil made *Varro* his chief master in agriculture; for, not contented to copy many of his precepts, he sometimes adopts his words and phrases, and that particularly in the culture of vines. [*P. Victor. Explic. in Varr. &c. p. 29. a.*]

PALLADIUS, under the article *de medica serenda*, agrees with *Virgil* and *Varro*, in the choice of soil for raising lucerne. This author (*Palladius*) writ about the times of *Antoninus Pius*: Somewhat more than 160 years after *Christ*. [*DE RE RUST. lib. v. tit. 1.*]

* Much of the same opinion were the old *French* writers on husbandry, and *De Serres*, who dedicated his *Theatr. d' Agriculture* to *Henry IV.*, expresses himself in the manner following : “ *Pour semer la luzerne l'en choisera quelque endroit de sa meilleurs terre, plus sablonneuse qu' argilleuse, plus legere que pesante, plus platte que pendante . . . is endroit soleiles . . . en beau solage & plain ; toutesfois voidant les eaux, a ce qu'elles n'y croupissent.* *Em fol. p. 271.*

† ——— *Sin in sua posse negabit*

Ire loca, & scrobibus superabit terra repletis,

Spissus ager. ——— *VIRG. Georg. II. v. 234.*

‡ Ground of such a temperament contains equal proportions of clay and sand.

MARKHAM's Farewell to Husbandry, 4to, 1631, p. 126.

roots firm, and consequently sustain and keep the plants upright.

The particles of this soil, when disturbed by turning, seem to recede from one another: And the earth, when dug and exposed to the influence of the atmosphere, expands so far, that, without you press it, it will more than fill the hole from whence it was taken: Which proves it to contain a putrefactive fermentation in its composition; and so much the rather, as it is naturally impregnated with fat oleaginous matter: And that more from some inherent intestine fermentation and motion, than from consisting of spongy dilating particles.* It also (as we observed before) sends forth a pleasing smell after soft mild showers; and the same may be remarked of it, when it is dug, or ploughed, even in dry weather. And this indication of a good soil was well known to the *Greek* writers on husbandry.†

Nor must we here forget *Virgil's* description of well conditioned fruitful land:

*Quæ tenuem exhalat nebulam, fumosque volucres,
Et bibit humorem, et cum vult ex se ipsa remittit;
Quæque suo viridi semper se gramine vestit,
Nec scabie & salsa lædit rubigine ferrum: —*

Ilia

* See Dr. HOME's *Principles of Agricult. and Vegetat.* Part I. Sect. 3.

† Ἀπὸ τῆς μὲν ἰσφορίας τῆς καλλίας [γῆς] δοκιμαζέτω.

GEOPON. Lib. ii. c. 10.

For the account of a good soil, as verified by practice, see *Reginald SCOT's perfect Plat-form of an Hop-garden*, 4^o. 176. c. 2. This gentleman writ about 40 years after *Fitz-Herbert*, and is, in point of time, the second writer on *English* husbandry, at least, as far as my collection goes, in books of agriculture. He was a younger son of Sir *J. Scot*, in *Kent*; had received an university education; and was looked upon to be a good scholar.

*Illa ferax oleo est; illam experiere colendo
Et facilem pecori, & patientem vomeris unci.*

GEORG. II. V. 217.

Which verses being of a didactic nature, and, as it were, the very basis of husbandry, may be thus translated almost verbatim :

Soils which exhale thin clouds and misty streams
Warm, half-translucent; drinking moisture in;
Discharging superfluity at will;
Cloath'd with perpetual verdure, all their own;
And never found to mark the shining share
With speckled morpew and corrosive scars;—
Such soils abound with oil. Just culture soon
Will wake the genial virtues of a land
Benign to cattle, patient of the plough.

Therefore, where people have much land and good choice of soil, we recommend the earth above described (or something as like it as may be found) for the culture of lucerne.

And here it is hard to assign a reason, why the plant, now under consideration, is called *lucerne*, since the canton of that name, in *Switzerland*, neither was, nor is particularly famous for producing this vegetable: Nor did the western and northern nations of *Europe* receive it thence, as appears from the account given of its revival and progress.

Nay, M. du Hamel asserts, that this plant succeeds not at all in *Switzerland*; though certainly it grows in various parts of the XIII Cantons extremely well, and all M. de Chateaurvieux's successful experiments were made in the territory of *Geneva*, which may be looked upon, almost, as a part of *Switzerland*, in an husbandry-sense, as to air, climate, and vicinity, without entering into geographical niceties.

M. du Hamel also is pleased to say, *Que la Lucerne vicut très mal en Anglettre*; though he must have read what Fall had then written concerning it. But, in this assertion, we flatter ourselves he is mistaken, except he alludes to lucerne sown with spring-corn, in the manner clover is sown.

It may now be time to proceed to the *experiment on transplanted lucerne* made in *England*; and, if the present Essay (or whatever else I may publish on the subject) has any degree of merit, it arises from this, that every practical and didactic part (except where references are made to other authors) is the result of my own experience; and, wherever I have no experience, the deficiency will be acknowledged.

Whoever proposes to sow a lucerne-nursery, or engages in any larger undertaking of cultivating whole fields of sainfoin, trefoil, buck-wheat, spurrey, fenugreek, sweetmelilot, &c. would be no ways ill-advised, if he prepared a bit of ground, and sowed a spoonful of the seeds about a fortnight before he proposed to sow his larger quantity; since, from the good or bad success of this little attempt, he may be enabled to judge, whether the seedsman has supplied him with seeds fit for vegetation.—Without such precaution, a whole year may be lost; which is a mortifying circumstance in matters of husbandry.

In the end of *March*, 1757, a common day-labourer was ordered to sow a pound and a half of lucerne-feed,* and keep the ground clear from weeds.

The

* The seed was bought of *Wilson and Sanders*, near *Durban-yard* in the *Strand*, and proved uncommonly good. These persons have supplied our friends and correspondents ever since.

In hot countries, like *Spain, Italy, &c.* the husbandman usually sows lucerne, and covers the seeds with a *trains* (a practice superior to our bush-harrowing) about an hour before sunset. Then the dews fall and moisten the ground, whereas the seeds

The seed was sown on one of the least promising pieces of land in all the neighbourhood; but this was done by express order; for it was thought unfair to make the experiment on a better soil than the commonest sort of grass-fields. The spot of earth, set apart for the purposes, both of nursery and transplantation, was, in former times, a kitchen-garden: But the good soil, to the depth of 18 inches, had been removed for the sake of manuring a corn-field. [To which we shall just add, that the attempt was made in an hilly country, where the *Staple* earth is naturally shallow.] What remained was a cold, yellow, clammy stratum, which the country-people looked upon as mere clay; but, its nature having since been better examined, it appears to be a mixture of imperfect clay, and imperfect marle.—No manure worth mentioning was used upon it, as will appear by the sequel.

To all seeming appearance, little, or next to nothing, could be expected from a piece of ground of such an unpromising cast. But, upon the whole, the experiment proved successful and easy.

By the middle of *August*, the plants were, some of them, 18 inches high; and many of them branched out, subdivided themselves, and made very fine side-shoots. Upon which it was resolved to venture upon the second part of the experiment, according to the accounts given by *M. de Chateauvieux*,

seeds are shrivelled and parched in the heat of the day, inso-much that they cannot expand themselves but with difficulty.

See *LIEBAULT, Maison Rustique*, 4^o. 1617, L. V. p. 527.

I thought proper to insert this note, but apprehend it is of no great consequence in our climate. Thus much, however, it seems to imply; namely, that it is never right (even in our country) to sow lucerne during a great drowth, and especially when the winds are dry and harsh.

vieux,* Therefore, taking the advantage of a moist season, in the beginning of *September*: (which season, by the way, did not last long) we performed the work in the following manner: — [But here let it be just observed, in passing along, that the time of the year, pitched upon for transplanting, was, at least, *three weeks too late for England*, though, perhaps, highly proper for the territory of *Geneva*, or the southern parts of *France*. This therefore is set down as one of the *mutatis mutandis*, so indispensably necessary in matters of agriculture, when the practice of one country is copied in another.]

First the roots were dug up carefully: Orders being given before-hand not to attempt drawing them, even with the smallest degree of violence, till the earth was intirely loosened at top and at bottom. In the next place, the long tap-roots were cut off, 8, 9, or 10 inches discretionally below the crown of the plant: (The scissars being generally applied just beneath the forks of the root, if it be a branching root) about the place marked by the undermost dotted lines in plate V. — Then the stalks were clipped about 5 inches above the crown of the plant: And the remaining plant, after these amputations (which may appear, at first sight, to be ve-

ry

* *M. Lullin de CHATEAUVIEUX*, chief syndic of *Geneva*, a gentleman of great worth and knowledge, and of a most communicative disposition, hath amused himself with the study of agriculture many years, and advanced that art very much, not only by improvements, but several new inventions and discoveries: But, being called, of late, to discharge his civil office in the republic, has not been able to oblige us with a continued series of his observations.

One may call this gentleman a true citizen of the world, who, like another *Metrophanes* (according to the inscription on an antient *Roman* marble) *has done good to all men, and harm to none*. He deserves a place amongst *Virgil's* heroes of peace:

Inventas—qui vitam excoltère per artes.

ty bold ones) was thrown into a large vessel of water which stood by for that purpose, in the shade. Such refreshment is no-ways unnecessary; for this plant is very impatient of heat and sunshine: After it is taken up; nay, to such a degree (at least the first half-year of its growth) that one may almost call it a sensitive plant. — The same day, making use of a dibble, or setting stick, and filling every hole with water before the roots were put in, we transplanted them in rows, 2 feet asunder, and each plant 6 inches apart in the rows; having first made little drills, or channels, and sprinkled or half filled them with sea-sand and wood-ashes kept dry: (Two parts of the former to one of the latter;) which was done with a view of loosening the soil, and giving a little warmth to a piece of ground, which was naturally cold and clayey; nor was any other manure used. The drills were afterwards once watered, to take off the dryness and heat of the ashes: * The roots were placed firmly in the ground, and two inches of the stalks covered with mold.

Yet here it must be freely acknowledged, that the hopes of possessing a large crop occasioned *one* mistake, which we chuse rather to mention than suppress, as many people may happen to entertain the same false expectances. The *mistake* was, that we made our rows two feet asunder, which was over-narrow; and placed the plants, in the lines, only six inches apart, which brought them nearer together, than they ought to have stood, † even though the ground was very poor. Nor did we foresee, that horse-hoe ploughing is five times more efficacious, as well as cheaper than hand-hoings.

Therefore after frequent experiments, since made, it appears best to make the lines *three feet*

Q

four

* See the *Vinti Giornate dell' Agricoltura* di M. *Agostino GALLO*, p. 35.

† This acre contained about 26,000 roots.

28. E X P E R I M E N T S

four inches distant from each other: And, if the soil is good, it may not be amiss to allow each plant a *foot* distance one from another in the lines, for thus the hand-hoers will work more commodiously, and a little hoe-plough may be guided safely up and down the intervals, which will save a great deal of trouble. Nor will the future crops be lessened by such thin transplanting, half so much as may be imagined; but, on the contrary, the plants will be larger, more juicy, and better tasted; which circumstance may be extended in favour of the *new husbandry* in general. Space and culture improve the herbage and feeds of plants. In proof whereof, I have been assured, from good authority, that all the corn, raised by M. de Chateaurvieux, sells at an advanced price; being larger, brighter, and healthier than common corn, and, consequently, more fit for sowing, or making bread.

But, by way of confirming the necessity of allowing lucerne-roots a good share of space, a friend of the author's filled an acre with plants, according to the *first* directions; but, the soil proving extremely good, and free from weeds, it soon appeared, that the roots stood too close. In consequence whereof, every other plant was taken up the next autumn, and, a fresh acre of land being properly prepared to receive them, he thus gained a new plantation of lucerne, at a small expence, with little trouble: And, what is more remarkable, it is thought the *second* acre bore a larger quantity of herbage than the *first* would have done, if the plants had continued as they were, without being thinned, to the amount of one half.*—Of course, there is reason to conclude, that this slight hint, which took its rise from mere accident, ought not to be
looked

* I have lately been informed, that M. *Bryna* was once forced, by the same necessity, to take up every other row in the year 1757.

looked upon as quite unuseful, since two acres may be raised with almost the same expence as a single acre.

An anonymous theorist, in matters of husbandry, says, "that an acre of lucerne, planted in single rows, each plant 6 inches asunder, will produce 29,040 plants, which yielding a pound of hay each, the hay off one acre will amount to 14 loads, of 1800lbs. weight each."

We acknowledge, that an acre, thus managed, will produce, very nearly, the number of plants above specified; but, except the ground be of an uncommonly good cast, how will the roots be enabled to expand and procure sufficient nourishment? † For it is certain, that the *weeds* which naturally rise in a piece of cultured land, where the hoe-plough (by reason the lucerne plants stand so close) cannot be admitted, will defraud their neighbours, that is to say, the lucerne-plants, of their needful quantity of sustenance: And, of course, hinder *their* roots from expanding themselves in order to procure food.

Besides, when two plants, one, for example, a *weed*, and one *lucerne*, stand so close to each other, the branches of the weed will over-shade, and drip upon the branches of the lucerne. Nor does any plant like the effluvia washed off from another plant.

As to the remark of the anonymous author, I am more inclined to think, that, in a field of lucerne, with narrow intervals, and plants standing at 6 inches distance one from another in the rows, each plant (one with the other) may, in all probability,

Q 2

† In a deep soil, the roots of drilled lucerne, *untransplanted*, may stand nearer than the roots of lucerne *transplanted*; as the former make not such large lateral shoots, and procure sustenance at a greater depth. This I observed, last year, in a patch of lucerne, raised at *Winchester*, in very rich ground.

bility, afford only 3 ounces of hay each, instead of a pound.

But the self-same ground will certainly produce a greater burthen; if every other plant be removed the second year, and placed at a distance of one foot from each other in the rows, with intervals for horse-hoeing, or digging, &c. of 3 feet 4 inches breadth.

What the same author reports afterwards comes nearer the truth:

“ If, by the introduction of such crops, land can be thus improved in its returns to the husbandman, it becomes a great national acquisition: For, if one acre of lucerne can maintain 3 or 4 horses a year,* instead of one horse’s consuming the produce of 3 acres in a year (of common grass) as in the usual way, this is equivalent to increasing the quantity of land in this kingdom, 12 or 18 times,” (I should rather think 3 or 4 times:) “ Which is a greater national advantage, than the addition of a proportionably larger extent of country.”

But to return to my first experiment.

In ten days, though a drowth succeeded, some transplanted plants made shoots of three inches height, which vigorous growth gave better hopes than had been conceived at first.

It was also some encouragement to the undertaker, that he found *wild* lucerne, † within two musquet-shots

* The author, here cited, has added a *fourth* horse; *Colomella* and *Palladius* say, only *three*. Had they named but *two*, I should have been better satisfied. However, this traditional truth, or mistake, shall be examined more at large in the *XIth* SECTION. If the account be true, the *Roman* husbandman’s horses must not be supposed to equal our fine large cart-horses in size, or appetite. They were rather what the present *Italians* call *cavalucii*. Nor did the ancient *Romans* perform the drudgery of husbandry-work with horses, but with oxen.

† This was the species of lucerne called *medica palustris*, or *meadow-lucerne*. *Sr. Liger* and other husbandry-writers sup-

shots of the place where the nursery was formed. These plants were certainly *aborigines*: For they grew in a part of the kingdom where the name of lucerne had rarely been heard of, except by gentlemen. Besides, no person curious in husbandry would have ventured sowing the seeds in such an unpromising piece of ground; for the field, where the wild lucerne grew, was a sort of coarse, uncultivated morass, and valued only at about two shillings and six-pence an acre.

Yet still the approach of winter made many persons doubtful concerning the success of this new plantation; nevertheless, it was some satisfaction to recollect, that there is less harsh, severe cold in *England* (and that almost by one third) than in the territory of *Geneva*, where the original experiment was made, and where the plant we are speaking of has been known to thrive so extremely well.

At length the winter passed over, and, out of four thousand roots, only thirty or forty perished, whether by frosts, immoderate rains, or any other accident, is hard to say: But the labourer filled up all the vacant spaces from the nursery in about an hour, and in *April*, 1758, most of the plants were nearly equal in size and strength; of a deep juicy verdure, with few or no discoloured sickly leaves. By *May* the 8th, people counted sixty stems from one particular root, and the stalks and leaves of some chosen plants weighed near half a pound at one cutting. Yet we learn, by experience, that lucerne must only be considered, as in a progressive state, till the *third* summer after transplanting, and then *M. du Hamel* assures us, that one flourishing plant will produce a *pound* of well dried hay, which is saying, a great deal, and much more than I could

Q 3

pose (erroneously, as I imagine) that the red honey suckle, perennial clover, in dry, sweet, upland pasturages, is a wild degenerated lucerne.

could ever verify; for, if a single plant produces *one pound of hay*, it must have weighed *four pounds*, when it was *green*. Yet I have received an account from an eminent physician in our own country (who planted 2 acres of lucerne by my directions) that many of his plants, in the second year, yielded near half a pound of hay each plant.

As an acre of lucerne, thus managed, will contain more roots than one is apt to imagine at first guess, how great must the produce be of four or five cuttings every year, and those confessedly the most nourishing and palatable food that cattle can eat? * For thus much is certain, amongst other advantages, that, if a field be industriously hoed, ploughed in the intervals or spaces, and hand-weeded in the rows, for the first two or three years, it is almost sure, that horses, cows, or sheep, will hardly find a single weed in a large quantity of green food.

We will now mention the state of our transplanted lucerne in its second year, namely, 1758.

And

* See GOOGE'S *Four Books of Husbandry*, 4°. 1578, *Saxons* letter, and imprinted for *John Wright*. This valuable writer, *Barnaby Googe*, Esq; translated the work here spoken of, from the *Latin* of *Conrad HERESBACH*, a *German* nobleman, who published it at *Cologne*, in 1573. *Googe* also has translated something from *Paltingenius*, perhaps the *Zodiacus Vita*; but I never saw it, to the best of my remembrance.—This gentleman (our second author of note in matters of husbandry, writ forty years after *Fitz-Herbert*.—He was of *Alvingham*, or *Alwingham*, in *Lincolnshire*, and grandfather to *Barnaby Googe*, Esq; who lived there in 1634, and after. The Epistle to the Book of Husbandry is dated at *Kingston*, February 1, 1577. *Gerwase MARKHAM* reprinted this work in 1614, 4°, with *insertions*; intended chiefly to adapt *German-husbandry* to the *English* climate. [*Markham*, by the way, appears to be the first *English* writer who deserves to be called a *hackney-writer*. All subjects seem to have been alike easy to him: Yet, as his thefts were innumerable, he has now and then stolen some *very good things*, and, in great measure, preserved their memory from perishing.]

And here let it be remembered, that what cultivators call a proper time for cutting, is, when the plants are about 15 or 16 inches high, at an average, throughout the field: But this must be understood in a relative sense, for some plants will be 2 or 3 feet high, and others may not be above 10 inches, or 1 foot in height, according to the circumstances of health, space, situation, &c. of the several roots.

The cuttings of the year 1758 were as follow: *May* 8th, *June* 7th, *July* 12th, *August* 20th, and *October* 1st.

In the year 1759, it was cut 5 times, and 6 times * in 1760; which made 16 cuttings in 3 years. Nay, by the 9th of *April*, in 1760, some of the lucerne plants were near 17 inches high, at a time when no field in the neighbourhood had grass of 4 inches height, though you took 5 or 6 acres together. The same lucerne was cut twice, before any hay-making began in the country round it: If we except some few meadows lying near market-towns.

Having carried on my first experiment thus far, upon almost as unpromising a piece of land as could be found, and being sensible I had made some mistakes from want of experience (having as yet never seen any transplanted lucerne in *England*) I gave directions for making a small plantation in *Berkshire*, but still took care to chuse a field that could hardly be called middling land. It was over-run with coarse weeds, had been long out of tillage, and the earth, in most places, was hardly 4 inches above a bed of chalk; *which* (let farmers say what they please of it, in respect to sainfoin †) is no-ways favourable

Q 4

favourable

* The *sixth* cutting, if it be after the first week in *October*, is little more than nominal.

† We have observed, elsewhere, that lucerne and sainfoin require the same soil and the same culture; no two plants being more alike in every respect.

yourable to the growth of lucerne: Especially if the latter be *transplanted*. For the chalk flakes, when thaws and rains come on; and it either heaves the plants out of the ground, or exposes the fibres of the roots too much to the cold. Yet upon this I ventured with my eyes open; for *Pliny** (whose authority I scruple not to take, when I have no other) had given me a caution concerning lucerne raised upon chalky lands; but what induced me to make the attempt was, that the goodness of the soil might not lead me to say more concerning the success of an experiment, than other people may hope to find. More will be said of this plantation in SECT. X.

As I think it unfair to suppress any unsuccessful circumstances in matters of husbandry, I will here ingenuously confess, that the most material of my first mistakes were these:—I followed my foreign instructions (which, at that time, were but few) with too much diffidence, and in too literal a manner. — I was not enabled, through want of experience, to adapt the husbandry-practices of other nations to the *English* climate. — I transplanted too late; filled my rows too full; and allowed not sufficient space for the intervals. — By following the *French* directions over-closely, I cut the tap-roots too short in the best plants; and knew not (as it is a point unmentioned by any cultivator of lucerne) how to manage a root that was very small. — The means of avoiding and rectifying all which mistakes and difficulties are, by the help of subsequent experience, carefully pointed out to the cultivator in various parts of this Essay.

And here it may be worth considering how to apply a field of lucerne, carefully and industriously cultivated, to the greatest advantage. — In such a case, let us suppose the plantation to consist of two
acres,

* *Hist. Natural.*

acres, and that four large horses are to be supplied with green fodder, from the end of *April* till *Michaelmas*. Now, in order to manage this affair with dexterity, count the number of rows or lines in the lucerne-field, and place in one of the headlands 30 land-marks, at equal distances; and thus, having cut a proper portion, day by day, you will be ready to begin afresh, after the last cutting; fulfilling the remark of *Virgil*:

——— *Redit labor actus in orbem:*
Atque in se sua per vestigia volvitur annus.

When I say you will be ready to begin afresh, at the end of 30 days, I must desire to be understood, with a small degree of latitude: For *physical* accidents are so numerous and unavoidable in regard to the growth of plants (though lucerne is liable to fewer checks and miscarriages, than most other cultivated field-vegetables) yet still the nature of the thing will not allow us to predict the time of each and every periodical cutting with much certainty; — nevertheless, thus much may be depended upon, even for some years successively, that, after the first annual cutting, our directions, here given, will be attended with no inconvenience to the owner; for there will rarely be more than three or four days difference between the times of the *second*, *third*, and *fourth* cuttings. — Nor will the want of lucerne-fodder, during such short intervals, be of the least ill consequence; for, surely, that husbandman must be a very improvident manager who has not other grass-fields by way of a momentary supply.

The times, therefore, of the *second*, *third*, and *fourth* annual cuttings, are tolerably certain; but the *first* cutting, according to the nature of the winter, may be accelerated, or retarded, a fortnight, three weeks, and, perhaps, a month.

The

The time of the *fifth* cutting, is also, in some degree, variable and uncertain, as the solar heat decreases; and the days grow shorter. A *sixth* cutting, which is seldom of much consequence, chiefly depends on a fortunate season, in conjunction with the industrious good management of the cultivator.

From this succession of fresh green food appears one singular advantage in raising lucerne: And, in the next place, care must be taken, that your plantation be always proportionable to your number of cattle; or, in other words, let it be a rule to you to have rather over-much lucerne, than too little. For then one cutting may be set apart for hay, which may be given occasionally to favourite horses and sick cattle. But, in case no hay is made, the owner of the ground, even then, by means of the supplies he derives from green lucerne, will be enabled to spare a large quantity of other grass for hay-making; and thus two acres of lucerne will give him the power of saving two or three tuns of hay more than he could have saved otherwise; consequently lucerne, *in effect*, helps to keep cattle both in winter and summer.

By such sort of husbandry, and provident management, the stock of hay for winter will be considerably increased, and the owner enabled, for the space of five months at least in the other parts of the year, to allow his horses very nearly the same quantities of green food each day; all equally fresh, wholesome, and well-tasted. Which single circumstance (if it related to horses only) gives lucerne the preference over all other sorts of green fodder hitherto known; and in process of time may be applied (as has been experienced with much success) to the fattening of horned cattle, provided such cautions are used as shall be specified hereafter, and which ought always to be remembered.—Now
what,

whatever increases the number of cattle, augments the quantity of dung necessary for carrying on the more successful cultivation of arable lands; and *whatever*, by multiplying the number of cattle, affords more animal food to man, will of course contribute towards lessening the price of meat, which will assist society in general, and more particularly the manufacturer and peasant.—For the grand secret of well-managing a trading populous country is to supply the inhabitants with flesh and corn upon easy terms; for then mankind will multiply of course (supposing the government to be mild and equal;) nor will other nations undersell us, in the commodities we export to foreign markets.

Now lucerne, in matters of husbandry, comes the nearest, of any article yet known, towards attaining the points here proposed; forasmuch as one acre of land, thus cultivated, will support as many cattle in spring, summer, and a part of autumn, as four acres of common, natural, † upland-grass did before. But this use of lucerne is still greater, if land be scarce; or if the nation be populous, and the soil has been cultivated to the extent of the *old* husbandry: For then the introducing this plant is, in effect, the same as creating new land, if the superior

† It is with some unwillingness we use the distinction of *natural* and *artificial* grasses (they being all equally natural, and the bounteous gift of God;) but the common language of every husbandman makes such distinction necessary, and of course we use it, in order to render our meaning intelligible to the generality of readers.—*Natural* grasses, therefore, are such as grow wild, and cover the surface of the earth without the assistance of culture, or are raised and managed in fields in a compendious negligent manner, which scarcely deserves the name of culture: but *artificial* grasses (if *grasses* be a proper word on this occasion) like lucerne, sainfoin, spurry, sweet melilot, &c. are to be introduced into the field with great care, and cultivated afterwards with equal diligence.—Many people have thought that a better distinction might be made use of: As, for § ample, *natural* grasses and *improved* or *cultured* grasses.

perior produce of lucerne, both in quantity and quality, be fairly considered by us.

Yet one thing must be well understood in the new practice of raising lucerne. Negligent husbandmen, and such as expect good crops without labour, expence, frequent plowings, weedings, &c. would act a *wise* part in not attempting to cultivate the plant here mentioned. Nor is it advisable for gentlemen of fortune to commit this part of husbandry to bailiffs and servants: Who (be their master's advantage ever so great) will not like the labour (tho' they are well paid for it) of turning fields into a sort of gardens: And, besides all this, may conceive a prejudice against improvements, and take some small delight to see them miscarry. So that all random, careless, and insincere methods of culture must have nothing to do with raising plants, which, tho' hardy and long-lived after they attain a certain age, yet are surprizingly delicate and tender when they are young, or when first transplanted; and more especially if wild couch-grass and other weeds should spring up amongst them.

For these reasons, at first setting out, I must advise every good cultivator to be particularly industrious in the extirpation of weeds; and that he over-burdens not the strength of the earth from a principle of avarice, but allows her the just refreshments of manures, and give her at least some breathing-space of ease and repose; remembering always the remarkable words which *Aretbusa* is reported to have said on a like occasion:

*Neve tibi fide violens irascere terra;—
Terra nihil meruit: patuitque invita rapinae.*
OVID. *Met.* lib. vi,

Which

Which puts me in mind of an expression to the same purpose in an ingenious writer: * “ No one “ knows (says he) to this hour, how far our com- “ mon mother may make kind returns to her in- “ dustrious and not unreasonable children.”

The antients were not only assiduous in destroying weeds, manuring the soil, and allowing it a competent degree of repose, but were also at the same time thoroughly sensible of the great inconveniencies which arose from the *master's inexperience or absence*. Cato says, “ That any estate may be looked upon as unfortunately circumstanced, if the master takes lessons in husbandry from the bailiff.” † Florentin observes, “ that, if the bailiff learns any new practice in husbandry, he should always consult the master, except the necessity be so pressing, that he has not time to receive instructions.” ‡ And, again, an anonymous author in the same collection observes, “ That the perpetual presence of the master greatly improves an estate. It is he that makes every workman apply himself diligently in his respective department. It is he that takes notice of every deficiency, and points out the

* Le marquis de MIREBEAU.

† The original passage is more strongly worded: *Agrum pessime multari cujus dominus non docet sed audit villicum*. [His author, M. P. Cato, the censor, flourished about 149 years before the birth of Christ, and was one of the first Roman writers who writ well in Latin. He learnt Greek of Ennius, and inscribes his book to his son. He writes like a plain country-gentleman, whilst Varro has more of the air of a French academician.]

Pliny lays a great stress on the master's presence: *Frons domini plus prodest quam occipitium*. *Nat. Hist.* lib. xviii. c. 5. And Xenophon, speaking of the confusion which naturally arises where a master is not intelligent in rural œconomics, illustrates his meaning in the following manner: “ I can compare such conduct, says he, to nothing more aptly, than if an husbandman should throw wheat, barley, pease, &c. into a mixt heap, and, when he had occasion to use any one sort of them, must be obliged to pick them out grain by grain.” *In Oeconom.*

‡ In GEOPON. *de Villico*, lib. ii. c. 44, 45. FLORENTIN lived under Macrinus, about the year 218.

the means whereby to supply it: Commending those that are active and dextrous, and reproving those that are lazy and untoward. Thus directing his eyes to a single point of view, he combines all the powers of his work-people in one universal act of diligence and industry. †

Two

† In *Geopon. de Villico*, lib. ii. c. 1.

As we have frequently cited this and other *Geoponic* writers, it may be worth observing once for all, that some suppose the collection of agriculture, called *GEOPONICS*, to have been extracted from the originals by one *Cassianus Bassus*: Others imagine the extracts to have been marked in the respective MSS. by the hand of *Constantine IV.*, or selected by his orders, and then recommended to the public, under the patronage of so illustrious a name, by the *Greek* editor. *Cornaro*, who translated this work into *Latin*, about 1528, 14 years before the *Italian* translations were published, declares himself to be of the latter opinion, and so do the two *Italian* translators, *Nicolo Vitelli* and *Pietro Lauro*. Nor are reasons wanting for encouraging such a conjecture, since, in a sort of epistle dedicatory, prefixed to the original, by an anonymous author cotemporary with *CONSTANTINE*, it looks as if the emperor made the *excerpta*, and commanded them to be published: For the editor calls the *Geoponics* *Constantine's Commentaries*, and observes, that this prince, in several respects, was superior to him, whom the world furnished the *Great*.

Indeed, it must be acknowledged, that *Constantine IV.* had uncommon merit; for, having conquered the *Saracens* and *Arabians*, and performed great exploits by sea and land, he not only patronized the arts of peace, but studied the practices of them diligently, fixing his chief attention on the advancement of husbandry. He also restored philosophy and eloquence, and collected the decisions of the famous synod held at *Constantinople*.

The extracts relating to agriculture, preserved by him, are selected, principally, from *Greek* writers; nevertheless, some detached parts are translated from *Latin* authors; and much are we obliged to this imperial care; for the *Greek* MSS. from whence these extracts were made, are now lost; as are many others which were written in *Latin*.

Of course, the *Geoponics* serve as the best commentaries towards explaining several disturbed and corrupted passages in such *Latin* writers, *de Re Rustica*, as now remain; and the said *Roman* authors, in their turn, where they copied or translated from

Two modern authors agree precisely with the antients in this particular; and the remarks they have made upon the occasion may be seen and examined at the bottom of the page.*

To these observations may be added the common *English* proverb, which is as follows: *The best dung in the world is the master's foot.*—Nor ought such sort of sayings to be looked upon as mean, trivial, and vulgar; for my Lord *Bacon* (if I mistake not) somewhere says, that country proverbs “are good sense ready cut and dried.” Nay the proverb here introduced, is as old as the times of *Plutarch*, and even the elder *Pliny*, who both mention a common saying to the same purpose. The *Rabbins* have also a proverb in favour of industry, which deserves to be repeated, “When the tale of bricks is doubled, then comes *Moses*.”

What has been here said may perhaps appear sufficient to convince any gentleman, that he can never hope for success in cultivating lucerne, except he be present at the preparation of the ground, as also at the times of sowing and transplanting; and sees every thing executed according to his own ideas and directions. Nor does the work end here. He must be eye-witness of the subsequent hand-
hoeings

from the *Greek*, are excellent expositors of various puzzling and dark passages in the *Geoponics*:

—Alterius sic

Altera poscit opem res, & conjurat amice.

* “On ne doit guéras attendre une telle attention d'un fermier: il faut que le maître s'occupe lui-même de cette culture, sans quoi point de succès.” DU HAMEL, *Cult. des Terres*, tom. 4. p. 344.

“Le maître est toujours prêt à quitter la campagne pour aller s'établir à la ville: En sorte que dans la plupart de nos terres, il ne restant que des mains, & point de tête.” *Essai de M. BERTRAND*, à Zurich, 1760, 8°. p. 123.

Varro has expressed this thought extremely well: *Omnes enim patres-familia, salce & aratro relicti intra murum, correpsimus & in circis potius ac theatris, quam in segetibus ac vinetis manus movemus.* *Varro ut citat. a Columell.*

hoeings, weedings, and horse-hoeings, the application of manures, and in short all that relates to diligent and accurate husbandry.

The difference is amazingly great between ground that is well or ill cultivated: Half-manured, or almost totally abandoned to wild chance.* Amongst the *Romans*, the occupier of a field ill cultivated was liable to receive some public censure from the magistrate.† And from the same authority we are told in another place, that a tract of land whose culture is neglected, becomes more hurtful to society than a barren one.‡ Nay, remissness in general, and neglect in the article of destroying weeds, will be found to injure the land, as much as *Ceres*, the goddess of fertility and plenty, is reported to have hurt it, when, in her transports of anger against mankind, she withdrew her kind maternal influence from the earth; which an antient poet has thus described with his usual elegance:

— *Arvaque*

* “God gave the earth in common to all men, but, since he gave it for their benefit, and the greatest conveniencies of life they were capable to draw from it, it cannot be supposed he meant it should always remain common and uncultivated. He gave it to the use of the *industrious* and rational; and *labour* was to be *his title* to it” *Locke on Government*, p. 167.

“*Labour* puts the difference of value upon every thing.—The property of labour overbalances the community of land,—Consider what is the difference between an inclosed well-cultivated acre, and an acre of the same land lying in common without any husbandry upon it, and you will find that the improvement of labour makes the far greater part of the value. I think it will be but a very modest computation to say, that, of the *products* of the earth useful to the life of man, most of them are the effects of labour. Nay, if we will rightly estimate things as they come to our use, and cast up the several expences about them, what in them is purely owing to *nature*, and what to *labour*, we shall find that, in most of them, 90% are wholly to be put to the account of labour.” *Ibid.* 170.

† *Agrum male colere censorium probrum judicabatur.* *PLIN. Hist. Nat. Lib. xviii. c. 3.*

‡ *Nihil est damnosius deserto agro.* *Idem, ibid. c. 5.*

Arvaque jussit

*Fallere depositum, vitiatæque semina fecit.
Fertilibus terræ latum vulgata per orbem
Cassa jacet, primis segetes moriuntur in herbis,
Et modo sol nimius, nimius modo corripit imber,
Sideraque ventique nocent, avidæque volucres
Semina jacta legunt : Lolium tribulique † fatigant
Triticeas messes, & INEXPUGNABILE gramen.*

OID *Met.* Lib. 5. v. 479.

She bade the lands be faithless to their trust,
And breath'd a curse on ev'ry useful grain :
Earth's boasted fruitfulness declin'd and fled :
The corn expir'd in life's first milky bloom,
Now scorch'd by *Phæbus*, now by *Auster*
drown'd ; —

O'erturn'd with hurricanes, by birds devour'd,
Or smote with astr'al influence ; whilst uprose
The pirate dock, that 'midst confusion thrives :
The miscreant cockle sucking tainted juice,

R

Sick

† We have taken the liberty to substitute the dock in room of the *tribulus*, in our translation.

I have often observed, in *Italy*, this pestilent weed, so destructive to the husbandman's crops, and so much complained of by *Virgil* and others. There are two kinds of it, the land and the water *tribolo* ; but care must be taken not to confound the *tribolo terrestre* with a plant of very different nature and qualities, called by the *Tuscans tribolo*, or more properly *trifoglio cavallino* (which is its other name.) This plant affords delicious food to horses, and is of so grateful a smell that the *Florentines* distill a perfum'd water from it.

The land *tribolo* of *Virgil* produces a purslain-leaf, but more thin and delicate than the leaves of real purslain. When its little tendrils disappear, new leaves put forth. Sharp hard prickles succeed, which, when bruised, have an acrid, bitter taste. The seeds bruised have powerful qualities, and an infusion of them in wine is reported to break or dissolve the stone in the kidneys.

It is remarkable that, when the septuagint translators render the names of the plant denounced by God as the criterion of human industry, as well as a punishment after the fall, the words they make use of are, *συναγας η; τριβουλος*.

44 E X P E R I M E N T S

Sick nature's wayward child ;) and grafs *canine*,^{*}
Rebellious, unsubdu'd by strength or art.

Thus much in general with regard to the necessity of extirpating weeds ; but lucerne, in particular, being a long-lived plant, arriving at most to its full size and growth three or four times a year, and sometimes oftener, and demanding, of course, much nourishment, dislikes the neighbourhood of all other vegetables that defraud it of due sustenance, or in short that quantity of sustenance which its nature requires.

Industry, therefore, may be justly called the ground-work of agriculture ; and, again, it is amazing what the spirit of improvement may do, when conducted by knowledge. In proof of which, the following short anecdote may not be looked upon as uninstrucive.

The famous *la Quintinie*, director of the royal gardens in France, obtained from *Louis XIV.* an abbacy for his son in one of the remote provinces ; and going soon afterwards to make the abbot a visit (who was not then settled in his apartments) he was entertained and lodged by a neighbouring gentleman with great friendliness and hospitality. *La Quintinie*, as was natural, soon examined the gardens of his host ; he found the situation beautiful, and the soil excellent ; but every thing was
rude,

* *Grafs canine* ; *dog's grafs* or *couch-grafs*. Every joint of a fibre in the roots of this plant will grow ; and therefore the poet, with great propriety, gives it the epithet *inexpugnabile*. I have exposed one bit of a root to the open air, during a severe winter ; and it has grown in spring with much strength, when placed in the ground : Nay, a small joint, transplanted, has filled a superficial yard-square of land in twelve months. In short, it is the last weed one would undertake to extirpate with any hopes of success.

Upon the whole, I can compare couch-grafs with but one weed in the world, and that is the *mal-nomme* of *Hispanide*, which disperses itself over a whole field by means of its winged seeds, and, if not destroyed in due season, over powers and starves the finest crops of indigo that can be raised. *Voyages de Charlevoix*, tom. ii. c. ult.

rude, savage and neglected. Nature had done much, and art nothing. The guest, delighted with his friendly reception, took leave with regret: And some months after sent one of the king's gardeners to the gentleman, and four under gardeners, with strict commands to accept no gratuity. They took possession of his little inclosure the moment they arrived, and, having dug it many times over, manured and replanted it, leaving one of their number behind them as a settled servant in the family. This young man was soon solicited to assist the neighbourhood, and filled their kitchen gardens and fruit gardens with the best productions of every kind, which are preserved and propagated to this very hour. What small beginnings lay the foundation of good culture amongst docile people!

But to return more immediately to the cultivation of lucerne. In a word it is highly unreasonable to expect success in the management of this plant *without care*, and highly improbable (if the seeds are good) to miscarry *with due care*. It is true, many people have failed in the process of this experiment; but then one is generally enabled to point out the error, as likewise the cause of ill success, with tolerable exactness. To begin well in cultivating this plant is doing but little; rules and directions must be cautiously observed for three, or two years at least. Few people make mistakes in the beginning of an experiment: But, generally speaking, after three or four months are expired, the master's attention and keenness wear off, and the bailiff or gardener (as sometimes the raising of a lucerne-nursery falls in the province of the latter) are extremely glad not to refresh his memory. For the *one* does not like an additional trouble out of his department (a punctilio which has great weight with all servants:) And it is a maxim with the *other* never to admit any thing new in matters of

husbandry, but admire those sort of crops which *Columella* describes: Crops that can hold up their heads and prosper under all the negligence of a pretending cultivator: *Suffinent omnem coloni negligentiam.*†

It is true, many difficulties and discouragements attend making experiments. The continuance of life is as short as that of art is permanent:—And few husbandry experiments can be made oftener than once in a year:—Nor must we reason too much by analogy, from success in one production to success in another of a different species.—Attention also is required, and that even to the minutest circumstances:—And again, too many experiments die with the observer; which, tho' highly useful, did not appear considerable enough for human vanity to establish a system thereon.

Yet still all these difficulties and discouragements may be counter-balanced by the advantages which result afterwards to society; this *interpretatio naturæ*, as Lord Bacon expresses it, being far better than the *experientia literata*; ‡ or, as he delivers the same sentiment with greater clearness in his essays, “Studies give directions too much at large, except they are

† Some parts of *Hispaniola* would agree well with such husbandmen, where the *Indians* only set fire to the savannas of long grass, and, having scratched the surface of the ground a little with a rake, let the maize into the soil with a setting-stick or dibble.

‡ *Advancement of Learning*, Book II.

“Agriculture does not take its rise originally from reason, but from fact and experience. It is a branch of natural philosophy, and can only be improved from the knowledge of facts as they happen in nature.—Medicine has attained its present perfection only from the history of diseases, and cases delivered down.—But where are the experiments in agriculture to answer this purpose? When I look round for such, I can find few or none, except *Du Hamel's*.” *Home's Principles of Agricult.* p. 202.

This ingenious author might have applied to husbandry what his master, *Hippocrates*, said of medicine: Μὴ τῷ ΛΟΓῷ γίνωσθαι, ἀλλὰ ΕΡΤΩ διὰ τοιαύτων ΙΗΤΡΟΥΣ.

are bounded by experience." Nor is it any argument against experience to alledge, that it is sometimes the child of chance, or of necessity.

From these and such-like representations, it may appear plain to some people, that lucerne cannot easily be freed from manifest disadvantages by any other method of culture than what is here recommended. That it has usually miscarried, when sown with spring-corn, after repeated trials in this kingdom, from the years 1577 to 1764, is well known to many readers. For common wild grass, and particularly couch-grass, may be called its destruction, if not its poison: Principally indeed by starving the roots of it, but probably from its effluvia too.—This likewise I have always observed in plants of a different species that stand too near each other; they immediately, as it were by a declaration of war, contend for mastery. The roots are constantly attempting depredations and incroachments upon each other: Whilst the stalks, especially those of weeds, make the same efforts in longitudinal shoots; and *that* plant, which over-tops the other, provided the shoots are equally thick and strong, always gains the victory, and, by over-shading and dripping upon its antagonist, forces it to dwindle away and perish. This struggling for life and mastery draws up the plants too weak and spindling, and the conquered plant usually dies. Now weeds, generally speaking, are more hardy, savage, and hungry, than manured vegetables. If such be the case, where is there a country to be found that abounds with foul grass and weeds more than *England*? So that, if lucerne be sown in the usual way amongst corn, like ray-grass, clover, and hop-trefoil, no care can keep an acre clean. It may last two years (only one crop being tolerable) and then must perish in the common course of nature. A gentleman very lately made this experiment (in

good measure against his judgment) for the sake of farmers, in hopes of finding out a cheap, easy, and compendious method of raising lucerne; but the crop, at the end of fifteen months, was as near being overpowered and starved as can be imagined*; which made him venture to take up and transplant the few good roots that remained, which, being freed from the bad neighbourhood and incumbrance of coarse grass and other weeds, appeared to prosper very well. Again, if lucerne be raised in drills, according to the best directions hitherto given by our ingenious countrymen *Tull* and *Mil-ler* (who, to do them justice, were the first persons, amongst our modern writers, that saw the great advantage of this grass, and pressed the culture of it strongly on the *English* nation) certain it is that such a method will greatly exceed the promiscuous sowing of lucerne with spring-corn. Yet still, in the practice of drilling †, a considerable part of the seeds may be faulty, and then the rows will appear naked and unsupplied with herbage: Nor can the hopper be

* *Si fit solum herbosum, vincitur (medica) et desiccit in pratens.*
Min. Hist. Nat. lib. xviii. c. 16.

I never yet saw, that lucerne promiscuously sown ever got the better of weeds and common grass, though the seeds were sown as thick as possible. It is true, I have known wheat overpower weeds and grass; but wheat, in its infant state, is more hardy than lucerne, and grows more kindly in winter than even grass or weeds.

† We have observed, in the latter part of the preceding essay, that *Tull* was not the inventor of drill-ploughs, or the method of drilling seeds by an instrument; for the *Spanish* or *Austrian* sembradore was known more than half a century before *Tull*'s time. *Worlidge*, in the year 1631, has given us the print of an engine “ for sowing corn, grain, or pulse, &c. at what distance, and in what proportion, you please. [*Syst. of Agricult. folio, p. 17.*] But another countryman of ours, *Gabr. Plattes*, gave a description of such an instrument, long before *Worlidge* began to write; and sure I am, though assisted only by memory, that a *Quarto Treatise*, on setting corn in this manner, was published about the year 1606, written by one *Maxey* or *Massie*.

be supposed always to drop the little grains at precise distances plant from plant.—Nevertheless, such persons as prefer DRILLING may reap great advantages from the present Essay, having the power to fill up all the vacant spaces with TRANSPLANTED ROOTS.

With regard to the methods the antients took in sowing lucerne, and the quantity of seed they used in sowing any given space of ground, I shall speak at large in the *sixteenth* section of this Essay; But shall mention here occasionally, that, whilst I was writing this, I received an account from France which informs me, that the husbandman, about the middle of the last century, allowed in lucerne-feed a sixth part of the weight of seed-wheat necessary to sow the same ground; which amounts to an allowance of about 3 lb. of lucerne-feed to each acre; and corresponds, in good measure, with *Hartlib's* account mentioned in the *Testimonies concerning lucerne* *. But *M. Du Hamel*, by way of result from all his experiments and observations, allows a great deal more in promiscuous or broad-cast sowing.

De Serres says, as long ago as in the year 1600, “That, if farmers, after all that has been suggested to them, should be bold enough to venture upon sowing lucerne with any spring-grain, let it be with vetches, and not with oats or barley; the vetch and lucerne being something alike in growth and other qualities.” This in part may be true: But I think the tendrils of the vetch will be apt to

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strangle

It was a custom in *China*, above seventy years ago (and how much longer one cannot say) to sow wheat in drills, the lines being about half a foot asunder.

Lettres Curieuses & Edifiantes.

* Another person says, “Qu’il faut pour semer une luzerne la sixieme partie moins de semence que pour semer du froment, c’est a dire qu’ au lieu de 5 ou 6 voisseaux de blé pesant 250 livres le tout, on ne’en prend qu’un sixieme, parce que la graine de luzerne est extrêmement petite: Et qu’elle ne veut pas être semée trop dru, mais en quantité raisonnable, & de maniere néanmoins que le champ en soit suffisamment & également couvert par tout.”

strangle the lucerne.—If such a sort of husbandry is to be dealt in, I hope to supply a better succedaneum*.

M. Bertrand, pastor of *Orbe*, in the *Païs de Vaud, Switzerland*, seems to speak most conformably to my ideas of husbandry, in an essay published by him about two years ago; namely, “That it is never right to sow any seeds together of different species; but, in case you do, then remember to pitch upon such plants as proceed in their growth *æquis passibus*, and ripen about the same time:” Otherwise one will defraud the other.

Indeed *M. du Hamel*, in his *Elements of Agriculture* †, published last year, seems to allow the practicability of raising lucerne and oats ‡ together; more, as I apprehend, out of compliance with farmers (who love cheap, compendious methods) than by way of speaking the result of his best thoughts and most mature experience: For he clogs the attempt with difficulties enough to deter even an enterprizing *Frenehman*; so that the cool permission he allows seems to amount to a tacit disapprobation. “If, says he, lucerne is to be sown with oats, in the manner of sowing oats and clover, care must be taken to mow the oats and lucerne together, at the time the seeds of the oats are formed,

* See the latter part of *Sacr.* XVI.

† When *M. du Hamel* first published the experiments made by himself and friends, he was obliged to relate them year by year, as they succeeded each other. This method (though the truest and best method in matters of husbandry) naturally threw the whole six volumes into no small confusion at last; nor was it in the power of any index to save the trouble of referring perpetually, but only to alleviate it a little. The author therefore, after all the experiments had been verified at large, and the justness and fairness of making them allowed by the public, reduced the result of them to one uniform system, under general articles in two duodecimo volumes; and certainly no one could better methodize or abridge such a diffused work, than he who first put the parts together.

‡ I should think barley a less voracious plant than the oat,

formed, in case the crop of the latter happens to be luxuriant. — For, except this small sacrifice be made, the lucerne-plants will be over-shaded and starved, — Besides, the ground, before the lucerne and oats are sown must be pulverized with much labour and expence to an exquisite degree of fineness.”

Nor is it possible *then* to destroy the weeds at once. Of *some*, the least fibre remaining will form a new plant: Witness couch-grass, the bane of husbandry. The seeds of *some* the wind will convey to you from a great distance; — the seeds of *others*, which might have lain dormant, and at length perished, may be brought nearer the surface by violent turning and disturbing the ground; in which situation they will surely vegetate, when placed within due reach of the influences of the atmosphere; — and, again, the seeds of *other* weeds only rise periodically, after an interval of two and three years: So that these plants will re-appear, when the field is supposed to be absolutely free from them.

These remarks I have thought fit to annex to those made by *M. du Hamel*: Who proceeds to observe farther, upon raising lucerne and oats by promiscuous sowing, that it will be extremely perplexing, the year after the oats are cut, to destroy the weeds irregularly dispersed all over the field, the lucerne at the same time not being placed in lines with proper intervals. Besides, he allows; that the oats and weeds (be your care ever so great) will defraud the lucerne-roots of their sustenance; so that you must be obliged to manure the field copiously in the second-year. — Now whether lucerne, after such precautions are taken, will ever prosper to any tolerable degree is much to be doubted: And, supposing there has been a commonly fortunate example or two in the more southern parts of *France*, yet sure I am that the same casual sort of success cannot be

be expected in *England*; and that for reasons above-suggested, namely, the abundance of weeds, and want of heat, dry weather, and sun-shine.

True it is, that, in some parts of *Italy* and *Spain*, the inhabitants sow lucerne with spring-corn, in order to prevent the scorching heat of the sun from burning the young lucerne-plants; but northern nations have nothing to fear in that respect: And thus what is *right* in them may be *absurd* in us.

—Different climates, and even a variation in slighter circumstances, call for different sorts of management. *Virgil's* precepts, excellent as they are, may sometimes deceive us, when we apply them literally to *English* agriculture. Nay, some intelligent husbandmen, in *Italy*, have observed, that the main part of the *Georgics* was composed in the *Mantuan*; and not the *Neapolitan* state (where our poet afterwards resided;) for the rules of culture, laid down for the *moist deep soil of Mantua*, did not hold quite conclusive in the *shallower* and more *brassy* lands of *Naples*. And thus, in the *Asiatic Georgia*, the husbandman is obliged to overflow his corn, by bringing streams into it, when the neighbouring mountains are covered with snow: Whereas, in the islands of the *Archipelago*, where the heat perfectly calcines the earth, and rain seldom falls, except in winter, you may behold some of the finest corn-fields in the world; which serves to demonstrate another point of husbandry, namely, that all earths have not the same inherent nourishing juices; and that some lands may be compared to the camel; for the one takes in a quantity of drink, and the others take in a quantity of moisture, sufficient to support them for a long continuance.

Therefore, upon the whole, where the heat of the sun is not intense, and where shade and moisture are no-ways wished for by the husbandman, it appears best, in general, to sow seeds of one species by
them-

themselves; for (besides many other reasons) it has been imagined by several good judges in husbandry, that the effluvia of one sort of plants seem to hurt plants of another kind. The same likewise is reported to happen among trees; and many judicious observers, in matters of gardening, have assured me, that an orchard, planted in rows, with an apple-tree, pear-tree, plum-tree, &c. interchangeably in each line, will rarely prosper. Nor were these points unknown to the ancient *Greek* writers on husbandry. — “In the same plantation,” says *Florentin*, “dispose not your plants at random, nor mix together such as are of a different species.”*

Of the like opinion is our countryman, Sir *R. Weston*: “sow clover,” says he, “and other grass-seeds ALONE, and not with *spring-corn*: Therein altering the custom of *England*, *Brabant*, and *Flanders*, which is to sow it immediately, either with, or after the corn; for I found, by experience, in *Heresfordshire*, that it will thrive much better *the first year*, and turn to more profit *alone*, than *that* and a crop of oats, &c. sown together will do.” † —

In

* *In Geoponicis.*

† See the *Discourse of Flanders Husbandry*, 4to, 1645, p. 17, 18. — We apprehend the author of this work to be *the* Sir *Richard Weston* who was ambassador from *England* to *Frederic V.* elector *Palatine* and king of *Bohemia* in 1619, and present at the famous battle of *Prague*; concerning which a curious relation of his, by way of letter, is still preserved in MS.

His *Discourse on Flanders Husbandry*, published by *Hartlib* in 1645; (who then knew not who the author was) contains about twenty-four pages in quarto: The *Legacy* to his sons, which relates also to the cultivation of their estates, consists of three quarto pages, and was written on his death-bed in 1645. — The *Discourse* has always been looked upon as a capital performance in husbandry.

It is remarked in the *Philosophical Transactions*, that *England* has profited in agriculture, to the amount of many millions, by following the directions laid down in this little treatise.

About twenty years ago a piece was ignorantly published under Sir *Richard Weston*'s name, intitled, *A Treatise concerning*

the

—In his days, the *Flemings* allowed 10 pounds of clo-ver-seed to as much land as answers the size of an *English* acre. Such was the practice when the clo-ver-seeds were purposely intermingled with those of oats or barley. At present, when the *Flemings* sow clover alone, they allow 20 pounds of seed to an acre, which (though contrary to the custom established amongst us at present) will be no bad example to the *English* husbandman.

As to the inconvenience of sowing grass-seeds and corn together, we need not have recourse, on this occasion, to the pompous distinction of *sympathy* and *antipathy* amongst the ancients, since Lord *Bacon* has explained the difficulty more clearly to us, and with great simplicity; “When plants, says he, require the same sort of soil and nourishment, they hurt each other extremely, when they stand too near together.”

*Obest vicinia, altera alteram fraudante:** And again, *Gemini prædones terram insident in mutuum perniciem.†*

But to return more directly to the subject before us.

In

the Husbandry and Natural History of England, 8vo; which performance is a poor, jejune abridgment of *Hartlib's Legacy*, of which the true author was neither *Weston* nor *Hartlib*, as we have observed elsewhere, but one *Robert Child*.

But to return to the subject which gave rise to this note.

A writer of some experience in husbandry makes the following remark, when he is speaking of vetches, oats, or barley, sown with lucerne :

“Pour le mieux, sans se mettre en peine du profit qu'on peut tirer de ces graines, ou les coupe avant leur maturité : la luzerne en vaut mieux, & y prend une nouvelle croissance.

“Ce mélange de semence dont on vient de parler, ne s't gueres en usage que dans les pais meridionaux, car dans ceux où les climats sont tempez, on seme la luzerne seule : Elle profite alors de tous les sels que la terre on elle est, peut contenir.”

Nouv. Theatr. d'Agriculi. par St. LIGER, 4^o, p. 382.

* *Sylv. Cent. V. N^o. 480, 481, 482, &c.*

† *Ibid. N^o. 429.*

In the method of cultivating lucerne, which is here recommended, an acre will be found to contain about such a number of chosen healthy roots as the ground is capable of supporting, and admit a greater number of them than the reader will be apt to imagine, *prima facie*. For it will hold, according to my first experiment, about 26,000 plants: But, if the ground be clean, rich, and well conditioned, it may be more advisable to observe the distances specified in the 26th page of this Essay. Upon which principle, the acre will contain about 13,000 plants; and this is the number, all things considered, I am most inclined to recommend. For the produce of such an acre will be full as large and profitable as the *former*, and the ground will be managed with less expence and more convenience. So that no one instance can better verify the old husbandry proverb, delivered down to us by *Hesiod*:
 —Πλέον ἤμισυ πάντος. *Half is more than the whole.*

It may be observed farther, that, in transplanting lucerne, there will be one advantage (and that no small one) which can never be obtained in drilling, or promiscuous sowing; each root will stand at a proper distance from its neighbour, and receive its allowance of food in due quantity, without diminution.—In the next place, you will seldom see a plant wanting, and rarely (except by mistake) a plant supernumerary: But, if a few sets should chance to die, it will be easy to supply the vacant spaces from the nursery, and that, as people find by experience, in any moist day, from *April* till the middle of *September*.

There is another advantage which arises from transplanting lucerne; for, by cutting the tap-root,*
 you

* It was a received opinion, amongst our ancestors, from time immemorial, that the amputation of a tap root, in tree or plant, was dangerous, if not fatal; but *Gabriel Platter*, about 150
 years

you prevent its penetrating ten or twelve feet perpendicular into the ground, which the plant naturally does in three or four years, except it be obstructed by a stratum of rock, or chilled at root by weeping springs, or finds admission in a bed of cold watery clay. Then the crop makes a poor appearance, or, perhaps, goes off all at once.

It may be asked here, by way of curiosity, what a plant of lucerne will come to, left alone to itself, the tap-roots and herbage not being cut, and without transplantation? To which the answer is, that it will grow slowly (for cutting accelerates its growth) but, if the ground be good and kept clean, and the root has room and power to force downwards, it will form something between an herb and a low bush, like young *falsified* cytissus.

I here revive the name which our countrymen gave this plant in the year 1597. Some have since called it *bastard cinna** (I suppose they mean *sen-na*. †) It is the *cytissus maranthæ* of old herbalists; and the *French* give it the name of *baguenauds* & *baguenaudiers*.

Nor may people who hand-hoe or horse-hoe lucerne, give themselves much pain about breaking or cutting off a lateral root accidentally: Not but that some care and caution must always be used; however, what seems to injure the parent-plant proves, in the end, no-ways disadvantageous to it; for horizontal, or side-roots, thus cut, or broken, push forth new roots and filaments laterally: And thus

years ago, seems to be the first who had experienced, that such an operation might be performed, not only with safety, but successfully.

Pract. Husb. improved, or a Discovery of infinite Treasure, 4to, 1656, p. 15.

* See Mr. *Stren's* ingenious account of cultivating this plant in *Maxwell's Husbandry*, p. 181.

† The *baguenaudier*, says *Du Hamel*, is of the *calatua* or *senna* kind.

thus the suckers, or tubes that suck nourishment, are multiplied by a cause which had the appearance of lessening their number.—Yet *transplanted* lucerne will no-ways bear such rude treatment as the ancients sometimes gave to *untransplanted* lucerne, when they thought fit to make it undergo the discipline of harrowing.* But this point shall be considered more at large in our XVIth SECT. whilst, in the interim, I shall only observe, that such persons as sow lucerne by broad-cast sowing, † in the manner of clover, cannot possibly (at least with advantage and profit) free the earth from weeds, and loosen the soil any *other way*.

We will here make a few short observations upon *sap-rooted* plants like lucerne.

Roots which *push immediately from the seed* are, generally speaking, and almost always, of the *tap-rooted* kind; they penetrate perpendicularly into the earth, till they find obstruction; but if you cut them by design, or break them through accident, they change their direction, and from that time (as particularly in the case of lucerne) the side-shoots, or branches from the tap-roots, spread themselves horizontally, and are found, by experience, to be sometimes very nearly as large as the primitive root,
from

* COLUMELLA, Lib. ii. c. 2.—The tynes, or teeth of these harrows, were made of wood, it being a received doctrine, with the old Roman husbandman, *quod ferro locum tangi non licebat*, *Pallad. Lib. v. Mens. April. Tit. i.*

This operation of harrowing must have been performed by them in the *second* year, before the plants had formed large crowns, or bulbs, above-ground; for otherwise such violence (not to mention the tread of the cattle) would have torn and bruised the crowns, and consequently greatly injured the plants.—It is true, the tap-roots in their second year (having suffered no amputation) were not very liable to be removed from their places.

† Broad-cast, or promiscuous sowing, is dispersing or spraining out the seeds by a cast of the hand, in such manner as the seedman commonly sows wheat.

from whence they took their accidental birth. These lateral branches and fibres extend farther from the parent-root than is commonly imagined, and are of so fine a thread-like nature, as often to escape our notice, especially if they derive an adventitious colour from the soil, which frequently happens. — All this may be exemplified, to some degree, even in a carrot, which seems to consist of a single perpendicular root, sending forth a few lateral filaments; but these filaments branch out afterwards into numberless others of a finer texture, which spread considerably, though, at the same time, the human eye can rarely discover them, except with uncommon attention and accuracy. Nay wheat, which appears to us to have nothing more than one tuft of shallow lateral roots will, if the ground be deep, and deeply ploughed, strike down perpendicularly, 15 or 16 inches.

On the contrary, horizontal or natural roots increase in length and circumference, as they approach nearer the surface, and enjoy the influence of the sun, air, dews, &c. especially if the ground be freed from weeds, and loosened by hand-hoeings and hoe-ploughings; for the roots of all plants seek to expand them themselves, or descend perpendicularly, upon supposition that they can find room and force their way.

The first production from the seed of tap-rooted plants is the root, which descends perpendicularly into the earth. Whenever a tap-root is cut off (though the part amputated be only half an inch long) it never afterwards increases in length, but, perhaps, some fresh fibres and filaments may push out just above the place where the root was cut off; and these may shoot down perpendicularly a little way. Now, whether the tap-root be shortened by cutting; — whether it meets with an impenetrable

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stratum of earth or stone; *—or whether it has pushed (without obstruction) as far as its nature and well-being require; true it is, that, in all these cases, it sends forth side-roots.

If we consider a root of lucerne, with all its lateral shoots, fibres, and filaments, it distributes itself in the earth, much in the same manner as the branches from the stems extend their foliage in the open air.

The horizontal or lateral roots of lucerne, after the primary tap-root is shortened, increase their size almost to that of the tap-root in a state of nature, and grow stronger and more vigorous, in proportion as they approach nearer the sun, and enjoy the benefit of a pulverized earth, together with the kindly influences of the atmosphere, and find themselves within the reach of manures. These side-roots *ramify* more visibly than the tap-root: And, if shortened by cutting, digging, or ploughing, push forth new fibres and filaments. But still no severe wounds must be inflicted on these lateral roots; which makes me, upon the whole, no great friend to the late revived project of *barrowing* lucerne. Hoeing and digging, carefully managed, will be of service. The hair, and the nails of the human body, will grow the faster after cutting; but the amputation of a thigh is too severely felt. Hardy as lucerne may be, in some instances, it is no polypus. I have seen a whole plant languid and discoloured, and, upon digging it up, have discovered nothing more than a little, lively, red worm that was preying on the root. †

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The

* I have known lucerne-roots sometimes penetrate the crevices of rocks; and, at other times, I have seen the roots repelled or driven back by commonly hard earth.

† When the leaves of lucerne turn yellow or white, or are variegated with yellow and white, then the plant is in an unhealthy, but not dangerous state; and, generally speaking, some
mis-

The more plants extend their roots in the earth, the more their herbage expands and flourishes in the open air; the finer is its colour, and more nutritious its juices; and, as plants cannot search their food from place to place, at a great distance, as animals do, it is useful to give them liberty of procuring nourishment, as far as their nature (obstructions removed) allows them to point their course.

Perennial roots require more room to spread themselves, and more food to support them, than *annual* roots. Of course the *former* cannot be kept too clean. A perennial weed, close to a perennial useful plant, goes halves with the latter in point of food. Annual roots, in general, have weak extemporary fibres just calculated for their short duration; but, on the contrary, the small thread-like tresses which shoot from the roots of perennial herbs, though they often perish in a severe winter, yet the more vital part of the root remains unhurt, and new filaments push out, and spread themselves abundantly at spring.

How long lucerne may last cannot be known by the experiments which are here related, namely, from the spring of 1757 to the beginning of the year 1764; but some persons of credit have observed the plants to continue in good strength and health near twenty years. [I suppose they mean here and there particular plants, and not a whole plantation.—] *Tull*, indeed, tells us that, except lucerne be choked or starved by grass and weeds, he hardly knew when to say it will die a natural death; and probably it may not prove the *less long-lived* for being *transplanted*: Since hand-hoings, horse-hoings, and digging, will give new strength and health to the plants.—The spreading of the roots will be facilitated by loosening the soil, and letting

mischievous insects will be found preying on the roots. *Soot-dressings* are here expedient.

letting in the good influences of the atmosphere; — their growth also will be augmented by giving them that additional nourishment of which the weeds defrauded them; — and, in the last place, all manures will more easily reach them: For thus much is a certain fact in husbandry, that, when the ground is rendered clean, light, and penetrable, the roots love to expand themselves, in order to procure a greater quantity of nourishment.

I fairly acknowledge that I am not enabled, from my own experience, to fix the common duration of lucerne, whether transplanted or drilled: (and that from no difficulty in the thing itself, but because a sufficient number of years has not elapsed since making my experiments,) but thus much I can take upon me to say, from my own knowledge, that lucerne sown at random, or by what we call promiscuous sowing, as the ploughman sows rye-grass and clover (whether with or without spring-corn) will not last to any tolerable purpose above two years, or three at most. But, as this plant is of the greatest use and value, where land is dear and scarce, as near cities and towns, I see no reason to doubt, but that the same spot of ground may be continued as a lucerne plantation for half a century at least. For if the rows are three feet four inches wide (which I look upon to be a *sine qua non*) then, whenever the old lucerne decays, new lines may be planted in the middle of each interval, which has lain fallow, and also been manured and pulverized for a considerable number of years; and thus progressively, *vice versa*, to a long continuance.

Not being able, therefore, to give positive satisfaction concerning the continuance of lucerne rightly managed, † I shall propose something that

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† M. du Hamel observes, by way of result from his experiments, that nine or ten years is the common date of transplanted lucerne, except it be managed with great art and skill.

is not merely a query, and which, perhaps, may give the reader an equivalent information. In a few words it is as follows: When lucerne is grown old, and the owner proposes to break up the plantation, layers might be made from all the principal stalks, and removed into fresh ground. These layers, in all probability, may succeed extremely well, according to some few experiments made abroad in the years 1755 and 1756.

Again, it may be observed to the credit and advantage of our island, that lucerne prospers as well here, as in any other country; since the most accurate and skilful cultivators of it in *France*, *Italy*, and the territory of *Geneva*, never cut their plantations oftener than *six* times a year, which happens not unfrequently with us: Nay, one of my correspondents believes that he cut *seven* in the year 1760;* and, in addition to all this, one may remark, that a single plant rightly managed will often out-weigh 10, or 15, that have been raised like common grass-seeds with spring-corn. It is true, the drilled crops make sometimes a four-fold better return, than those last mentioned; but *transplanting* seems to be the sort of husbandry that deserves the preference. Yet even this idea is suggested to the public with modesty and diffidence: Both ways are good; and I leave the reader to his own choice and inclination; adding only *one* precaution, which is, *That he should take care, when he raises lucerne by drilling, to fix upon a soil that is rich, deep, and no ways stubborn or clinging; free from weeping springs, stratum of clay, rock, &c.*

Nor needs one be surprized that lucerne appears to have a liking for the *English* soil, air, and climate; for many wild sorts (no-ways contemptible in their kind) have been discovered in low meadows and
common

* In *Switzerland* lucerne is rarely cut above four or five times a year.

common upland pasturages : Not in one county, but in several. Indeed, there is a vegetable something like it, which cattle usually refuse to eat (and the same happens in *France, Italy, and Spain,*) but *that* is a sort of plaister-melilot or bituminous trefoil, which may easily be known by rubbing or bruising the leaves, and then smelling to them. I once knew a gentleman who, by the mistake or fraud of a seedman abroad, was so unfortunate as to raise a plantation of this disagreeable herb. I have seen a plant very like it, in taste, smell, and aspect, in some fields near *Wells* in *Somersetshire*, particularly in the neighbourhood of *Okey-hole*.

As to the expence and risque of cultivating small quantities of ground, agreeably to the method here laid down, it is to be hoped that curious gentlemen will not be deterred by some few minute difficulties or objections, but give the present experiment fair, patient, and repeated trials; † for neither the out-goings nor the hazard will be very

S 3

considerable

† “ There is nothing wanting but a willing mind to make this country (*England*) the paradise of the world. If gentlemen would be pleased to begin first, and lay the corner-stone of this building, all would follow without questioning; for gain, the loadstone of the world, being laid a little open by practice, would draw the rest.” *Gab. PLATTES'S Discov. of Inf. Treas. 4^o, 1656, p. 2.*

As great a genius as this writer was, the public allowed him to drop down dead in *London* streets with hunger only; nor had he a shirt upon his back, when he died. He bequeathed his papers to *S. Hartlib*: Whom a cotemporary author addresses in this manner: “ None (but yourself, who want not an enlarged heart, but a fuller hand to supply the world's defects) being found, with some few others, to administer any relief to a man of so great merit.” *Letter to Hartlib from Flanders, 1650.*

Another friend of *Hartlib's* gives *Plattes* the following character: “ Certainly that man had as excellent a genius in agriculture as any that ever lived in this nation before him, and was the most faithful seeker of his ungrateful country's good. I never think of the great judgment, pure zeal, and faithful intentions of that man, and withall of his strange sufferings and

manuscript

considerable, * it having been remarked, by a celebrated genius in husbandry, *Qu'une bonne culture coute moins q'une culture languissante.* †—And we the rather lay some stress upon this article, because no invention has ever failed to receive improvements, when the intelligent part of the *English* nation have thought fit to pursue their point in good earnest. But at present it is no-ways our intention to persuade farmers

manner of death, but am struck with amazement that such a man should be suffered to fall down dead in the streets for want of food, whose studies tended to no less than providing and preserving food for whole nations, and that too as with much skill and industry, so without pride or arrogance towards God or man."

C. D. in a Letter to Hartlib, 1653. *Legacy*, p. 183, 184.

Hartlib, as far as can be learnt, published but few posthumous papers of *Gabriel Plattes*; and indeed an author, so extremely poor as this unfortunate person was, would in all probability have sold his writings to the bookfellers, had they been so far finished as to deserve publication.

The pieces already published are these which follow:

Practical Husbandry improved, or, A Discovery of infinite Treasure, 4^o, containing 120 pages, 1656.

A Discovery of subterranean Treasure, 4to, 1638. About three sheets.

Mercurius Lætificans, 4to. 1644. Twelve pages.

Observations and Improvements in Husbandry, accompanied with twenty Experiments, imparted to S. Hartlib by Gab. Plattes. 32 pages, 4to, 1653.

This author had a bold adventurous cast of mind, and seems to have preferred the faulty sublime, in matters of invention, to the faultless mediocrity. As to his MS. intitled *Art's Mist'ess*, containing a series of observations and experiments in agriculture for fifty years, and in all probability the most valuable in matter, as well as most considerable in size, of all his writings, we have spoken thereof in the 1st Essay.

In a letter to Hartlib, May 14, 1644, he mentions a work of his called, *The Treasure-house of Nature unlocked, and set wide open to the World, &c.* Whether this performance was ever printed is more than I know, or whether it be not the tract first mentioned in this list, which I am partly inclined to believe.

* A plantation of hops lasts less time, is more liable to accidents, and doubly more chargeable, before any profit can be received.

† Le marquis de MIREBEAU.

farmers (at least such as are in low circumstances) to quit their *little certainty* for an advantage which may appear to them quite *uncertain*.

Let them wait at least for a few years, in hopes some cheaper and more compendious method may be discovered for their sakes; and, if at present they make any experiments, let them be in *small*.

The first point of consideration, when I undertook to recommend *transplanted* lucerne to the public, from my own experiments, was to bear constantly in mind whether the profit counterbalanced the expences, and labour of culture, and that in a double or even treble proportion: Since, otherwise, I was doing little more than postponing utility, for the sake of introducing a new sort of husbandry which only deserved to be called *ingenious*. But this article shall be exemplified, more at large, in the Vth and VIth sections of the present Essay. Upon the whole, I have paid a scrupulous deference to the sage advice of the antient writers on agriculture. “No man in his sound senses,” says *Varro*, “would propose to expend more on any branch of husbandry, than he sees plainly he can make himself amends for; § as the principal point in these matters is to take care that the expences exceed not the profit.” * And a writer, soon after the time of *Varro*, assures us, “That it is with fields, as with a rich man; little wealth will remain, if he be of an expensive extravagant turn.” †.

I am well aware, even upon a single moment's reflection, that every improvement in husbandry, like the present, must meet with *some* opposition; for

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§ *Nemo sanus debet velle imperisam ac sumptum facere in cultura, si videt non posse refici. De Re. Rust. lib. i. c. 2.*

* *Summa enim spectanda ne in ea re sumptus fructum superet. Ibid. c. 53. p. 69.*

† *Agroque, ut homini, quamvis questuosus sit, si tamen sumptuosus, non multum superesse. PLIN. Hist. Nat. lib. xviii. c. 5.*

for the force of custom and prejudices in agriculture are only to be checked by imperceptible degrees and gentle measures. Thus, in *Ireland*, it was almost an immemorial practise to make horses draw by their tails; nor was it unusual for the inhabitants, in those unenlightened ages, to set fire to their straw in order to get out the corn. It is a common custom with farmers, in some parts of *Bretagne*, to burn their dunghills, and spread the ashes on their lands.

Many *English* farmers, to this hour, allow a change of species in grain: As, for instance, that barley, sown in spring, has been metamorphosed into oats at harvest. As to the superstitions of husbandmen, in various countries, concerning the hag, shrew-mouse and barberry-tree, not to mention their accusing and hanging old women for conjuring up blights, mildews, and hurricanes, we have already spoken sufficiently in the 195th page of the preceding Essay, with relation to the amazing force of prejudice, and the mental slavery that has been occasioned by an habitual train of thinking. For custom, according to my Lord *Bacon*, “familiarizes us, by degrees, even to poisons, infections, excesses, and torture:” † “Being, in truth,” as he observes elsewhere, “the principal magistrate of human life; ‡ so that education, is, in effect, little more than a good custom.”—Yet nothing ought to dismay the man who is a true lover of agriculture: He may meet with objections and obstructions, difficulties and disappointments, at his first setting out, and even in his middle course: But at length, by slow degrees, will be master of the race:

— *Caloque inveltus aperto*
Flectit equos, curruque volans dat lora secundo.

Or,

† *Natural Hist.* Cent. I. N^o. 61.

‡ *Idem*, *Essays*, N^o. 40.

Or, if this inducement may appear too enthusiastical, let the discoverers of important improvements comfort themselves with a plain *Spanish* proverb : *La verdad como el oleo siempre anda en fomo* : Truth, like oil, always mounts uppermost. Yet still it shall be allowed (and that with some reluctance and mortification) that *prescription* and *custom* are two fortresses that often hold out a long siege.

It were to be wished, therefore, that individuals, (and these ought to be the nobility and gentry, whose example and influence will have some effect on the neighbourhood round them) would give a part of their attention to the art of agriculture, and making improvements in it ; and then, as a noble author observes, who thought not the subject we are now treating of beneath his inquiries, if the state thinks fit to add its approbation and patronage, the encouragement is given, and the point desired obtained : “ For commonwealths and good governments,” says he, “ nourish virtue grown, but do not much mend the seeds.”*

As I am now recommending the cause of husbandry, not only to the *great*, but even to the *rulers* of states and kingdoms, let it be permitted me to observe, that (besides the concurrence of common ordinary assistances) nothing in *our cold northern climates*, but the sun-shine of the sovereign, can ripen the productions of agriculture to due maturity : And this sun-shine must be powerful (as it happens in a *Swedish* or *Russian* summer) if ever we hope to see the fruits carried on to good perfection in a short space : And then not only our present demands will be satisfied, but something will remain for our support in the long winter which is to succeed.—Husbandry will flourish, even in lands which have a temperament not quite favourable to culture, when *another* emperor shall erect *another* public

* *Idem*, *Essays civil & moral*, *Nam. ced.*

are *bulbous*. I have known an hyacinth or iris, placed in a water-glass for blowing flowers, shoot forth such a quantity of roots, fibres, and filaments, that they seemed to form a sort of peruke or bush of hair. But how small a part of this will be discovered, if a plant of the same species be dug up from a garden?

If the earth be good, and duly pulverized, it is certain the roots will expand themselves in *such* earth almost as freely as in water. The farther these filaments extend, the greater store of nourishment they convey to the plant; for, by the laws of the Supreme Being, plants always spread, if they find a passage and food: *Qua data porta, ruunt, &c.*

To ascertain this, you may, in any hard, dry, half-barren, brushy field, near a live-hedge that stands on level ground, dig a trench three feet deep, and eighteen inches broad; cut it down straight, without mangling or breaking the sides; and, having removed the bad earth, fill up the vacancy with good mold well pulverized. The roots of the shrubs will soon point their course to this better soil; they will *there* make amazing shoots, and flourish exceedingly: But, when they reach the hard, barren wall, or boundary of natural earth, they recoil immediately, and, forming a curve, will spread themselves afresh with a retrograde motion in *that* earth where they find food and free passage.

This may be called the *Instinct of Plants*.

I have plucked up roots of fine common wheat at harvest-time, which seemed to me to have penetrated not more than six inches into the ground, and appeared poorly supplied with fibres. But, from better observations and experiments made afterwards, I have reason to conclude, that, if due space be allowed to plants, and the earth is found sufficiently penetrable, these tresses that issue from fibrous roots like wheat, or tap-roots like lucerne or sainfoin (after amputation of a part of the tap-root)

root) as also the filaments or branching tresses that proceed from the roots of turnips and many such-like husbandry-vegetables, will extend themselves to a circle of eight, ten, or twelve inches diameter in every sense. Do we not therefore, according to the *Old Husbandry*, sow most seeds too close *?

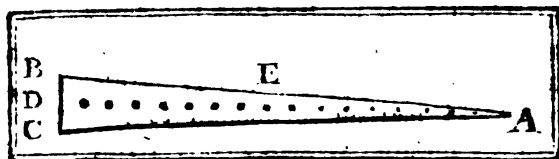
And here I ask pardon for admitting an expression which is not common in books of botany, namely, *the tresses of the roots of plants*; but, to say truth, I had an inclination to substitute an equivalent for that elegant *French* term, *la chevelure de racines de plantes*.

The roots of *tap-rooted plants* are less *filamentose*, or hairy, than those of *fibrous-rooted plants*; yet still the former throw forth abundance of small shoots, like so many rays; which form a sort of globe like the solar rays breaking through a mist. Thus, for instance, the root of a lucerne or sanfoin-plant, which in its natural growth has something of the look of a young carrot, spreads (in like manner as a carrot does) its fine hairy filaments to a far greater distance than most people imagine; but these threads are so exquisitely small, and so liable to break (being almost as tender as a cob-web, and at the same time quite assimilated with the earth round them in point of colour) that it is very difficult for the sharpest human eye-sight to discover many of them, except with uncommon care and attention.

In order to form a reasonable conjecture concerning the extension of the roots of plants useful in husbandry, together with their appendage of fibres,

* If the common farmer sows any one sort of seed too sparingly in the broad-cast manner of sowing, it is the seed of clover and trefoil, of which he usually allows 6, and sometimes 8℔ to an acre: Whereas, if they are sown without a mixture of corn (as I would always recommend) 20℔ are not too great a proportion for each acre. Such practice will also increase and continue these commonly transient crops at least a year longer than usual.

bres, (whose contexture and ramification are of so exquisite a nature) it is in the power of almost every person concerned in agriculture to make the following cheap, easy, and compendious experiment, which took its rise in our country :



In a field that is well situated, and which has not been broken up for many years, fence in a strip of ground in such manner that the fence or hedge may not shade the plants sown; then dig a piece of earth in the triangular form above represented, and marked by the letters A. B. D. C.; let its length be twenty yards from A. to D. and the breadth twelve feet from B. to C. the space dug terminating in a point at A. Dig this ground effectually, and pick it clean from large stones and weeds, remembering first to cut down, one-spit deep, with a sharp spade, the out-lines or boundaries of the spot to be dug; and, in the course of digging, be careful not to break or loosen the earth on the outward side of the lines first traced out, and that for a plain reason.

Then sow in the twenty dotted holes, which form a line from D. to A. twenty seeds (one in an hole) of the largest sort of turnips, or any other plant, distances changed, according as you imagine they want more or less room; using the hoe frequently to keep the ground loose, and freeing your experimental crop from the neighbourhood of bad herbs.

Now, if the plants at or near the point A. appear at the usual time of maturity to be starved or stunted, it is because the roots wanted room, and could

could not penetrate the hard ground that surrounded them.

If the turnips, for example, become larger and carry a better aspect, in proportion as they approach the middle part of the cone marked E. where the pulverized earth is four feet broad, it may be inferred, that the roots of these turnips extend themselves near two feet each way in their lateral fibres; and again, if the remaining plants from E. to D. are of a size and colour nearly equal to those at E. there is reason for concluding that their roots, &c. spread no farther than two feet*.

S E C T. I.

Of the Beauty and Wholesomeness of Lucerne.

LUCERNE is one of the handsomest of all the *grasses* which are called (improperly enough) *artificial* †: And some sorts of it are admitted into gardens on account of their singularity. The flowers of common kinds are sometimes red, and sometimes purple: And the aspect of them, when they cover a large field, has such a bright beautiful glow at a distance, that one would think *Claudian* had a field of lucerne or sainfoin in his eye when he said,

Quod gelidi rubeant alieno gramine menses.

This vegetable is looked upon to be wholesome for men as well as cattle; nor is the taste of it displeasing. *Dioscorides* says, that the seeds are medicinal and palatable when mixt and eaten with table-salt*;

* *Culture des Terres*, Tom. I. p. 5.

† In compliance with custom we call lucerne, sainfoin, trefoils, &c. *grasses*, though perhaps the propriety of the expression may be doubted. Concerning *artificial* *grasses*, see note to p. 37.

salt *; and persons of repute have asserted to me; that the inhabitants of the south of *France* give the leaves a place among spring salad-herbs: This is probable enough; for they taste like cresses, or nasturtian.—The leaves, infused in boiling water; have all the fragrance of fine new-made hay; and the husk that envelops the seeds has much the same taste as the pod of a pea.

Our countryman *Spencer*, in one of his Pastorals, describes a nosegay or garland that was to be presented to the shepherdess *Eliza*, under which name he represents the person of Queen *Elizabeth*. Amongst other flowers he takes notice of coronations, (i. e. carnations) and *sops in wine* †. We asked many skilful botanists what plant could be here meant, but, receiving no satisfactory answer, at length discovered, in a writer cotemporary with the poet, that *sops in wine* were the *meadow-lucerne*; whose flowers probably were thrown into wine and water, as borage and bugloss are, to give the beverage a pleasing taste, and therefore were called *sops in wine* ‡.

As to cattle, the wholesomeness of this plant is beyond dispute. *Florentin* (or *Florentius* as some call him) who writ a book on Planting, and another on Agriculture, about fifteen hundred years ago, recommends small quantities of lucerne as a cure for sick sheep ||; and *De Serres* prescribes the same remedy

* DIOSCORID. *Matthiol.* lib. ii. c. 141. p. 384.

† B. Jonson, in his *Sad Shepherd*, mentions the plant called *Sops in wine*.

‡ “L'on nomme (la medica) en quelques endroits (de la France) SOUPPES EN VIN” Whence came the *English*, *Sops in Wine*. *Liebault, Maison Rustique*, 1617, 4to, lib. iv. 479.

|| In *Geoponic*.

See also SURFLET'S *Country-farm*: Second and Third Editions, revised by *Geruase Markham*, Folio, London, p. 495.

remedy to all cattle that are ill, languishing, or out of plight *.

Nevertheless, however wholesome lucerne may be to these animals, when they are sick and weak, yet still it was matter of pure ignorance in some old *English* writers on husbandry and botany to say it was called *médica a mēdendo*; for, had these gentlemen known the scansion of a *Latin* verse, they might have seen that *Virgil* writes,

—*Medica putres, &c.*

And the *Greek* authors call it *μυδική*, because it came from *Media*, of which word the first syllable is long, as

Media fert tristes succos, &c. IDEM.

It is a great misfortune that the treatise is lost which *Ampbilochus* writ concerning the cultivation of *medica* and *cytissus*, which book was composed as long ago as before the times of *Pliny* the elder.

S E C T. II.

Lucerne Fields not to be grazed. Of Fences.

IT is no-ways advisable to graze lucerne-fields, though some good *English* writers seem to allow the practice: For the crown of the root (which at length becomes a sort of bulb) is so sweet, that the
T
cattle

* *Τροφήν δὲ μακαρομένην κέρισον ἢ μυδικήν. Geopon. lib. xviii. c. 2.*

— Dandum est lactarius medica & cytissum. VARRO, Lib. ii. c. 1.

“ Le bon mefnager fera très bien de se pourvoir de quelques journaux (A *journal* is something less than an *English* statute-acre) de ceste *exquise pasture*, pour en distribuer en hyver à ses bestes malades, lasses, maigres, récréées, pleines à lait, pour
aider

cattle will often bite it too close, and heavy large beasts may bruise it with their feet. Nor is this any new-fashioned fanciful opinion; for an experienced writer on husbandry, more than one hundred and fifty years ago, very much dissuades us from grazing lucerne *. Therefore, upon the whole, it seems best to cut it up mornings and evenings, and bring it (at least for horses) into the stable; by which means the same quantity will go thrice as far as if it was fed promiscuously and trampled by them.

On this account lucerne-plantations must be guarded from cattle with as much caution as *Virgil* wished to protect his vineyard, and for the same reasons, if not stronger ones † :

Tende

aider a remettre & fortifier les portières & servir à l'augmentation du lait des allaitantes : Aussi à ses poulains, veaux, agneaux, chevreaux ; par fois leur en donnant comme pour les rejaillarder." *Theatr. d'Agricult.* Fol. 1600, 271."

" * En ceci (dit-il) ceste herbe differe d'avec les autres des prés communs, qu' elle ne veut estre nullement mangée sur la terre, ne foulée aux pieds par les bestes : Leur dents, soufflé, & trepis contrarians à son naturel : Ains son propre est d' estre fauchée rés de terre avec des faux bien trancheantes." *Idem*, *ibid.*

† FITZ-HERBERT, the father of *English* husbandry, recommends fencing lands with equal earnestness. *Surveying*, p. 50. Lit. b.

Much has been said concerning this great man in the foregoing Essay.

His first work, in husbandry, is intitled, *THE BOOK OF HUSBANDRY*; printed in *Italics*.

At the end of it are these words :

" Here endeth the right profitable book of husbandry, compiled some time by master *Fitz-Herbarde*, of charity and good zeal that he bare to the weal of this most noble realm : Which (work) he did not in his youth, but after he had exercised husbandry with great experience XL years."

Imprinted at *London*, in *Fleet-street*, in the house of *Thomas Berthelet*, near the *Conduit*, at the sign of *Lucret* (*cum Privilegio*) 1534, small 8vo.

Of this work the author speaks as follows :

*Texende sepes etiam, & pecus omne tenendum est:
 Præcipue dum frons tenera imprudensque laborum,
 Cui, super indignas byemes, solomque potentem,
 Sylvestres uri assidue, capreaque sequaces
 Illudunt: pascuntur oves, avidæque juvenca.
 Frigora nec tantum cana concreta pruina,
 Aut gravis incumbens scopulis arenibus æstas,
 Quantum illi nocuere greges, durique venenum
 Dentis, & admorso signata in stirpe cicatrix.*

GEORG. II. V. 371.

T 2

Firm

“As touching the points of husbandry — I will not say it is the best way, and will serve best in all places: But I say it is the best way that ever I could prove by experience, the which have been an house-keeper 40 years and more; and have essayed many divers ways, and done my diligence to prove by experience which should be the best way.—

————— Rhet'rick in me doth not abound;
 Wherefore I have sown such seeds as I found.”
 [i. e. managing an estate.]

His second work, in husbandry, is intitled SURVEYING; or, as he calls it, in another place, *The Book of Surveying and Improvement*; small 8vo, containing 120 pages, imprinted for Berthelet, 1539, in a black letter.

Fitz-Herbert was born at Norbury in Derbyshire, and, if I mistake not, is buried there. He was made judge of the Common-pleas in the 15th year of Henry VIII. How he could be a practitioner of the art of agriculture for 40 years, as he himself says in 1534, is pretty extraordinary. I suppose it was his country amusement, in the periodical recesses between the terms.

This treatise consists of instructions to noblemen and gentlemen who manage their estates in person; and to land-stewards, bailiffs, &c. who act under them or in their stead. It sets forth likewise the nature of tenants tenures, and the laws of court-baron, court-hundred, chartuaries, &c. being a sort of commentary on an old statute named *extenta manerii*.

In a word, one may pronounce justly, concerning each book of husbandry which Fitz-Herbert has given us, what a modern writer observes of *Crescenziò's Agricoltura*; which was published 86 years before: *Èst libro stimatissimo & fa testo dell' arte*. In short,

Firm fences, † must be made, and entrance barr'd

To cattle of all kinds, whilst the young shoot
Is soft and green, unknowing rude despoil.

For

short, *Fitz-Herbert*, like *Virgil*, seems to have written intirely from his own experience.

Those who cannot procure these two books of *Fitz-Herbert*, (of which, probably, there are not twenty complete copies in the kingdom) may content themselves with *S. B.'s Epitome of Husbandry*, 12^m, 1669; which author, without making the least acknowledgment, has transcribed from him 181 pages, almost verbatim.

It is pretty plain that the ingenious and diligent inquirer, *Samuel Hartlib*, had never heard or known of *Fitz-Herbert's* works, though published a little more than a century before his time, as will appear from the following passage, where he laments that we have not a system, or complete book, of all the parts of agriculture: "Till the latter end of *Queen Elizabeth's* days, (says he) I suppose that there was scarce a book wrote of this subject: I never saw or heard of any. About that time I suffer made his verses, and *Scot* wrote about an hop-garden. *Googe* translated some things. Lately divers small treatises have been made by divers, as *Sir H. Platt*, *Gabriel Plattes*, *Markbam*, *Blythe*, and *Butler*, who do well in divers things; but their books cannot be called complete books, as you may perceive by sundry particular things not so much as mentioned by them. The *Country Farmer*, translated out of *French*, is enough, if not more than enough; but it is no ways framed for us here in *England*: And I fear the first authors went on probabilities and hearsays, rather than experience. I hope some ingenious man will be encouraged to undertake a work so necessary and commendable." *Legacy*, p. 105, 4^{to}, 1651.

† "The fence, here mentioned by *Virgil*, is supposed not to have been a green hedge, but posts or strong stakes interlaced with dry wood." *MARTYN's Georg.* p. 217. 8^{vo}.

But *Columella*, seemingly with greater judgment, declares himself of another opinion, and says, "That the most ancient writers on husbandry preferred the live-hedge before the *struibile* one, as more lasting and less expensive." *Vetustissimi auctores vivam sepem struibili prætulērunt, quia non solum minorem impensam desideraret, verum etiam diuturnior immensis temporibus permaneret.* *De Re. Rust.* Lib. xi. c. 3.

Quick-set hedges are of great antiquity. It appears from *Homer*, that, when *Ulysses* returned to his father *Laertes*, the good old man had sent his servants to take up young thorns, and was occupied in preparing ground to receive them for the purposes
above-

For (not to mention winter's piercing blast,
Or summer raging with solstitial heat,)
Dread thou the savage buffalo, which insults
Thy rampart's strength, and bursts a breach by
storm;

The goat, who wantonly must all things taste,
Succeeds,—with nibbling sheep and hungry
steers.

These hurt thee more, than all the rage of frost,
Or the sun's stroke that splits the vineyard-rocks:
Their bite a poison, and their wound a scar
Indelible, unseemly.—

Columella is as careful under this article as *Virgil*,
for he will not allow large cattle to enter a meadow
of common grass, till the third year after sowing.]]

T 3

S E C T.

above-mentioned. *Odyssey*, Lib. xxiv. This sort of fence is
called, by *Varro*, *tutela naturalis* & *vivua*.

DIOPHANES, who flourished about the time of *Cicero*, and
abridged the voluminous husbandry-writings of *Mago* the *Car-*
thaginian, has left us further directions about such hedges, in
the *GEOPONICS*. Lib. v. c. 44.

Impetus aquarum proluit terram, nudatisque radicibus gra-
mina non patitur coalescere, propter quod nec pecora oportet
teneris adhuc & subsidentibus pratis immittere, sed quoties herba
profuerit falcibus desecare. Nam pecudes molli solo insigunt
ungulas, atque interruptas non sinunt herbarum radices serpere &
condensare. *Alio* tamen anno minora pecora post foenicia
permittere admitti, si modo siccitas & conditio loci patietur.
Tertio deinde, cum pratium solidius ac durius erit, poterit etiam
majores recipere pecudes. *De Re Rust.* Lib. ii. c. 18. p. 76.

In another part of this work, namely, in the Poem on Gar-
dening, he observes as follows;

*Talis humus, vel parietibus, vel sepibus hirtis
Clandatur, neu sit pecori, neu pervia furi.*

COLUMELLA flourished under the Emperor *Claudius*, about
fifty years after the death of our Saviour; and lived in *Spain*, in
the province of *Batica*. His xth book, which was intended
as a supplement to *Virgil's* *Georgics*, has its merit. All good
bailiffs and land-stewards were called from him *Columella's*; wit-
ness the following inscription on an antient marble;

Servus

S E C T. III.

The Management of Lucerne-nurseries; and of Burn-beating.

SOW lucerne-seeds carefully in the nursery, in such a manner as turnep-seeds are sown, taking care that the ground be finely dug and picked.

If the weather be dry and the wind harsh, as often happens in the beginning of *April* (the common time of sowing) remember, after the seeds are neatly raked in, and thinly covered, to make use of the watering-pot very sparingly, keeping the rose on, and just moistening the surface of the ground. Since making this remark, I find the same precaution recommended by that experienced practical husbandman *Agostino Gallo**; who continues to observe (perhaps with greater justice in regard to *Italy* than *England*) “that it is best in *dry* weather to sow lucerne-seeds about half an hour before sun-set, because the falling dews will dispose them for vegetation; whereas, in dry hot ground, the seeds will be rumped, parched, and cracked.”†

This being done, preserve the spot intirely free from weeds, as soon as ever the plants are high enough to be well known and distinguished:‡ But, when they come to an height of five inches, thin them with a transplanting trowel, where they stand too thick, and prick them into the vacant spaces, or into

Servu' neque infidus domino, neque inutili' cuiquam

Lucili Columella hic fitu' Metrophanes.

“Here lies *Metrophanes*, the *Columella* of *Lucilius*: Faithful to his master, and unuseful to no man.”

* *Vinti Giornate dell' Agricoltura*, 4^{to}, 1569, p. 35, 36.

† *Ibid. Giorn. 2da.* (The author *Agostino GALLO* was a nobleman of *Brescia*.)

‡ See two prints of young lucerne, one plant a week old, and the other *five* weeks old, S E C T. XXVI.

into the beds freshly prepared to receive them: Taking the advantage of a moist drizzling day.

I have known sixteen perches of nursery afford sets or plants sufficient to fill an acre, at proper distances; but then the previous management was very exact and skilful. It is more prudent (considering the generality of cultivators) to allot thirty perches for such a seminary, and four ounces of seed, at least, to every perch. *M. du Hamel* advises more; * and perhaps great allowances ought to be made for casual drowth, black sharp winds and other accidents; particularly the attacks of the turnep-fly, and the ravages of small birds.

And here, if people have no objection to a little more expence, it would be certainly best to order the plantation-field to be as well dug † as the nursery, and picked clean from weeds, roots, stones, &c. which may cost about two pounds an acre once for all. Of course, the additional expence will be near one pound greater than ploughing and harrowing; yet will repay the owner doubly and trebly, and much facilitate all subsequent hand-hoings and horse-hoings. Besides, it is almost impossible to plough one or two acres clean; for half such a little plat will be waste-ground and head-lands near the hedges.

And that digging is greatly superior to ploughing will appear from reading a treatise written by

T 4

Sir

* *Elements d'Agricult.* Tom. ii. p. 126. 1762, à Par.

† *Memoires du Marq. de TOURBILLI, sur les Desfrichemens*, p. 291.

Τὸ φυτεῖον ὁμοίως χερσὶν ἀπὸ πάσης ὕλης καθαριστὸν, ἢ σκαπίστῳ μόνῳ, ἀλλὰ καὶ ἀρότροις πύλλαις πολλάνκις· ἢ τὰς ρίζας μόνον ἐκκαθαίρωντας, ἀλλὰ καὶ τὰς λίθους ἐκφορῶντας, καὶ μάστιγα τὰς μαίζας Τὰς δὲ γῆς σκαπίζουσαι δι' ἄνω, εἰς τὴν ἄνω ἄσπετον εἰς βάθος χερσὶν, καὶ τὸν κατώτερον ἄνω φέρονται. GERONIC. Lib. v. c. 19.

VARRO seems to be the first husbandry-writer who comprehended the reason why hoeings and diggings gave new life to plants, and in one instance most particularly: *Si siccitate fit, sarrito.*

Sir *Hugh Platt*, whom *Hartlib* calls * “the most curious man of his time.” This pamphlet is intitled *Adam’s Art revived*. *Wolridge* says, that *Gabriel Plattes* was the author of it. But this seems to be a mistake. However, the *latter* concurs with the *former* in saying, “That one acre dug will produce as large a crop as four acres ploughed.”†

What is here said relateth only to small undertakings, whose object is only one acre, or two at most. Those who have inclination, fortune, or spirit, to venture farther, would do well to copy the method made use of by that excellent cultivator *Bellingham Boyle*, Esq; who began his experiments of lucerne in the same year that I did, but proceeded upon a larger scale; for he undertook the culture of six acres at once.

His preparation of the field was as follows :

“In the year 1757, he gave his field a summer fallow, and having thoroughly ploughed and harrowed it (not as farmers understand these words, but effectually, instead of superficially) he sowed wheat, after the ground had been dressed with lime. In 1758, his crop of wheat was very great. Immediately after harvest, he gave the land in question a severer discipline, using every method for pulverizing the earth and extirpating weeds, that the best husbandmen are acquainted with, either in our kingdoms or abroad: So that the field appeared again a perfect fallow. Then ploughing it very narrow and sharp, he made water-thoroughs with the plough, and left it in this condition for the winter 1758.

“In spring 1759, he made many *French* drains in the field, as before he had made open ones for the winter; and, by stone-picking the land, had nearly stones sufficient to fill them. In *March*, the same

* LEGACY, p. 88.

† *Discovery of infinite Treasure*, 4to, 1656, p. 92.

same year (taking advantage of the first fine weather) he silt the ridges with the plough, and reduced the land to the finest tilth he was able, and transplanted the lucerne from his nursery in autumn: In the whole process of which, he followed *Du Hamel* exactly."

Nothing in husbandry could be more sensible and masterly than this preparation of a large piece of land for receiving lucerne.

As I am here speaking professedly of nursery-plots, and fields set apart and prepared for transplantation, it may not be amiss to give directions how to act in a certain case of difficulty, which may happen to present itself.

Those who would throw an old pasturage into lucerne, instead of fields that have been long in tillage (which is a point more easily managed) must have recourse to *burn-beating*, an old practice of husbandry, in my opinion, originally *English*, but kept up in its full forms only in *Cornwall* and *Devonshire*.

As I have been a constant witness of this operation for a number of years successively, and remarked its defects and advantages with a careful eye, I may, perhaps, one time or other, deliver my sentiments at large upon the whole process; for the practice appears to me to be of great uninterrupted antiquity in the counties above-mentioned,* and more or less known and used all over *England*, till about the time of the restoration.

To perform this work, in order to prepare an old pasture-field for receiving lucerne, I must first make the reader acquainted with an instrument, called, in the west of *England*, a *beating-axe*,† of which I shall give a representation cut in wood in this section.

With

* What the farmers at present, in most parts of *England*, call *burning the couch*, is an imperfect burn-beating.

† This shews that we ought, according to proper orthography,

With this *beating-axe*, when old pasturages are to be prepared for receiving lucerne, after the bushes and brambles are neatly † grubbed, the turf is cut up in strips about two feet three inches long, and ten or eleven inches broad. These strips are thicker or thinner, according to the foulness of the sward; but the usual thickness is three inches; for, if the instrument does not cut below the crown or head of the roots of weeds, such roots will sprout again, and the first labour become fruitless. The work-man, with the same tool he uses in cutting these slices or strips, sets them up very dextrously, in a sort of spiral pyramid or cone, not much unlike an high-crowned hat, but rather more obtuse; in which position they dry speedily and conveniently, the grassy part standing outermost.

The common expence of this labour (for I shall pass by the whole process, which is very minute) including the burning the turf and spreading the ashes, in very coarse grassy ground choaked with weeds, comes to about one pound seven shillings an acre, and I have known above five hundred bushels of ashes procured from a single acre.

This performance being finished, and the ashes spread, make use of a light plough, and plough the ground with a thin shallow stroke, cutting the lines formed by the burn-beaters at right angles. Harrow the trash together, till little or no earth remains sticking to it, and then burn it in small heaps.

In such grass-fields as are broken up expressly for receiving lucerne, begin the first operation in the former part of *May*, and let the seed-burning take place before the end of *June*. Forty equidistant heaps (called by the *Swiss* perpetual ovens, about two feet and an half diameter, with half a

furze-phy, to write *burn-beating*, and not *burn-bating*, *burn-baiting*, and *burn-baking*, as many authors do.

† If the turf, in taking up these roots, be much broken and mangled, it will perplex the burn-beaters in their cutting,

furze-faggot placed near the bottom, and an air-hole fronting the wind) will answer the purpose better than two hundred small ones, according to the common practice.

These heaps, when once thoroughly lighted, may be fed, enlarged, and consumed at pleasure: Whereas in small heaps a great part of the outermost turfs will remain uncatelined.

The field thus prepared must be gently stirred with the plough, after the seed-burning and spreading; I say gently, because ashes have a great propensity to sink deep into the ground. — Afterwards, at leisure, give the field a winter's fallow, that the dry sharp force of the ashes may cool a little, and then prepare it duly for a spring transplantation. The marquis de *Tourbilli's* famous treatise *sur le Defrichemens*, † is founded principally upon the art of burn-beating. He fancies the practice to be originally *French*; but it is incontestably certain that it has been constantly made use of in *Devonshire* and *Cornwall*, from times immemorial. Our writers speak distinctly concerning it in the beginning of the last century: Theirs are totally silent; even *De Serres*, with all his minuteness, in a vast folio, never mentions it in the year 1600.

I will speak a few words more upon this subject. — Tho' the manner of burn-beating may vary in several countries, as also the methods of collecting together the hurtful vegetables that ought to be burnt; and tho' different instruments may be made use of for scarifying the surface of the earth, as light common ploughs, firmed, and three-coultered ploughs, paring-axes, &c. yet the practice in general seems to me to be almost as old as agriculture it self. *Virgil* advises it, ‡ but describes not the opera-

† Published in 8^{vo}, 1761.

‡ *Sæpe etiam steriles incendere profuit agros.*
and again,

Effusos cinerem immundum jactare per agros.

operation, being at that time well known. The *Hurons of Canada* (the most sensible civilized nation on the continent of *North-America*) have never used any other sort of manure; and the inhabitants of *Upper Hungary* have pared and burnt the foul turf from times immemorial.

But burn-beating, like all other good practices in husbandry, may be abused, and in some cases prove detrimental rather than useful, either by performing the operation improperly, or repeating it too frequently. But these exceptive cases deserve to be considered more at large. It may suffice here just to suggest the precaution.

Nor is there any reason to think that the instrument, made use of to pare the turf, is of *French* invention. To prove which, I will beg leave to lay before the reader a print of the *French ecobûe*, and refer myself to those persons who have chanced to take notice of our *West-country beating-axe*. Nor will I dispute the *national* credit of this invention, (except in a ludicrous manner) with such an intelligent and skilful cultivator; but rather wish to say, in the language of the poet,

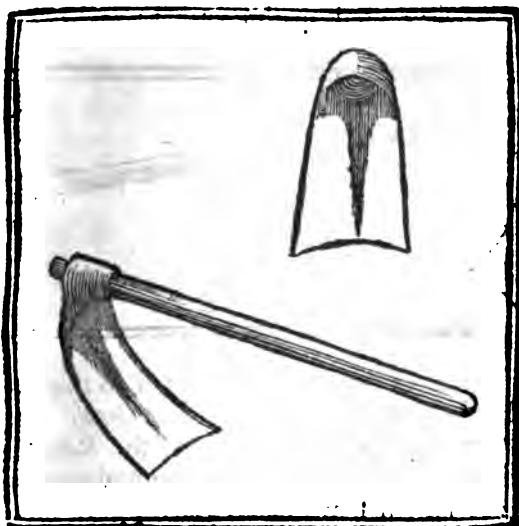
— *Solida est mihi gratia tecum.*

OVID. *Met.* xii.

Therefore the whole matter in question (with the marquis's consent as well as mine) may be left to the decision of some future *Pancirolli*.*

* An *Italian* who wrote an ingenious book *de Rebus inventis ac deperditis*.

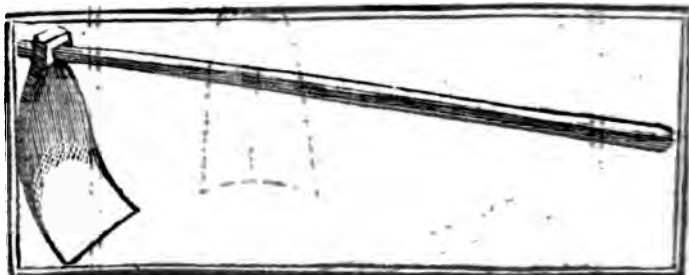
The FRENCH ECOBÜE.



The *English* west-country *beating-axe* is precisely the same with the *French* beating-axe here represented, if we except only one particular; which is, that the handle of the *English* instrument is something longer, and consequently more commodious.

If this beating axe of the marquis *de Tourbilli* be not of true, original, *English* invention, it seems plain to me that we did not copy it from the *French*, but from the *Italians*, who had always a frequent intercourse with the south-west parts of our kingdom, in making voyages for tin; and of course might shew us the use of their instrument called *Zappeta*. For as agriculture revived with them some time before it made any shew of considerable appearance with us; (now by the way we were half a century before the *French*;) And as drawings and prints were published of most husbandry implements then used in *Italy*, it is probable that such improvements made no small noise in *Europe*, and many things were copied from these discoveries. The

The *Italian ZAPPETA*: Being a *paring* or *beating* axe used in the year 1569.



What makes me more inclined to think, as I now do, is that the *Devonshire* and *Cornish* spade is formed exactly upon the model of the *Italian bailli* (a spade made use of in stony mountainous countries;) of which I will here give a slight sketch, omitting the handle, which is about four feet six inches long, without cross-bar, or ear at top, as the common garden-spade has.

The *Italian BAILLI*, or *field-spade*, of the same antiquity.



Whoever

Whoever remembers the *Devonshire* or *Cornish* spade, will see at one glance that the bailli and *that* are the same thing.

The east-country husbandman holds the west-country-spade in derision very unjustly; for, tho' it is of little use in gardening, as it turns up a cone of earth instead of a cube, yet no instrument of the sort works so expeditiously and easily in a stony country.

The nature of its point facilitates entrance, and the length of its handle, in dislodging and upheaving a large stone, supplies the place of a lever.

I shall conclude this section, so far as it relates to lucerne-nurseries, with observing, that, if the nursery be made somewhat larger than I have recommended, the supernumerary plants may be reserved till another year or two, with no small advantage to the owner.

Those persons; therefore, who make a large plantation of lucerne, would do well (if they have a quantity of roots in the nursery sufficient for free chusing and rejecting at the time of transplanting) to remove only the larger, well-coloured, vigorous plants, and leave the small and more weakly ones in the nursery, which, in another year, will make excellent roots for supplying some vacant places in the transplanted field; for forty or fifty plants out of a thousand may be supposed to die every year. These seemingly contemptible roots, left in the nursery, will make a fine appearance in the second year. They will procure free space and nourishment by the removal of their neighbours; and the ground will be loosened and stirred round them in taking up the better roots.

These nursery-plants may be taken up, clipped, and removed into the field, as before directed, till the beginning of autumn in the third year of their growth, after which (another small nursery being

being made for replenishing vacancies in the great plantation) they must remain undisturbed in the place where they were first sown; and be cut occasionally for green fodder. But, perhaps, I may suggest here a better expedient, confirmed by frequent trials: Which is, that if, at the first time of transplanting, the cultivator should find a considerable number of *small roots* in his nursery, and yet be desirous to fill the whole piece of ground set apart for receiving the transplanted roots, *I would then advise him not to cut the tap-roots of the small plants at all, but remove them into the new ground in their natural state, shortening the herbage only:* And such small plants, thus managed, will prosper extremely well.

My reason for giving this advice is, *that, if you amputate the tap-root in a small plant, then a sufficient length of root will not be left to answer our purposes; and, as thenceforward the root in question will shoot no more downwards, the result will be, that it will never attain a sufficient depth of ground, and consequently may be easily dislodged in hoe-ploughings, and injudicious cutting, when the operator, making use of a reap-hook, grasps the herbage of the whole plant in his left-hand, and pulls a little upwards with it, at the same time that he is cutting with the right.*

S E C T. IV.

Times of sowing Lucerne; Times and Manner of transplanting it.

THE general times of sowing and transplanting lucerne have been limited hitherto to the beginning of *April*, and the first or second weeks in *August*: But this is tying ourselves down to a *couple of fortnights in each year*. I have therefore made several experiments, in order to try whether it be not possible to obtain a little more time for performing

the operations abovementioned: For few people like to be fettered down so very strictly.

And here, perhaps, the cultivator may not be displeas'd, if I inform him that he may safely venture in case of urgency (or if he happens only to be impatient, though *April* is, upon the whole, the most proper natural time) to sow lucerne-seeds in *May*, *June* (and, perhaps, the beginning of *July*) in warm moist weather: Cutting the stalks of the plants on the approach of winter, and leaving the roots undisturbed in the nursery, till the new appointed time of removing them comes (which cannot be the *August* of the same year) but in the *April* of the year ensuing. Such plants, though their seeds are sown in *May*, or *June* particularly, will have little to fear from the severity of the succeeding winter: For the roots will have acquired strength and vigour enough to contend with it. Thus *one half-year* will be gain'd in raising a crop, and people will have their choice of *two* seasons for transplantation instead of *one*; which may be looked upon as some advantage.

Experiments of this kind have been made by me at all the times abovementioned. As to sowing lucerne in the end of *April*, the whole month of *May*, and till the middle of *June*, I never found the least appearance of danger. It may suffice, therefore, just to relate one experiment that was made something later in the year. I mention it only as an attempt of curiosity, without proposing to recommend it for a general practice in husbandry, there being full choice of time allowed by me, without postponing matters to a season where there is the least appearance of danger.

On the 26th of *June*, 1758, I sowed a plat of ground, with lucerne, in a wet warm season. By the 8th or 9th of *October*, the plats were some of ten inches high. They pass'd through all the severity

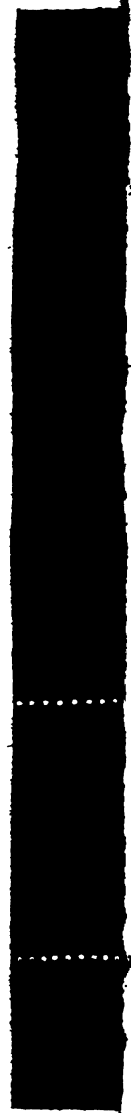
of winter, were transplanted at spring, and cut twice or thrice during the summer.

Thus have I allowed a couple of different periods for transplanting; namely, *April* as well as *August*, instead of *August* only. As to the time of sowing, I have extended it from three weeks to near a quarter of a year; and, if I here differ, in any degree from *M. de Cbateauxvieux's* excellent instructions, I do it with as much deference as if he were actually supervising what I am now writing.

It is true, some cultivators, in the southermost parts of *France*, have ventured to sow lucerne in *August*; sometimes with tolerable success, but very rarely. Therefore, upon the whole, such a practice in husbandry is hardly worth copying, even in a warm climate; and an imitation of it, in *England*, might be looked upon as a rash undertaking.

I have dwelt longer upon this article, as many persons may not have patience to postpone their attempts in agriculture to another year: Others again may sow their nurseries in *April*, without being at leisure for autumnal transplanting; or the field, set apart for receiving the roots, may not be thoroughly prepared, or the crop removed. A third class of men may like to raise large plantations very soon: And therefore, upon each of these accounts, we have given as much latitude in transplanting, and pointed out as many seasons of sowing, as could be discovered from such experiments as we had the power of making for six years successively.

Nevertheless, such as chuse to follow *M. de Cbateauxvieux's* directions for transplanting (which probably are the best of any, where we have free choice of time, and are not too impatient) may, about the 10th of *August* (chusing a moist season, or else waiting a little longer) take up their plants, from the nursery, with a sharp spade; but then, at the same time, they must remember to take up no more roots



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than can be transplanted conveniently before night. As to the manner of clipping the stalks, and pruning the roots, enough has been said concerning it in the beginning of *this Essay*; but the eye will better guide every person, who shall just consider the annexed representation, where he will see the manner of clipping and pruning lucerne, the plants being five months old, the stalks fourteen, fifteen, or eighteen inches high, and the roots measuring about twelve inches in length.

In the print here given, the white spots direct you to the places where the stalks and tap-root are to be clipped, or cut off with strong sharp scissars. The lateral fibres also are to be shortened a little, and that with discretion: And if the tap-root (which is sometimes the case) divides itself into two or more large forked branches (a circumstance we thought needless to represent in the print) it may then be proper to apply the scissars below the forked part, that each branch may push forth new shoots, and, consequently, draw greater nourishment.

The species of lucerne here treated of, as chiefly cultivated for husbandry uses, is *the larger upright* MEDICA *with purplish or violet flowers.*

It may be needless to say any thing concerning the shape, aspect, and manner of growing of this plant, since every such circumstance is better represented by a drawing, than described in words. Let it suffice, therefore, to observe, that this plant generally keeps an erect posture, and seldom droops but for an hour or two, from *April* towards *Michaelmas*, either in rains or drowth, except the root be injured by some accidental cause,* arising often from some neglect in its management, which a skilful cultivator will discover in a few minutes.

The present drawing was made according to the traditional accounts they have at *Venice*, concern-

ing the manner *Matthioli*, a famous cutter on wood, made use of in designing plants from life: Whereas, in common herbals and books of agriculture, the drawings are usually copied from plants that are taken up and withering, or from branches preserved and gummed on paper. But no artist can spread a plant as nature spreads it when growing; and all the elasticity of the stems and leaves will be lost, as well as the true shape and distances one from another. And hence it happens, that the picture of the *dead* may not be able to recal the memory of the *living*.—Induced by these motives, the ingenious *M. du Hamel* (though *France* abounds with neat copper-plate engravers) thought it worth while to procure, from *Venice*, the wooden prints* in the *Valgrisi*-edition of *Matthioli's* Commentary,

* It were to be wished, that the art of cutting on wood were *revived* amongst us, and, more particularly, in the present case, as it comes nearer to the true representation of plants, than any engraving on copper, though performed by the neatest hand. For there is a force and fulness in figures cut on wood, which the fainter delicacy of the burin can never attain to.

As a proof of this, whoever contemplates a plant rightly, cut on wood, will remember its figure longer, than *that* of the same plant engraven on copper, and know it more easily, when he sees it in the fields. And, in confirmation of this assertion, I appeal to the Herbal of *Durante* (excluding the edition, at *Venice*, of 1667, and meaning only the *Roman* editions in the century preceding) and the prints, cut on wood, in the first *Valgrisi*-edition of *Matthioli's Dioscorides*, printed at *Venice*, folio, 1559. Concerning which, it may be observed, that they almost equal the exactness, sharpness, boldness, and firmness of *Marc-Antonio's* gravings, being finished in the age of fine drawing and good workmanship. To which we may add, that prints, cut on wood, are intermixed most easily and conveniently with the letter-press; a doubly greater number of copies may be worked off; the lines retouched with greater firmness; and the engraving restored with less pains and more correctness.

This art arrived to tolerable perfection amongst us, in the latter part of *Queen Elizabeth's* reign; and was carried on successfully, by *Switzer*, father and son, through the reigns of *James I.* and the two *Charles's*; but expired in effect with the engra-

mentary, though they were 200 years old, and many thousand copies had been drawn off from them.

Again, if the roots differ in shape from that which is represented in the print, then the pruning of them must be varied: In which case we can only give one general direction, which is to cut the tap-root below the forks; which forks (I believe) are occasioned by some obstruction from hard knobs of earth; or stones, which hinder the pivot or point of the tap-root from descending in its natural perpendicular course.

I have sometimes seen a lucerne-root with five or six irregular spurs, occasioned (as I suppose) by some obstructions in the ground.

Roots of such kind must be pruned with discretion; and, if it can be distinguished that any one of the roots is the tap-root, cut it not at all, but prune the others,

I have nothing farther to observe, under this part of the present section, except that, in the print above exhibited, the undermost dotted marks, in the root, are not placed quite low enough below the crown of the root: Permit me, therefore, to observe, by way of caution, that if the root be sufficiently long (and sometimes I have known a lucerne-root, like *Virgil's* oak, equal in length to the length of the branches) then leave it nine or ten inches long, after you have cut off the lowermost part of it.

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ver of the wooden cuts in *Croxall's Æsop*: Of which, the first impression is now held in good esteem at *Rome*, and has gained admission into some curious collections of prints there.—In the present declining condition of this art, we can only make use of it to represent little sketches which deserve not the expence and labour of copper-plate engraving.

Since writing this, the *Society for encouraging arts*, &c. has appointed a public premium for reviving a manner of engraving admired by *Raphael*, and executed so perfectly by his *Marc-Antonio*.

We have already mentioned the throwing the pruned plants into water; upon which article, an ingenious friend has observed, "that, if the roots remain any time therein, they will imbibe so much moisture as will be greatly prejudicial to them." I apprehend, says he, "that to water them, after they are planted out, with a watering pot, will both refresh the plants, and settle the earth about their roots."

This must be acknowledged to be a prudent method, and most agreeable to the practice of gardening; but as *M. de Chateauvieux* does not advise it, and as plants are found to succeed very well without it, we were fearful of giving beginners too much trouble; but have carefully recommended a warm, moist, gloomy season for transplanting, and allowed the roots to remain in water but a short space. Yet still the watering-pot may be used to advantage in a dry season, if people chuse to give themselves so much trouble.

Some precautions of this kind ought to be used, for it appears, by experience, that these plants, when dug from the nursery, droop in an hour, tho' removed into the shade, except they are steeped in a vessel of water.—In the next place, when you transplant the roots, squeeze them down moderately firm, and bring the earth up with your hands, till the shanks of the stalks are partly covered. But to this passage the same excellent judge in gardening has made an objection; to which our answer is, that he is certainly in the right with regard to spring-transplantations, such as we have recommended, and partly experienced: But in respect to *M. de Chateauvieux's* practice of transplanting in *August* (the point now under consideration) I believe the remark will be found unnecessary; for the autumnal heavy rains will partly wash the light new-earthed-up mold down to its due level, and the frosts afterwards

wards will heave many plants upwards; so that, about *Christmas*, the crowns of the lucerne-roots, thus managed, will stand just as far above ground, at winter, as the best cultivator would wish to find them.

When the plants are removed from the nursery, some healthy roots may penetrate deeper into the earth than I have mentioned. Such roots must be taken up with double care, especially if the ground be of a clayey or marly cast. Even in other cases you must direct the labourers to take them up with attention and patience, expressly ordering them to apply the spade* to a *certain* depth, and loosen the earth at bottom as much as may be. Nor must you break the lowermost fibres of the roots, more than you can possibly avoid; nor squeeze the stem and crown of the plant, when you draw it.

Nothing more needs be added under this article, except that the intervals should be hand-hoed and hand-weeded after every cutting, till the assistance of the horse-hoe can be called in, and then these kinds of labour will be considerably diminished.

S E C T. V.

The Expence of cultivating Lucerne.

AFTER all that can be said, many people may object that nurseries and transplantations are expensive and troublesome: But these circumstances, it is to be hoped, will deter few gentlemen of spirit and fortune; for the long continuance of lucerne makes ample amends for a little uncommon diligence, and the first charges may be lessened considerably, when the culture of this plant falls into the management of better hands than mine.

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A particular spade for this purpose is described and recommended in a note to SECT. VI, p. 102.

We all know that the farmer expends much money and gains very little from a crop of wheat at the expiration of his twelve months: But if we take ten years together, and compare the profits of lucerne on the one hand, and wheat, barley, oats, and clover on the other, the balance will certainly turn in favour of the lucerne-crops, and that in a proportion of three, or two to one at least.

The expence of raising an acre of lucerne in the manner which we recommend (and supposing even digging to be made use of instead of ploughing) amounts, as nearly as I can remember, to the following sums:

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Fine-digging and picking 30 perches for for a nursery* —————	0	12	0
Seed —————	0	7	0
Hand-weeding the nursery twice, and transplanting into vacant patches such plants as stand too thick —	0	13	0
Digging an acre for receiving the roots	2	10	0
Transplanting — —	1	5	0
Hand-weeding and hand-hoeing the rows, with a four inch-hoe that cuts down- wards, and then with a larger planta- tion-hoe, which cuts horizontally	1	0	0
Two horse-hoings — —	0	5	0
	<hr/>		
	Total	6	12 0

It is true, the expences of raising lucerne, in this manner, will vary, when applied to parts of *England* different from those where the experiment was made,

as

* For fear of accidents, it might not be amiss to set apart a quarter of an acre for a nursery. An over-plus stock of plants will inable the owner to pass by the weaker ones, and leave them to remain for another occasion. I subjoin this caution, as I have before mentioned only 30 perches: And thus every cultivator may follow his own judgment.

as the price of labour may be dearer, and rents run higher: But then the ground ought to prove better, which will balance the difference.

This plantation of lucerne may be cut three times, † the first year after transplanting, as some repayment for the out-going expences: Next year the profit will be more considerable.

On the other hand, those who prefer the drill-method of raising lucerne, as less expensive, may seem to save about two pounds, or more, upon an acre, at the first appearance of things; but then the rows, in case the crop succeeds (which is a doubtful point) must be thinned, with good judgment, which will cost money: And the vacancies in them must be filled at last with transplanted roots. Nay *M. de Chateauxvieux* asserts, that *drilled* lucerne will rarely be so large and flourishing as the *transplanted* for the effects of horse-hoeing, and the influence of manures may prove of less service to the roots of the *former*, at a depth of 12 or 13 feet, than to the roots of the *latter*, whose finest imperceptible fibres will hardly descend above a yard perpendicular.

Besides all this, the cultivators of lucerne are desired to bear in memory what has been remarked in the 27th and 28th pages of this Essay, where it is suggested to them, that they may place the transplanted roots the first year at a distance of six inches asunder from one another in the rows, and remove every other plant, the spring following, into a fresh acre of ground well prepared to receive them; by which means *one third* of the expence, in our last computation, will be taken away; — they will save themselves the trouble of a second nursery; — gain a year in point of time; — and two acres of lucerne instead of one.

But

† I endeavour, upon this occasion, to speak with moderation. I have known a plantation of lucerne cut 6 times, the year after transplantation.

But here it must be observed, that, as in this latter case, 26,000 sets must be raised instead of 13,000, it will be necessary to allot more ground for a nursery, and sow a larger quantity of seed; allowing always (which I think sufficient) four ounces to a statute perch, though *M. du Hamel* allows six ounces to a *French* perch; but then the reader must remember, that a *French* perch is larger than ours, and that, at least, by one 5th. I thought it unfair to suppress this circumstance; so that *English* cultivators (if they please) may sow five ounces to each statute perch of nursery.

It is hard to say, at what precise time the assistance of the hoe-plough should be called in: But the owner of the plantation may venture on the attempt, I think, with safety, in three days after the second cutting, about the beginning of *June*;* for the roots then will be tolerably well settled in the ground, and before that time the flat plantation-hoe may be used, chusing such an one as is about eight inches and an half wide in the cutting part.

S E C T. VI.

Of Hoe-ploughing, and other Methods of keeping the Plantation clean.

AS continued hand-hoings will be chargeable, troublesome, and almost endless (being, in truth, little more than a temporary expedient, and slight scratching the surface of the earth) remember to make a light plough with which you are to cultivate the spaces between the rows; and in this case you may either invent a plough according to your own fancy, or copy such as are used at home, or in other countries, on the like occasion.

The

* This relates to lucerne transplanted in *August*.

The share of this plough should be sharp, about sixteen inches long, with a coulter proportionable: The plough itself no heavier than a strong lad of 15 years of age can carry. And thus one horse, after some obstructions of no great consequence in the first attempt, will afterwards draw it with ease. Yet still the trouble will be lessened, if the field be prepared by digging and picking up the roots and stones, instead of common ploughing, just before the ground is to receive the transplanted roots. Therefore, after a full second consideration, the former practice is recommended preferably to the latter: And, if the lucerne stands nine or ten years, the difference of the expence will not be perceived.

As the rows will be one yard four inches asunder, there will be room sufficient to guide the plough safely along the intervals, and yet no room to spare. It behoves the ploughman therefore to be extremely careful in the slice he cuts next the lines; such a stroke must be a shallow and a dextrous one, nor must he approach too nearly. A man, an horse, and a boy to lead the horse will manage an acre in a day when they know their business: For it is more a matter of nicety than fatigue, since the ground ploughed in an acre will hardly exceed half an acre.

After the first time of using the horse-hoe plough (which a man's own discretion upon considering the strength of the plants will best determine) it may be laid down for a general rule, *that it will be always found most convenient to horse-hoe the intervals (as long as the plantation stands) the third day after each cutting; for by that time the new shoots will make the plants visible, nor will any side-branches stand in the plough's way.*

It may be proper also to hand-weed the lines once a year; And the larger weeds may be taken up expedi-

peditionously with the three-pronged spade, or the field-spade.*

Nor must we look upon this as any uncommon extraordinary trouble, for *Virgil* orders three or four ox-hocings every year, even for the vineyard :

Est autem ille labor curandis vitibus alter
Cui nunquam exhausti satis est, namque omne quotannis

Terque quaterque solum scindendum est, glebaque
versis†

Æternum frangenda bidentibus. —————

Georg. II. v. 397.

————— New labour is requir'd,
Nor must the painful husbandman be tir'd :
For, thrice at least in compass of a year,
Thy vineyard must employ the sturdy steer
To turn the glebe ; besides the daily pain
To break the clods, and make the surface plain.
DRYDEN.

Again, we may observe, under this article of cultivating and keeping the intervals clean between the rows, that some persons (at least in small plots of lucerne) may prefer the *breast-plough* to the *plantation-*

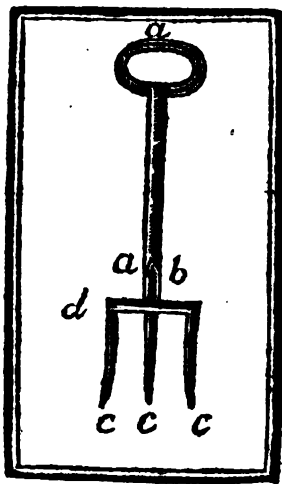
* The field-spade, for taking up weeds, should be two inches and an half longer in the bit than the *London* garden-spade, and one inch and an half narrower between side and side, being, at the same time, well pointed with tempered steel.—This implement of husbandry is chiefly used by foreigners in cleansing fine grass-fields once a year in *April*. When the weed is taken up with all its roots, a few grass-seeds are sprinkled on the spot where it grew : But this relates to common pasture-meadows.

† The teeth or tines of the antient *bident* were curved or bent downwards almost at right angles, as may be seen in an instrument of husbandry, now used by farmers, called the *drag* : But *Lawson's scrape-all* has the appearance of being a better invention.

tion-hoe, and of course may use the *former*, if the ground will admit.

Or else you may cause to be made a *trident* or *three-pronged spade*, formed from the handle to the iron-work, in every respect like the common garden-spade, as to length, strength, and substance. This instrument is managed like the ordinary spade, but performs its work with half the fatigue to the labourer, and consequently twice the business may be done in a day. It likewise lays surer hold of the roots of weeds, and cuts not asunder (as the garden-spade often does) the roots of valuable plants, which it is intended to assist and strengthen either in the hop-garden, lucerne-plantation, or the nursery of young trees. For these reasons it deserves well to be recommended, being in some instances superior to the common garden-spade, and always preferable to the breast-plough and plantation-hoe.

A THREE-PRONGED SPADE.



The letters *aa* represent the handle, one foot ten inches long; *bb* the socket, six inches in length;

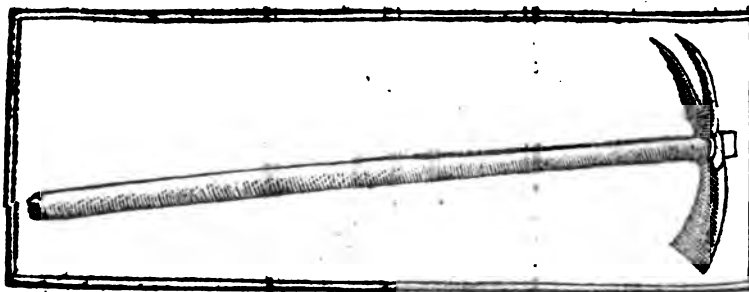
length; *cc* the grains, and the iron they proceed from marked *d*; their breadth at the uppermost part *d*, before they begin to diminish, being three-quarters of an inch.

These grains turn a little upward, and not sideways; which cannot be represented in the print.

Virgil, in the passage last cited, seems to have some idea of such an instrument; but a *three-pronged spade* is far better than his of *two-prongs*, and many have thought that four grains or prongs are preferable to three, but then one fourth more labour will be required: And, if the teeth are made sufficiently strong, it is probable that this utensil will be too cumbersome.

The old *Italian* hoe, called *Zappetino*, will be found to be of incomparable use in a lucerne-plantation. It may be used safely between plant and plant in the lines, and work very near the roots with little or no injury to them; answering at one and the same time the intent of an hoe, as well as of a bident or trident: But then it can only be used with advantage in neat elegant agriculture, where much circumspection is required, as in nurseries, lucerne-plantations, &c.

The ZAPPETINO.



But, if none of the instruments above-mentioned should happen to content the reader, it may not be amiss

amiss to recommend a fourth instrument, (invented by *William Lawson*, an eminent gardener and nursery-man, about the year 1620, and called a SCRAPE-ALL) which proves extremely useful in gardens, nurseries, hop-grounds, lucerne-plantations, and most loose well-cultivated lands; but observe always, that the weeds must be raked off immediately after they are dislodged and torn up, both in this instance and the former one: Or else, if the season should happen to prove moist, they will most of them take new root and spring again.

The following print is an exact representation of the instrument here spoken of:

LAWSON'S SCRAPE-ALL.

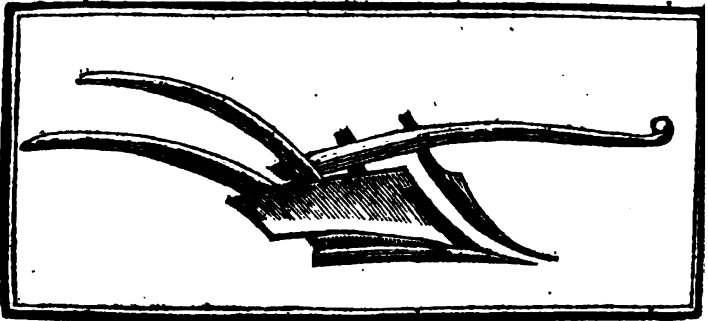


In this figure, *a* represents the head, one foot long; *b* the teeth, eight inches long from the place where they branch out to their extreme point; and *c c* the handle, four feet eight inches in length.

As we are now professedly treating of destroying weeds, keeping plants clean, and stirring the ground; it may not be amiss to express one's hopes of seeing some new-invented plough, cheap, simple, and rightly calculated for the occasion: Particularly in a nation justly famous for skill in mechanics.

For my own part, I have contented myself hitherto with a plough of *Blythe's*, altered so as to agree with the account given in the 101st and 102d pages of this Essay. It was no-ways intended by *Blythe* for the present purpose, as the practice of horse-hoeing was then unknown.

BLYTHE'S PLOUGH.



Many ploughs may be made of a more elegant shape and structure, but this performs its work safely and steadily. Wheels, it is true, would render the draught lighter : But the ploughman then might cut in upon the rows, and make other mistakes, as the plough may move with too much facility.

So that nothing more needs be said concerning it, except that the idea of its construction seems to be formed upon a right principle ; and of course it may only be considered as a temporary succedaneum, till skilful and ingenious persons shall devise something that is equally cheap, but more perfect. — Now, as most people prefer usefulness and cheapness to elegant and expensive inventions, it is natural to wish for an hoe-plough intirely simple and not costly : For the mechanism of those, devised hitherto by ingenious lovers of agriculture, is of so perplexed and complicated a nature, that it will no ways answer the common purposes of husbandry : But, being perpetually out of order, will throw the poor ploughman into despondence ; and the rather as neither he nor the country plough-wright can comprehend how to rectify any defects or accidents, except with extreme difficulty.

As

As to other horse-hoeing ploughs, there is *that* of *Tull* and the *cultivators* of *Messieurs du Hamel* and *de Chateaurovieux*; but, if the reader be still more curious, let him examine the description of another sort of cultivator or horse-hoe plough, explained by six copper-plates, being the invention of *M. de la Leuvrie* in 1759*.

And here, as to ploughs of all sorts, we join with *Hartlib* in observing, "That any ingenious person would do the honest and painful husbandman very great pleasure, who could facilitate the going of the plough, one of the most necessary instruments in the world †."

But all improvements are slowly propagated even from county to county. For example, the wheel-plough and folding of sheep were known and commonly made use of in *England* two hundred and sixty years ago, yet have not been able to travel through the kingdom to this present moment; which shews, that many good and valuable improvements have not (taking a century together) spread themselves, at a fair average, more than about a mile a year.

We will now consider the expences of an acre of lucerne the second year, which will stand as follow:

	l.	s.	d.
Clearing the lucerne-plants from weeds			
in the rows by hand	—	—	0 8 0
One hand-hoeing of the intervals	—	—	0 8 0
Four horse-hoe ploughings	—	—	0 11 0
Compost-dressing for manure, or foot, wood, or peat-ashes, at an average			
per year	—	—	0 10 0
Dispersing the manure	—	—	0 3 0
	Total	2	0 0

X

Such

* *Experiences sur la No v. Cult.* tom. vi. p. 244, &c.

† *Legacy*, p. 5, 6.

Such will be the yearly charges, or in some proportion very like them, during the continuance of your lucerne, which I fix at a medium of ten years. *M. de Chateauvieux* says it may last twenty; and *Pliny* goes as far as thirty; though the expression may be looked upon to be exaggerated*.

S E C T. VII.

The Author an Advocate for manuring Lucerne.

CONTRARY to *Tull's* continued practice, and *M. de Chateauvieux's* first practice, I declare myself an advocate for manuring lucerne; premising, in such cases, that all dressings are *relatively good, inefficient, or hurtful*, according to the nature of the soil on which they are employed. Here also let it be observed, *That most soils have some one original predominant cast, which may be mastered for a time, but seldom or never conquered totally.*

In regard to manuring lucerne, it may suffice to suggest here in general terms, that, if the ground be stiff, cold, and of a clayey tendency, then wood-ashes, foot, and lime are proper dressings. If the ground be hot, shallow, and brashy, a compost of calcined clay, dung rotted to a fine mold, and pond-mud, long exposed to sun and frosts, and frequently turned, may have its use. And, if the ground proves of a middle nature, then malt-dust will not be amiss.—All these manures are easily procured; and therefore we have mentioned none that are scarce and dear. But as variations of soil are infinite, and few people know the true nature of any field (especially if it be of the mixt kind) we recommend the *compost-dungbil* as the surest and most universal assistant upon such occasions.

Many other manures may be good for lucerne; but dung probably is not one of the best, except

* *Histo. Natural.* lib. xviii. c. 16.

cept it be very old *, and well-corrected with proper mixtures of a sweet, as well as fertilizing nature, sufficiently warm and cherishing, but no-ways rank; for dung (especially if it be new) produces in general very luxuriant, troublesome weeds, insects in abundance of various kinds †, and gives the grass a foul, cloying, putrified taste.

The owner's eye, it is true, may be deceived, and his hopes encouraged by the largeness of the crop; but the sagacious four-footed animals will distinguish better than we can pretend to distinguish :

X 2

• Le fumier nouveau brule la semence de la luzerne, jetté sur iceluy, avant qu' estre dompté par les temps.

Theatre d'Agricult. fol. 1600, p. 171.

Our countryman *Reginald Scot* declared himself much of the same opinion, upwards of twenty years before *De Serres* published his work. See the PLAT-FORM, &c. 4to, 1576, p. 37.

In dry, gravelly uplands, which are apt to burn, free use may be allowed of what the farmers call *spit-dung*, by which is meant dung that is turned and rotted, till it looks like black mold, being at least two years old. G. PLATTES.

The *Norway* peasant *dungs* his meadows *very slightly*, but has recourse to sand or ashes.

Bp. of BERGHEN's *Nat. Hist. of Norway*, fol. p. 110.

More may be seen upon this subject in the *Curiositez de la Nature & de l'Art* by the Abbé de VALLEMONT, tom. ii. p. 75.

“Dung is never used properly for esculent plants, till it be fully putrified, and turned into mold which has no rank, offensive smell.” G. PLATTES'S XX *Experiments*, 1651.

The same author observes in another place, “That fattening the ground with rank dung does in some sort adulterate plants, and *pejorate* [render worse] their qualities: When, contrariwise, raising the same plants in wholesome natural earth doth meliorate their qualities.”

† See the QUINTILII *opus* *Korpus* in *Geopon* lib. ii. p. 52, edit. *Needhami*.

In proof of what has been said, horses, for a year or two, will not taste the grass of a pasture-field that has been plentifully manured with the fresh riddance of privies. Nor will they eat oats the first year, that have been raised in an arable field thus manured. Something offensive to them mixes with the juices of the plant. But, if such dressings lie exposed to the air two or three years in an heap, till they are reducible into powder, they are then very efficacious, and communicate no bad taste, &c. to plants.

guish: And, if they could present a petition to their masters, as the white heifers are reported once to have done to the emperor *Julian*, they would remonstrate not a little against the immoderate use of this manure. Nevertheless, assertions like the present ought to be confirmed by some proof. An experiment therefore was made upon four acres of grass-ground; of which *one half* was dressed with stable-dung, and the *other* with wood-ashes kept dry. The *former* moiety appeared the most rich and luxuriant of the two; but the cattle always neglected it, till they had bitten the *latter* down to the bare earth.

M. de la Quintinie was of the same opinion with an ancestor of *Columella's*, who always opposed applying dung to the roots of vines. The *Frenchman* is full as peremptory as the old *Roman*: *Nul fumier, dit-il, pour les arbres: Je n'en veux point de sout* *. And his reason was, that, if the soil proves commonly good, there is strength sufficient in it to support such trees as we expect to bear fruits of an agreeable flavour. It has been observed, that a vineyard plentifully dunged produces abundance of grapes; but their taste is no-ways exquisite: And therefore it is a common saying in wine-countries, *Vive le vin d'un mauvais menager*; because such a man, neglecting the use of dung, or not being able to purchase it, produces but a small quantity of wine, which, at the same time, is excellently well-tasted.

Thus sweet parsley, the *celeri* of the *Italians*, is wholesome and of a delicate taste in dry, upland ground of moderate fertility; in grounds richly dunged, it is more rank and less wholesome: But in wet grounds, supported by the mere force of dung, it has to a certain degree malignant qualities;

* VALLEMONT; *Curiositez de l'Art & de la Nature.*

ties; for it becomes acrid, unpalatable, and dangerous to be eaten.

Having thus given the result of my experience in regard to dung as a manure for lucerne, I shall subjoin only one short caution; which is, that no dung, not even of the best kinds, must be spread on a lucerne-plantation, till it be two years old at least.

In all grounds inclinable to moisture, and such particularly as are of a clayey cast, it is pretty certain, that the preference ought to be given to foot-dressings; and, after foot, to chimney-ashes (those of green wood especially) provided they are housed and secured from wet. Then soap-boilers ashes may take place, coal-ashes well sifted, charcoal-ashes, and malt-dust. Nor might the ashes of lime be amiss, nor lime itself, when mixed with such fine mold as may be found under a short sweet turf in lanes or commons. The compost-dunghill also, as observed before, should be applied to, which, at the end of twelve months, having been thrice turned, will spread almost as well as ashes or foot. Nor will such compost want strength, when it is rightly managed: For if the dunghill be moistened at times with the brine, soap-suds, dish-washings, and chamber-lie, &c. of the family, then, when it is removed into the fields, the sharp, pungent, strong salts, which fly off, will make the labourers sneeze, and occasion a smarting in their eyes.

When you manure lucerne with foot, dry chimney-ashes, lime, soap-boilers ashes, &c. it is sufficient to dress the *rows* only; because these finer sort of manures may be dispersed in the nicest exactest quantities, if sown, in the *Berkshire* manner, with a *peat-ash spoon*. But if coarser manures are to be employed in larger quantities, as old dung, marle, compost-dressings, &c. I would then advise the pro-

prietor of the field to manure *the intervals and rows promiscuously*.

I have observed elsewhere, that the generality of cultivators manure lucerne once in two years; but, perhaps, it may be as well to refresh it slightly and frequently at seasonable junctures, whenever such assistance appears to be necessary. Frequent repetitions will make amends for the smallness of quantity; seven or eight bushels* of foot mixt with sand, † or fifteen or sixteen bushels of wood-ashes (kept dry) or malt-dust, at each time, will be sufficient for one acre, when sown on the rows: Care being taken to perform this work in moist weather. Such a small quantity of refreshment appears, at first sight, a mere trifle; but, being renewed occasionally, will amount to something in its effects. As to repeating the same dressings in *November* and *February*, ‡ you must be left to your own discretion and careful observations, in proportion as you perceive that such assistances may be wanted. And again, if you find foot, ashes, &c. to prove a manure over-dry and over-warm for the summer-season,

* Throughout these Essays, we mean, by bushels, *Wimbeſter-bushels*, of 8 gallons; because, in various parts of *England*, the bushels are 9, 16, 18, and 24 gallons.

We desire to be understood, with the same exactness, whenever mention is made of a *cart-load of manure*, which, according to the dung-cart used near *London*, is supposed to contain about 40 or 50 bushels.

† The sand is added, in order to spread or sow the foot more equally. Sea-sand answers the same purpose, and is also a manure. If the foot be old and caked, like the cinders of oar, it must be pulverized with a beetle.

‡ The two *Quintilii*, who writ on agriculture in the reign of the emperor *Commodus*, give directions to manure lucerne (τὴν μανδικὴν κομμένην) in the month of *January*. These writers, brothers, and both governors of provinces, were put to death by *Commodus*, about the year 186. They had no crime, except that of being rich, good, and knowing.

Epitomizer of Dion Cassius,

son, reserve them rather for winter-supplies, and have recourse to the compost-dunghil.

Nothing can be more cheaply and easily managed, than manuring lucerne with foot-dressings: * For the labourer, if he makes use of a peat-ash spoon and seed-lip, may sprinkle the rows of an acre in four or five hours, walking down the first interval and returning by the second, and so progressively.

Ashes may be sown in the same manner.

X 4

It

* PLATT'S *Flora's Paradise*, Part I. p. 35, 34.

Sir HUGH PLATT (not to mention his other excellent talents) was the most ingenious husbandman of the age he lived in: Yet so great was his modesty, that all his works seem to be posthumous, except the *Paradise of Flora*, which appeared in the year 1600, when it is probable he was living. He spent part of his time at *Copt-Hall* in *Essex*, or at *Bishop's-Hall* in *Middlesex*, at each of which places he had a country-seat; but his town-residence was *Lincoln's-Inn*. — His *Jewel-House* was published by Dr. *Beati*, commonly called, in *England*, Dr. *Boat* (who, by the way, was as great a genius in husbandry, as most we have mentioned) and the *Flora's Paradise* (with a second original part) was published by one *Bellingham*, the author's kinsman, who changed the title to the *Garden of Eden*.

Sir *Hugh* held a correspondence with all lovers of agriculture and gardening throughout *England*. And such was the justice and modesty of his temper, that he always named the author of every discovery communicated to him.

In a word, no one man in any age ever discovered, or, at least, brought into use, so many new sorts of manure. Witness his account of the COMPOST and COVERED DUNGHIL, and his observations on the fertilizing qualities lodged in SALT; — STREET DIRT AND SULLAGE OF STREETS in great cities; — CLAY; — FULLER'S EARTH; — MOORISH EARTH; — DUNGHILS MADE IN LAYERS; — FERN; — HAIR; — CALCINATION OF ALL VEGETABLES; — *Malt-dust*; — *Willow-tree earth*, *Soap-boilers ashes*; and *broken pilchards* and MARLE.

See more concerning ashes in *Virg. Georg.* — *Varro de Re Rust.* — *Columella de Cult. Hort.* Lib. x. v. 354. — *G. Plantes* assures us, that ashes, mixt with lime, kill moss in meadows, and prove likewise an excellent grass-manure. *Discov ries*, p. 29. — And therefore, says *Folkingham*, it was an observation of the antients, “quod lætas faciunt segetes sterco ratio, intermissio, & sincerum sparso.”

It was well known to the *Greek* writers on husbandry, that ashes were great improvers of grasses; and *Didymus* observes particularly, that they were one of the best manures then known: "For, being small, penetrating, and warm, they killed worms and all pernicious insects." And an anonymous author, about the middle of the last century, in a letter to the famous *Hartlib*, remarks, "that ashes produce the white and purple honey-suckle (clover) if sown on the ground in *February*, and that so copiously, till the field appears to be candied with ashes like a hoar-frost."*

And here (as ashes are a favourite manure with the writer of these *Essays*, when the question is concerning the improvement of grass-lands) if any one should object, that he finds nothing new in the practice now recommended, we can only answer, that people, in works of this nature, ought to seek for profit rather than novelties: And that every man should thoroughly consider the nature of his own soil, and vary his agriculture according to circumstances.

S E C T. VIII.

Whether Lucerne impoverishes the Ground?

Answered in the Negative.

WHETHER a quick-growing vegetable, of so long continuance as lucerne, impoverishes the ground, is a point that well deserves to be examined. Common husbandmen start at the very proposal of this query (having, for their own part, no doubts but that lucerne acts in this manner) and some of them, to say truth, have made the objection themselves. "How," observe they, "can a plant,

* Published in Quarto, London, 1656, and supposed to be written by Dr. Beati.

plant, which is cut near fifty times in ten years, produce any other effect upon the soil than to weaken and exhaust it?"

To which my answer shall be as follows: Only let it be remembered, that I cannot speak from my own personal knowledge to one particular part of the query, because I have not as yet outlived my first plantation; but many foreign cultivators of this vegetable assure me (and they are persons of great experience, as well as probity and veracity) that wheat and other kinds of grain have prospered surprizingly on the very spots of ground where lucerne-plantations had been discontinued, after having stood ten or more years. This being matter of fact, I shall say nothing farther concerning it, but set myself to inquire into the reasons why the ground is not impoverished.

First (at least according to my notions) the field is refreshed from time to time with gentle dressings;—Secondly, weeds will not greatly impoverish the ground, when our main business is to extirpate them:—Thirdly, one half of the field lies fallow,* and is stirred frequently for ten or eleven years, provided the lucerne lasts so long:—And, fourthly, it must always be remembered, that this grass ought to be cut, whenever a small number of healthy† plants begin to shew their flowers in full bloom: *Which circumstance well deserves notice*, for all plants weaken the soil and draw double nourishment, when they ripen their seeds.

Lastly, there is another reason which may be looked upon as equal to the four already mentioned.

* "Lands, cultivated in intervals of a proper breadth, produce, and lie fallow, as half to half at least."

Experiences sur la Nouv. Culture, tom. vi. p. 33.

† I name the word *healthy* expressly, because *sickly*, *stunted* plants, sometimes blow prematurely, and therefore are no true guides to us.

ed. All plants that bear leguminous flowers (as Lucerne, sainfoin, trefoils, vetches, &c.) enrich the ground, † and of this the husbandman has daily experience in the culture of clover.

It may be observed too, that all cattle are particularly fond of leguminous herbs, and even leguminous shrubs; as the *cytis* of every kind, the falsified *cytissus*, and the *algarobale*, or *Spanish valantia*, &c. &c.

I have ever looked upon the culture of leguminous plants, for the better support of cattle, to be *one* of those sorts of improved culture which Providence has decreed to man as a reward for industry in husbandry. The neatness, diligence, and constant little attentions requisite for managing them, seem to imply what Scripture has predicted concerning the *anxious* cultivation of the earth; and, by way of remuneration to the husbandman, he finds, by experience, that his cattle prefer such food to the very best common grass he can give them.

S E C T. IX.

Of the Head-lands, Hedges, and Aspects of a Lucerne-plantation.

WHichsoever way the cultivator determines to place and dispose his transplanted roots (and much depends on the situation and aspect of the rows) let him always remember to leave an head-land at each end of the lines or rows, about eight feet wide, for the horse and hoe plough to turn in: And, the moment the whole work of transplantation is finished, cause these head-lands to be ploughed, har-

† DURANTE observes, as long ago as the year 1585, that lucerne, even when sown the broad-cast way, enriches the soil instead of impoverishing it: And so do all leguminous plants.

Herbario Nuovo, Fogl. in Roma, p. 279.

harrowed, and raked clean; and sow them with fine ray-grass, to the amount of six ounces to every perch square; adding, if he thinks fit, a little white *Dutch* clover and hop-trefoil. These grasses may be mown occasionally, as green food is wanted; and thus no ground will be lost.

I have here given the preference to ray-grass, because it forms a firm sward, by reason of its strong matted roots. But if the weight of the horse, plough, and ploughman, should break the contexture of this new-raised turf the first year (which is an accident that may partly be expected) then gently scrape the broken earth together, and flatten it lightly, having sown fresh grass-seeds thereon,

Nor may it be amiss to make a ditch near the hedges to keep hurtful weeds from incroaching upon the field. Cut also, before seeding-time, all foul weeds that grow in and close to the hedges, and lop such boughs of trees and shrubs as drip over the lucerne, or obstruct the sun-shine. Otherwise it will fare with lucerne as with the suckers which *Virgil* describes growing under the shade of their parent-tree:

————— *Altæ frondes & rami matris opacant,*
Crescentique adimunt foetus, uruntque ferentem,

For lucerne dislikes shade and watery situations, but fears not a free air and open healthy exposures. Therefore, if possible, always transplant it where the sun has full power; and avoid, at the same time, as much as you can, the choice of all eastern and northern aspects.* An antient *English* writer on husbandry

* No one seems to have understood the choice of situations and aspects better than *Democritus*: Vid. *Geopon.* Lib. v. c. 4. Though there are reasons to think, that this antient writer on husbandry was, in general, more abstruse and speculative, than scientific and practical. "Whilst his mind," says *Horace*,
"was

bandry speaks with much good sense and experience upon this occasion. "A north-east aspect," says he, "guarded with plantations properly situated, is protected from the winds beyond all dispute; but the shade of the trees hurts the soil, and the effluvia from them taint the air. Hills and mountains therefore are the best protection."†

S E C T. X.

The Produce and Profits of an Acre of Lucerne.

IT is somewhat hazardous, before one has made experiments upon lucerne for ten successive years at least, to attempt specifying what quantity of green food or hay, and what profit, in point of money, an acre of lucerne may produce annually? Yet the little we have to say upon that subject, from the observations of six or seven years, shall be imparted candidly to the public.

It is certain that lucerne, at various cuttings, may grow in *England* ten or twelve feet high in an year; and that the stalks, at each cutting, being rarely more than a month old, are as juicy, tender, and nourishing as the leaves.

One perch † cut five times in the year 1758 (as was the rest of the plantation) weighed, taking the whole five cuttings together, one hundred pounds of green food; which makes the annual produce of an acre to be very considerable, even in the first year after transplanting: For in *that* year the experiment was

"was wandering far from its home, the cattle broke through his fences and destroyed his choicest fields."

Democriti pecus edit agellum,
Dum peregre est animus.

† Scot's *perch*: 7 Plot-form, &c. 4^o, 1576, c. 3.

‡ N. B. The perches, in the county where this first experiment was made, are 18 feet square.

was made. In a word, the produce amounted to about eight tuns of green lucerne, which was sufficient to keep two coach-horses near five months, and fatten a small heifer besides.—Yet this calculation must not be looked upon as an exact one, for the estimate was formed merely from motives of private curiosity, and without any view of making it public.

In the year 1761, as before-mentioned, I gave directions for making a small lucerne plantation in *Berkshire*. The little field, or close, consisted of one rood of ground, or a quarter of an acre; which we threw into fifty-four rows, each row containing one hundred and ten plants, or five thousand nine hundred and forty in the whole. In the second year after transplanting (and lucerne is not then arrived to its due size) and at the first annual cutting (which is not the best cutting, as the herbage suffers much from the winter) I weighed, out of curiosity, a parcel of the prime plants, which, one with another, weighed about one pound and a quarter each. But supposing that every plant weighed only one quarter of a pound, and admitting we give up the sixth cutting (which is more than one needs to do,) then the crop of forty perches, or one fourth of an acre, amounts to a very considerable return of ten tuns, at least, of green lucerne *per acre*.

Of larger crops, let others speak in the following part of this Section:

As to what, relates to myself, I would never chuse to raise the expectations of the public, in matters of husbandry, to an undue height. Nothing is more flattering to a true lover of agriculture and his country, than to hear that his own crops are exceeded by those of other cultivators, whilst they please themselves with the thoughts of having outstripped their instructor, who concealed, through diffidence, a part of what he had reason to believe,

or

or chose ground, of a *middling quality*, for the *field of experiment*, merely that he might not tempt people to expect too much. If it had been his design to have raised lucerne from a principle of vanity, and not general utility, he would have chosen an *hop-garden* just discontinued, and which lay hard by the field which bore the produce above spoken of.

With relation therefore to other men's crops, *messieurs de Chatevieux* and *Eyma* assure the public, (tho' they never cut their lucerne oftener than it is cut in *England*, and very little higher or larger than what may be observed in its growth here,) that they have received from *one acre*,* in one year, five tuns of

* Foreign books, relating to husbandry, are in some principal cases uninformative to us, except we know the *measures of land and grain*, in the countries where the authors writ. For example, how can an *English* reader in general form a judgment concerning the result of an experiment, if a *French* author says he drilled twelve *litrons* of wheat on a *saute* of land, and his production of grain amounted to a certain number of *septiers*? How, I say, is an *English* reader to understand the passage, if a translator does not explain himself by *English* measurement of land and grain? And this ought to have been done in all the late translations made from *M. du Hamel*, who is particularly exact in recounting his experiments. In this case, dictionaries as often mislead us as help us. Thus *Boyer*, and others, render *boisseau* a bushel: Now the common difference, between a *boisseau* in *France* and a *bushel* in *England*, is as 32 to 63, or thereabouts.

Similar names, assigned for certain superficial measurements of land, contain different quantities of land in different countries, and very frequently in the same country. We will give an example in the words *jugerum*, *acre*, and *arpent*.

It is natural to imagine, that the *Roman jugerum* admitted variations, as well as the *acre* and *arpent*. That which *Columella* mentions contained 28,800 *Roman* feet, or, in our measure, 27,849.

An *English statute-acre* consists of 160 perches, 16 feet and $\frac{1}{2}$ square. Each perch contains 30 square yards. Forty perches long by 4 broad constitute such an acre, which will be 240 yards long by 2 1 yards-broad. Of course such an acre will consist of 4800 square yards, or 43,200 square feet.

The *customary acre* of the west of *England*, &c. consists of perches 18 feet square, and contains about 19 more statute-perches than the statute-acre.

I shall

of well-dried hay. Now, if such be the case, then, agreeably to what is remarked in another place, * (one pound of green lucerne making but four ounces of cured hay) of course the produce of their acre must be twenty tons of undried fodder.

M. Eyma, † in the year 1755, had, at one cutting from a single acre, 14,445 pounds of green food. M. du Hamel, at that time, suspected some miscalculation in this account; but M. Eyma made it appear that the original computation was just.

The same gentleman cut, from what he calls one *journal*, ‡ as much lucerne-grass in a year as produced near five tuns of hay, or, in other words, about twenty

I shall say nothing of the antient *forest-acre* in *Nottinghamshire*, &c. whose perches were 18, 21, and 22 feet square. See *Fal-kingham's Survey*, 4th, 1610.

A *Welch acre* contains about two *English* statute-acres.

An *Irish* (plantation) *acre*, makes an *English* statute-acre and $\frac{1}{2}$.

The *little French arpent*, about *Paris*, contains 100 perches of 18 feet and $\frac{1}{2}$ square; which makes in superficial measure (*pieds de roy*) 32,400 feet.

The *middle arpent* consists in like manner of 100 perches, 20 feet square; which makes in superficial measurement (*pieds de roy*) 40000 feet.

The *great arpent* (water and forest measure, commonly called *mesure de roy*) consists of 100 perches, 22 feet square; and contains 48,400 feet (*pieds de roy*.)

The *acre* of *Normandy* has 160 perches, the perches 22 feet square; and contains superficial feet (*pieds de roy*) 77,440.

The *Flemish acre*, or *gammat*, answers to an acre and $\frac{1}{2}$ *English* statute-measure.

As to the *Italian acre*, each *tarò'a*, if I remember right, is 2 feet square; 25 *tarò'ole* make a perch (*pertica*;) and 4 such perches constitute an acre, (*jugero*.)

The *Swiss acre* contains 31,250 feet, *pieds de Bern*.

These remarks will serve to explain, throughout the present work, most accounts relating to experiments made by foreigners on certain quantities of land.

* See the next SECTION.

† The late death of this gentleman deserves much to be lamented by all lovers of agriculture.

‡ The measure of land, called *journal* in *France*, signified originally as much ground as one man and two horses could plough

twenty tuns of green fodder. This may be looked upon to be a very luxuriant crop ; and yet there is a memorandum annexed to the present Essay,* which shews that *England* has produced as much lucerne, or pretty nearly as much, at one cutting, and at every cutting.

But, in the last place, *M. du Hamel*, as the result of all his former experiments, informs us, that he has received ten tuns of hay (or forty tuns green) from a single acre of transplanted lucerne.—Now, considering the superior excellence of lucerne-hay, such crops, taken from an acre in one year, may be reckoned worth thirty pounds :—So that, from the account here related, I cannot help imagining that this must have happened in some year that was particularly favourable to the growth of lucerne. Less than half such a product would content me, and I dare say most of my countrymen.

From what has been represented by others, surely the public will not think me confident in asserting, that an acre of transplanted lucerne rightly managed will bring in 5*l.* a year, free and clear from all expences, and that for a considerable tract of time. Now certainly this advantage deserves well to be considered : For the husbandman is said to be a good manager who makes three rents each year : A first for the land-lord, a second for labour, &c. and a third for himself : But an acre of lucerne will for several years produce *five* rents, clear of all out-goings for rates, rent, workmen, manure, &c. supposing the land to let at 15*s.* an acre, as usually happens in most estates that lie at some distance from

in a day ; which computation must vary, as the soil is more or less manageable : At present, it actually does so in different provinces ; but I am informed that the *journal* where *M. Eyma* lived contained 888 *toises* square, or 31,958 superficial feet ; which production is very astonishing, as the ground did not make quite three quarters of an *English* acre.

* *Elements d'Agriculture*, 1762, tom. ii. p. 133.

from cities and market-towns. On the contrary, if land be dearer near rich populous places, the ground will be better, and the produce more advantageous. This gives lucerne its value near towns and cities, where two or three acres may be rented, but ten or twenty cannot; and sure it is some advantage in husbandry to make one acre supply the place of two or three, and especially where it is difficult to rent land, even at a very high price.

It is certain, that the profits, arising from transplanted lucerne, have been no ways-exaggerated in my account; for by some collateral observations it may be easy to carry the value of an acre something higher than has been here represented. Suppose *green vetches* (which are rarely cut more than once) and *green lucerne* to be of equal value as food for horses; (which is making a supposition no good writer on husbandry will allow to the disadvantage of lucerne :) Now a perch of green vetches (if the crop be good) sells for sixpence at seventy miles distance from *London*, and a perch of transplanted lucerne will weigh as much, or very nearly as much, at two cuttings, out of the four or five annual cuttings: Which (every circumstance being duly considered) brings an acre of lucerne (to say the least of its advantages in husbandry) to be of equal value with two acres and an half of vetches. Not to mention that lucerne is a perennial plant, and vetches are annual; which, upon the whole, makes a new difference in point of profit.

S E C T. XI.

A Difficulty in Columella explained, when he says, "That one Acre (JUGERUM) of Lucerne, will maintain three Horses plentifully the whole Year."

I Come now to a difficulty which always has embarrassed me. It is remarked with confidence by *Columella* and *Palladius*, *That a single acre of lucerne will maintain three horses plentifully the whole year round*: *Unum jugerum ejus toto anno tribus equis abunde sufficit*. Now the *Roman* acre, or *jugerum*, (for we ought rather to anglicize the *Latin* name) was *one third less* than an *English* acre. However, I have in part explained the difficulty in a note to page 30, where it is represented that the ancient *Romans* performed all the drudgery-work of husbandry by oxen, and not horses: And that a *jugerum* of lucerne would hardly maintain two large labouring oxen (by their own account of feeding them) throughout the whole year. For *Varro* tells us, that the husbandman allowed 20lb. of lucerne-hay, at night only, * to a working ox. Now 20lb. of lucerne-hay amounted to 80lb. weight, when the herbage was green.

As most writers 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, transplanting, and horse-hoeing were then unknown, (and as we have raised
greater

* *De Re Rustica*, edit. *Steph.* p. 23.

† *De Re Rust.* Lib. ii. c. 2.

‡ *De Re Rust.* Lib. iii. *Menf. April.* tit. 6.

greater crops by these means, than ever we raised by broad-cast promiscuous sowing, even in *Italy*) 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 it can be done either in *France* or *Italy* at present.*

The ingenious *Hartlib*, in more express terms than others, revived the same assertion, about one hundred years ago: But I believe something may be offered in his excuse, though he foresaw no objection to a seemingly established truth, and consequently never guarded against the objection.

This author (as was the fashion of the age in which he lived) took most of his notions in agriculture from the *Flemings*, who at that time gave the tone of husbandry to all *Europe*. Now a *Flemish* acre, or *gammat*, may perhaps verify his assertion to a good degree: For the *gammat* contained one of our acres and *an half*, being similar to the *Irish* plantation acre, and consisting of 160 perches, a 2 feet, superficial measure in every sense.

I have often considered how far it is possible to verify this assertion of the antients, even upon supposition that the *Romans* laid the main stress of ploughing, and other hard labour, upon large oxen, and not on horses; and that the farmers horses of those days were generally small hackneys, used more for riding round the fields, than for the heavier and more solid drudgery of agriculture.

Now, according to my ideas and experiments in husbandry, that person must be an excellent manager who can keep two good cart or coach horses, all the year round, upon an *English* acre of lucerne.

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For

* Mr. Miller gives me countenance in this opinion. For, when he says that one acre of lucerne will keep three horses the whole year, he cautiously assures us, "That he makes the report upon the authority of foreigners."

For these two horses will consume near 80lb. weight of green food in a day and night (with some dry food besides) and the owner likewise must allow three tuns and an half of hay, * for their winter-support, during a space of seven months. Now it will be difficult to maintain these two horses five months with green lucerne, and steal one cutting (that being probably the best cutting too) for making hay. [Nor will the hay then be sufficient, except mixt with straw, as recommended elsewhere.†]

Upon the whole, therefore, the most feasible way of justifying the opinion of the antients is to fat a large heifer of the *Somerset, Derby, or Lincolnshire* breed (and there may be green food enough to answer that purpose) at the same time you maintain your horses with daily cuttings of lucerne; and then expend the profit arising from the sale of the heifer, as far as it will go, in purchasing hay for winter.—

In this sense a fine acre of lucerne (our acre being one fourth larger than the *Roman*) may be brought to verify, or nearly verify, the assertion of *Columella* and *Palladius*.

M. du Hamel has approached nearer to the opinion of the antients, than I have taken upon me to venture. Questionless, he had better success in his husbandry-attempts, and consequently better reasons. His remark is, “That one good acre of lucerne, at three prime cuttings only, is superior in quality and equal in quantity, at each time of cutting, to the produce of two acres of natural grass in dry meads: Since such fields, if we act like prudent

* A most ingenious nobleman of great rank and station, who understands all the parts of agriculture to perfection, has been pleased to discourse with me upon this subject, and many other particulars contained in the present Essay; and, after a comparison of his calculations with mine, the quantity here specified seems to come very near the medium, supposing horses to have their customary allowance of corn at the same time.

See Sect. xviii of this Essay.

dent husbandmen, ought never to be mown but once a year; consequently one good acre of lucerne is equal to six-good acres of common pasture-lands: — And, if the same comparison be extended to downs, heaths, and commons, which are generally supposed to produce but one fourth as much as inclosed pastures tolerably well managed, then a single acre of good lucerne is as *twenty-four to one*, when compared with the last-mentioned grounds."

S E C T. XII.

Of feeding Horses with Lucerne. — Lucerne recommended to our Colonies.

HORSES fed with lucerne, except when employed in journeys, or other hard work, will need neither oats nor beans; and this we relate from the authority of *M. du Hamel*. Nay, thus much has been observed in *England*, that no food makes their coats so smooth, marbled, and well coloured: Besides, the good effects of such diet will appear from their liveliness and briskness. "I gave my horses, at the same time," says the *French* author, three bundles of hay, each excellent in its kind; but, after repeated trials, the well-judging animals have ever given the preference to lucerne. I then suppressed their allowance of oats, and fed them with the hay of this plant, chopped in the same manner as they cut straw for horses in *Spain*. Since that time, my coach-horses are in finer order than they were before, and have acquired such strength and spirits, that it is easier to make them move with velocity, than to govern them."*

Horses, at first, smell to lucerne very cautiously, taking it sometimes in a quarter of a minute, or sometimes sooner; and, having chewed three or four

Y 3

mouth-

* *Traité de la Cult. des Terres*, tom. iv. p. 523.

mouthfuls, seem to solicit earnestly for more. Some horses may hesitate longer, but they all* eat it, if a small parcel is laid in the manger, and you leave them quiet and alone. Nay, even the shiest of these creatures, having once known the taste of lucerne, eat it afterwards very freely. But any delicious nourishment, though healthy in itself, may prove unwholesome and dangerous, if given to cattle in *undue* quantities. † Therefore, when a large horse first feeds on green lucerne, increase his allowance gradually, for the space of three weeks, from ten pounds a day, to twenty, thirty, and perhaps forty pounds: But, as we pretend to no degree of skill in feeding horses, except for the purposes of common labour, it may be more proper to refer their each day's allowance to the determination of knowing and curious persons, who, after accurate observation upon a certain number of experiments, will easily discover the proper middle quantity which is most convenient.

Under this article, other precautions are to be taken.

Lucerne-grass must be given in small quantities, and at certain periodical distances, to such horses as are touched in their wind. ‡ — In which cases, lucerne-hay also may be slightly moistened with pure sweet water. — Remember also, that green lucerne is

* I have never yet known a horse refuse *true* lucerne, sooner or later; but have been informed, by persons of credit abroad, that they have observed an instance or two, where horses have continually abstained from eating it. Such very rare exceptions prove little or nothing against the grand general rule. Gramivorous animals may have their whimsies and antipathies, as well as men have them. I have often observed cattle to be very fantastical in their choice of food. The goat has the appearance of a coarse glutton, and yet, at the same time, is the most fastidious, capricious, epicure, in the universe.

† *Herbario di Castore* DURANTE. Fogl. in *Roma*, 1585, p. 370.

‡ This is related on the authority of the late M. Eyma.

is too full of nourishment for running-horses, except it be used to *soil* them early in the spring. Lesser quantities likewise must be given to fine hunters and saddle-horses than to coach, post-chaise, or cart horses: As the former are of smaller size; as well as of a more delicate habit of body.—And again, when horses, &c. are first fed with green lucerne in spring, it may not be amiss to take from them a little blood. This advice seems to be suggested by no less persons than *Pliny* and *Palladius*: And the reasons assigned are, that such food is flatulent, and increases blood. † But what the *Roman* authors just suggested old *De Serres* confirms, by his own experience, in express terms. †

And a *Swedish* writer, of good experience, is still more explicit upon this subject. “Those,” says he, “that would feed horses, kine, and sheep, as they ought to do, should give them a small portion of food, five or six times a day, at stated hours, and not at three times only. The cattle then will never be satiated, but eat with appetite, and make no waste.” †

Gentlemen who cultivate lucerne will always find it most convenient and profitable to order their best horses to be brought into the stable about eight in the morning, and appoint them their dividends for the day parcelled out into equal portions; one to be allowed them when they first come in, a second at mid-day, and a third at four in the afternoon: Permitting them to remain cool and quiet under shade, and sending them to the field at six in the evenings, where they may shift for themselves

Y 4

each

† *Dasi non ad satietatem debet, ne deplere sanguinem necesse sit. Hister. Natural. Lib. xviii. c. 16.*

Prius parcius exhibenda est novitas pabuli; inflat enim, & multum sanguinem creat. De Re Rust. Lib. v. tit. 1.

† *Theatre d'Agricult. Lib. iv. c. 4. p. 270. fol.*

‡ *Oeconomie Rurale Suedoise à Zurich, 1761.*

each night in some common pasturage.—Their continuing all day in the stable, during the violent heats, will free them from the vexation of flies, and prevent their skins from being tanned, or sun-burnt. The manure they thus make will more than pay the trouble of bringing them in; for lucerne cleanses their bodies surprizingly, and causes them to discharge large quantities of foul urine,* as will appear from the abundance of litter which they will soil, trample, and moisten in one day.

An horse will eat fourteen or fifteen pounds of lucerne and glean up every sprig, in about a quarter of an hour. He then usually lies down and sleeps.

Thus much might suffice for the present section; but having spoken so largely, and that from experience, of the superior excellency of lucerne as a food for cattle, and the advantages which arise from the culture of this vegetable; let it be permitted me to recommend, with some degree of earnestness, the care and culture of the same vegetable to all our colonies, and especially to such as are situated in warm climates, where green herbage is scarce either for feeding, or fattening cattle; and so much the rather, as the plant, here spoken of, is known to prosper extremely well in *Peru*, *Mexico*, and countries adjacent, from seeds that had been carried thither by the natives of *Old Spain*; And highly useful it is found to be in such hot climates, where the natural soil hardly produces any common herbage fit for cattle to feed on, the ordinary grass being of the *savannah* kind, immoderately long, dry at bottom, and rotten. On this account the husbandman brings green lucerne every day into *Lima*, *Quito*, and other cities;

* “ The urine of an horse will be more powerful in manure, than the dung of the same creature, except it be preserved in a moist shaded compost-dunghil.”

cities; and thus the town's-folks supply their horses, cows, &c.

This therefore may be looked upon as a plant capable of thriving in most soils and situations from the equator almost to the poles; so that, upon the whole, one may venture to pronounce it a sort of universal grower: A free citizen in almost every part of the known world.

If we cast our eyes on *Jamaica* * and *Barbadoes*, Lucerne might be found to be more useful (in the last named island especially) than in any other of our *English* colonies; land being scarce there, the inhabitants numerous, and food for cattle much wanted, as well as flesh-meat for man. Of course the two *desiderata*, in that island, are an augmentation of pasturage and an increase of animal food. It is true, the few weak attempts hitherto made for raising lucerne have miscarried, merely because they were weak, indolent, and injudicious; but *ab abusu ad usum non valet consequentia*. I should not blame our colonists so sharply, if what I say were not grounded upon the authority of persons well skilled in agriculture, who have lived in *Barbadoes*.—Let the

* I cannot learn that any attempts have been hitherto made to cultivate lucerne or sainfoin in *Jamaica*, though good grass-fields are much wanted in that island, and bring the owner great profit. The inhabitants have only cultivated *two improved grasses*; the larger panic, a native of the country, and indeed of most countries, (erroneously there called *Scotch grass*) and a species of *polygonum*, or *knot-grass*, which was first brought thither from the coast of *Guinea*. This vegetable, which affords good food to all cattle, but excellent food for sheep, is well known to some curious cultivators in *England*, being a smaller species of the famous *Maddington-grass*, which flourishes in one particular spot, between *Warmister* and *Ambresbury*, in *Wiltshire*. It grows in *Jamaica* almost as fast as transplanted lucerne does with us, and is reckoned near *Kingston* to be worth *so much per acre*, that I dare not venture to print the assertion. (See *Dr. Parr. Browne's Hist of Jam.* p. 133.)

Broad-clover seeds were carried thither about twenty years ago, and grew extremely well.

the culture of the plant in question only be managed, according to the *local* directions given in the last paragraph upon this subject; and then the probability of lucerne's prospering in this island is at least as *ten to one*: And surely the cultivation of lucerne is of vast consequence to any populous country, when ten thousand acres may be made equal to thirty thousand, and the land to realize those thirty thousand acres (in measurement) is not to be had.

From what causes then have our *Barbadoes* colonists miscarried? Probably from an ignorance of lucerne-culture in general: Or through a remissness in destroying weeds. We may conclude likewise, that the fields were not sufficiently pulverized to a certain depth, nor the intervals between the rows properly hoed, especially in summer. For such practice would have kept the roots cool during drowth and burning heats, (especially in the first and second years, when such danger is most to be apprehended *.) The roots also would have found freer room to expand themselves; and, as they had gained ground, the branches would have been enabled to draw more nourishment from the influence of the atmosphere. All these circumstances combined may, I think, account for the accidents abovementioned.—Nay perhaps (for I forgot to inform myself in *that* particular) the lucerne-seed might be sown broad-cast way in the manner of clover, no other grain of a quicker growth being mixed with it, in order to keep the young lucerne cool and shady: Which practice would have been as proper in *Barbadoes*, as it is absurd in *England*.

This example may convince the reader how dangerous it is to miscarry through wilfulness, self-confidence, or weakness, in making any new, useful experiments of husbandry. The whole neighbourhood

* Observe here, that the author is only speaking of very hot countries,

bourhood is dismayed at least for half a century: And of this I could give almost as many instances as there are counties in our kingdom.

Neglect therefore, as to weeding and hoeing, and want of attention to local circumstances, produced this miscarriage in *Barbadoes*. It will be in vain to alledge, that drowth and heats killed the lucerne. If such were the case, why should it flourish even in hotter places? And, as for *England*, I can safely say, from seven years experience, that I never saw an indispensable necessity for watering lucerne, except the first fortnight after transplanting, in case an extraordinary drowth supervened.

Let me also observe here *relatively*, and by way of exception to my general directions, that cutting the tap-root may be an improper practice, in any country which is situated within twenty degrees of the equator. Therefore, in such places, I would prefer sowing the lucerne in drills without ever disturbing or amputating the tap-root, and that for reasons too obvious to be here dwelt upon, as the roots ought to be kept cool, and penetrate as deeply as they can.

Having spoken thus of the *West-Indies*, it is natural to conclude, that the *Spanish* inhabitants make the same use of sainfoin (or at least they ought) as they do of lucerne: Of which former vegetable *Old Spain* has supplied them with a very excellent sort; but, at present, I cannot specify the name it bears in *Spain*, for the memorandum sent me concerning it is mislaid. The culture of *this* plant likewise deserves to be recommended strongly to our colonies,

S E C T. XIII.

Of fattening Cattle with Lucerne.

LUCERNE may prove of singular service to any populous, manufacturing kingdom, in fattening oxen, cows, heifers, and perhaps sheep and deer: For cattle, fed with this grass, may be made fit for sale more expeditiously, as well as earlier in the year, than the farmer, according to the *old husbandry*, can bring them to market; since it is very easy to begin fattening with lucerne in the end of *April*, and finish about the middle of harvest, when meat bears an high price.

When you fat these creatures, remember to proceed by gentle degrees, in a manner more cautious, if possible, than has been recommended in feeding horses. Nor should you omit taking away from each beast a little blood. After certain trials and observations, you may venture to give a large ox 40-lb. of green lucerne each day, and perhaps more*. Meanwhile the fattening cattle must be allowed to range in a spare-field, where they may glean moderate pasture, as before-mentioned, when we spoke of horses. Besides air, motion, and coolness are conducive to health, and promote an appetite in cattle, especially at the time of the year when they are fattened in this manner.—As to the quantities that are to be given to fattening cattle, I rather shew what *may* be done, than *how* it is to be done.—But time, experience, and more judicious observations, than what are here laid down, will bring these points to a greater degree of certainty than I can pretend to; for the experiment can never

* The antient *Romans* allowed 20lb. of lucerne-hay at night to a large labouring ox, that was not fattening.

Cato de Re Rust. p. 23. edit. *Steph.* 1543.

ver be truly made till thirty or forty head of cattle shall be fatted with lucerne at one time, and under one inspector.

It is a favourable circumstance in fattening cattle with lucerne, that such cattle may be purchased in **spring** (though, if bred on the estate, the profits will be greater) and cleared from the fields, or, in other words, consigned to the shambles, about *Michaelmas*: So that they will create no trouble nor inconvenience at winter, when the husbandman is most troubled and distressed to find support for his herds and flocks.

The *convenience*, as well as excellency of lucerne-food, is another argument strongly pleading in its favour; for it may be observed, that hardly a weed will be found in a large quantity of herbage.

—That not a sprig will be wasted.—That nothing is bruised, half-bitten, soiled, or breathed on.—

That the cattle, in effect, have a fresh field every day.—And thus one acre may stand in the place of several acres of common grass that are carelessly grazed and trampled by feeding beasts.—Add to this, that there will be no great need of looking out for a change of pasture, since the lucerne-food will be equally young, good, and fresh for five months, as every cutting is in effect the same thing to them as a new field each day.—And thus the cattle, which eat it, are not liable to become delicate and whimsical in their choice of food, which usually happens in the common way, when they are half fat: And then the husbandman is often distressed, not knowing where to find a fresh supply; till, at length, being quite chagrined and out of temper, he turns them over to another year:

— *Ibi omnis
Effusus labor.*

VIRG.

— *deplorata*

————— *deplorata colonis*
Vota jacent, longique perit labor irritus annis.

OVID. MET.

Again, there will be little to fear from summer-drougths: For, when the neighbouring fields of common grass are stunted in growth and half parched up, there will be scarce any visible alteration in the flourishing state of transplanted lucerne, provided it be refreshed with an hoe-ploughing. In proof whereof, in the year 1758, a fine crop was cut after twenty-one days growth, during the burning heats of summer, though no rain had fallen since the last cutting.

Beeves and kine appear to be very fond of this green food: For in meadows sown with perennial German clover and hop-trefoil (than which few plants are more delicious to cattle) they will trot immediately to their feeder, whenever he comes near them with a burthen of lucerne.—*But still remember, that kine, &c. always prefer such lucerne as has been cut a day or two, and stood twenty-four, or forty-eight hours, in a dry, shady place* *.

We

* The old French writers seem to be well acquainted with the truth of what is here observed: “ Ne donnez à ce bestail [la bouvine] que de luzerne seche, encores moderément.”

DE SERRES; *Theatr. d' Agricult.* fol. 1600. p. 270.

Again, lucerne must be given with more caution to cows than horses, for the latter purge greatly by urine upon first eating it, and afterwards in about ten days begin to grow fat.

LOUIS, p. 171.

Near fifty years before De Serrus communicated his husbandry-observations to the public, *Agostino Gallo*, a nobleman of *Brescia*, remarked, that, though cattle eat green, fresh lucerne with the greatest pleasure and avidity imaginable, yet still it was the most prudent management to leave it to perspire and dry twenty-four hours at least after cutting; since, in case such precaution be taken, it will not injure cattle, as fresh clover and trefoils are found to do:

We make no doubt but sows and pigs may be brought into extraordinary good plight by being fed with green lucerne, but, having never made the experiment, shall refer the reader to his own observations.—Nor have we much to say concerning feeding and fattening sheep with green or dried lucerne, partly because we took this article *pro confessa*, as all writers, antient and modern, agree that no one plant is so acceptable to them, or so nourishing. Thus much I know from my own experience, that sheep will eat lucerne green or cured, when they refuse every sort of food besides; nor can there be a better preservative, when the rot begins to threaten, than to give them green lucerne mixt with a little buck-bean,* or lucerne-hay moistened with fresh brine.

Under this article we shall only add, that, when oxen or heifers are fed for the butcher with lucerne, that the fat will spread itself like veins in marble thro' the lean flesh, which many travellers have observed in the famous mutton near *Montpelier*, called *mouton de garço*; both which circumstances proceed from a similar cause. The beeves eat lucerne, and the sheep feed on a wild sweet-scented rosemary.

S E C T.

do. “Anzi che ordinarimente la mangiano piu volentieri, vende, ma bisogna darliela dopo un giorno che é tagliata, percioche potrebbero patire per la troppa morbidezza che é in lei, quando la mangiassero fresca et non passa. Ma dandola al modo detto, non scalda, ne offende gli animali, come fa il trifoglio, & altre herbe fresche, anzi li mantiene sani et gagliardi.”

Giornata IIda della Medica, p. 37.

* The *marsh-trefoil*, commonly called *buck-bean*, is a plant of an unsavoury taste: And sheep, when sound and in health, always avoid eating it; but, when the symptoms of the rot begin to attack them, they search for it by instinct, and devour it greedily. Where such sheep are pastured, no buck-bean is to be found, for in a week or two they devour it all. Might it not be prudent, therefore, in husbandmen who keep large flocks, to cultivate an acre of these plants in some morassy ground, which otherwise would not yield them two shillings the acre? Some might be cut

up

S E C T. XIV.

The early Appearance of Lucerne.

BESIDES the superior goodness of lucerne as food for cattle, its early appearance is another particular advantage; for it comes in use long before all common grasses,* and even six or seven weeks before broad-clover or winter-vetches;† and at the same time continues much longer than the common grasses: Being young and blooming,

—*Ubi verna novis expirat purpura pratis.*

which makes it more desirable, not only as a needful support of cattle, but for soiling running-horses, hunters, and road-horses. In confirmation of this plant's forward growth, it was observed, *February 10, 1760*, (though an uncommonly severe frost had happened some weeks before) that the lucerne-shoots measured five inches in height, the common grass not having then moved; and, by *March the 17th*

up green for unsound sheep, and given them with lucerne, a^s occasion requires; and some might be made into hay, and mixed with their fodder.—I cannot remember that this advice has been given by any husbandry-writer.

* The earliest spring-grass, in *England*, is what our fore-fathers called *prim-grass* (*gramen vernal*, Raii & Merretii in *Pino-cast.* Thus they said *prim-rose*, instead of *vernal rose*.) This is one of the most valuable grasses, on account of its good taste and early appearance: It is no where cultivated at present; nay, the very name of it is forgotten.

Chaucer seems to have known it in its *Flower* and the *Leaf*, and describes it in language not unworthy of the best modern poet:

So small, so thick, so short, so fresh of hue.

† *Winter-vetches* are so called, because, being sown in autumn, they pass thro' all the winter's severity, and are larger, stronger, and sooner ripe than vetches sown in *March*; which usually bear the name of *spring-vetches*.—It is thought they are the same species of vetches.

17th, the stalks measured fourteen inches. *April* the 9th, the whole plantation was cut, being arrived to full maturity.

But what was taken notice of, *January* 17, 1761, was more surprizing; for some stalks of a lucerne-root (that were not visible, *October* the 10th, 1760) were then cut, which measured four lines of an inch round, and were nine inches high;—of a deep green colour, and very weighty. Another plant the same winter was cut twice (about four inches high each time) to make some experiments on lucerne-tea. *February* the 27th, it was measured and cut again, and the stalks were then seven inches high. *May* the 20th, it was cut a fourth time, being seven inches and an half in height. This was done to make trial, upon cutting a lucerne-plant as often as one pleased in winter, whether it were possible by so doing to check and kill it: But the event proved otherwise.

S E C T. XV.

Transplanted Lucerne preferred.—Sketch of a Parallel between Lucerne and Sainfoin.

AS lucerne is the first of all improved grasses, so *transplanted* lucerne greatly exceeds that which is raised in the common way like clover; for each plant arrives to the due perfection of its nature, having space to be produced at large, and air and sunshine to render it more wholesome and palatable. Besides, in this method of culture, you will rarely discover any yellow or sickly leaves; which happens too frequently, when lucerne is sown, like clover-seeds, with spring-corn.

Lucerne exceeds sainfoin in all respects, such as size, luxuriance of growth, frequent cuttings, rich taste, and high nourishment: But this is spoken of

fainfoin, as it is now cultivated by the *English* husbandmen, and usually sown with oats, barley, and some mixture of common grass-seeds.—Therefore, of course, so long as fainfoin is *thus* raised, there is no drawing any well-grounded parallel between *that* and *transplanted* lucerne: For, besides the advantages above-mentioned, the stalks of the *latter* are rarely more than a month old, and perhaps full as sweet and nourishing as the leaves; but the stalks of the *former* are hard and woody, being sown usually in spring, and not fit to cut for hay till *June* twelve-months; and, if it be mown a second time in *September*, then there is danger of impoverishing the crops; for manures cannot easily refresh roots, which, when not shortened by art, strike down into the earth ten or twelve perpendicular feet.

True it is we have made some observations on *transplanted* fainfoin, but have not acquired experience enough to speak to the purpose. Nevertheless, this plant, managed like lucerne, may produce as large a return in quantity, but less valuable (though highly valuable) in point of nourishment and rich taste. We thought it proper to make this observation, as some people may prefer fainfoin to lucerne: And, if that be the case, it is quite needless to say more, since they *both* like the same soil, sun-shine, exposure, and culture.

In confirmation of the large returns made by fainfoin, M. de *Chateauxvieux* assures us, that he cut, in the year 1756, from a field which had not been manured since 1749, two crops of *transplanted* fainfoin, which weighed green at the rate of about *eight* tuns an acre each time.

Nevertheless, it is some disadvantage to fainfoin, that the stalks are weak in comparison with those of lucerne, so that *it* is more difficult to be mown; and the branches, often drooping and lying on the ground, contract a mouldy putrified taste. Rats

and

ON *transplanted* LUCERNE, ESSAY II. 14F
and field-mice * make great depredations on its
roots, but rarely touch those of lucerne, tho' two
fields, one of each sort, may chance to join.

In some few points, but in one particularly, the
parallel between sainfoin and lucerne agrees ex-
tremely well; for both of them thrive slowly, when
grazed and trampled: Yet the heavy tread of large
cattle is not so hurtful to them, as the close nib-
bling of sheep.

S E C T. XVI.

The revived Practice of barrowing Lucerne examined.

AN attempt has been made lately in *England* to
cultivate lucerne, in the manner some of the
Roman husbandmen cultivated it in the times of *Co-*
lumella; and I the rather chuse to examine this point,
as I have always had a desire to make lucerne use-
ful (if that be possible) to the common farmer, who
has neither leisure nor inclination to employ himself
in correct and accurate husbandry. I have already
recounted my own ill success in an attempt for that
purpose, having sown lucerne, as clover seeds are
usually sown, when we have a mind to turn an ara-
ble field into pasturage.

The antient *Romans* had two methods of cultiva-
ting lucerne: ONE *in detail* (upon which principle
this Essay is partly founded) and ONE of a *more com-*
pendious nature. For the husbandmen of all coun-
tries would (if it be possible) gain a great deal with

Z 2

very

* *La Pluche*, author of the *Speſtaele de la Nature*, tells us that
these little animals are very pompous architects, for their house
consists of a chamber, ante-chamber, and store-room.

Field-mice, in *French*, *mulots*. The *French* also in some pro-
vinces call *grub-worms mulots*: (See SECTION xxxi.) but the
writer here cited seems to mean field-mice, as he joins them with
rats. *Exper. sur la Nour. Cult.* tom. vi. p. 155.

very little trouble: *Which* Providence, in general, seems to have denied us for the justest reasons imaginable.

(1.) The established practice, among the antient *Roman* cultivators, was the *first* of the *two* above-mentioned. They threw up the field in beds, ten feet wide and fifty long, with paths between each bed, in every sense: That the hoers might have access to the lucerne without mangling it, or trampling it. Besides, by throwing up part of the earth out of the paths, they made the beds somewhat elliptical, and obtained a freer air, &c. for the plants.

(2.) The *second* practice, among the antient *Roman* cultivators, aimed to reach the point designed by a *shorter cut*, if I may be allowed to make use of the husbandman's language. Instead of hand-weedings, hoeings, diggings, &c. in the 2d year they harrowed it boldly, but not rashly; this operation was followed by a lighter harrowing: After which the weeds torn up were to be raked off. This discipline was used annually, or oftener, as occasion required: And, concerning which, I shall speak more at large, before I conclude this section.

That such practice often succeeded among the *Romans*, more or less, is incontestably true: But, in matters of agriculture, there is no drawing an absolutely conclusive argument from *Italy* to *England*: And for this several cogent reasons have been assigned in the 52d page of our Essay. — That the present *Italians* barrow lucerne, instead of keeping it clean, and dividing the earth some other way, is more than I remember. If they harrow it, I think the circumstance would not have escaped my notice: But, to speak plainly, the culture of lucerne has declined in that country for an hundred years past, and upwards.

Certain it is, that we cannot always argue safely in matters of husbandry from *Italy* to *England*. And there-

therefore, out of numberless instances, let it be observed, at present, that *Italian* weeds, in general, are more of the *annual* than *perennial* kind: (Which usually happens in the warmer climate.) Of course, the roots of the *former*, which are placed at a shallower depth in the ground, are more easily dislodged than the roots of the *latter*; nor are they, in their own nature, so hardy and obstinate.* Hence it happens, that a slight harrowing (or a scratching rather) may avail more in *Italian*, than in *English* fields.

A single fibre of a *perennial* weed, if it be left behind in the ground, will prove a formidable enemy the year ensuing; so that harrowing can never make the havoc with *perennial* weeds as it does with *annual* ones: Especially in a country like ours, that has usually moisture and shade enough to cherish the young fibre in its tender state, when it is left dismantled from the parent-root.

I may add farther, that the settled summer-drowths and burning gleams of sun shine in *Italy* destroy the roots of a weed torn up, and exposed naked to the air many days (I might say weeks) sooner, than a weed of the same species would be destroyed in *England* with the same treatment.

These apprehensions made me diffident in attempting to revive the practice of *harrowing lucerne*, in the manner the ancient *Romans* harrowed it. A childish passage likewise in *Columella*,† and other husbandmen among the antients, was another reason why I never ventured to make the experiment. “Let the teeth of your harrow,” say they, “be made of wood, for iron is hurtful to lucerne.”

Z 3

Never-

* I cannot find that the old *Romans* ever sowed lucerne with spring-corn (though their country was less weedy than ours) nor with lupines, vetches, fenugreek, sweet melilot, &c.

† *De Re Rust.* Lib. ii. c. 11. See *Pliny's Nat. Hist.* Lib. xviii. c. 16. And *Palladius* Lib. iii. tit. 6.

Nevertheless, I am informed, that an ingenious cultivator near *London** has ventured upon an attempt which I had not courage to undertake, having revived this practice of the old *Romans* in our country, and, as I am told, with a good prospect of success.

Whether his method be the best and most efficacious way of managing lucerne is not the question: The point I always wished for was to enable the farmer, by any compendious method, to extract some profit from lucerne.

The practice revived by this cultivator, according to the accounts that have been given to me, is to allow five pounds of seed (when lucerne is sown with barley) to an acre; and fourteen † pounds of seed,

* *Mr. Rocque.*

† The practice of the old *Romans* was to allow near 40 pounds of lucerne-seed to as much land as is equivalent to an *English* acre. The directions given are remarkable: *Ut singuli cyathi seminis locum occupent X pedum longum, & V latum.* And I am the rather inclined to think this computation of mine a just one, as we agree with them (the antients) in the quantities they prescribed in sowing wheat, barley, and pease.—*Agostino Gallo* tells us, about the year 1550, that the *Italians* allowed, in his time, *tre oncie per tavola*: And I believe he means three ounces Troy-weight. But, without insisting upon this particular, the *tavola* was a superficial measurement of earth, eleven feet square; so that a *tavola* and half make an *English* statute-perch; and, of course, one of our acres requires about forty pounds weight of seed, or indeed more; for I have omitted the fraction of eighty ounces. See *Giornata seconda dell' Herba Medica*, 4^o, p. 35.

The *French* throughout the whole last century (before the methods of drilling or transplanting lucerne were known) allowed about as much seed as the *Italians* to a piece of ground that corresponds with an *English* acre.

Now, if our country abounds with weeds more than *Italy*, or *France*, it seems natural to me, that we ought not to lessen the quantity of seed sown to a diminution of more than one half; and the reason assigned by the antients, for sowing thick, appears to be a just one: *Opus est densitate seminis (medicæ) omnia occupari, internascentesque herbas excludi.* *PLIN. Hist. Nat. Lib. xviii. c. 16.*—The *Italian* author I have before cited is of the same opinion. If you sow thick, says he, *non vi nascono altre herbe, se non con difficoltà,*

seed, if the lucerne be sown alone. [These allowances appear to me too scanty; nor can I see any reasons for rejecting the practice of the old *Romans* in *one* part of the process, and reviving it in *another*.]

In the second year you are to mow it with all the grass and weeds, and then harrow it with a strong harrow,* as occasion requires.

Whether such an indiscriminating purgation be equal to the exactness of horse and hand hoeing, and whether it can, with common safety, pulverize the earth, and let in the influences of the atmosphere to one third of the depth commonly attained in horse-hoeing, digging, or by making use of the old *English back*, the *Italian zappeta*; or the *three-pronged spade*—are points that shall be submitted to better judges of agriculture than I can pretend to be.

That a common and moderate degree of harrowing may not *much* hurt (*untransplanted*) lucerne, in the *second* year, is a fact I have long known from experience. But violent harrowings (such as seem to me sufficient for the eradication of perennial weeds) must, in my opinion, maim a great many roots, and destroy others intirely.—If the result be contrary to what I apprehend in the present instance (for I approve not the practice even in *Italy*) it is the only example I know in agriculture, where confusion is the mother of order, and slight desultory labours get the better of patient and industrious ones.

I have already allowed, and still freely allow, that lateral or horizontal roots (which will be of an in-

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con-

* As Mr. *Rocque* has not favoured us with a print of his harrow, it seems to me, that no instrument will answer the purpose of an *harrowing-rake* better than one formed upon the principle of M. *Vanduffel's* drill-rake: (See a drawing of it in SECTION XXIX.) Because the handles which the harrower holds, in the manner of a ploughman, will enable him to inforce or lessen the pressure, as he may find it necessary, every moment.

considerable size in lucerne, whose tap-root has not been shortened by clipping) will send forth fresh side-fibres, when the former ones have been torn, or broken off, except the violence be over-great.

A few years will shew how far this operation may be attended with success in *England*. After the *third* year, I have new apprehensions of danger, which arise more from the bruising and trampling of the horses feet, than from the harrowing. For, when the bulb at the crown of the root is formed into a considerable size, and mashed by the heavy tread of labouring cattle, I think the crop will suffer extremely. If it does not, then all writers who have treated on lucerne have been in an error, for 1700 years and upwards: For they allow no large cattle, for this very reason, to graze a lucerne-field (where the pressure of their feet is less violent than in the act of harrowing) and assert also, that sheep ruin the crop by biting the part of the bulb above ground too close.—It is much safer, as I have found by experience, to wound a root of lucerne below the bulb, than to bruise and mash the bulb: The *former* may re-appear and come to good perfection in the space of twelve months, but the bruised mass of the *latter* remains on the top of the plant and putrifies; not to mention the water that lodges in its cavities. This may be partly seen in turnip-fields, when the bulbs are nibbled or scooped by sheep.

Having delivered my sentiments thus far on the *reviv'd method* of cultivating lucerne near *London*, the reader, according to his own judgment, may make choice of *barrowing his crops*, *sown promiscuously*; or *drilling*, or *transplanting* them. But, as I have observed before, far from drawing husbandry-conclusions from *Italy* to *England*, I am, in part, convinced that we cannot, in another sense, argue quite safely from the district of ten miles round *London* (for in that district Mr. *Rocque's* experiment

is made) to the remote counties of *England*: First, because the best cultivators will be always near the metropolis; and, secondly, because manures may be procured from thence on easy terms, and in great abundance. So that there may be almost as much difference between the meliorated soil round the capital, and that of counties remote from it, as between a field in the country and a country-garden: Or, to speak more properly, between the nature and soil of a common *Italian* field and an *English* field. Now, as my prime intention was to promote the culture of lucerne in every part of this kingdom and *Ireland*, it was on that account that I made my first experiments on *very middling ground*, merely through choice.

I shall add, in the next place, that, if from the universal consent of all *good* husbandmen, for 1700 years past, it has been thought necessary to allow *about* forty pounds of lucerne-feed, at a medium, to every acre raised by broad-cast sowing, are not five pounds of seed too small a quantity, when the lucerne is sown with barley; or fourteen pounds, when it is sown alone?

I will not pretend to say, but that all husbandmen may have been in an error about the quantity of lucerne-feed to be sown on an acre by broad-cast sowing, from the times of *Columella* to the present hour. Such a series of mistakes, in matter of fact, is *possible*, but not *very probable*. — If five pounds, or even fourteen pounds, are sufficient for sowing an acre of lucerne (the first *with*, and the second *without* spring-corn intermixed, in the common manner of promiscuous sowing) I then retract all that I have advanced upon this article; *totum hoc indicium volo*. But till these assertions are fully verified by *matter of fact*, as well as *continuance of the crop* (and the rather, as *England* requires, on *many accounts*, more seed-lucerne than *France* or *Italy*) I shall prudentially
make

make it my choice to adhere to the party of *Virgil*, *Columella*, *Palladius*, *Gallo*, *Hartlib*, and *Du Hamel*, who bear witness to their own experience, and that of their co-temporaries, for seventeen centuries, without *opposition*. Through diffidence of my own strength, I have taken post in the rear of the engagement, and, when once my principal chieftains are routed, it will then be time enough to surrender at discretion, and take care of my own safety.

But, to put the matter still farther out of dispute, *M. du Hamel*, in his *Elements of Agriculture*, (which work may be looked upon as the result of all his experiments) requires more seed for sowing an acre broad-cast way than even the ancients did. "The husbandman in *France*," says he, "if he sows lucerne *alone*, allots a pound of seed to every perch." [The perch he here speaks of is twenty-two feet square, and an hundred of them make an acre.] And from the same passage I conclude, that when *French* cultivators sow this seed with spring-corn (or vetches, as was once their custom) they allow near one half of the quantity abovementioned. It is true, they raise the seed themselves, or buy it at about three pence a pound; whereas, here, we are obliged to pay one shilling a pound.

Whoever considers this account laid down by the latest, as well as one of the most judicious writers on husbandry, will, I think, be inclined (and particularly with respect to the continuance of his crops) to prefer *transplanting* to *random sowing*. For if, in the *latter* case, the seed-lucerne will cost four pounds *per acre*, and in the *former* only eight or nine shillings; (the charges of *labour*, on one hand, being balanced against the charges for seed on the other) it appears, that the expences, either way, will be much the same; and surely no good cultivator will
 refuse

refuse to give his assent on the side of accuracy, cleanliness, and allowance of free space for the roots to expand in. Nay, I think, he will not withhold his approbation, if only *Hartlib's** and the antients forty-five pounds of seed are requisite for sowing an acre broad-cast way, and not eighty or ninety pounds, which quantity comes nearly to M. *du Hamel's* allowance for an *English* statute-acre.

Now, as I plainly foresee, that *English* cultivators will hardly ever be induced to allow the quantity of seed which the *French* author recommends (notwithstanding our farmers, in general, are much richer than theirs) I will make it my endeavour to qualify matters a little, and descend, as nearly as my experience in the culture of lucerne will give me leave, in order to accommodate things to the parsimony of our husbandmen in this respect.

All the concession, therefore, I shall make, is as follows: And it is the result of my own experience and observations, such as they have been. Whoever proposes to raise lucerne, with prospect of success, by promiscuous broad-cast sowing, and without an intermixture of spring-corn (and here I am only speaking upon the footing of husbandry at present) must allow, at least, one pound of seed to every four perches, statute-measure; which will amount to the proportion of forty pounds to each acre.

And here I no-ways take upon me to make emendations on M. *du Hamel*, whom I allow to be my superior in every article of husbandry. But, as I seem to foreknow, in part, that few, if any *English* farmers, will be prevailed upon to adopt the *French* practice, I have therefore ventured to diminish the quantity to as low a degree as I can possibly go, and preserve, at the same time, any probability of success. Nor should I have hazarded one half of a short paragraph upon the subject, if it had not been that

* See *Hartlib's* account in the *Testimon.* p. 9.

that the price of each pound of lucerne-feed, *in England*, is three or four times more than it is *in France*. And this makes another argument in behalf of *transplanting* lucerne in *our* country.

As to the sufficiency of small quantities of seed for an acre of lucerne, I can only say, for my own part, that, in the year 1758, I gave an acre of land a winter's fallow. [I am here speaking, as is my intention in all general experiments, of land at a considerable distance from the metropolis, and of a common-rate quality.] I ploughed and harrowed the ground to an exquisite fineness: Burnt the couch-grass twice, and, in *April*, sowed six pounds of the smallest ray-grass, five pounds of *German* trefoil, and ten or twelve pounds of lucerne, I gave the field a slight mowing the first year, being afraid to graze it.* In *June*, the second year, I mowed it again, and raked off, as before, the produce of hay very carefully. By this time the weeds began to make a formidable appearance: And, as I observed, such a thinly dispersed crop of lucerne, with no prospect of increase, but rather diminution, I ordered the plants to be taken up with a field-spade, and placed with other transplanted roots: Sowing ray-grass above ground, where the earth had been broken. Nor was there any reason to suspect the lucerne-feed, as a nursery was raised from it, at the same time the field was sown.

Two years before, for the sake of encouraging farmers, I sowed lucerne with a crop of barley; but the event no-ways answered my expectations.

Upon the whole, whoever, in remote counties, where the land is poor, sows lucerne with a view of harrowing it, must chuse the deepest and best ground he has; let such ground be *rather* strong than light, and a *little* inclinable to moisture, instead of being over-dry.

But

* See COLUMELLA, Lib. ii. c. 18. p. 76. Edit. Steph. 8o.

But if people have a mind to make farther attempts towards raising lucerne by broad-cast sowing, without the danger of harrowing the grown plants, or the trouble of transplanting, horse-hoeing, &c. permit me to run the risk of offering a new method of husbandry. It is true, I never made the experiment myself, being contented to procure lucerne (as Providence seems to ordain) with *some* care, as well as *some* labour.

Instead of sowing lucerne with *barley*, sow it with *panic-grass*:* But be careful to chuse such ground as is adapted to the nature of the last-named plant, and not unfavourable to lucerne: For example, clean, sound land, but not wet.

Panic-grass seems preferable to barley in many particulars. It will be *mown with the lucerne-crop in July*, † and will rise no more, in such manner as to do harm. The herbage it produces (especially when the shoots are young) is very agreeable to cattle. But barley stays too long in the ground; so that not only annual, but many perennial weeds have time to ripen their seeds and stock the field. The shade and drip of it, towards autumn, are very hurtful to the lucerne underneath: And from the time the barley-seeds are forming, till the time of their maturity, the roots suck a double proportion of nourishment from the soil. All which is prevented by mowing the panic-grass and lucerne in season; nor will there be any trampling and carting at harvest to bruise the young lucerne. As to losing a crop of barley, it is only arguing from mistaken economy.

* One of the best sorts of panic-grass seeds, for this purpose, may be procured from *Brescia*, in *Italy*, by the name of *panico*. We have a middling sort of panic-grass in *England*. Our ancestors knew it, and called it *rye-grass* (*gramen secalinum*) not *ray-grass*.

† This mowing will be but a small one. It would seem more profitable to stay till the end of *August*, but, by that time, most of the weeds would have dropped their seed.

my. If the barley flourishes greatly, the lucerne is defrauded and half-starved; if the lucerne be predominant (which is rarely the case) then the barley, all things considered, will little more than defray the expence of feed, &c.

Having given an acre of land, a summer's fallow, and stirred the ground by a second ploughing before *Christmas*, plough it again in spring, twice at least, before the end of *March*, and harrow it thoroughly. Then sow twenty pounds of lucerne-seed in a moist calm day, six or eight pounds of panic-grass, and four pounds of red, perennial, *German* clover, vulgarly called marle-grass. As the field ought to be pulverized to a great degree of fineness, and as the lucerne-seeds are buried or trampled too deep into the earth by horse-harrowing, it will be better to order the field to be hand-raked, and the rather, as the plat of ground is but small. Mow the crop in *July*, and towards the end of *August*, if some strong foul weeds appear here and there, let them be taken up carefully with a sharp field-spade made on purpose. Much may be done by one man in a single day. Let him carry a few ounces of marle-grass seed in his pocket, and, when he has removed the weeds, and returned the broken earth, let him drop a few seeds on the naked place, and just flatten the surface with a slight motion of his foot, or the back-part of the *bit* of his spade.

Lucerne, thus managed, may last four years.

I might easily take the credit of this discovery to myself (as the writings of the author, who suggested the hint to me, are extremely scarce) but I think it more ingenuous and praise-worthy to acknowledge, that I owe the idea to that excellent practical husbandman, *Agostino Gallo*.*

According to the best of my judgment, one very important conclusion may be drawn from what is here

* *Le Vinti Giornate dell' Agricoltura*, 4^o, 1569, p. 48.

here laid down; namely, *that whoever attempts to raise lucerne, with any crop of another species, by broadcast sowing, must cultivate some vegetable with it, which will bear mowing by the middle of July, and before the weeds have dropped their seed.*

This (or something upon *this principle*) is the only probable scheme I can recommend, on my own part, to common farmers for raising lucerne. The expence is small, and the labour short and easy. As to the success, *videbunt posteri.*

Lastly, by way of concluding this section, and with regard to the revived method of harrowing lucerne, great thanks are undoubtedly due to Mr. *Rocque*, who is attempting, with equal ingenuity and diligence, to accommodate the culture of lucerne to the taste (and I hope profit) of the common husbandman. This has been my principal point of view in cultivating lucerne; but to my mortification be it said (except there be any chance from the hint suggested by *Agostino Gallo*) I have never yet been able to reduce the management of this plant to any very cheap, easy, and compendious method.

S E C T. XVII.

Of Lucerne-Hay, with Rules for making it, and preserving it. A Carniolian Hay-stack, or Hay-Barn for receiving it.

THE *hay* of this plant is the most excellent of any sort yet known, and usually sells in *France, Switzerland, Spain, and Italy*, at a much higher price than the best upland hay. Nor does the richness of such delicious food (if taken with moderation) occasion any disorders in cattle; yet, in my opinion, it is too precious and valuable to be given constantly, or without mixture, even to favourite

avourite horses. It might perhaps make them *overdelicate* in their choice of food, when they went from home, and hay of an inferior quality was offered to them.

It seems, therefore, most advisable to preserve a quantity of this hay for the refreshment and better support of *sick* cattle; and another part, set aside for more general uses, may be cut into short joints with a straw-cutting engine, and mixed with common hay.

Cattle (perhaps no contemptible judges in their own sense of tasting, and guided by the assistance of that sagacity with which Providence has endued them) always prefer lucerne-hay to any other, if you lay different heaps before them: And of this I shall partly assign the reason in another place.* In proof of which assertion I will here add a short example grounded upon my own experience: A weaning calf, about five weeks old, refused to drink her milk, nor could any art prevail on her to take it. Having confined her in a little stall, the first trial was made with small fine ray-grass hay and hop-trefoil, which had been cut young, and cured without receiving a drop of rain. This the sagacious little creature refused. Then small handfuls of lucerne-hay were fastened to strings, and hung up within her reach: Which, when left alone, she began to taste, and, continuing to eat thereof every day, never afterwards touched any more milk, but took to grass very kindly.

Having mentioned the good oeconomy of not giving lucerne-hay profusely to cattle, it may be remarked occasionally, that it is partly a custom, in *Switzerland* and *France*, to give horses in winter regular feeds of lucerne-hay cut small, in order to supply the place of oats: And it is computed by *Monfieur de Chauteaurvieux* in particular (who first sub-

* See the 4th paragraph succeeding this.

substituted this *succedaneum* instead of corn) that two pounds of chopped lucerne-hay are an equivalent for a quartern, or two quarts of oats. Indeed, we allow that two pounds of lucerne-hay, dried, weighed eight pounds, when the herbage was green: — Yet still, if two pounds of lucerne-hay are equal in nourishment to a couple of quarts of oats, how are we to reconcile the practice of the old *Romans* to this calculation, who allowed 20lb. of the same hay, or what was tantamount to twenty quarts of oats, to a large working ox every night? * Either the allowance was a very generous one, and a very expensive one for farmers; or 20lb. of lucerne-hay were not so full of virtue and nutriment as twenty quarts of oats.

I have thrice made lucerne into hay, in parts of *England* very remote one from another; and each time with success; but my good fortune, as to weather, was accidental. For this reason I do not chuse to establish any general practice in husbandry upon casual success; for our climate is neither hot nor dry enough to expect much uniform good luck from this sort of hay-making; but, by calling in the assistances of art and prudence, we hope to counterbalance the inconveniencies of our climate, and shew that every industrious cultivator may either make lucerne-hay pure and unmixed in fine summers, or mixed by art in more difficult seasons for hay-making, and yet answering the purposes of excellent fodder to our best cattle.

Those who intend to cut one of their lucerne-crops for hay each year, † may, if they please, make a plantation with a principal eye to this purpose: In which case they must set the roots in double rows of three feet four inches distance, and an interval

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terval

* VARRO *de Re Rust.* p. 23.

† To cut oftener than once a year, upon the same ground, would impoverish the soil, and weaken the roots too much.

terval of six feet between every two rows; in which large interval the hay is to be made: Which practice will not diminish the crop one fourth part so much as may be imagined. Others again, who may not chuse to take so much precaution, may convey the herbage, when cut, into some adjoining field that is bitten down pretty bare,* and there perform the work in the best manner they can.—In short, one of these two methods must be followed; for, if you attempt to make hay in a common lucerne-plantation, the roots will send up fresh shoots in about forty-eight hours after cutting, and heavy juicy damp heaps lying thereon will blanch the new buds and stalks, and kill them soon.

Yet *two great difficulties* are still to be struggled with, namely, *the making lucerne into hay, and preserving it when made.* Many a good cultivator has been much distressed with the *facere* and *servare* †, under this article. Nay, these difficulties increase upon the husbandman in a climate like *England*, where solar heat is wanted, at least for this purpose; not to mention the variable nature of the weather, and the abundance of rain which falls. I am therefore for attempting to make only a tun or two of this hay every summer, either to mix with common hay, or give it in small quantities to favourite horses (when they droop in their feeding) or sick sheep and cows; especially the latter, before and after their time of calving:—And tho' we can never produce such stocks of lucerne-hay as may be seen in drier and warmer countries, like *Italy* and the southern parts of *France*, yet there is no just cause
for

* I once made lucerne-hay with great expedition, on a sun-shiny gravel-walk; but the grit and sand mixed with it, and the rather, as there is a kind of gum in the juicy parts of lucerne, which renders it apt to adhere to whatever it touches, good or bad.

† HORAT. *Epist.*

For repining, when we reflect that every tun of lucerne-hay weighed four tuns in green herbage; and something like such a decrease may be discovered in drying sainfoin and clover.—However, except I greatly deceive myself, the remarks and directions I am going to lay down, will *alleviate* the difficulty abovementioned, and perhaps in some fortunate summers *totally remove* them. But however, if the sickness and pining away of cattle could be put out of the question, it might be full as good œconomy to consume the lucerne *green*, as to dry and keep it.

As lucerne is not only extremely *juicy*, but that juice is of a *viscous* nature, it is extremely difficult (at least in *England*) to dry it for hay: So that the most skilful cultivator, when he attempts this work, must sacrifice in some degree to Fortune, or the *Bonus Eventus* of the antient *Roman* husbandman.*

At the time of drying, this viscosity rather *hardens*, than *evaporates*: Like gum-arabic water, or sugar boiled up for candying;—and therefore a delicious flavour remains for cattle, after the herbage is dried.

If heavy rains of long continuance set in, immediately after the lucerne is cut, the leaves in a few days will turn white, which is no very promising prospect; and, if strong gleamy sunshine succeeds, the swarths must be turned very gently, or else the leaves will fall from the stalks. Something of this kind will alarm the husbandman in the most favourable seasons; and the same may be observed to a lesser degree in making clover and sainfoin hay. Therefore, when the lucerne herbage is almost half-dried and put into grass-cocks, it will be proper not to turn those cocks with a prong, carelessly and hastily, as in common hay-making; but order a couple of hay-makers to slide two thin strips of a deal-

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board

* Bonus eventus rusticorum est dicitur. VARRON de Re Rust. lib. i. c. 1.

board under the cock, and turn it over bottom upwards with one gentle motion; and for the same reason, when these grass-cocks are to be removed in order to form wind-cocks, it may be most advisable to carry them on a hand-barrow.

When lucerne receives its last drying in the field, being packed up in large wind-cocks, I have found it no-ways improper to place an empty osier-hamp-er (with the lid or cover fastened) in the middle of the cock in one sense, but nearer the bottom than the top in another sense. Such a contrivance will in some measure answer the ends of a ventilator: and, when this hay is carried to the hay-barn hereafter described, place in the compartments a layer of clean, dry, sweet, wheaten straw, and another layer of lucerne alternately, till the whole is filled. This will not only prevent the lucerne from heating, but augment the quantity of forage: Besides, the straw will imbibe a fragrancy and moisture from the lucerne, and cattle will eat them mixed together with great pleasure: * And, if an horse or cow be very sick, it will be easy to pick out any proper quantity of pure unmixed lucerne-hay for them.

It may be observed farther under *this important article*, that, by intermixing alternately layers of straw and layers of lucerne, there will be no need of giving lucerne so much drying in the field, as might be requisite otherwise, and which can be seldom brought about effectually in our climate, except in some particular summers.

Yet still it must be remembered, that even when *this mixt lucerne-hay* comes to be stacked, it may be prudent not to make it into a rick according to the common custom, but protect it in a manner as shall be hereafter described.

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* *Bellingham Boy's*, Esq; in his account communic'd to the author, has comprehended the use of this expedient extremely well.

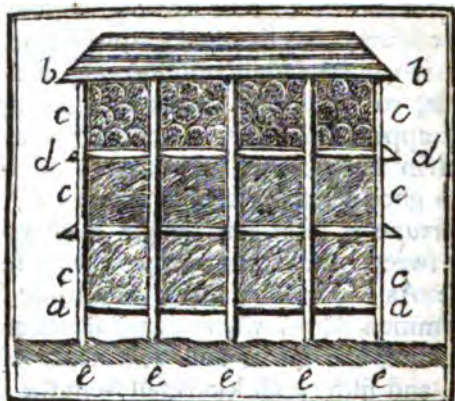
A greater difficulty yet remains, which is to preserve the pure lucerne-hay, that is unmixed with wheaten straw. It is easy to imagine, at first sight, that this hay is too delicate to bear being exposed to rains and winds in the open air; besides, the leaves of it are too brittle to bear stowing so close in the stack, as common hay is usually stowed; and consequently it will be found troublesome, if not impracticable, to make any thatch lie close upon it. Hence it appears necessary that lucerne-hay must be *housed* in some shape or other: And then it may keep good for some considerable time.* But the misfortune is, that few people have room to spare, or sweet, wholesome, proper places for such purposes: As lucerne-hay ought not to be stowed in our common barns, where damp floors and earthen walls might taint it, and abundance of dust, cobwebs, and filth of all kinds fall from the thatch. On the contrary, it should touch nothing but clean boards, and receive the influences of the air with as little rain as possible.

This being premised, perhaps, the following scheme of erecting a receptacle for lucerne-hay may prove, upon the whole, no bad expedient; and I rather mention it, as such a cheap, slight, commodious structure is no where made use of, but in one solitary unfrequented part of *Europe*.

What I mean is a little extemporary kind of edifice made use of by *Carniolian* husbandmen, being invented by them for better securing corn and airing it, or preserving the hay of curious tender grasses. There is something in the idea which seems to deserve a transient notice at least, as may appear by examining the following drawings made in *Carniola*, in the year 1749.

* Lucerne-hay, if rightly housed, will keep extremely well for three years. *Culture des Terres*. Tom v. p 529.

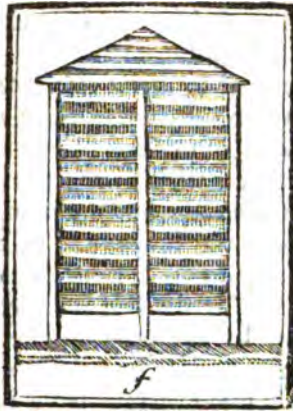
The Front and Back Prospect of a CARNIOLIAN
Hay-stack, or Corn-stack,



The frame of wood-work is weather-boarded at top (the boards over-lapping) and the eaves project, but not much. This little structure is twenty-one feet high from the undermost floor, a. a. to the hanging over of the roof, b. b. the length of the fore and backfront (if such an expression may be made use of) is thirty-two feet, and the measure of each compartment, c. c. (there being twenty-four in all) is eight feet in breadth, and seven high; which, by the way, our wood-cutter has not represented so exactly as it might have been done. The projecting ledges of the two middle rows, marked d. d. are fixed on or taken off occasionally. The posts, or supporting pillars, e. e. (which serve also for staddles) are three feet high, before you come to the stack. Every thing is the same in the fore and back front.

The

The Side-View.



This print represents the sides of the same hay-stack, weather-boarded, and each board lapping over as in the roof. These sides are of the same height with the front, and sixteen feet wide, with one upright boarded partition in the middle, at the letter *f*. which runs from end to end, dividing the cells into twelve and twelve, of the same dimensions in every respect.

Nor may it be amiss to apprise every person who erects a little structure of this kind, that great care must be taken in forming a strong fence or palisado round it, which may be of an oval figure, as best agreeing with the ground-plot of the hay-stack, which is an oblong square. In the front-part of this fence must be a five-barred gate for carts to enter. Such an hay-stack may be placed in any little meadow near the stables.

It may also be observed, in the second place, that, though *M. du Hamel* assures us *, that lucerne-hay, rightly made and housed, will continue good for three years, yet I am not sure that this may be

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asserted

* See the note to page 159.

asserted confidently with regard to lucerne-hay cured and housed in *England*. Nor is there much need of keeping the aforesaid hay after the spring-cutting of green fodder begins, except in small quantities for sick cattle.

I thought proper to make this short remark, by way of precaution: Leaving people at the same time to use their own discretion, gratify their own fancies, and consult their own convenience.

When the *Carniolian* husbandman wants hay or corn, he empties the lowermost cells of the stack first; and by so doing all inconveniencies from rain are avoided. If the said stack consists half, or intirely of corn, he sets traps in the emptied cells to catch rats, mice, &c. but, before that time, if he suspects that these vermin have begun to commit their depredations, he thrusts a small truncheon of young willow into each compartment or division where the corn is stowed, and, if the rind be grown and pilled, he takes the corn out in a fine day, and then replaces it, after having destroyed the vermin.

Little can be objected to this hay-stack but the expence of erecting it; and that objection will in a great measure vanish, if people can cut coarse timber from their own estate; for the workmanship will be rough and ordinary, and the whole framework after standing twenty years (which it will certainly do, if the outside and more exposed parts thereof are painted) will afford sound materials sufficient to erect an extemporary shed in the fields for grazing cattle: At the same time those who are desirous to save timber, may make a vacancy of five inches breadth between each plank or board, either in the floors or upright partitions; nor will corn or hay squeeze through such a narrow space.

The said stack or rick will contain about six tuns of hay, of which, when you carry it into the stable, take always one compartment or division at a time:

Such

Such persons as have not lucerne-hay enough, may fill one side with wheat, making the bottom of the sheaves front the weather.

S E C T. XVIII,

A Digression, wherein it is shewn, that many good practices in Agriculture may be borrowed from Nations whom we look upon as quite ignorant in Matters of Husbandry. — Exemplified in Harrowing, Covering Seeds, Breaking and Dividing the Earth, &c.

THE reader may smile to see any thing that is borrowed from *Carnolians**, *Croatians*, &c. recommended to the imitation of the more intelligent *English*; but there is hardly a country, how unskillful soever the inhabitants may be, but something may be gained, by attentively observing their methods of working. Thus the mines of *Misnia*, *Hungary*, and *Idria*, are, in many instances, carried on more dextrously and expeditiously than in kingdoms famous for mathematics and mechanics; and, perhaps, as many efficacious medicines have been learnt from the unenlightened *Indians*, as from *Theophrastus* and *Mesra*.

It were to be wished therefore, that nations, which value themselves upon their skill in agriculture, would not despise some practices of husbandry in countries less famous in that respect than their own. For there are marks of genius and sagacity in people, not renowned for their good management in cultivating the earth. Modesty and docility will never misbecome the most knowing practitioners. — And
thi

* I remember to have seen another instance of ingenuity in the inhabitants of *Carniola*: They construct a corn-mill upon rafts, or two large flat-bottomed boats, to which mill is added a small weather-boarded dwelling-house: And thus the miller ascends or descends the river, working, as he pleases, sometimes near one town (situated on the banks of the stream) and sometimes near another town.

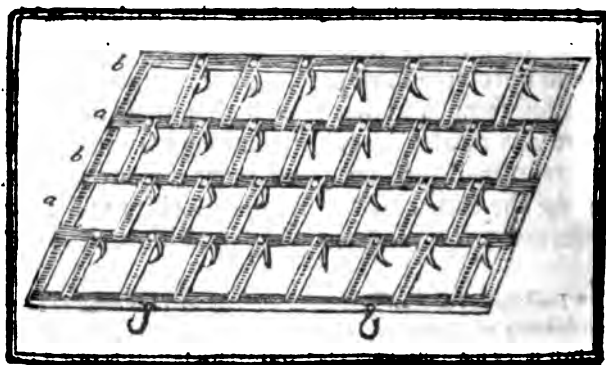
thus the circumstance, which chiefly raised the *Romans* to the sovereignty of the world, was their laying aside their own customs, as soon as they met with better among the people they conquered.

Thus, in a word, no small matters may be gathered in husbandry from nations seemingly buried in ignorance: And as continually dividing the earth, keeping it free from weeds, and a dextrous method of covering curious seeds when sown, constitute the principal part of this little system of husbandry; I shall beg leave to make a digression on the subject, which I hope will not prove unpleasing or unuseful: Bearing still in my memory the remark of *Columella*, namely, * that every country, in this, as well as other particulars, may impart some lights to the most ingenious husbandman: And, for this reason, I shall just sketch out the figure of a *Swedish* harrow, made use of even on the borders of *Lapland*.

A SWEDISH HARROW,

(The under-part turned uppermost.) To be drawn by two or four horses, in proportion to the resistance and stiffness of the soil.

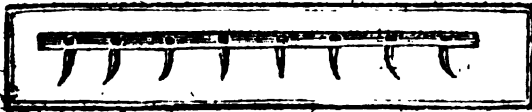
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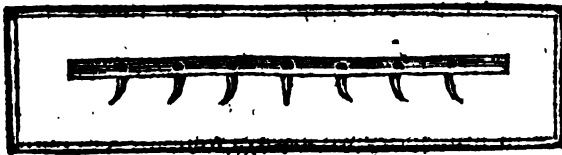
* There is no country where there are such ill husbandmen, but, in some particular or other, they excel. *HARTLIB'S LECTURE*, p. 78.

From the bare aspect of this harrow and the configuration of its teeth, or tines, we may easily judge how it stirs and cleanses the ground: But in this operation care must always be taken to draw it straight along the field first, and then cross-wise; which may be repeated as occasion shall require.

The *teeth* of the *Swedish* harrow in the rows, *a. a.*



The teeth in the rows, *b. b.*

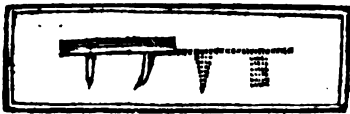


The teeth or tines of this harrow are larger, stronger, and take deeper effect than those of the *English* harrow, and stand as here described in the rows marked *a. a.* being eight in number, and only seven in the rows *b. b.*

This instrument is drawn straight forwards in a natural manner, the horses being fixed to a couple of hooks, represented in figure the first, which are the two central points unto which the traces ought to be fastened. And hence it is, that the *Swedish* harrow lies flat, and cuts more evenly than the *English* one, as the equality of pressure is better preserved, and the teeth succeed each other in alternate lines.

Again, the different effects which arise from the manner, whereby the teeth of the *Swedish* harrow perform

perform their work, may be fully comprehended, by considering the slight sketch which follows :



You here see, by the dotted points, that straight teeth or tines* pulverize a cone of earth, and curved teeth pulverize an oblong square.— And thus curved tines turn, disturb, and break to pieces one third more ground than *straight* ones; and still with greater success, if they succeed each other in alternate lines, as the *Swedish* tines do. They will also, like tooth-drawing irons, lay stronger hold on the roots of weeds, and better cover the grain that is sown: Which our farmers allowed, upon examining the drawing above-given: “*Our* harrow,” said they, “moves the seed, but *this* covers it; a circumstance in husbandry we always wanted, and lamented such a want.”

With them the experienced *du Hamel* agrees exactly in his last work. “The great use of harrows,” observes he, “besides tearing up weeds, and breaking the clods; is to cover the seeds well.”†

Having thus fully considered the *Swedish* harrow, I cannot help thinking on the occasion, that, remote as *Sweden* may lie from *Italy*, the idea of the *Swedish* harrow was first taken from the *Italians*, who revived husbandry about 200 years ago, and upwards: For which I can assign no other reason, but that the actual perusal of *Virgil's Georgics* in some; and the traditional memory of them in others, made the inhabitants of that country (*Italy*) extremely ambitious

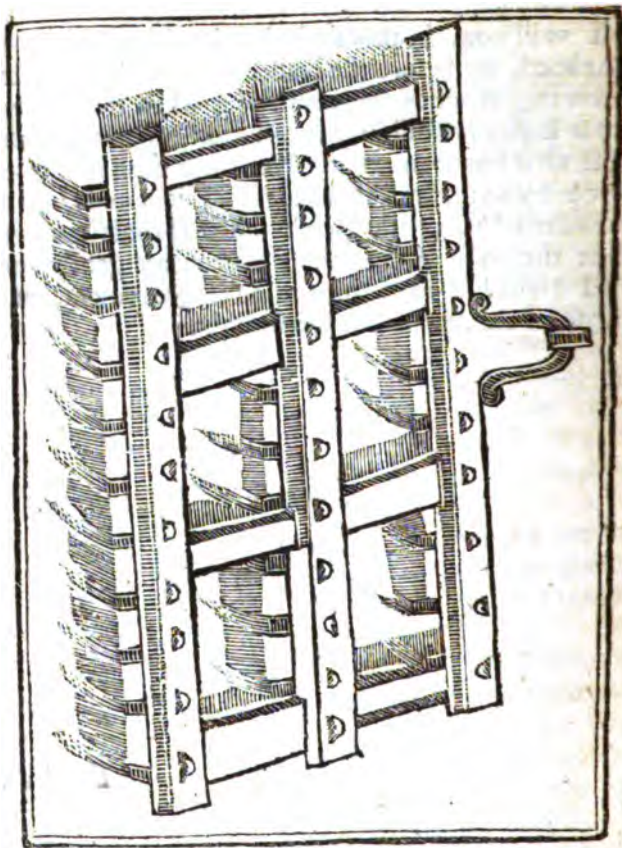
* The cutter, in this representation, should have made the tine on the left hand intirely straight.

† *Traite de la Culture de Terres.* Tom. I. p. 376. Tom. VI. p. 376.

ambitious to take the lead in matters of husbandry; but that ambition, alas, is forcibly extinguished, and now no more! The present laws and practice of the country seem to be calculated against agriculture; which (as *Augustus* said of *Haterius*) *suffla-minanda est*.

I will now, in proof of what has been before remarked, lay before the reader the copy of an *Italian* drawing, made in the year 1569, when the harrow, here beneath exhibited, was looked upon to be the best that was then extant: Nor has it been improved since by us: Nay, we have rather departed from it. Nevertheless, at the same time, I must observe, that the teeth of the *Swedish* harrow are gently curved (which I look upon as an improvement) and those of the *Roman* one are straight.

ERFICE *in Opera:*
O R
AN ITALIAN Harrow at Work.



From this slight sketch exemplified only by a few instances selected from many, it may fairly be concluded, that the man deserves some public encouragement who shall find out a better expedient for securely covering seeds, than the common method of
har-

harrowing can afford us at present; and that not only in regard to the attacks of living creatures, but the inclemency and other injuries of weather.

Nevertheless, our common harrow has its use in two instances, namely, in cleaving couch-grass and stubble from the new-ploughed earth; for by jumping and tottering along it frees itself from the incumbrance of trumpery, which would otherwise choak the teeth, and render the draught more difficult. The weeds and stubble being burnt, then the *Swedish* harrow may give the finishing.

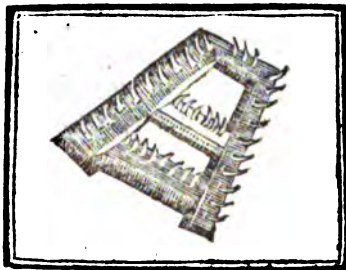
The *English* husbandman perceives, in part, some inconvenience in the common construction of harrows, and therefore (that each row of tines may not follow the first leading tines) drags the machine transversely, by fixing the drawing-part at one of the corners of a sort of square, which is unnatural, as it disposes the frame-work to waver and jump by starts from the ground: Nor does he, by making use of this expedient, diversify the lines of the teeth so much as may be imagined. So that, upon the whole, it is a modern attempt to rectify one error by committing a second: For I have the draft of an harrow by me, used in the year 1669, copied from a sketch made by *William Sberwyn*, a disciple of *Hollar*, where the instrument moves straight forwards, and the traces are fixed at each end, something like what may be observed in the *Swedish* harrow.

An *English* HARROW, in the year 1669.



That we may draw towards a conclusion of this article, the harrow, used in *France*, deserves some notice.

A *French* HARROW.



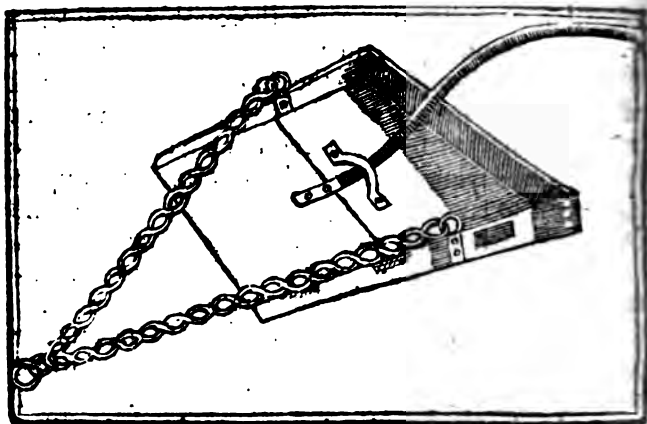
Again, the *Chinese* have an harrow with handles like a plough, which, when the horse or horses draw it, is kept down firm to the ground by the person who guides it, in proportion as need requires.

The

The idea of a husbandry-instrument of such an useful nature deserves to be thoroughly considered by all persons skilful in mechanics.* For the instability and jumping of the *European* harrow (and of the *English* harrow especially) renders it in a great measure ineffectual; and the remedying this deficiency, by laying one sluggish uniform weight upon it, seems to favour a little of barbarity; whereas the *Oriental* method has an air of dexterity and convenience, as the pressure may be increased or lightened every moment, just as appears to be requisite.

As the present Essay relates chiefly to the culture of grasses, and as the seeds of them require to be covered more lightly and elegantly than those of corn, let it be permitted me to add another improvement, which (so far as I can learn) never made its appearance in *England*, and possibly is forgotten even in *Italy*, where it took its rise. This husbandry-instrument, called, by the *Italians*, *traina*, was a sort of *drag* intended to level the broken surface of the ground, and cover the footsteps of the horses or oxen after harrowing. No invention of this nature can be more simple in its construction, or more useful in its effects: Of course, I feel no small pleasure in giving an exact representation of it, copied from the same authority I have mentioned before.

* The *Sieur Guerin*, a bookseller at *Paris*, has a *Chinese* drawing of this harrow.



The *Italian TRAINA*, or *Drag*, for smoothing the surface of the ground after common ploughing and harrowing, or for covering small feeds.

This operation is of the utmost consequence, after sowing common grass-seeds, where the least eminence, or depression of the ground in holes, perplexes the labourer at mowing-time, and is prejudicial to the crop: For grass that, is not cut low, never thrives.

We shall observe, in the last place, under this article of cleansing and pulverizing the ground, that it was an invariable rule, amongst the antient *Romans*, when they broke up foul lands, to destroy, as nearly as possible, every weed; so that (to use their own phrase) there wanted little or no *occation*, when the seed was sown: *Resolvatur terra in pulverem, ut vel nullam, vel exiguam desideret occationem cum seminaverimus**. *Occation* was breaking
ing

* *Columella De Re Rust.* Lib. ii. c. 4. *Varro* has given us a clear short definition of *occation*: "*Occare est comminere, ne sit gleba.*" *De Re Rust.* Lib. i. c. 31. In which sense *Horace* uses

ing the lumps of earth into small pieces, either with harrows, † or hurdles, ‡ (made to answer the purposes of a light harrow, like our bush-harrow) or with an instrument of husbandry called the *bident*, which resembled, in some degree, *Lawson's scrapell*, above described, or *what* our farmers call a *rag*: For it broke and tore the surface of the ground near the roots of plants; where the plough could not approach with safety.

This instrument was used by the antients in a double capacity; for, if it did not disunite the clods by tearing, then the workman turned the head of it, and, with a smart blow, beat the stubborn lumps to pieces: Hence *Virgil* says:

B b 2 — duros

uses the last mentioned word, when he speaks of foul, coarse, grassy clods and lumps of earth:

Rident vicini *glebas & saxa* moventem.

† ——— *Rastris* glebas qui frangit inertes.

Virg. Georg. I. v. 94

The *rastrum* of the antients signified an *harrow*, and rarely, if ever, a *rake*, as we translate it. It denoted usually an *heavy* harrow, in contradistinction to the lighter sort next mentioned, called *crates*. Thus

————— *Iniquè ponderis rastris. Ibid. v. 164.*

And *Columella* says, speaking of foul, coarse, strong land,

Tu gravibus rastris cunctantia perfode terga.

De Hortis, Lib. x.

‡ *Crates.*

Virgæ præterea Cæli, vilisque supellex;
Arboræ crates.

Georg. I. v. 165.

As also *wimineæ crates*, *salignæ crates*, in the same author; and metaphorically, *crates favorum*, *crates pistoris. Ibid.*

—— duros *jaſtare* bidentes *.

(To break the clods to pieces with a ſtroke of the *Barra* i. e. iron-beaded, bident.) And in another place :

—— glebaque *verſis*

Æternùm frangenda bidentibus †.

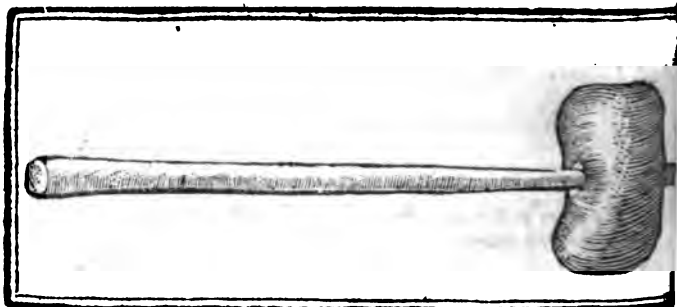
(The earth muſt be broken perpetually with a blow of the bident, turning the drag-part uppermoſt.)— Our *Engliſh* farmers, as long ago as in the reign of *Queen Elizabeth*, diſcovered the prudent intention of the *Roman* huſbandmen; and, upon theſe occaſions, called in the aſſiſtance of a more convenient utenſil, namely, the *maul*, or *clodding-beetle*, which I have myſelf ſeen uſed in ſome parts of *England*, and particularly in *Somerſetſhire*, and the *Vale of White-horſe* in *Berksire*, where the operation is called *bill-beetling*.

It may be perceived, at firſt ſight, where ſuch an inſtrument is moſtly wanted: Namely, in ſtiff, clayey grounds, after ſowing the ſeed and harrowing.

The old *Engliſh* MAUL,

O R

Clodding-Beetle.



Besides

* *Georg.* II. v. 355.

† *Georg.* Ibid. v. 399.

them, which were made in the former part of Charles the First's reign,

S E C T. XIX.

Of Neatness in Husbandry and Destroying Weeds in a Lucerne-plantation.---When to cut Lucerne for green Fodder. --- The Author dissuades the Cultivator from letting Lucerne stand for Seed, except in one Instance. --- Foreign Seed recommended.---How to act, if the Plants flower in the Nursery.

(1.) **C**leanliness and destroying weeds are the useful elegance of husbandry, and old *De Serres* recommends such practice, particularly in the culture of lucerne*.

As to hand-weeding the rows, there are poor people enough to be found who may perform that work at a moderate price; and, with regard to hoeing and cultivating the intervals or spaces, we have spoken already of various instruments made use of for that purpose by the husbandmen of the last two centuries, as well as the present, in different parts of *Europe*.

In hand-hoeing, or horse-hoeing between the rows, make it a point to set about destroying weeds in a *dry season* only; and, if rain surprizes you during the attempt, let the weeds, already eradicated, be hand-raked between the rows, and carried to the compost-dunghil. Remember also particularly, when you order the plantation-hoe to be used the first

* As the passage is very remarkable, it may not be amiss to transcribe the original words: "Curieusement conviendra echerber ou sarcler la luzernière en arrachant toutes les malignes herbes & plantes qui se feront fourrées, quant et les bonnes; & cela toutes heures qu'elles paroistront; de peur que par les temps devenues grosses, l'on n'en puisse par apres desongancer le lieu, au detriment de la luzerne, qui se perd, ou s'abastardit, par le voisinage d' autre herbage."

first or second year, that the labourer be charged to work so, that he never treads upon the weeds, after he has cut them up; for, in such case, his trampling on them, in a wet season, will fix them afresh in the ground, where they will take root and spring again. *Depressa resurgit* may be applied to a weed, as well as the palm-tree.

Upon the whole, it is impossible to recommend cleanliness and neatness (the characteristics of the *New Husbandry*) with too much earnestness.

Homer, speaking of old *Laertes*, who was preparing to make a quick-set-hedge *, takes notice, that his buskins and hedging-gloves were compact and tight, though old and mended, by which little circumstance, says an antient commentator, our poet (who exceeded all men in slight, but significant, touches of the pencil) seems to insinuate, that neatness, in matters of agriculture, is the first mark of a good husbandman.

And thus much for the encouragement of industry may be observed in general, that, though vegetables cultivated neatly, or according to the *new husbandry*, are not totally free from the injuries of weather, yet, upon the whole, they succeed better in unkindly seasons, than those which are cultivated the common way. This is speaking without any enthusiasm, and even without partiality.

My other remarks, under this section, are as follow:

You may safely cut lucerne, when the stalks, at an average, are about sixteen or eighteen inches high throughout the plantation, and when you discover that here and there a full-sized, healthy plant puts forth its blossoms †: For nothing baulks or

B b 4

checks

* *Odyssey* xciv.

† Sickly, stunted plants sometimes blow prematurely, especially after the roots have been removed by transplantation. Therefore care must be taken to pay no regard to such sort of flowering.

checks the growth of lucerne more, than omitting to cut it at a right age.

Nor need you give yourself much anxiety about preserving the seeds; nevertheless, for the sake of gratifying those that are curious in husbandry, we shall, in due time and proper place, take the whole of that process into consideration. My reasons for not being over-sollicitous on that head are as follow: (1^o.) The suffering plants to form and ripen their seeds will always impoverish their roots, and of course diminish their future production.

(2^o.) Never permit a lucerne-crop to stand for seed, except it be the last year you intend to continue it, and propose either to new-plant the same ground with lucerne (forming the rows of this second plantation in what was the intervals of the preceding one) or destine the ground in question to receive wheat, or some other change of crop.

(3^o.) Supposing you, or your neighbours, should stand in want of lucerne-feed; yet, even then, so small a quantity is necessary towards raising a seminary for one or two acres, according to the method here laid down, that, upon the whole, it seems most advisable to have recourse to the seedman, who may afford you (if he be honest, and has good correspondents abroad) the best foreign seeds at 12d. a lb.

(4^o.) If love of gain be your motive, and you raise seed for sale, (for the produce, from an acre well managed, may perhaps amount to the sum of seven pounds in money) I will take the liberty to suggest one little query partly founded upon my own experience; which is, that probably one half of such seed (at least in *our* climate) will not vegetate, when it is sown, for a plain reason, because it never came to a proper degree of maturity: For we want that strength of sunshine and constant settled weather which the cultivators of lucerne enjoy

in France, Spain, Switzerland, and Italy; since it is necessary, that not only the grain, but the pod or husk should be ripened thoroughly; for, if the latter be green and damp, it will taint the former, before you can discharge the seed from the husk.

(5°.) It may be remarked farther, that the nature of our weather in *England* is so variable, and our warm, sunshiny days so few and casual, that a crop of lucerne-seed will never be *all ripe*, or two thirds of it *nearly ripe, at the same time*. Perhaps, equal, uniform ripeness, throughout a whole seed-crop of lucerne, happens no where.—In this respect there is a *plus* and *minus* in all countries:—But such good fortune is ten times, I may say twenty times, less likely to happen in *England* than in the warmer and less showery countries abovementioned.

Lastly, if the force of all that I have here remarked could be obviated or explained away, yet still I should advise the *English* cultivator to purchase his seed-lucerne from foreign countries; for, in husbandry, the benefit of changing seed from places at a remote distance is inconceivable!

We will now proceed to some other directions.

If the plants, in the seminary or nursery, chance to blow by the beginning, middle, or end of *July*, cut them for green fodder as they stand: Not that such cutting will be considerable enough in quantity to be any object of œconomy, but we rather advise it upon prudential reasons: For the plants will be much weakened by flowering. *That* being over, you have then the power (according as shall be judged convenient) of transplanting the roots in *August*, or leaving them quiet in the ground without removing them, till the spring ensuing.

The small matter of herbage you may happen to cut, upon this occasion, will serve to give your cattle a foretaste of what lucerne is; and the great avidity,

avidity, with which they eat it, may help to animate the master in continuing his undertaking.

If the lucerne-plants happen to be of any tolerable size about the end of *October*, cut them carefully, notwithstanding they are but eight or ten inches high, and though the advantage of such green fodder be worth little or nothing: For it seems natural to conclude, that the drip and shade of the stalks will hurt the crown of the root in winter, as the leaves never perish intirely in the severest weather.

We have made this experiment with good success for five years one after another, yet no ways assert, that the plants would have suffered greatly, if the precaution had been omitted, because we never ventured upon that trial.

S E C T. XX.

*Better to cut Lucerne with a Reap-book than mow it.
---The Beauty, Variety, and Use of a Lucerne-plantation,---Lucerne good for Sheep and Deer.*

(1.) **A**FTER various observations founded on experience, it appears most advisable to cut lucerne with a *reap-book*, and not with a *scythe*: For a scythe, be the mower ever so careful, will frequently slice off such parts of the bulb as stand above ground; in consequence whereof, the root will weep, and the air and rain will cause it to perish. Besides, some weak and limber stalks will not stand firm to the stroke, but give way and rise again; others will escape the scythe intirely, by trailing on the surface of the ground out of the mower's reach. Nor must we omit, that a stalk or stalks, uncut, hurt the future growth of the plant.

For

For a branch, uncut, will send no fresh shoots from the buds in the crown of the root*.

But cutting with a reap-hook gets the better of all inconveniences; for, as the stalks of most lucerne-plants can be grasped in one hand, so the reap-hook, in the other hand, performs the cutting-part at once, and always avoids wounding the crown of the root. Nor is the operation tedious; for a boy may cut enough in an hour to feed four large horses a whole day. This being done, nothing more remains, but to weigh a large osier-basket (something like a chaff-basket) as also the quantity of herbage it will contain; or weigh the quantity that will fill a little cart made on purpose, till at length you bring your eye to a sort of gage; and thus you will be enabled to give your cattle very nearly what you intend to give them: Since a small matter, more one day and less another, will be of no consequence to horses or kine.

(2.) What *Virgil* says of a regular vineyard may be applied with equal propriety to a lucerne-plantation. No part of the *Georgics* is more exquisitely heightened than the passage I here allude to:

Ut sæpe ingenti bello cum longa cohortes
 Explicuit legio, & campo stetit agmen aperto,
 Directæque acies, ac late fluctuat omnis
 Ære ridenti tellus, necdum horrida miscet
 Prælia, sed dubius mediis Mars errat in armis;—
 Omnia sint paribus numero dimensa viarum;
 Non animum modo uti pascat prospectus inanem,
 Sed quia non aliter vires dabit omnibus æquas
 Terra, neque in vacuum poterunt se extendere rami.

Georg. II. v. 279.

The

* I have always had my eye upon this point, but never could observe that the stalks of lucerne made any shoots after cutting; but the bulb or crown of the plant grows larger, and pushes forth new buds from the sides, which become future stalks. Something of the same kind may be remarked in all grasses.

The agreeable view of a lucerne plantation may be considered as matter of some pleasure to every beholder; for the regularity of the rows, and the exactness of distance from plant to plant, amuse the eye, as a work of industry. Besides, what can diversify and enliven a landscape more, than to see a fine, thick, verdant grass, when other grass-fields are quite bare, or russet-coloured? — It is something also to behold, as it were, the returns of several springs in the same year. — To-day the field is clothed with verdure: To-morrow it is cut and removed: In a fortnight more it appears in all the bloom of fresh vegetation, and in another fortnight arrives to maturity. Thus the picture changes almost every day: A variety and repetition of appearances rarely to be found even in the vegetable world!

It is thought, the expression of *ver assiduum*, &c. which *Virgil* bestows, by way of pre-eminence on *Italy*, alludes to the frequent crops of *medica* (i. e. lucerne) which made their appearance five or six times a year, when our author wrote.

The poet's words are as remarkable as any that are to be found in the *Georgics*; and their true meaning, at least, seems to be preserved in the translation annexed:

— Hic ver *assiduum*, atque *alienis messibus æstas* *.

*Perpetual spring the face of nature wears; —
Harvests of other months the summer bears.*

I have elsewhere quoted the same circumstance, but diversified a little by *Claudian*. See SECT. I.

It is still an higher satisfaction to reflect, that, if transplanted lucerne be found to answer, and is thoroughly encouraged amongst us, the culture of
it

* GEORG. II. v. 149.

It will afford much employment to the infirmer poor, and to those who are too young, or too aged, to undertake any laborious work.

(3.) As lucerne ought never to be grazed, it is difficult to make many observations on it in regard to sheep; and the little that has occurred to us, worth notice, has been specified in the xiiith SECTION, p. 137. However, thus much is certain, *sheep* love it extremely, either green or dried into hay; and thrive wonderfully well, whenever they eat it.

At the same time it is to be regretted, that few or no experiments have been hitherto made on lucerne as a food for *deer*. For my own part, opportunities were wanting; and therefore it may be most prudent just to suggest the hint, and leave the matter to be farther inquired into by curious persons at their leisure and convenience. However, upon the whole, it is pretty certain, that, if lucerne be well managed, it will be fit to cut by the 10th of *April*; so that deer may be advanced in good plight, long before they can receive any considerable support from common grass. But, when you feed them, remember that the stalks, after cutting, should lie forty-eight hours in a dry, shady place, and then be given them in such a manner as directed concerning cows. SECT. xiii. p. 137.

As to young *swine*, no food is so healthy, no food so nourishing and agreeable, as the vegetable we are here speaking of; and that from the time they leave sucking, till they are put up for fattening: Before which time lucerne also has its use; for no sort of food enables the mother to give such large quantities of milk to her litter.—Here opens a considerable advantage to the industrious husbandman. Meanwhile common sense implies, that such lucerne must be cut up green, and carried to the sty.—The amazing growth of young pigs fed with

with lucerne will give the farmer great hopes of success and profit.

S E C T. XXI.

Farther Directions about Transplanting.—The Hardiness of Lucerne in bearing Cold.

WHEN you move lucerne roots for transplanting, though you dig but ten or fifteen inches deep, take care to give directions that the tap-roots be no-ways broken: And, if you hear the least cracking or snapping, order the workman to be more careful; for the scissars hurt not a tenth part so much as drawing up the roots with violence. When the plants are clipped, throw them into a large vessel of water, though they remain there only an hour; for the sun's heat causes them to droop and wither immediately: And yet this plant, of a contexture so delicate in its early days *, having once acquired a certain degree of strength and age, is able to bear the severity of a *Swiss* winter, where the winds and frosts are far more piercing than in our island. Hence also *M. du Hamel* tells us, "That, when the intense cold, in the year 1709, killed most of the olive-trees and walnut-trees in *France*, the lucerne received no damage deserving notice; and, in the severe winter, 1755, when the thermometer of *M. Reaumur* shifted variously from eight to thirteen degrees above blank, and, on *February* 3, when a thermometer, exposed to the open air, stood at sixteen degrees,

* *Agostino Gallo* says, that the *breath* of cattle hurts young, growing lucerne, if they are allowed to graze it. This may be refining a good deal: But of so delicate a contexture is the plant here spoken of, that I have observed the leaves to droop and shrink, if handled much with the warm hand. And thus, if *Pliny* and the modern *Italians* may be believed, the annual trefoil (which is of the same genus with lucerne) gives marks of being a sensitive plant, upon the approach of violent rains.

grees, the lucerne at the same time suffered nothing."

Our *countryman*, *Tull*, (for there is a lover of husbandry of the same name frequently cited by *French* writers) has declared his sentiments much to the same purpose as *M. du Hamel*.

"We need not, says he, much apprehend the danger of *English* winters, for lucerne will endure those which are more rigorous. In the principality of *Neuchâtel* the winters are so severe as to kill all the rosemary left abroad, yet lucerne survives them there. This proves it more hardy than rosemary, which is planted for hedges in *England*; and here is scarce twice in an age a frost that will kill it. I have known one single lucerne-plant, in a poor arable field, that has stood the test of twenty-two winters, besides the feeding of sheep at all seasons, and yet remains as strong as ever. What quantity of hay this plant yearly produces cannot be known, because, at those times that cattle are kept from it, the hares constantly crop it, being sweeter than any other grass *."

But *Mr. Millar* gives us a stronger proof of its hardy nature. "That the cold, says he, will not injure this plant [at a certain age] I am fully satisfied: For, in a very cold winter, 1728-9, I had some roots of this plant, which were dug up in *October*, and laid upon the ground, in the open air, till the beginning of *March*, when I planted them again, and they shot out very vigorously soon after; nay, even while they lay on the ground, they struck out fibres from the under side of the roots, and had begun to shoot green from the crown of their roots †."

SECT.

* *Horse-keeping Husbandry*, 8vo, p. 201.

† *Dictionary*, Article *Medica*.

This ingenious author appears to be almost as well skilled in agriculture as in gardening: Witness what he says concerning

S E C T. XXII.

Of the various Accidents and Injuries to which Lucerne is liable.

HE that cultivates lucerne, or indeed any thing that is curious and valuable in husbandry, has many difficulties to labour against, and many enemies to contend with. For, according to the best observations hitherto made, few things hurt lucerne more than wild, coarse grasses, weeds of all sorts, cold, marshy grounds, wet clays, and stagnating waters; for, though water affords one part of necessary nutrition to plants, yet water, without a certain degree of warmth, is rather hurtful than advantageous *. There is also another danger: For, as this vegetable is usually transplanted in *August*, there may be weeping springs in the field, which are not discoverable at that season. An accident of such sort surprized a gentleman the first winter after transplanting, yet he preserved his lucerne (and has done so for three successive years) by sprinkling

ing the neglect of cultivating grasses in general, and the common erroneous practice of sowing grass-seeds with corn, &c. He has also thrown out several valuable hints concerning the mistakes and prejudices of farmers.

* Wherever the *myium*-moss grows, the *red-rot*, and the *marsh-pennywort*, not to mention many other hurtful herbs that may be specified on a more proper occasion, there the water is uncommonly cold, and perhaps of a poisonous or mineral tinge.

The test or criterion here recommended is the shortest, cheapest, and most easily attainable of any thing I have laid down in these Essays, and has only been omitted by husbandry-writers, because men scorn to contemplate what is near them and under their eyes, in order to speculate upon that which is far distant and above them.

Grazing all low lands, where such plants grow as above described (except perhaps in the height of summer) will occasion the death of many sheep, and cause some disorders in larger cattle,

sprinkling the wet patches with frequent dressings of fresh soot, or new chimney-ashes, in *November* and the end of *February*.

It must be observed likewise, that this plant never flourishes near foul weedy hedges, or under the drip and shade of trees, or close to garden-walls.

Insects also hurt it frequently, but not so much in *England*, as in warmer countries.

(1.) It hath not yet been fully discovered by us (though something of the kind happened in the spring of the year 1762*) that turnip-flies mangle and destroy young lucerne-leaves; but, if they should attack the nursery (as I have reason to think they will at some particular junctures) or fall upon the young shoots in the plantation, you must apply to the gardening-pot, and sprinkle the plants copiously with an infusion of soot in water, made very bitter. This, in the present case, is both a medicine and a manure.

Virgil and *Columella* were both of them fully convinced, that certain steepings for seeds, and infusions for watering young plants, and guarding them from insects, were not only easily procured, but had often been applied with good success. The recipe's mentioned by the former of these poets (I say poets, for the passage I shall transcribe from the latter, is taken from his *poem on Gardening*) are too well known to be inserted at length, *Et nitro prius*, &c. † but the advice of *Columella* is as follows:

C c

Sed

* We never knew these insects pernicious to young lucerne, till the time above specified, there being a drowth and harsh northern and easterly winds, more or less, from the beginning of *April* till the 6th of *May*; an unlucky setting-out to many people, who began their lucerne-nurseries, for the first time, on the transplanting principle, and knew not how to prevent the evil, or lessen it by having recourse to soot-water, which, at one and the same time; is a corrective of the soil; an excellent manure, and the best remedy we know against the troublesome attacks here spoken of.

† *Georg.* l. v. 194.

*Sed ne dira novas segetes animalia ledant,
 Profuit interdum medicantem semina pingui
 Palladia (sine fruge salis) conspergere amurca,
 Innatave laris nigra satiare favilla.
 Profuit & plantis latices infundere amaros
 Marrubii, multoque sedi contingere succo.*

De HORT. CULT. v. 351, &c.

Lest hurtful insects ravage and despoil
 The tender produce of th' expected crop,
 Insteeep the *seedling-grains* with previous care
 In rich *Palladian* lees,* (th' expence of salt
 May frugally be spar'd) or sow *them* mixt
 With fable foot and ashes dusky-hued,
 Kind presents, which thy grateful *lares* give.
 Nor is it labour thriftless to bedew
 The embryon-plants with strong infusion drawn
 From sedum,† or from hore-hound's bitter juice.‡

There is an insect in *France*, called, by the country people, *barbotte*, and described by *Des Serres*, as *une petite chenille noire*,§ or a little black caterpillar, which, in time of drought, preys on the young shoots of this herbage, even one or two years after transplantation; causing the leaves to appear sickly and discoloured. We never observed these mischievous creatures in *England*; but, if they should be discovered, it will be proper to cut the lucerne, though but six or eight inches high; and bestow on the rows, in moist weather, or when large dews fall,
 flight

* The lees of olives.

† The sedum, here meant, is the *larger* sedum. *Columnella* mentions an infusion of this plant in another part of his work, where he is speaking of young turnips, and the turnip-fly.

‡ The hore-hound, here prescribed, is the *black*. The *Italians* still call it, from the *Latin*, *marrubium*, *marrobbio*.

§ See *Theatre d'Agriculture*. fol. p. 273.

Digbt repeated sprinklings of fine new foot; or, if you live near tobacconists, the dust, at the bottom of their hogheads, may not be amiss; but this latter remedy is only mentioned upon the authority of others.

(2.) And here it may be just observed, in case you apprehend that a very common grub or maggot may destroy the young fibres of lucerne-roots (which with me is more than doubtful) or infest and injure a field of new-sown wheat (a point still more certain) it may not be amiss to imitate the practice of farmers in *Perigord*, which is to put soon after sowing in the four corners of the field (if the field be not large) an heap of dung amounting to a dung-cart load, or, in short, such a quantity as may preserve the heat; and, if you open these heaps about *March*, you will find them full of insects, which have many legs, and their head is armed with two shells, which, like a pair of scissars, cut the roots and fibres of young corn for food. — Therefore in the month abovementioned, provided the headlands will give a little cart room to pass, you may remove these heaps to some reservoir of manure, as marle, virgin-earth, &c. &c. but not to the common farm-dunghil which is to be made use of in the same year. In short, to no dunghil at all; for these insects will not easily die, except the heat is quite evaporated.

The inhabitants of *Perigord* call this insect *mulot*; in the *Patois* dialect, it is called *trauque-courge*, i. e. *gourd-piercer*; our farmers (as I believe) give it the name of *grub-worm*, and assure me it becomes a chaffer in summer: For about *May* you may dig it up, with wings half formed.

These insects live two winters under ground, in the shape of the worm abovementioned; and destroy the roots of corn and fine grasses. In the third year they undergo a metamorphosis, and take the

form and name of *chaffers* about the months of *June* and *July*.

(3.) When you see a plant with yellow sickly leaves, without having received any external injury, you will generally find, upon examining the root carefully, a little lively carnation-coloured worm which causes this mischief: And here, again, foot-dressings are the best remedy (except the ground be of a burning nature.)

(4.) To this insect may be added another, called, by the *French* writers on husbandry, *pucceron*, and, in *English*, *vine-fretter*,* which fattens also on the roots of wheat, and all garden-plants of the leguminous kind.

(5.) Whether moles eat the fibres of young lucerne-roots is more than I know, but certain it is, that they loosen the hold of the plants, and consequently do them great mischief, immediately after transplanting.

But there is a worse enemy to lucerne than all those that have been hitherto mentioned, and that is an owner who neglects cultivating the intervals, cleaning the rows, and manuring the plantation: For, in a word, except a person manages lucerne according to rules of art, he had better discontinue the project of raising it, and break up the ground once for all. *Martial's* remedy may be applied here as a good one, though prescribed only to a poor unsuccessful poet:

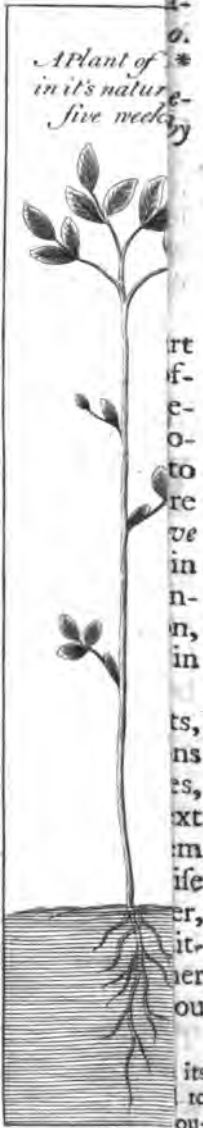
————— *Una litura potest.*

One perpendicular line, drawn thro' each page,
Will free thy work from faults and critic's rage.

Or,

* *Columnella* seems to have had some idea of a little mischievous insect of this kind, for, after having mentioned the depredations made by pismires, snails, and caterpillars, he adds,

Parvulus aut pulax irrepens dente laceffit.



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LUCERNE
Natural Size;
18 old.

LUCERNE Leaves
in their natural Size.



The Flower
in it's natural Size.

A Plant
one week old.



— Or, to speak more immediately to the purpose in the language of *Pliny* the elder on the same occasion, *si evicerint herba, remedium unicum est aratio.*

— *Sæpe vertendo, donec omnes aliæ radices intereant:**
If weeds happen to overpower the crop, the only remedy is ploughing, till every noxious root is destroyed by disturbing, turning, and pulverizing the earth.

S E C T. XXIII.

How to know young Lucerne in order to weed it.

IT being highly probable, from the larger part of the preceding section, that, as insects may often attack lucerne in *England*, though not so frequently as in warmer countries, it behoves all people, concerned in nurseries or plantations of it, to make themselves well acquainted with the figure and shape of this vegetable, *when it first appears above ground,† or when it is about five weeks old*: But in spring and summer they must be particularly attentive, during dry harsh winds in the former season, or when great heats and drought may molest us in the latter.

Thus, by distinguishing and knowing the plants, you may prevent, in a good degree, the depredations of the fly, which will discover the two seed-leaves, in all probability, sooner than you; and, in the next state of the plants, you will be able to weed them with safety, and may form a judgment likewise how far the nursery is properly stocked;—whether, for example, you ought to let it stand (after waiting a fortnight to see the full event:) Or whether

C c 3

you

* *Hist. Natural.*

† By the manner in which lucerne comes up, and makes its first appearance above ground after sowing, I am inclined to think, that the seed splits itself into two lobes, that form a couple of seminal leaves; from the center of which a third leaf afterwards shoots forth.

you may not be obliged to new-dig the ground and sow it afresh: Though, as yet, we never had the ill fortune of being reduced to make this disagreeable experiment.

As to lucerne in its infant-state, no better direction can be given to know it, than by saying it comes up like clover; Nevertheless it varies a little, after it is a month old; and begins to put out three leaves; so that the master must be well acquainted with it under its first appearance, and the weeders under its second.

S E C T. XXIV.

Rules for saving and gathering Lucerne-seed.

I Will, in this section, disengage the promise I have made to the reader of saying something concerning the manner of setting lucerne apart for seed, together with the whole process of saving the seed. The substance of the present article will be matter of curiosity at least, and, perhaps, of some little utility. Nor would a treatise, on the culture of lucerne, be complete, without a chapter on this subject.

If the attempt of saving lucerne-seed in *England* should appear to be worth carrying into execution, I flatter myself, that the observations here made, and the directions here laid down, will be conformable to the practice of the most skilful cultivators in foreign countries.

I have saved lucerne-seed with no great difficulty in *England*, but never could see a reason for preferring it to good lucerne-seed brought from the south of *France*, *Italy*, *Switzerland*, and *Spain*. (1°.) The price of foreign seeds (at least for twenty years) will be very little higher than our own.—(2°.) Such seeds will be better ripened; and (3°.) some advantages may result not only from change of seed, but
be.

because such seed was raised at a considerable distance from us.

At the same time it is readily allowed by me, that we may save lucerne-seed almost as easily as the seeds of broad-clover, sainfoin, trefoils, &c. but, to say the truth, I would sooner receive all those seeds from a warmer and drier country than ours.

Let me therefore continue to observe, as before, that if persons are determined to save seed from *transplanted* lucerne (which will certainly yield the largest and ripest grain, each plant having enjoyed free air, room, sunshine, &c.) we then only grant this indulgence to them the year before the ground is to be broken up, and the crop discontinued.

I would give the same advice to those who have raised lucerne by *drilling*. And, if either *one* or the *other* ventures upon the undertaking, I would counsel both the transplanter and driller to manure the field *pro hac vice*, as shall be more expressly mentioned in another part of this section.

As for those who are determined to sow lucerne by *promiscuous sowing* in the manner of clover, they may, if they are so inclined, set aside a crop for seed, whenever they please: For *such* lucerne will be short-lived from the very circumstances of its culture; and any project may be ventured upon it, without running the risque of losing much; since, if *transplanted* and *drilled* lucerns (which grow wide plant from plant) can hardly support the impoverishment of standing for seed, without some extraordinary assistances; what can be expected from a *crop promiscuously sown*, which crop, if the seeds sown take full effect (a piece of good fortune I never saw in *England*) or if half of them take effect, may contain, instead of *thirteen thousand* plants, perhaps *five hundred thousand*?—But then, generally speaking, the plants will be discoloured, small, weak, and sickly; overpowered by weeds, and even m-
 lected

lefted by one another. So that, when they have not a quarter part nourishment enough, and yet want more than that quarter part (as they naturally will do, in order to perfect their seeds) they of course must perish by downright famine. At least, such is usually the case in our climate.

In the other two instances, if any gentleman has a mind to save the seeds of *transplanted* or *drilled* lucerne, either for use, or by way of curiosity, it is probable that the following instructions may not be unacceptable to him.

Whenever he purposes to set apart a crop for seed, he must cut the two first annual growths, when the plants are not arrived to such an height as he ought, in general, to wait for, and before the flowers make their appearance, that the plants may acquire more strength to ripen their seeds at the next cutting.

Whoever attempts to save lucerne-seed must lay his account in losing one cutting at least, if not two cuttings, *that year*; and, in the year *following*, he will find (without my telling him so) that his plantation will decline a little in health and strength. In a word, he must, by the help of some comfortable manures in the succeeding autumn and winter, endeavour to make amends for the impoverishment occasioned by such an effort. Such manures, whatever they are, must be opposite to the predominant ill temper of his soil.

When he proposes to gather the seeds, the tops of the seeding stalks must be cut off with large horse-scissars, or a small sickle made on purpose; and the time must be just after sun-rising; since, otherwise, the husks or pods will burst and brit during the heat of the day.

The pods, thus cut, must be dried in the sun on a winnowing-sleet, and thrashed out with a short stick, in such manner as clover-seeds are thrashed. The seeds must be passed through a very fine sieve;

For they are small, considering the size of the plant that bears them. It will also be difficult to find them all, for they are extremely slippery.

As to the quantity of seed, *Agostino Gallo* tells us, that one hundred pounds is the common produce of an acre in *Italy*, that has been sown promiscuously like clover or trefoil.* I should think a crop from drilled lucerne might answer better: And a crop from transplanted lucerne might exceed both. For, when the roots have space sufficient, they will procure more nutriment: Nor will they (if common care is taken) be defrauded so much by incroaching weeds as crops are that have been sown by random sowing. On the other hand, transplanted crops, particularly, will enjoy a freer air and more sunshine: Consequently the seeds will be better ripened; they will also be larger, healthier, and more apt to vegetate when sown.—Another great advantage is, that, as every plant upon this principle has, as it were, impartial justice done it, the seeds will be all ripe, *much nearer to the same time*; whereas there may be a month odds or more between plant and plant, among *those* that have been sown according to the *random broad-cast way*; and, tho' the owner may have full choice to mow this crop, whenever he pleases, yet one half of the field will never be ripe at one time. Experience justifies this remark in regard to *England* particularly.

Having cut off the summits of the seed-branches, as above directed, care must be taken the next day to cut the remainder of the stalks, as near the ground as at other times of cutting; that is, within three or four inches of the crown of the root, otherwise the new shoots will not sprout and flourish. This crop will be hay half-made at the time of cutting, and the rest of the drying part, being finished, may be given to cart-horses, hungry yearlings, colts,

* *Giornata seconda dell' herba MEDICA,*

colts, and swine, which will relish such plain hearty diet very well, and that for a reason assigned, which is almost peculiar to lucerne-hay.*

But observe here, that as the stalks, by standing so long and ripening their seeds, will grow hard; of course, the sickle, made use of to cut them, must be very sharp, since the person employed in this work will be apt to pull upwards with one hand a little, whilst he is cutting with the other, and may thereby loosen and incommode the roots. In this case, I would advise rather, that a pair of large, sharp, gardening sheers should be made use of.

As to the crop of hay abovementioned, I think I have done sufficient justice to it, in allowing that it will afford hearty food for coarse, hungry cattle. However, an author, much esteemed by me, seems to have gone farther than my experience will permit me to confirm: For, after allowing that such a crop (including the tops of the seedling-branches after thrashing) would give the owner two waggon-loads of hay upon an acre † (in which point we agree) he adds, that this dried herbage will not be inferior to the generality of hay, procured from common meadow and upland grasses. The truth, perhaps, lies between us; I may have depreciated the crop a little, and he seems to have over-rated it.

* See SECT. XVII, p. 155.

† By waggon-loads, the author means the *Italian carro a quattro ruote*; which carries about 1400 lb. weight of hay.

Vinti Giornali di Gallo, p. 36.

S E C T. XXV.

What sort of Lucerne is best for Husbandry-uses.

AN enumeration of the several *varieties* of lucerne might have the appearance of changing the practical cultivator into a contemplative botanist. It may suffice therefore to say, that the seed of the upright sort, which bears violet-coloured and purple flowers, is thought to produce plants of the largest size. The blue-flowered lucerne is also valuable; and, in *Switzerland*, is to be found a large species of this plant, which bears yellow flowers.

In *Dalmatia*, a fine variegated sort grows wild—Nor might it be amiss, if curious cultivators were to procure seeds of the original *medica* from *Media*. If I mistake not, *Tournefort* found one or two fine sorts there.

The flowers of lucerne are leguminous, † or, as the learned call them, *papilionaceous*. From their impalement arises the pistil, which afterwards becomes a wretched *siliqua*, or pod, somewhat resembling a ram's horn, in which are lodged seeds shaped like a kidney. The green plant has the taste of nasturtian-leaves.

As the culture of lucerne and sainfoin, according to the principles laid down in this Essay, is executed without much difficulty, it may tempt men, by imperceptible degrees, to apply their minds to the culture of corn, conformably to the practice of *new husbandry*. But this may be found a more complex, as well as a more difficult undertaking, as will appear from what will follow in the last paragraph of the last section. —

Again,

† Most plants and shrubs, that bear leguminous flowers, afford delicious food to cattle.

Again, when grass-lands are only wanted to bring about a quick return of arable crops, then clover and trefoils are the properest vegetables that can be cultivated in such cases; for lucerne and sainfoin come not to their full perfection till the *third* year. —

As this section is extremely short, I will take the opportunity of employing one minute's revision upon what I have said from *Agostino Gallo*, in my XVIIth article, concerning sowing lucerne-seeds with those of panic-grass. For, tho' first thoughts are generally the most fortunate in poetry, yet second thoughts are the safest in prose. Therefore being naturally fearful of misleading my readers, or depending over-much on the authority of others, I will re-consider the point in a few words, and then leave the cultivators of lucerne to think and act for themselves.

Upon reviewing the original, it appears to me, that the *Italian* author speaks from his *own* experience: And for that reason (as well as from concurring probability) I believe the fact; and so much the rather, as he was a person of credit and genteel condition.

At the time when *Gallo* wrote, there was no better way of raising lucerne (as drilling or transplanting it were then things unheard of) than by mixing a good quantity of panic-grass seeds* with 20 lb. of lucerne-seeds for every acre. For the panic-grass (says he) having overpowered the weeds, will perish the second year, and leave the lucerne-roots in full possession of the ground. *But my secret fear is, that panic-grass will exhaust the soil; nevertheless, as it stands but one year, a good previous manuring may obviate this apprehension.* Be that as it will, . . . I think

* Our farmers (if I mistake not) call the panic-grass *cow-quake*.

I think it honest to put the cultivator upon his guard.

Nor can we (as I suspect) either in *this* point, any more than in what has been observed concerning harrowing lucerne, draw safe and certain conclusions from success in *Italian* husbandry to success in *English*. A soil phlegmatic like ours, liable to perpetual rains, and unenlivened with the same degree of solar heat, gives nourishment to an hundred obstinate perennial weeds, whose proper support is derived from a cold, sickly moisture which the *Italian* climate is not acquainted with.

Once, in order to copy *Gallo* to a certain degree, I ventured to sow hop-trefoil with lucerne, instead of panic-grass: (Hop-trefoil being confessedly an *annual* plant, and a weak exhauster of the ground, or rather the contrary;) but the success of this attempt, after several repetitions, was not such as allows me to recommend the practice of it. I had a beautiful crop the first year; but in the second, as *Pliny* foretels, *descivit in pratam*; and (what is still worse) that meadow contained little more than weeds.

So easily is lucerne over-run and devoured by these hungry savages, except the husbandman supports its well-being and prosperity by virtue of a firm and faithful alliance.

Yet still the *Italian* practice ought to be tried, as the loss, resulting from such an experiment, is hardly worth mentioning.

SECT.

S E C T. XXVI.

Some Objections answered, with Relation to the present Discovery of cultivating Lucerne by Transplantation.

IT is natural to expect, that many objections will be made to this *new practice of transplanting lucerne*. Some will say, that amputating a tap-root is counterworking the original intention of nature. But then it must be answered, that the Supreme Being has left many things to the personal industry and discoveries of man. — Others will remark, that the culture of lucerne has been diligently studied, at least, at intervals, from the times of *Virgil* and *Columella* to the present moment. How came a person then to discover this mighty ΕΥΦΗΚΑ in a corner between *France* and *Switzerland*? — To which we can only reply, that, in like manner, the mines in *Misnia* and *Bobemia* were first discovered by some poor *Cornish* men who fled from *England* about the 15th century.

Thus the sembrador (a sort of plough, with an hopper annexed to it, contrived to set corn at equal distances) was first invented by an *Austrian* engineer, whom the emperor of *Germany* sent afterwards to *Madrid*, that he might instruct the *Spaniards* in the manner of making and using it.* Thus the uses of the magnet were found out, the art of printing, the medicinal application of plants from the wild *Indians*, and many other valuable discoveries: For, sometimes, *the bumber things of this world are appointed by God to surpass and confound the stronger!*

From my own private opinion, I think I could almost venture to assert, that *M. de Chateaucieux*

rea-

* *Willoughby's Travels into Spain*, 1663, p 426.

reasons modestly concerning himself upon this occasion, and perhaps says,

*Primum ego me illorum, dederim quibus esse colonos,
Excerptam numero.**

A third set of men will object, that the trouble and tediousness of raising and cultivating lucerne, in the present manner, are over-great, and too much clogged with minute cares and attentions. But *industry*, † in husbandry, being the *condition* decreed by the Supreme Being, in consequence of the fall of man, we shall not presume to expostulate with our great and good Creator upon that subject, who has threatened to punish a state or kingdom where the inhabitants are negligent even in husbandry: *With arrows and with bows shall men come thither, because all the land shall become briars and thorns; but, upon the hills that are digged with a mattock, they shall not come thither:—But it shall be for the sending forth of oxen, and for the treading of lesser cattle. ‡*

Nor need we expatiate more under this article; for time and habitude, by gentle degrees, will cure all the astonishment of novelty. *Lucretius*, according to his accustomed manner, has touched beautifully upon this idea: For men seem to stand amazed, at first, upon any new discovery; but, after a few years have elapsed, they then consider it as coeval with the world, and no subject for wonder at all:

*Sed neque tam facilis res ulla est, quin ea primum
Difficilis magis ad credendum constet: Itemque*

Nil

* *Horat. Epist. Lib. i. Ep. 14.*

† Lord Bacon enforces industry from a very natural inducement, “*Quod opera & virtute nostra partum est, majus bonum: Quod ab alieno beneficio vel ab indulgentia fortunæ delatum est, minus bonum.*”

Colours of Good and Evil, vol. III. p. 391.

‡ *Isaiab vii. 24, 25.*

*Nil adeo magnum nesciam mirabile quicquam
Principio, quod non minuant mirarier omneis
Paulatim, ut cæli clarum, purumque colorem.**

Nothing is found so easy, but appears
Full difficult at first to be believ'd:
Nothing so great or wonderful, but men
Forget and overlook by slow degrees:
Witness the clear, translucent light of heav'n!

S E C T. XXVII.

*An Inquiry into the Reasons of the Prejudices which
Farmers and Labourers entertain, in Opposition to
the NEW-HUSBANDRY.*

THE objection, that lucerne by growing so fast is a great impoverisher of land, has been already obviated in the VIIIth Section; and, in a word, though horse-hoeing, hand-hoeing, digging between the rows, and frequent slight manurings, may appear to be troublesome, and really are so, yet the expences and labour are soon repaid; and, indeed, Providence seems to have left no other expedient than human industry, if we desire to keep any one crop in long continuance: Taking care, at the same time, to call in the assistance of slight and frequent ploughings, &c. For, by constantly dividing and loosening the soil, we bring a stiff strong land, by degrees, to an easy prolific state; which *Virgil* has expressed in one hemistyc that contains more good sense and true knowledge of agriculture, than is to be found in a modern volume. Industry, says he, converts a stubborn, stiff, tenacious soil into the *PUTRE solum*:

— Nam

— Namque hoc IMITAMUR ARANDO.
 GEORG. II. V. 204.

Where the strength and beauty of the thought are so very plain and forcible, that *Dryden* seems to be animated with them, and has surpassed not only himself, but even equalled the original, if we except the brevity and sententiousness of *Virgil*:

*For ploughing is an imitative toil,
 Resembling nature in an easy soil.*

Nothing can exceed the brevity and force of this passage, except it be a similar passage in one of the prophets: BREAK UP *the FALLOW GROUNDS of your HEARTS.**

The remainder of this section shall be set apart for examining into the causes and reasons of *an uncommon difficulty* which most gentlemen are obliged to struggle with, when they first undertake to make a *nursery* for lucerne, and then *transplant* it.

I have attempted, various times (and that unsuccessfully for many years) to comprehend, if it were possible, why bailiffs, farmers, and day-labourers, should entertain such an incurable aversion to the *new husbandry*? — That there is labour employed in it must be allowed: But it is slight labour, and well paid for. [Therefore *that* seems not to be the true reason.] — Let us proceed one step farther, and suppose these men to be prejudiced against the undertaking, or doubtful concerning its success? Yet still they run no hazard in making the experiment, and incur no blame in case of a miscarriage; being sure of their gratification, when the work is done. So that, though both these reasons may conclude in part, yet still they are not the true specific

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* Jer. iv. 3. See also Hosea x. 12.

reason.—The like may be said of these mens aversion to novelty, and their tenaciousness of ancient habitudes; yet even this disinclination may be overcome by the counterbalance and acquisition of gain. Manufactures, artizans, peruke-makers, taylors, &c. (who seem, in other respects, to be wiser than the countryman) soon familiarize themselves to what is *new* in their business, and like it. Why? Because they get by the inconstancy of mankind, and the change of fashions. So that this objection is only a partial one. And, in proof that the trade's-people are in their way more docible and more vigilant than the husbandman, let it be remembered, that the invention of dying the *Saxons* green was brought to *London* in the year 1748, and all *Great-Britain* and *Ireland* knew how to imitate it before the year 1754, though the secret was preserved from taking air by many precautions. But the generality of husbandmen pass away life without making any reflexions upon agriculture, and grow old, long before they have taken leave of their infancy.

In order to inform myself better, on the subject before us, I inquired of country-people, even parties concerned, what might be the true reasons, and desired them to be explicit? But they gave no distinct answer; which, at length, led me to suspect, that a sort of natural good manners, and fear of giving offence, compelled them to be silent. The *main* reason, therefore, seems to be (and especially if we consider how bounded the capacities of these men are, and how clogged with prejudices) that every such sort of employment appears to them *as merely trifling*, or, at most, a labour of supererogation. This being premised, it is then certain, that all men, wise or unwise, *under this persuasion* (be they right in their notions, or mistaken) will be tired of going through any work that carries *such* an aspect with it, even though it be profitable. In proof of this,

take a labouring-man, from cleaving wood, and order him to gather up, one by one, a pint of pins, scattered on the floor of a room, at the same wages he was to have received for performing harder work. — In such a case, what will be the consequence? He will feel dissatisfaction and disgust against his new employment in half an hour. Or suppose a gentleman was to bid a country day-servant to leave off breast-ploughing a field (than which there is scarce any husbandry-work more laborious) and then order him to take a light hoe in his hands, and work upon a thin surface of water, than which nothing can be cut or divided more easily; merely for his (the gentleman's) pleasure, or for some reason which he keeps a secret: The master, upon this, meets with compliance; but the edge and appetite for work go off immediately in the honest peasant thus employed: For he fancies himself, as *Shakespeare* expresses it, to be the *image of labour in vain*. His hands move listlessly and unwillingly: He grudges even every insubstantial stroke he gives, and heartily wishes for the approach of night. — Thus appear all the operations in the new husbandry to bailiffs, farmers, and labourers, though the case be widely different; but, not being able to comprehend how their labours can tend to any use, they are as much chagrined, as if employed in gathering up pins, or hoeing water: But, when they once see the good effects of their labours, they, at length, grow perfectly reconciled to what they despised, hated, and even laboured, by their unfaithfulness, to render useless and ineffectual. There were the self-same objections made at first to the culture of vineyards, hop-gardens, and saffron-plantations: As also to the raising of woad, madder, liquorice, maize, tobacco, field-turnips, and twenty other sorts of vegetables, which are now managed by country-people, with as much good-will, as if they were com-

tion from rocks, &c. or inconvenience from weeping springs.) In this case, two joints of the borer will suffice.

The instrument, above represented, is composed of two iron-bars, marked Fig. 1. Fig. 2. each bar six feet in length, and one inch in thickness or diameter; the former screwing into the latter.

The end A. Fig. 1. carries a screw which enters into the socket B. Fig. 2. after you have unscrewed the little button opposite to C, contrived partly to hinder earth and dust from getting into the socket. These screws are an inch and half long, and eight lines thick; so that there remain two lines of thickness for the socket.

D. Fig. 1. is a sharp point or nose, somewhat *camused*, as the *marquis de Tourbilli* expresses himself (or, in other words, bluntish, and turning a little upwards) contrived in such manner, for better forcing its way through the earth, rocks, &c. Its length is about three inches, and you may make it with three, or four sides, as you judge to be most convenient. It is screwed into the bar A. in the same manner, and with a screw of the same size, as A. is screwed into the bar B.

E. is an aperture or groove made on which side of the bar you please, six inches long, four lines broad, nine lines deep, and rounded at bottom, in order to bring up a part of the different *strata* of matter, whilst you are boring. And if in the present instance of cultivating transplanted lucerne you fear weeping springs (which are very detrimental to the growth of this plant) you may soon know where to find them, by putting a bit of sponge into the groove.

The lowermost end of the bar F. Fig. 2. carries a screw which enters into another socket, if you are desirous to lengthen the instrument by adding a
new

new joint, and so on, to a length of one hundred feet. But an examination of the soil, to a depth of twelve feet, is quite sufficient for our present purpose.

To put this instrument properly to work, use must be made of an iron-handle, called, otherwise, in mechanics, a *double-branched lever*, which is marked G and H, and each branch is fifteen inches long. This handle, or lever, is fastened by a clasp I, lined with steel, fixed at one end by a hinge, and at the other by the screw L, by which means it may be placed at whatsoever height the labourers please. This screw is fastened, or unfastened, by an iron pin, six lines thick, and eight or nine inches long.

Fig. 3. is a plan of the same handle, or lever, separated from the bar of iron, and marked by the same letters G, H, I, L.

Fig. 4. is a handle, or lever, resembling that which has been described above, with this exception, that it has only one branch marked G. The letters I and L denote the same as in the foregoing. This last-named handle, or lever, serves, at times, to suspend or stop the *borer*, when we are bringing it up from a considerable depth: As also to screw and unscrew the several bars, or joints, as occasion requires: And to put on, or take off, the point or nose of steel at bottom.

But of this more needs not be spoken at present, as all borings, with reference to exploring the ground for raising lucerne, will go but a little way beneath the surface of the earth. Those who search for mines, quarries, &c. may find farther information in the marquis *de Tourbilli's Memoire sur le Defricemens*.

In ground set apart for receiving *transplanted* lucerne, it is hardly requisite to have recourse to the *borer* at all; and in land where we raise it, either

by drilling, or in the manner clover is sown, we need only use two joints of the borer: And two men, generally speaking, (if the ground be tolerably well conditioned) may bore to a depth of twelve feet in a quarter of an hour: And, of course, in one day, make a sufficient number of essays for one acre of ground, one trial being enough for every ten perches square.

The difficulty of finding a good soil, to a depth of eight, ten, or twelve feet, seems to me to have been one of the reasons which induced M. de Cha-teauvieux to amputate the extremity of the tap-root: Other reasons have been formerly assigned by me,

S E C T. XXIX.

How to manage large Plantations of Lucerne in the cheapest, safest, and most economical Manner.

AS I would willingly make this Essay as instructive as lies in my power, and at the same time save industrious cultivators the trouble of collecting and combining directions from various dispersed passages, it may not be amiss to bestow one section more, by way of answering a couple of questions which have been often proposed to me in letters.

The first question is, How and in what manner (by way of result from the considerable number of experiments made by me) I would advise any gentleman to prepare three or four acres of land for receiving lucerne? This being an undertaking of some moment, or, as the *French* call it, *une grande exploitation*.

The second question is, How to perform this work in the shortest, safest, and most economical manner?—Concerning both which points my ideas are as follow: This only premised, that I am here endeavouring to make the expence of the undertaking

taking as cheap as possible; otherwise, where people pay no regard to a few incidental charges, I would recommend Mr. *Boyle's* method of preparing a field for receiving transplanted lucerne, concerning which more has been spoken at large in the 82d page of this Essay.

In the present case it may suffice to say, that supposing the nursery to be properly prepared, and the seeds sown in the first week of *April*, before the season for transplanting, according to directions already given. — I would recommend a field in good tilth, after barley-harvest, and before oats have been sown in it. This field should be thoroughly ploughed and harrowed twice; which we will suppose to be, for example, in the autumn of the present year, 1764. After each ploughing and harrowing there should be a very diligent burn-beating, according to rules laid down, SECT. III. — But, if the season should prove too wet at the time of a second burn-beating, we make a virtue of necessity, and the weeds and trumpery must be raked together and carried off.

Then give the field a trench-fallow-ploughing for winter, and early in *March*, 1765, (if the weather any-ways permits.) Having manured your ground, as the relative nature of the soil requires, and ploughed and harrowed it again to an exquisite fineness, drill in a crop of field-pease, making use of M. *Vanduffel's* * *drill-rake*, as early in the spring as is consistent with prudence and safety; for this crop must be ripe, and removed, by the last day of *July*. — Much depends upon this point of foresight; however the pease, by standing thinner than in hand-sown, promiscuous crops, being at the same time banked and hoed with greater ease, and enjoying more room, free air, and sunshine, — will in all probability gain an advance of ten days at least in their ripening. This will be a great point secured. For it is in husbandry, as in war: There

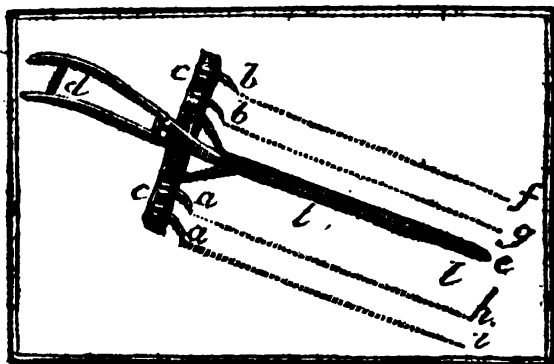
are

* M. *Vanduffel* is a treasurer of France at *Bayonne*.

are critical moments, which never present themselves a second time in the same campaign.

I will now speak of the manner of letting this pea-crop into the ground, and of M. Vanduffel's drill-rake. This instrument has been often made use of by myself and friends, with good success, much expedition, and little trouble. But we must observe, that it is chiefly calculated for light grounds in small inclosures, not exceeding four or five acres.

The DRILL-RAKE.



This instrument is a sort of strong plough-rake, with four large teeth at a. a. and b. b. gently curved, as represented in the print. The distance from a. to a. and b. to b. is nine inches.

The space, or interval, between the two inner teeth, a. and b. is three feet six inches *, which is

* Something more space is allowed in the intervals of a pea-crop than in a lucerne-plantation, because the *cultivator*, or *bes-plough*, never enters the lucerne-field, till after the herbage of the plants is cut: Whereas the pea-branches spread much, and the roots are shallow and tender, quite different from lucerne-roots. It is therefore my opinion that field-pease, thus managed, can admit but one horse-hoeing; and the intervals may be made still wider, if people please.

is sufficient room for the cultivator or hoe-plough to move in, if conducted with care, before the pease have branched much. To the piece of timber, at the head of the rake, denoted by the letters, c. c. are fixed the handle, d. and the beam, e. to which the horse is fastened.

It is pretty certain, that, when this instrument is drawn over a piece of land made thoroughly fine, and the man, who holds it, bears upon the handles more or less, according to his discretion, four channels or little furrows will be formed at the letters, f. g. h. i. which will be found to be distant nine inches from furrow i. to furrow h. and as much from g. to f. the interval marked e. being three feet and an half from h. to g. and, that these distances may be preserved with greater truth, it has been found necessary that the two teeth, a. a. should return (when the ploughman comes back, after having ploughed one turn or *bout*, as they call it) in two of the channels formed before, marked b. b. : So that, though he cuts four drills at the first bout, yet, in effect, he only forms two drills each turn, because there are always two drills to be passed over twice or re-ploughed, being, in truth, not much more than guides, or marks of direction. Yet even this small work of supererogation repays itself, because it makes the drills more open, distinct, and clean.

If the first four channels, formed at one motion by this instrument, are straight and true, all the lines in the field will partake of the same regularity. It has therefore been my custom to lay out this first trace of the drill-rake myself by exact measurement, fixing into the ground, at every distance of ten feet, little slit sticks labelled with paper; and, that being finished, leave the rest to the ploughman.

When the ground-plot of an acre is thus formed into drills (which work I have seen completed in
four.

four hours with one ploughman, horse, and boy to lead the horse) you then send two or three women and children into the field, who *sprain* * the pease into the channels.—Use no harrow, which will draw the feeds out of the lines; but cover them with the flat part of the head of an hand-rake, and press them down gently.

This practice was well known to the *Grecian* husbandmen; for *Leontius* greatly prefers the covering of feeds by hand to common harrowings even by oxen, which trample the ground less than horses †.

I will now only observe of this drill-rake, that, different from the hoe-ploughs of *Du Hamel*, *De Chateaufieux*, and *De la Levrie*, its great excellence consists in its simplicity: For, after the measurement of the parts is once laid down, the meanest carpenter and smith in *England* can make it, or repair it; and, if the first four lines formed by it are true, the rest of the lines or rows must be geometrically exact: Which is an elegance none can feel, but such as take delight in correct husbandry.

But to return to our lucerne-plantation.

This pea-crop being hacked, and moved from the field by the fourth or fifth of *August*, call in all the assistance you have of husbandry-strength, or can procure; and plough and harrow the field, and burn the pea-roots, weeds, &c. as often as you have time before the twentieth of *August*; and then (your nursery being supposed to be in perfect readiness) transplant

* To *sprain* feeds is to throw them with a single motion of the hand at a certain distance one from another.

† Τα σπαρίττα τῶν μὲν κάρσιον δι' ἀδελῶν καὶ ἰσχυρῶν ἄνδρα, ἢ καὶ ἴσως καὶ ἀρχαῖον ἢ δι' μὴ, καὶ διὰ βοῶν σπαλλόμενα.

GEOPONIC. Lib. ii. c. 24.

This writer (*Leontius*) flourished under the emperor *Justinian*. We have a couple of his epigrams extant in the fourth book of the *Greek Antology*.

on *transplanted* LUCERNE, ESSAY II. 215
transplant your roots as before directed, and con-
trive to close your work by the end of the month.

S E C T. XXX.

*Miscellaneous Observations, and short, useful Hints
concerning Lucerne.*

THIS section shall consist of *miscellaneous ob-
servations, and short, useful hints*, which it
was no-ways necessary to consider more at large.

(1.) We know no better proof of the sweetness
of lucerne than that an horse will never leave a sprig
in the rack or manger, or even on the ground.
(2.) If you have free choice of ground in the field
wherein you transplant lucerne, or, in other words,
the power of placing your rows in what direction
you please, then let the rows front the mid-day
sun *. (3.) No better place can be found than a
hop-garden, if the owner thinks fit, or sees reasons
for discontinuing it. (4.) No water must be al-
lowed to lodge in the nursery or plantation. (5.)
Hares and rabbits must be chased away, or in some
other manner prevented; for, as the former range
much at night, especially in spring, they will
change their old abodes, and lodge themselves in
the neighbourhood of a lucerne-field, where they
commit great ravage, brouzing the young shoots
of

* This rule, where there is the same free choice of moving
which way you please, must not be extended to the lines or fur-
rows of corn-lands, whose course or direction are, by no means,
matter of such indifference as to be left to chance, or the plough-
man's fancy. The lines or furrows of corn, therefore, in case
there be no impediment or obstruction, should always run from
north to south, and not from *east to west*. The curious may see
the reasons assigned in the *marquis de Tourbilli's Memoire sur les
Defrichemens*, pag. 888, 889: But I shall avoid inserting these
reasons at present, and confine my remarks only to lucerne, or
sainfoin drilled, or transplanted in rows.

of the plants, as fast as they recover and sprout afresh, till they bring them at last into a downright atrophy. (6.) Geese and ducks must have no admittance into a lucerne-field. (7.) If you manure the land set apart to receive the transplanted roots take care to spread this dressing two months before the roots are moved into it. (8.) Lastly, the culture of lucerne depends as much on industry as skill; for it was the custom of the *French* near two centuries ago, when they prepared a field for receiving the seeds, to give the ground sixteen months fallow with ploughings and harrowings; but hand-hoeing and horse-hoeing have made the management more easy, and less expensive at present: Yet still there remains some labour, some care, and some expence; for delays and negligence are avowed enemies to good husbandry:

— *Cereris contraria semper
Sunt operi* — *

S E C T. XXXI.

*Farther Remarks on the Necessity of using Manures.—
Also on neat Husbandry and Industry.*

WE cannot conclude this Essay without observing, that it hath been asserted by the enthusiastic admirers of drilling, transplanting in rows, and hoe-ploughings, both at home and abroad, that no manures are needful to support the credit of their system, even in the cultivation of lucerne and corn. † Indeed, we allow, that vegetables

* *Ovid. Metam. Lib. V. v. 814.*

† It is not in *Europe* as in *Louisiana* and *Chili*, and some of the warmest parts of *Canada*, where wheat has been sown successively on the same land for eighteen years without manuring.

I can only remember, that a crop of wheat in *England* has been raised for five successive years upon the same ground without

Plants may be thus raised and continued many years, without the assistance of dressings; but this is weakening the soil, and defrauding the plants, merely through vanity and love of paradoxes. It may be more prudent therefore to recommend slight frequent refreshments at certain convenient times and distances. For manures, let men dispute, contend, and wrangle ever so long about laying them aside, are, in many cases, equally requisite with tillage and weeding. The best soils expect some assistance, and the weaker ones demand a great deal.—So that, upon the whole, an ingenious foreign author has reconciled these difficulties very well. “Abundance of manure, says he, supplies the want of good culture; and good culture, reciprocally, makes amends for deficiency of manure: But the surest and most advisable method is to make use of *both*.” And, as to the utility of manures in particular, the two *Quintilii* have left us the following remark, which the reader is desired to take in the words of *Cornaro’s* translation: *Bonam terram sterqus meliorem facit, vitiosam autem amplius juvabit. Bona igitur terra stercore multo non habet opus; media paulo ampliore; tenuis vero & imbecilla multo: Non acervatim autem, sed densius stercoreandum est.**

Lastly,

out manuring: (And *that* according to the practice of the old *husbandry*, which is more extraordinary :) But then it must be observed, that this land was uncommonly circumstanced. It was a dry, sound, healthy soil. It had lain in grass for a century at least; and once a year a great fair for cattle had been held upon it, which the owner of the soil thought fit to discontinue.

* *In Geopon. Lib. ii. c. 19.*

I am well informed, since *M. du Hamel* published his last work, in 1761, that *M. de Chateaufieux* found, by experience, that, in spite of all assistances from ploughing, without using manures, he carried a visionary idea of *Tull’s* too far. Of course, he returned to the old practice, combining one and the other, as before recommended; and, as his fields had been thoroughly pul-

Lastly, there is a simplicity and variety in the neat field-husbandry, here recommended, that exceeds all the studied elegance and regular accuracy even of parterres and gardens, which tire us soon — for they imply restraint. — They bound the eye, and seem to trespass upon our liberty : — Whereas the fields are the free range and dominion of nature. — The difference of culture proves the superiority by the very crops that are obtained. — To raise a beautiful flower is a slight amusement : To bring corn and grasses to perfection are matters of attention and serious labour. The *first* may be called an avocation, but the *second* is a business ; and for these reasons the Supreme Being has made perpetual exercise and diligence in agriculture as necessary as our bread, and as interesting as life itself.*

Of this truth the heathen writers, on husbandry, had some imperfect traditional notions ; they knew what difficulties were annexed to the culture of land, and beheld plainly all the happy effects of diligence and industry. “ The earth, says *Columella*, is not effete or worn out ; but men are indolent.” † “ Allow her only a moderate repose once in three years (bestowing, at the same time, a certain quantity of manure) and *she* will resume all the vigour and strength of a constitution restored to youth.” ‡

Hesiod.

pulverized and cleansed from weeds, every spoonful of manure took effect, and the produce of corn was very surprizing.

We make this remark for the sake of the new husbandry in general, as also to set right a passage in *M. du Hamel*, which held true in the year 1754 ; his words are these : “ Quoique *M. de Chateauneux* n’ait pas fumé ses terres depuis qu’il a adopté notre nouvelle culture, il a néanmoins été satisfait de ses récoltes.” Tom. IV. pref p. x.

* *Speſtacle de la Nature.* Tom. II. dial. 2.

† *De Re Ruſt.* Lib. ii. c. 1. p. 47.

‡ Sola terra nunquam irascitur homini s—Benigna, mitis, indulgens, usſque mortalium semper ancilla, quæ coacta generat, quæ sponte fundit. *Plinii Hiſt. Nat.* Lib. ii. c. 63.

Hesiod, Virgil, and Varro, recommend industry, husbandry, with as much earnestness as *Columella*; but, as we shall have some other occasion of referring to them more than once, it may suffice to subjoin a short extract from *Pliny the elder* :

“ One *Cresimus* (says he) being made a freed-man, purchased a little farm, where, by dint of skill and up unwearied application, he raised such surprizing crops, that the neighbouring husbandmen all accused him of magic; alledging, in particular, that he enriched his own fields, and impoverished theirs. A day of trial was appointed before the ædile of the district. *Cresimus*, after various allegations produced against him, found means to bring his spades, scythes, and reap-hooks into the court, where, upon examination, they appeared to be very bright and exceedingly clean. His ploughs and harrows were next exhibited; they were ponderous, strong, and admirably made. His cattle then passed along the street in review; they were in full proof, large, and well-fed. Behold, O *Romans*, cried he, these are my magical arts in agriculture, but some there are, which it is not in my power to produce; I cannot make you see the sweat of my brows, when I toiled and laboured; nor have I kept a minute diary of my unwearied industry, and perpetual fatigue, late and early.”

Upon this, every sensible by-stander soon perceived the moral of the story; and *Cresimus* returned home, laden with the old *Roman* honour, *BONUS CIVIS, BONUS AGRICOLA*.

In a word, one may apply to industry what *Petronius* said of the enchantress *Enothea* :

*Quicquid in orbe vides, paret mihi. Florida tellus,
Cum volo, subdit opes; stopalique atque horrida saxa
Nilivadas jaculantur aquas.*

Whate'er thy eye contemplates is my child.
 Deck'd by my care refulgent nature smil'd;
 Earth at my touch exerts her beauteous pow'rs,
 Inrob'd in verdure, and instarr'd with flow'rs:
 Sooth'd by my arts, th' obdurate rocks comply,
 And a new Nile falls thund'ring from on high.

But *Stattius* has given us a more pleasing and animated picture of good culture and industry in his poem, in itled, *Surrentinum Pollii*:

*Hic favet natura locis, hic vieta colenti
 Cessit, & ignotos docilis mansuevit in usus.
 Quæ nunc tellus subis, ubi nunc nemora ardua cernis,
 Hic nec terra fuit. Domuit possessor, & illum
 Formantem rupes, expugnantemque, secuta
 Gaudet humus; nunc cerne jugum discentia saxa,
 Intransesque domos: Jussumque recedere montem.
 ——— Gælici sedat tibi gloria pleætri,
 Et tu saxa moves, & te nemora alta sequuntur.
 ——— Vix ordine longo
 Suffecere oculi; vix, dum per singula ducor,
 Suffecere gradus. Quæ rerum turba? Locine
 Ingenium, an Domini mirer prius? * * * *
 Hic præceps minus audet byems; nulloque tumultu
 Stagna modesta jacent, dominique imitantia mores.*
 SYLV. Lib. ii.

And here, perhaps, the reader may remember, that, in the beginning of the preceding Essay, I declined translating a beautiful passage from this poet; for no *Englishman* hitherto has had courage to give us an intire version of him. Those who have done a little, soon found they had work enough upon their hands. But, as the present quotation relates to rural improvements, I have here given a
 faint

But glimmering of his meaning, in a manner something between a metaphrase and a paraphrase; which seems to me the only way of turning our poet successfully into any modern language:

Nature comply'd with interceding art,
 And half-way met her, to perform her part:
 Pleas'd to admit an help-mate on the throne,
 Extrinsic laws, and subjects not her own.
 Where glittering domes and rich plantations stand,
 Was once a tract of rock, and not of land;
 Industrious labours, vary'd and renew'd,
 The stubborn genius of the soil subdu'd:
 Earth follow'd, where th' improving hand requir'd;—
 The quarry vanish'd, and the hills retir'd.
 Boast not, O ORPHEUS, of thy moving song;
 The rocks and forests round my POLLIVS throng,
 From him receive their being and their fates;
 Those he displaces, and he these creates.
 Eye-sight scarce measures thy improvements bounds;
 Foot-steps scarce wander o'er th' enchanting grounds:
 Varieties augment the pleasing toil:
 The master we admire, and then the soil.
 Here winters cease to rage, and storms to roar;
 The placid waters sleep along their shore;
 For nature, seconded by art, design'd
 T' express the calmness of the owner's mind.

Once for all, industry is the *vis vivida* that animates agriculture, of which there cannot be a clearer illustration than in the following extracts from Mr. Locke:

“ The *Americans* are rich in land, but poor in all the comforts of life. Nature has furnished them, as liberally as any other people, with what might serve for food, raiment, and delight; yet, for want of *improving their land by labour*, they have not one hundredth part of the conveniencies we enjoy; and

a king of a large fruitful territory there feeds, lodges, and is clad worse than a day-labourer in *England*.”*

“ Industry and labour make the far greatest part of the value of things we enjoy in this world, and the ground that produces the materials is scarce to be reckoned in, as any, or, at most, a very small part of it: So little, that, even amongst us, land that is left wholly to nature, and that hath no improvement of tillage, pasturage, planting, &c. is called (as indeed it is) *waste*: And we shall find the benefit of it amount to little more than nothing.”†

Nothing shews more strongly the inattention and indolence of mankind, in general, with relation to new discoveries and improvements in husbandry, than the remark I am going to make: Which is, that, wherever any successful attempt of this nature is first made, there, and in a little district round that place, the practice remains, without extending itself far from the spot of its birth. Thus the place, or province, where the attempt began (and that attempt, perhaps, was purely the result of accident, or took its rise from the enterprizing genius of some one particular man) is generally looked upon by us, as the spot of ground designed by nature for such purposes; being, as it were, the only spot, exclusive of all others; when, at the same time, the improvement might be carried on to an higher degree of perfection, in an hundred parts of the same kingdom.

In

* On *Civil Government*.

† *Ibid*.

Every thing in the world is purchased by the labour of one person or other, and our wants and passions are the true causes of labour.

Trade, artizan-ship, and manufactures, are nothing more than a public store-house of labour.

Hume's ESSAYS, vol. IV. p. 15.

In proof of this, peat-ashes are looked upon as a *Berkshire* manure only, because first made use of in that county, tho' I have found peat in abundance, and observed the ashes to impart the self-same good effects to the soil in counties that lie at 100 and 200 miles distance from *Berkshire*. The culture of hops began first in *Kent*; and hops were then considered so much in the light of a provincial plant, that a whole century passed away, before cultivators had courage to raise them in *Essex*, *Hampshire*, and *Worcestershire*. — The custom of folding sheep, as we have remarked before, and making use of wheel-ploughs, was found to be very advantageous in *Kent*, as long ago as in *Henry VIIIth's* time; but looked upon to be unprofitable, and even absurd, in the same latitude of the same kingdom, and in fields and lands equally circumstanced with those where the improvements first took their rise. — Thus, likewise, there is a little district in *France*, called *St. Briouac*, where husbandry has been carried on for a century past to great perfection; and, though the adjacent parts of the province, where it is situated, enjoy a soil equally well conditioned, yet good agriculture has not passed the limits of a little circle about ten miles diameter. — I remember, when I was a youth, to have heard that venerable husbandman, old *Jesbro Tull*, declare, that, though he introduced turnips into the field, in King *William's* reign, with little trouble or expence, and great success, yet the practice did not travel beyond the hedges of his own estate, till after the conclusion of the peace of *Utrecht*. — In short, we have all a hankering, more or less, to make *the horse draw by the tail*, and not by the chest and shoulders. — This is owing not only to the force of prejudice, but a natural tendency to indolence, and a propensity for admitting that sort of industry (if there must be industry at all) which is most compendious.

In the next place, let me have the liberty of observing, out of justice to my own intentions, *that no-ways recommend the new husbandry to farmers for raising corn, as such culture will require more industry and attention than men of their occupation and cast of thinking either will have inclination to bestow, or can have leisure to bestow; nor am I quite clear that the profit will greatly counterbalance the expence and labour; but still I exhort them to copy the new husbandry in neatness, cleanliness, and extirpation of weeds: And recommend it strongly for the culture of horse-beans, field-pease, lucerne, sain-foin, fenugreek, woad, weld, hemp, flax, turnips, carrots, parsnips, winter-cabbages, with a long train of etc.eteras.*

Thus with more labour than I can, with any degree of reason, either expect or hope to be thanked for, I have imparted to the public the whole result of my experiments and observations on that very valuable and important plant, the LUCERNE. As to the work itself, I cannot make my apologies, or take my leave in a properer manner, than in the words of one of the fathers of *English* husbandry: Which I am the rather inclined to make use of, as our cases are as near as possible parallel, in regard to the nature, utility, and novelty of the subjects we have undertaken to write upon: For he introduced the culture of *bops* amongst us, and I am attempting to introduce the culture of *lucerne*.

REGINALD SCOTT'S "EPILOGUE to the reader."

"Thus have I, according to my small skill and experience, according to my friends' desires, and according to the truth, uttered these few notes concerning the making and maintenance of an *bop-garden*. That which remaineth more to be said thereof, resteth in the skill of skilfuller persons, and is, at this time, either beyond the compass of my knowledge,

edge, or beyond the reach of my memory. I doubt not but I have herein ventured to teach some *that* which they know better than I; and also provoke [incite] some that need not, and some that care not to be employed in these matters. Howbeit, I urge nothing but *that* which may be done without great difficulty, charge, labour, or spoil."*

N. B. That the reader may not make a mistake in the most material part of this undertaking, the author, from his own experience, as well as frequent observations made by others, begs to put him in mind, that a *pound* of seed ought to be allowed to every *four* perches in the nursery; and that the seed ought to be sown in calm weather, and dispersed in sowing, as equally as may be.

* *Perfekt Plat-form of an Hop-garden*, 4^o, 1576, p. 60.

POSTSCRIPT.

AS the Author, during the years he has made his experiments on LUCERNE, made also experiments upon most sorts of vegetables, (native plants of England, or foreign ones) which afford wholesome, well-tasted, nourishing food for cattle, he would be glad to receive assistances, founded upon experience and matter of fact, relating to the following articles, which have been the objects of his consideration.

- (1) ACAAIA.
- (2) AIRA-GRASS.
- (3) ALAGAROBALÉ. (*The Spanish; called, in Spain, Valencia.*)
- (4) AMEL-CORN. (*Cut green for cattle.*)
- (5) ANTHOXANTHUM.
- (6) ARROW-HEADED GRASS.
- (7) BUCK-WHEAT. (*Cut green for cattle; or the dried grain mixt with oats.*)
- (8) BURR-REED.
- (9) BURNET.
- (10) CALEVENCHES.
- (11) CANARY-GRASS.
- (12) CICYLY. (*Wild.*)
- (13) CLOVER. (*Broad.*)
- (14) *White Dutch, or German.*
- Hop. (*With Trefoils in general, English and foreign.*)
- (14) COW-WHEAT.
- (15) CYPERUS-GRASS,

- (16) CYTISUS *falsified*: Or, *Bastard-Senna*.
 (17) FENUGREEK. (*Sweet, Italian.*)
 (18) FESTUCA-GRASS.
 (19) FOX-TAIL GRASS.
 (20) FURZE, (Young and chopped green.)
 (21) GUINEA-GRASS. (*Jamaica.*)
 (22) KIDNEY-VETCH.
 (23) KNOT-GRASS.
 (24) LADIES-MANTLE.
 (25) LENTILS.
 (26) LUCERNE.
 (27) LUPINES.
 (28) MADDINGTON-GRASS.
 (29) MAIZE.
 (30) MARLE-GRASS.—*Marygolds.* (*Green.*)
 (31) MELILOT. (*Sweet, Italian.*)
 (32) MILLET.
 (33) MOON-TREFOIL.
 (34) PLANTAIN. (*Narrow-leaved.*)
 (35) PARSLEY.
 (36) PEA OF GRACE: Or, *German Sheep-Pea*.
 (37) PEA EARTH-NUT.
 (38) PHLEUM.
 (39) RAY-GRASS.
 (40) SAINFOIN. (*Sown with corn, drilled, or
transplanted.*) *Spanish Sainfoin, and
ESPARCETTE.*
 (41) SILVER-WEED, or *Wild Tansey*.
 (42) SOPHORA. (*North-American.*)
 (43) SPURREY.
 (44) TRIBOLO, or *Trifoglio Cavallino.* *Horse-
Trefoil, Tuscan.*
 (45) TRIFOLIUM *Fibrinum* *.

(46)

* This remarkable vegetable, not to be found in any Herbals that I have seen, is of the lucerne, or trefoil kind, but larger than lucerne, and well-tasted. It grows wild in *Stiria, Carniola, Carinthia, Friuli, &c.* and, mixed with five other mountain-herbs,

(46) TIMOTHY-GRASS. (*Ireland, Jamaica, &c.*)

To these may be added the *herbage* of some plants raised in the field, for the support of cattle in winter: As,

(47) COLLIFLOWER BROCOLI; SAVOYS; *Brown Winter Cabbage, &c.* And also esculent roots for the same purpose: As,

(48) CARROTS.

(49) *German* TURNIP-CABBAGE; OR KAHL-REUBEN.

(50) NAPPER; OR *Swedish Turnip.*

(51) PARSNIPS.

(52) POTATOES.

(53) TOPINAMBOURS*.

Now, that new sorts, or varieties of some, if not all these useful plants may be better procured from abroad by such persons as are desirous to make experiments on them, the Curious may not be displeas'd (when they write in quest of them) to learn the foreign names given them at present, and for two or three centuries back, in the various parts of Europe; and that, so far at least, as it was in my power to collect them. I have also included, in a parenthesis, the Latin names made use of by modern botanists.

AMEL-CORN. (*Zea.*) Escourgeon, Espautre, *French.* Ammilkorne, *German.* Zea, Spelta, Bida, and Pirra; *Italian.* Spelta, *Spanish.*

ANTHOXANTHUM.

tain-herbs, makes a medicinal tea, for thinning the blood, of a very pleasant taste. The physicians of the countries abovementioned prescribe it always under the name of *trifolium fibrinum*. I made a drawing of the plant at *Gratz*, and have all imaginable reasons to think it will afford excellent, as well as abundant food for cattle.

* An esculent root for men and cattle, cultivated, gathered, and preserved like potatoes. It is the *beliantbemum tuberosum Indicum*, or *corona solis tuberosa radice*.—A sort of *Jerusalem artichoke*.

ANTHOXANTHUM. Prim-Grass, *Tusser*, 1577.
Vernal-Grass, *Ray*, 1680.

BUCK-WHEAT. (*Fagopyrum*.) Dragée au che-
vaux, Blé de Sarrasins, *French*; Heydonkorne,
Highb-German. Bochweidt, *Low German*.

CLOVER, *Broad*. (*Trifolium majus sativum*.)
Grand Trefle, & vray Trefle, *French*. Trifolio, *Ita-
lian*. Trevol; *Spanish*. Grootte Claveren, and Spa-
ensich Clayeren, *Low German*. Klee and Vuifenklee,
Highb German.

CANARY-GRASS. (*Phalaris*.) Panic, *French*.
Pfenich and Heidel-pfenich, *German*. Panico, *Ita-
lian*. Panizo and Paniso, *Spanish*.

CYTISUS *falsifid*, or bastard Senna. (*Cytisus
Maranthæ*.) Baguenaudieres and Baguenaudes,
French. Linsen Welsch, Lombartshe-Linsen, and
vulgarly Senebroome, *Highb and Low Dutch*. Cy-
tiso, *Italian*.

FENUGREEK. (*Fœnum Græcum*, *Trigonella*.)
Fenugrec & Senegre, *French*. Bochsborne, or Ku-
horne, *Highb German*, Fiengreco, *Italian*. Alfor-
nas, and formerly Alholvas, *Spanish*. (This is the
Siliqua of *Columella*.)

FOX-TAIL GRASS. (*Alepocurus*.) Qüeve de Re-
nard, *French*. Vossen Steert, *Low Dutch*.

KIDNEY-VETCH. (*Anthyllis*.) Tanasie sauvage
and argentine, *French*. Grenserich and Ganferich,
German. Antyllide, *Italian*.

KNOT-GRASS. (*Polygonum*.) Renouée & Cor-
rigiole, *French*. Weygrass and Weytrit, *Highb
Dutch*. Wachgrass, Verkensgrass, and Duyfent
knoop manniken, *Low Dutch*; as also Knawel, i. e.
Knot-weed. *Polygono masehio* and *Corrigiola*,
Italian. *Corrigola* and *Gailis*, *Spanish*.

LADIES-MANTLE. (*Alchemilla*.) Pié de lion,
(hence the *English* Pedelion) & Aspergoutte,
French. Synnan, Lewentaupen, and Lewenfufz,
Highb Dutch. Onser Frawen mantel, and Gros Sa-
nickel.

nickel, *Low Dutch.* Stellaria and Alchemilla, *Italian.*

LUCERNE. (Medica.) Lucerne and Trefle au Li-
raison, *French.* Gedraite Claveren, and Spaensh
Claveren, *Low Dutch.* Medica, *Italian.* Alfalfa,
Ervey, and Alfalfa (from the *Moorish* Alfasafar).
Spanish.

LUPINES. (Lupinum.) In *French* as in *English.*
Feigbonen, *High Dutch.* Lupinen, Vyckboonen,
and Wolffbonen, *Low Dutch.* Lupino domestico.
Italian. Entramuces and Entramocps, *Spanish.*

MARYGOLDS. (Calcha, vulgo Calendula.) Souci,
French. Ringelblumen, *High Dutch.* Goubloem-
men, *Low Dutch.* Maravilha, *Spanish.* Calcha,
and Fior rancio, *Italian.* As it blows every month,
it is also called Fior d'ogni mese (the flower of every
month.) The flower of the calends (Calendula; and,
as it turns towards the sun from morning to even-
ing, it is called Sposa del sole (the sun's wife;) and
Horologio de i cittadini (the citizens clock) *Italian.*

MELILOT. (Melilotus.) In *French* as in *En-
glish;* and also Melilot d'Italie, Ghemeyne, *Low
Dutch.* Meliloto, *Italian.* Corona di Rei, *Spanish.*

MILLET. (Milium.) In *French* as in *English;*
and also Mil. Kirfz, *High Dutch.* Miglio, *Ita-
lian.* Milho and Miyo, *Spanish.* (N. B. There is
another Millet, of the *Indian* kind, mentioned by
Virgil and *Pliny*, called, by the *Italians*, Sorgho,
Miglio Indiano, Sagina, and Melago; and by the
Germans, in the hereditary dominions of the House
of *Austria*, Sorglamen.

Plantain, Ribbed. (Plantago quinquenervia.) Petite
Plantaine, Lançoole and Lanceolette, *French.* Spitzer
wegrich, Klein wechbree, Kentfribbe, and Uvege-
rich, *High and Low Dutch.* Plantagine, *Italian.*
Llanthem, and Tarnelagen, *Spanish.*

Ray-Grass. (Gramen avenaceum, elatius, longa
juba splendente.) Yvray, Gasse, Fromental, Chien-
dent