

A treatise concerning the husbandry and natural history of England : in twenty two chapters ... / by Sir Richard Weston ... ; And a preface by Sam. Hartlib.

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A

TREATISE

CONCERNING

The Husbandry and Natural History of ENGLAND,

In Twenty Two CHAPTERS, *viz.*

- | | |
|--|--|
| 1. On <i>Saint Foin</i> . | 15. Of Silk-Worms. |
| 2. Of Ploughs and Carriages. | 16. Of the Husbandry of other Countries. |
| 3. Of digging of Land, setting and hewing of Corn. | 17. Of our Ignorance of the Metals, Minerals, &c. produced in <i>England</i> . |
| 4. Of Gardening. | 18. Of our Ignorance of the Virtues and Uses of the Vegetables of <i>England</i> . |
| 5. Of Smut and Mildew. | 19. Of Animals, Fishes, Insects, &c. |
| 6. Of planting Fruits. | 20. Of divers Things necessary for the Good of Cattle. |
| 7. Of the Defect of Fruits. | 21. Of many Necessaries wanting in Agriculture. |
| 8. Of <i>Vines</i> . | 22. Of God's Blessing on the Husband-Man's Labour. |
| 9. Of <i>Hemp</i> and <i>Flax</i> . | |
| 10. Of Dunging and Manuring Land. | |
| 11. Of the Improvement of Meadows. | |
| 12. Of Waste-Land. | |
| 13. Of Woods. | |
| 14. Of Bees. | |

Useful for all Persons, especially those who have any
Concern in Rural Affairs.

By Sir RICHARD WESTON,

Late of *Sutton* in the County of *Surrey*, and left by
him, as a Legacy, to his SONS; with an Intro-
duction addressed to them, written by himself.

And a Preface by Mr. SAM. HARTLIB.

The Second EDITION, Corrected and Improved.

L O N D O N :

Printed for T. HARRIS at the Looking-Glass and Bible
on *London-Bridge*, 1742. [Price sew'd Two Shillings.]

THE ARTS

CONCERNING

THE INFLUENCE OF NATURE UPON
THE ARTS

By the Hon. the Earl of Shaftesbury
in a Letter to the Hon. the Earl of
Burlington
As it is now published by
W. Woodcock, at the Sign of the
Three Kings, in Pall Mall
1724

By Sir Richard Worsley
of the County of York, and Esq;
of the County of York, who has
written the following

Letter to the Hon. the Earl of
Shaftesbury

LONDON
Printed by J. Sturges, at the
Sign of the Three Kings, in
Pall Mall

ADVERTISEMENT.

*T*HE Subjects treated of in the following Sheets are of such general Use to Mankind, that there needs no Apology for the Publication of them. But perhaps it may be pretended, we are much improv'd in those Affairs since the Time of our Author. To which we answer, some few Things are, but many others of the utmost Consequence to this Nation are not, the Generality of People being bigotted to the Methods used by their Fathers, or others, have notoriously neglected making (or I may almost say attempting) any Discoveries in Agriculture, or the Natural History of their Country. Likewise our modern Authors, BRADLEY, &c. are chiefly built on Theory; whereas the following Sheets are either founded upon the Author's own Experience, or his Friends. Vide INTRODUCTION.

The Publisher.

ADVERTISEMENT

THE SMALL TRACT of the same name
of the same author is now
these words as before for the
in our that property was in
and the same in the same
our author, the same as before
things are, but many others of the same
comes to this Nation are not
People being invited to the
their Father, or other, have
ed, making (as I may call it) a
Differences in Agriculture, in
of that Country. I have
Authors, BRADLEY, &c. and
Theory; others the following
formed upon the Author's own
Theory. With Introduction.

The Publisher



To the R E A D E R.

Courteous Reader,



THE Discourse which I formerly published, concerning the *Brabant Husbandry*, was somewhat imperfect, the Author thereof being then unknown to me; but since I have learned who he was, I have got a more perfect Copy, which I now offer to the Publick. Sir RICHARD WESTON (the Author of the *Brabant-Husbandry*) left the following Discourse as a Legacy to his Sons, whose Introduction to that Discourse I have here prefix'd. I could wish, that GOD would put it in the Heart of those Worthies that manage the Publick Trust, that by their Influence and Authority, these and such like Means of Industry, may not be left wholly to the uncertain, disorderly, and lazy Undertakings of private Men; but to have an Eye over them, and their Proceedings, which so plainly appears to be a Publick Concern. Therefore let us all join to entreat

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and

and petition them, that in order to the Publick and General Welfare of this Common-Wealth, these two Things at least may be thought upon and resolv'd.

First. In respect of the known Untowardness of the major Part of the People, who being wonderfully wedded to old Customs, are not easily won to any new Course, tho' never so much to their own Profit, that two or more fit Persons, of approved Skill and Integrity, may be made Publick Stewards, or Surveyors; one of the Husbandry, the other of the Woods of this Common-Wealth, and impower'd to oversee and take care of the Preservation of what is, and by all good Improvement to procure and provide for what is wanting in the present Age: And (except some such Expedients are used) it is very likely they will be wanting to succeeding Ages.

Secondly. That according to the usual Custom of *Flanders*, a Law might be made of letting and hiring Leases upon Improvement; where the Manner is, That the Farmer covenants on his Part to improve the Land to such or such a greater Rent, by an orderly and excellent Management of Husbandry, as well as Building. The Landlord, on the other Side, covenants on his Part, at the Expiration of the said Lease, to give so many

Years

To the READER. v

Years purchase of the Improvement (according to the Argeement) which is three or four Years, or sometimes more, or to give out of it such a Parcel or Moiety of Ground. As if Land formerly going for Six Shillings an Acre, be upon Improvement worth Ten Shillings, or Thirteen Shillings and Four Pence an Acre; the Landlord is to give Four or Five Shillings upon every Acre, more or less, according to the Agreement. If it please GOD to bless these Motions, and that the *National Husbandry* of this Common-Wealth be improv'd; we may hope thro' GOD's Blessing to see better Days, and be able to bear necessary and publick Burdens with more Ease to our selves, and for the Benefit of our Posterity.

Thy Faithful Servant,

SAM. HARTLIB.

INTRODUCTION.

Sir *RICHARD WESTON*, late
of *Sutton* in the County of *Surry*,
his LEGACY to his SONS, &c.

My SONS,

I Have left this short ensuing Treatise
to you as a LEGACY ; if I shall not
live my self to shew you, what there-
in is written, by Example, which I know
instructs far more than Precept ; yet Pre-
cepts from a dying Father, instructing of
his Children what he hath seen and known,
and received Information of from Witnes-
ses free from all Exceptions, should make
such an Impression on them, as at least to
believe their Father writ what he thought
was true ; and therefore supposes those
Things worthy to be put in practice by them
which he himself would have done, if it
had pleased God to have granted him Life
and Liberty ; especially seeing the Matter
it self, which is required by him to be done,
is in View so profitable, and so easy to be
effected, and with so little Charge, consi-
dering the great Gain that is proposed by
it, that not any thing can restrain a ra-
tional

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tional Man from the Trial thereof, but not giving Credit to the Relator.

The whole Discourse shews you how to improve barren, heathy Land, and how to raise more than ordinary Profit therefrom, by such Ways and Means as are not practised in England, but as commonly in some Parts of Brabant and Flanders, as the Husbandry of Wheat and Rye is here. By that Means you may nobly augment your Estates, and will receive so much the more Profit and Praise, as by your Industry and Diligence you govern your Affairs; and will not only be imitated, but also honour'd by your Neighbours, when they shall see your Labours prosper so far as to convert barren and heathy Ground, left unhusbanded for many Ages, into as commodious arable Land, with Pastures and Meadows, as any in this Kingdom. And certainly, that Man is worthy of Praise and Honour, who being possessed of a large and barren Demeasne, constrains it by his Labour and Industry to produce extraordinary Fruits; which redounds not only to his own particular Profit, but also to the Publick Benefit. CATO says, It is a great Shame to a Man, not to leave his Inheritance greater to his Successors than he received it from his Predecessors; and that he despises the Liberality of GOD, who by Slothfulness loses that which his Land may bring forth, not seeming willing to reap the Fruits which GOD has offer'd him.

Nay,

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Nay, he threatens the Crime of High-Treason to those that do not augment their Patrimony so much as the Increase surmounts the Principal. It is a Thing much celebrated by Antiquity, and thought the noblest Way to gather Wealth, for to employ one's Wit and Money upon Land, and by that means to augment his Estate. If you observe the common Course of Things, you will find that Husbandry is the End which Men of all Estates in the World point at. For to what Purpose do Soldiers, Scholars, Lawyers, Merchants, and Men of all Occupations and Trades, toil and labour with great Affection, but to get Money; and with that Money, when they have got it, to purchase Land? And to what End do they buy that Land, but to receive the Fruits thereof? And how shall one receive the Fruits of it, but by his own Husbandry, or a Farmer's? So that it appears by degrees, that what Course soever a Man takes in the World, at last he comes to Husbandry, which is the most common Occupation among Men, the most natural and holy, being commanded by the Mouth of GOD to our first Father. There is Care and Diligence requisite in Husbandry, as there is in all the Actions of the World; and therefore as a Captain hath a Lieutenant to command his Soldiers in his Absence, or for his Ease, so must you provide some able honest Man, to whom you may commit the Execution

of

I N T R O D U C T I O N. ix

of such Things as you can't do without too much Labour; whereof you must often take an Account, and confer with him, as Occasion shall require, about your Business, that nothing may be left undone for want of Prudence. To such a Man you must give good Wages, with Intent to advance your own Gain, and take the more Ease, by reason of his Honesty and Knowledge.

You will find this Husbandry, after you have once had Experience of it, to be very pleasing to you, and so exceeding profitable, that it will make you diligent: For no Man of any Art or Science (except an Alchymist) ever pretended so much Gain any other Way, as you shall see demonstrated in the ensuing Treatise. The Usurer doubles but his Principal, with Interest upon Interest in seven Years; but by this little Treatise you shall learn how to do more than treble your Principal in one Year's Compass. And you shall see how an industrious Man in Brabant and Flanders would bring five Hundred Acres of barren and heathy Land, that was not worth at the most above five Pounds a Year, to be worth seven Hundred Pounds a Year in less than seven Years. I know no Reason why the like may not be done in England; for we are under as good a Climate as they are; our heathy Land, that is neither Sand nor Loam, is as good a Soil as their barren Ground is. We have not only Dung to enrich our Land, but also Lime and Marl, of
which

X I N T R O D U C T I O N.

which they know not the Use, where they sow their most gainful Commodities mention'd in the ensuing Treatise, nor of any other Manner, but only Dung. In fine, I am certain there is none of their Commodities but will grow in England as they do in Brabant and Flanders; but ours are not of the same Kind as theirs, nor put to the same Use. What can't be vented at Home may as well be vented from hence into Holland, as the like Commodities are from Flanders there. I will say no more of this Subject in the Preface; only it remains to tell you, that you must not expect either Eloquence or Method in the ensuing Treatise, but a true Story plainly set forth in the Last Will and Testament of your Father; which he would have you execute: But before all things, to be sure you lay the Foundation of your Husbandry upon the Blessing of Almighty GOD; continually imploring his divine Aid and Assistance in all your Labours; for it is GOD that gives the Increase: And believing this as the Quintessence and Soul of Husbandry, Primum quærite Regnum Dei; & postea hæc omnia adjicientur vobis. These Things being briefly premised, I will leave the rest to the Work, and commit you all, with a Father's Blessing, to the Protection and Providence of Almighty GOD.

Your Loving Father,

RICH. WESTON.



A
T R E A T I S E

Concerning the
Husbandry *and* Natural History of
ENGLAND, &c.

Written to Mr. SAM. HARTLIE.

C H A P. I.

Of Saint Foin.

SIR,

According to your desire, I have sent you what I have observed in *France* about the sowing of a feed commonly call'd *Saint Foin*, which in *England* is as much as to say *Holy-Hay*, by reason, as I suppose, of the excellency of it. It's call'd by *Parkinson*, in his *Herbal*, where you may see a perfect description of it, *Onobrychis Vulgaris*, or *Cocks-Head*; because of

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its

its flower, or *Medick Fetchling*: By some it is called *Polygala*; because it causeth cattle to give abundance of milk. The Plant most like it, and commonly known (being frequently sown in gardens) is that which is called *French Honey-suckle*, and is a kind of it, though not the same. *France*, although it be supposed to want the fewest things of any country in *Europe*, yet it hath no small want of *Hay*, especially about *Paris*; which hath necessitated them to sow their dry and barren lands with this feed. Their manner of sowing it is done commonly thus: When they intend to let their Corn-lands lie, because they are out of heart, and not situate in a place convenient for manuring, then they sow that land with *Oats* and these feeds together, about equal parts. The first year they only mow their *Oats*, leaving their *Saint Foin* to take root and strength that year: Yet they may if they please, when the year is seasonable, mow it the same year it is sown; but it's not the best way to do so. The year following they mow it; and so do seven years together: the ordinary burthen is about a load, or a load and a half in good years, upon an *Arpent*, [which is one hundred square Poles or Rods, every Pole or Rod being twenty Feet] which quantity of ground being nigh a fourth part less than an *English Acre*, within a league of *Paris* is usually rented at six or seven shillings. After the land hath rested seven years, then they usually break it up, and sow it with corn till it is out of heart, and then sow it with *Saint Foin* as formerly: for it does not impoverish land, as *Annual Plants* do; but after seven years, the roots of this plant being great and sweet, as the roots of *Liquorice*, do rot, being turned up by the Plough, and enrich

rich the land. I have seen it sown in divers places here in *England*; especially in *Cobham-Park* in *Kent*, about four miles from *Gravesend*; where it hath thriven extraordinary well upon dry chalky banks, where nothing else would grow: and indeed such dry barren land is most proper for it, as moist rich land for the great *Trefoil*, or great *Clover-Grass*, although it will grow indifferently well on all lands; and when the other grasses and plants are destroy'd by the parching heat of the Sun, because their roots are small and shallow, this flourisheth very much, having very great root and deep in the ground, and therefore not easily to be *exsiccated*; as we have observed *Ononis*, or *Rest-Harrow*, commonly to do on dry lands; but if you sow this on wet land, the water soon corrupts the root of it. This plant, without question, would much improve many of our barren lands, so that they might be mowed once every year, at least seven years together, and yield excellent fodder for cattle, if it be rightly managed; otherwise it comes to nothing, as I have seen by experience. I therefore counsel those who sow this, or the great *Trefoil*, or *Clover Grass*, or any other sort of grasses, that they observe these Rules.

1. That they make their ground fine, and kill all sorts of other grasses and plants; otherwise, they being native *English*, will by no means give way to the *French* ones, especially in this moist climate. And therefore they are to be blamed, who with once ploughing sow this or other seeds; for the grass presently grows up and chokes them, and so by their negligence, and ill husbandry, discourage themselves and others.

2. Let them not be too sparing of their seeds; for the more they sow, the closer and thicker they

will grow, and presently so fully stock the ground, that nothing, else can grow. And farther, the seeds which come from beyond sea, are oftentimes old and much decayed, and therefore the more seed is required.

3. Not to expect above seven years profit by it; for in that time it will decay, and the natural grass will prevail over it. For every plant hath its period, some in one year, some in two, others in three, as the common *Thistle*; and therefore after seven years let them either plough the land up, and sow it with that same seed again, or with other grain, as they do in *France*.

4. Let not sheep or other cattle bite them the first year, that they may be well rooted; for these grasses are far sweeter than the ordinary grasses; and cattle will eat them down, leaving the other, and consequently discourage their growth.

5. The best way, if men will be at the charge, is to make their ground very fine, as they do when they are to sow *Barley*, and harrow it even, and then to sow seeds in alone, without any other grain, as the gardeners do *Pease*; yet not at so great a distance, but let them make the ranges about a foot's bread thone from another, and they shall see their grasses flourish, as if they were green *Pease*, especially if they draw the how through them once or twice that summer, to destroy all the weeds and grasses. And if they do thus, the great *Clover* and other seeds may be mowed even twice the first year, as I have experimented in divers small plots of ground.

There is likewise at *Paris* another sort of fodder, which they call *La Lucern*, which is not inferior, but rather preferr'd before *Saint Foin*,
for

for dry and barren grounds; which hath been lately brought thither, and is managed as the former: and truly every day produces some new thing, not only in other countries, but also in our own. And though I cannot but very much recommend these plants unto my countrymen, knowing that they may be beneficial to this nation, yet I especially recommend unto them a famous kind of grass growing in *Wiltshire*, nineteen miles from *Salisbury*, at *Maddington*, which may better be call'd one of the wonders of this land, than the *Hawthorn-tree* at *Glassenbury*, which superstition made so famous; for divers of the same kind are found elsewhere. You may find this grass briefly described in a book called *Phytologia Britannica*, which lately came forth, and set down even all the plants which have been found naturally growing in *England*; *Gramen Caninum supinum longissimum*, which groweth nine miles from *Salisbury*, Mr. *Tucker's* at *Maddington*, wherewith they fat Hogs, and which is twenty-four feet long; a thing almost incredible, yet commonly known to all the shire. Now, without question, if the seed of this grass be sown in other rich Meadows, it will yield extraordinarily; tho' perchance not so much as in its proper place. I wonder that those that live thereabouts have not tried to fertilize their other Meadows with it; for it is a peculiar species of grass; and tho' some ingenious men have found about ninety species of grasses in this island, yet there is none like to this, that can by any means be brought to such an height and sweetness. And I suppose, that the thorough examination of this grass is a thing of very great importance, for the improvement of Meadows and Pastures; and it may excel the great *Trefoil*, *Saint Foin*, *La Lucern*,

Lucern, or any exotick plant whatsoever. And though I am very unwilling to exceed the bounds of an Epistle, yet I cannot but certify you wherein the Husbandry of this nation in other particulars, as I suppose, is very defective, which I will do as briefly as may be; and likewise, how ingenious men may find Remedies for these Defects.

C H A P. II.

Concerning Ploughs and Carriages.

FIRST, he would do the honest and painful Husband-man a very great pleasure, and bring great profit to this nation, who would facilitate the going of the Plough, and lighten our ordinary Carriages. I wonder that so many excellent Mechanicks, who have beaten their brains about the Perpetual Motion and other curiosities, that they might find the best ways to ease all Motions, should never so much as honour the *Plough* (which is the most necessary instrument in the world) by their labour and studies. I suppose all know, that it would be an extraordinary benefit to this country, if one or two horses could plough and draw as much as four or six; and also, that there is no small difference in Ploughs and Waggon, when there is scarce any sure rule for making them; and every country, yea almost every county, differs not only in the Ploughs, but even in every part. Some with wheels, others without; some turning the Rest (as they call it) as in *Kent*, *Picardy*, and *Normandy*, others not: some having Coulters of one fashion, others of another; others, as the *Dutch*, having an iron wheel or circle for
that

that purpose, some having their Shares broad at point; some not; some being round, as in *Kent*; others flat; some tying their horses by the tails, as in *Ireland*. So likewise Waggon and Carts differ: some using four wheels, others two only; some carrying timber on two wheels in a Cart, others with four wheels and a long pole only between, which is the best way; some plough with two horses only, as in *Norfolk*, and in *France* and *Italy* I never saw above three horses in a Plough, and one person only to hold and drive: but in *Kent* I have seen four, six, yea twelve horses and oxen. Which variety sheweth that the Husband-man, who is ordinarily ignorant in Mechanicks, is even at his wits end in this instrument, which he must necessarily use continually. Surely he would deserve very well of this nation, and be much esteem'd by all, that would set down exact Rules for the making of this most necessary instrument, and for every part thereof: for without question there are as exact Rules to be laid down, as well for this as for Shipping and other things. And in Shipping, how have we, within these six years, gone beyond all nations? For which Art some deserve eternal honour: and why may we not in this? I know a Gentleman, who is now beyond sea, where he excels even the *Hollanders* in their own business of draining, who promiseth much in this kind, and I think he is able to perform it: I could wish he were called on to make good his promise. In *China* it is ordinary to have Waggon to pass up and down without horses or oxen, with sails, as ships do. And lately, in *Holland*, a Waggon was framed, which, with ordinary sails, carried thirty people sixty *English* miles in four hours. I know some excellent Scholars,

who

8 Of Ploughs and Carriages.

who promise much by the means of *horizontal Sails*, (*viz.*) to have three or four Ploughs to go together; which shall likewise both sow and harrow.

I dare not, being ignorant in these high speculations, engage my self to do much thereby; but with these gentlemen, whom I know to be very ingenious, would attempt something, both for the satisfying of themselves and others. There is an ingenious *Yeoman* of *Kent* who hath two Ploughs fastened together very finely, by which he ploughs two furrows at once, one under another, and so stirreth up the land twelve or fourteen inches deep; which in deep land is good. Near *Greenwich* there lives a Gentleman, who hath excellent corn on barren land, and yet ploughs his land with one horse, when as usually through *Kent* they use four or six. These things shew that much may be done in this kind; and I hope some, in these active times, will undertake and accomplish this work of so great importance.

C H A P. III.

Concerning digging of Land, Setting and Howing of Corn.

THERE is a Book long since printed, made by Sir *Hugh Plattes*, (the most curious man of his time) called, *Adam's Art revived*; wherein is shewed the great benefit which would accrue to this nation, if all land which were fit to be digg'd, were so ordered, and their corn set. Mr. *Gab. Plattes* likewise hath written much of this kind, and promiseth that men shall reap one hundred for one; all charges borne,

borne, which are very great. That this may be true, he brings some probable reasons, supposing that less than a peck of *Wheat* will set an Acre. I dare not promise so much as these Gentlemen do: neither can I commend Mr. *Gab. Plattes's* Setting-Instrument, for I know there are many difficulties in it, which he himself could never get through; but concerning digging and setting, and howing in of corn, these things I dare maintain.

1. That it is a Defect in Husbandry, that it is used no more.

2. That one good digging, because it goes deeper than the Plough, and buries all weeds and kills the grass, is as good as three Ploughings; and, if the Land be mellow, not much more chargeable.

3. That it would imploy many thousand people: that a third part of the seed might be saved. As I have found by experience, that all the weeds and grass might be more easily destroyed thereby, and the ground better accommodated for other crops; and to conclude, the crop considerably greater. Yet thus much I must farther say concerning setting of Grain, That great *Beans* are even of necessity to be set, and that small *Beans* in *Surrey*, and other places, are likewise set with profit, for the reasons above mentioned; but to set *Pease* (unless *Hastovers*) *Oats*, or *Barly*, is ridiculous: but *Wheat*, although in divers grounds it may be set with profit, yet to *how it in* (as the Gardeners speak) as they do *Pease*, though not at the same distance, but about a foot the ranges one from another, is better than setting, for these Reasons.

1. Because to set corn is an infinite trouble and charge; and if it be not very exactly done, which

10 *Of Digging, Setting and Howing.*

children neither can nor will do, and these must be the chief setters, will be very prejudicious.

2. If worms, frost, ill weather, or fowls, destroy any part of your seed, which they will do, your crop is much impaired.

3. The ground cannot be so well weeded, and the mould raised about the roots by the How: which three inconveniencies are remedied by the other way.

Farther, I dare affirm, that after the ground is digged or ploughed and harrowed; even it's better to *bow* *Wheat* in, than to sow it after the *common way*; because that the weeds may be easily destroyed, by running the How through them in the spring, and the mould raised about the roots of the corn, as the Gardeners do with *Pease*, it would save much corn in dear years, and for other reasons before mentioned. Yea, it is not more chargeable; for a Gardener will *bow* an acre for five shillings, and in the spring, for less money, run it over with a How, and cut up all the weeds, and raise the mould: which charges are not great, and you will save above a bushel of seed, which in dear years is more worth than all your charges.

Farther, one shilling and six pence an acre for the sowing and harrowing of an acre in *Kent* is accounted a reasonable price; but if any fear charges, let him use a Drill-plough. I therefore cannot but recommend the *bowing in* of *Wheat*, as an excellent piece of good Husbandry, whether the ground be digged or ploughed; not only because it saves much corn, employs many people, and is not chargeable; but also as it destroys all weeds, fitteth grounds for after-crops, and causeth a greater increase; and, in my apprehension, is a good Remedy against Smut and Mildew.

Mildew. There is an ingenious *Italian*, who wonders how it comes to pass, that if one sets a grain of corn, as *Wheat*, *Barly*, &c. it usually produces three or four hundred, as I have tried: yet if you sow *Wheat* after the ordinary way, six or eight for one is accounted a good crop; what becomes of all the corn that is sown, when as the fiftieth part, if it grew, would be sufficient? In answer to this;

1. I say, much corn is sown, which nature hath destinated for the Hens and Chickens, being without any considerable vegetative faculty.

2. Worms, Frosts, Floods, Crows and Larks, devour not a little.

3. Weeds, as *Poppy*, *May-weed*, and the grasses growing with the corn, destroy much.

Lastly, when corn is sown after the ordinary manner, much is buried in the furrows; especially if the ground be grazed: much is thrown on heaps in holes, and, consequently, starve and choak one another. Most of these inconveniences are to be remedied by this way of setting and howing in of corn.

C H A P. IV.

Concerning Gardening.

Gardening, though it be a wonderful improver of lands, as it plainly appears by this, that they give extraordinary rates for land, viz. from forty shillings *per* acre to nine pound, and dig, how, and dung their lands, which is very expensive; yet I know some, by two or three acres of land, maintain themselves and family, and imploy others about their ground; and therefore their ground must yield a wonderful increase,

or else it could not pay charges; yet I suppose there are many Defects in this calling.

1. Because it is but of few years standing in *England*, and therefore not deeply rooted. About fifty years ago, about which time Ingenuities first began to flourish in *England*, this Art of Gardening began to creep into *England*, in *Sandwich*, and *Surrey*, *Fulham*, and other places.

Some old men in *Surrey*, where it flourishes very much at present, report, That they knew the first Gardeners that came into those parts, to plant *Cabbages* and *Cauliflowers*, and to sow *Turnips*, *Carrots*, and *Parfnips*; to sow *Raith* (or early ripe) *Rape*, *Pease*; all which at that time were great rarities, we having few or none in *England*, but what came from *Holland* and *Flanders*. These Gardeners, with much ado, procured a plot of good ground, and gave no less than eight pound *per acre*, yet the Gentleman was not content, fearing they would spoil his ground, because they dug it. So ignorant were we of Gardening at that time.

2. Many parts of *England* are yet ignorant. Within twenty years a famous Town*, within less than twenty miles of *London*, had not so much as a ræss of *Pease* but what came from *London*; where, at present, Gardening flourisheth much. I could instance divers other places, both in the North and West of *England*, where the name of Gardening and Howing is scarcely known; in which places a few Gardeners might have saved the lives of many poor people, who have starved these dear years.

3. We have not Gardening ware in that plenty and cheapness (unless perhaps about *London*)

* *Gravesend*. as

as in *Holland* and other places, where they not only feed themselves with Gardeners ware, but also fat hogs and cows.

4. We have as yet divers things from beyond sea, which the Gardeners may easily raise at home, though nothing nigh so much as formerly; for in *Queen Elizabeth's* time, we had not only our Gardiners ware from *Holland*, but also *Cherries* from *Flanders*, *Apples* from *France*, *Saffron* and *Liquorice* from *Spain*, *Hops* from the *Low Countries*: and the *Frenchman* who writes the *Treasure Politick*; saith, that it's one of the great Deficiencies of *England*, that *Hops* will not grow there: whereas now it is known, that *Liquorice*, *Saffron*, *Cherries*, *Apples*, *Pears*, *Hops*, and *Cabbages* of *England*, are the best in the world. Notwithstanding we, as yet, want many things; as for example, we want *Onions*; many coming to *England* from *Flanders* and *Spain*; *Madder*, for dying, comes from *Zurick-sea* by *Zealand*; we have red *Roses* from *France*; *Annise-seeds*, *Fennel-seeds*, *Cummine*, *Caraway* and *Rice* from *Italy*; which, without question, would grow very well in divers moist lands in *England*; yea, *Sweet Marjorum*, *Barley*, and *Gromwell-seed*, and *Virga Aurea*, they grow in our hedges in *England*.

Lastly, Gardening is defective in this particular: that we have not Nurseries sufficient in this land of *Apples*, *Pears*, *Cherries*, *Vines*, *Chestnuts*, *Almonds*; but Gentlemen are necessitated to send to *London* many hundred miles for them.

Briefly, for the advancement of this ingenious calling, I only desire, that industrious Gentlemen would be pleased to encourage some expert workman into the places where they live, and to lett them land at a reasonable rate, and if they

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be poor and honest, to lend a little stock; they will soon see the benefit that will redound, not only to themselves, but also to their neighbours, especially the poor, who are not a little sustained by the Gardener's labours and ingenuities.

C H A P. V.

Of Smut and Mildew.

OUR Husbandry is deficient in this, that we know not how to remedy the infirmities of our growing corn, especially Smut and Mildew; to instance in these two only, which oftentimes bring great calamities to these nations: Smut in wet years, Mildews in dry. These distempers in corn are not only in our country, but also in other places. A learned *Author saith, "That Smuttiness of corn, which makes it smell like a red-herring, was not known in *France* till about 1530, at which time the great foul disease began to break forth; which he conceiveth from hence to have some original, as also the camp-disease." Mildews are very great in the kingdom of *Naples*, which often stick to the scithes of those that mow grass and corn: and (God be thanked) we are not troubled with Locusts, which is a great flying Grasshopper; nor Palmer-worms, which is a kind of great black Caterpillar, nor with great Hail in summer, nor with great Draught, which stifeth the ear in the stalk; which calamities, in hot countries, do very often totally destroy the honest and patient Husband-man's labours: neither are we troubled with extreme Colds, which,

* *Helmont.*

which, in *New-England* and other cold countries, do often destroy the corn. But to return to our purpose.

And first briefly to shew you my opinion concerning the cause of Smuttiness. I desire not to fetch causes afar of, and to tell you of the sad Conjunctions of *Mars* and *Saturn* (for I think *Quæ supra nos*, belong not to us) whenas we have enough at home: this is certain, that there are many evident causes of this corruption of corn.

1. A moist season about Kerning-time: which moisture either corrupteth the roots of the plant, or the nourishment of it, or the seed in its embryo; or, perhaps, in some measure all these.

2. Low, moist, foggy ground, for the reasons above mentioned.

3. Dung'd land. In vineyards it's observ'd, that dung causeth more increase in quantity, but less in goodness; so that the ill taste of the dung may easily be discerned, because wine hath an high taste; without question the same happeneth to other Plants, although it be not so easily discerned; for the ferment, or ill odour of the dung, cannot be over master'd by the Plants: as we see also in animals, that corrupt diet causeth unsavory tastes in the flesh; so Hogs in *Newfoundland*, where they are nourished by fish, may by their tastes be called rather Sea-porpuesses than Land-swine.

4. The sowing of Smutty corn often produceth Smuttiness: the son like unto the father. I account Smutty corn an imperfect or sick grain, and suppose that by a microscope the imperfection may be discerned.

Lastly, the sowing of the same seed often on the same field causeth Smuttiness; because that nitrous

trous juice, which is convenient for the nourishment of the grain, hath been exhausted in the precedent years; and therefore it is excellent husbandry every year to change the species of grain, and also to buy your seed-corn from places far distant. I am informed of a Gentleman, who sow'd some *Wheat* which came from *Spain*; where the grain is usually very hard and flinty, and as it were transparent, and far weightier than ours (as it appeareth by a measure at *Amsterdam*; which holdeth about three bushels, and if our *Wheat* in the northern parts weigheth 160, the southern corn weigheth sometimes 180, 200, 220) and had a crop beyond expectation.

The usual Cures of Smuttiness; besides those mention'd before, are these.

1. To lime your ground, which warmeth and dryeth the land.

2. To lime your corn: which is done thus; first, slack your lime, and then moisten your corn, or lime, and stir them together, till your grain be as big as a small *Pease*. This liming preserveth corn likewise from birds and worms, and is found a very good remedy against this disease: others make a strong lye with common salt, and steep their corn in it all night, and then draw away their lye for farther use; which seldom fails of its desired effect. Whether this doth by its corrosiveness mortify the weak and imperfect corn, so that it will not grow; or whether it be a remedy to cure the imperfections thereof, is worth the enquiry. I suppose this lye doth exsiccate the superfluous humidity, which is the cause of this corruption. If corn be brought into the barn very Smutty, in *Kent* they usually thrash it on dry floors plank'd with boards: by which means the Smuttiness is beat away,
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and sticks not to the grain, only a little blackness appears about the eye.

Mildew is, without question, an unctuous dew, which descends from above about *Midsummer*: it abounds in dry years, as Smuttiness in moist. I cannot think that there is ordinarily any malignity in this dew; but it produces its effects by manifest causes, *viz.* from an oily viscous quality, which stops the pores of the husk wherein the *Wheat* lieth, and deprives it of air, and consequently of nourishment: for air is the life of all things. I have heard, and do believe, that if you streak an ear of *Wheat* with oil, it will produce the same effect. I am sorry I never tried, that I might better have understood the nature of this sad calamity, which often ruins the industrious Husband-man, and causes great scarcity in this isle. It is to be observed farther, that *Wheat* only suffers considerable damage by Mildew; because it lies in a chaffy husk, which other grains do not. The grounds most subject to Mildew are these:

1. Those that are inclosed with trees and high hedges. And truly this is the only great inconveniency I find by enclosures.

2. Low vallies. I have seen very often in the same field, the banks fine, bright corn; and all the lower parts, though greater in straw, yet little worth, by reason of the Mildew.

3. Dung made of straw, I have observ'd, disposed much to Mildew, and sheeps-dung to be a kind of antidote against it; as also pigeons-dung: because, I conceive, these two last sorts abound much in nitre, which produces a firm, hard, bright corn, not easily to be putrefied; but the other being more oily and sulphurous causeth a dark, spongy corn, soon corruptible.

And secondly, because straw is a part in the same kind corrupted, which is always in some measure hurtful to the same species, both in animals and all vegetables; and therefore rottensticks, or the earth proceeding from them, is found hurtful to the roots of trees; and trees will hardly grow where roots of other trees have formerly been corrupted.

The remedies for this accident, briefly, are these. (Not to speak of Bees, who certainly make most of their Honey from these Honies, or Mildews: for they gather very little in comparison of that which falls).

1. The best way is to cut down the trees about your ground, and keep your hedges low, that the wind may ventilate your corn.

2. To sow early, that your corn may be full kernalled before these Mildews fall. I am informed, that an ingenious Knight in † *Kent*, did, for curiosity, sow *Wheat* in all months of the year, and that sown in *July* produced such an increase that it is almost incredible: and truly I think it a great fault in many places, that they sow late, for many reasons. I am sure in *France* they usually sow before *Michaelmas*.

3. Some use (and with good profit) to draw a line over their corn, and to strike off the Mildew before 'tis thickened by the sun. This ought to be done before sun-rising: two men in an hour will easily run over an acre. The Mildews usually fall like a thick fog, or a misty rain: if you go to your Bees, you will soon perceive it by their extraordinary labour, very early in the morning.

4. The use of a kind of bearded *Wheat* is an excellent remedy: for the beard shoves off the
dew,

† Sir Cheney Culp.

dew, that it does not so easily insinuate itself into the ear, and likewise causes the ear to shake by the least wind. There is a kind of *Wheat* in *Buckinghamshire* called red-straw *Wheat*, which is much commended: it's a strong-stalked *Wheat*, and doth not soon lodge, and therefore excellent for rank land, where corn is apt to lodge, and consequently to Mildew; but I question whether it hath any property against Mildew. This I am very confident of, that if this *Wheat*, or any other, were without the chaffy husks exposed bare to the air, as *Barly* and *Rye* are, *Wheat* would not be afflicted with Mildew. Perhaps such grain may be found by diligent enquiry. I have casually pick'd out of a wheat-field some stalks, which had two ears on them: and though *Barly* usually hath only two ranges, yet I have seen some sorts with four or six, and there are great varieties in grain not yet discover'd. Truly, if any one knows better ways than these, how to kill this malady of Mildew, he is much to blame if he does not publish it for the good of his country-men.

C H A P. VI.

Concerning the planting of Apples, Pears, Cherries, and Plums.

I Will not here set down the divers manners of Graftings and Inoculations, which nevertheless is an art absolutely necessary in planting; for every book of Husbandry doth shew it, and every Gardener can teach it to those who are desirous to learn it: neither will I set down all the sorts of *Apples, Pears, Cherries, Plums, &c.*

for it would be too tedious, and Mr. *Parkinson* hath already very excellently done it, in his book call'd *Paradisus Terrestris*; where at leisure you may read. I will only point, briefly, at the Defects which I find in this part of Husbandry, and the best ways to remedy them.

1. I say, that it is a great Defect in *England*, that we have not more Orchards planted. It is true, that in *Kent* and about *London*, and also in *Glocester*, *Hereford*, and *Worcester* shires, there are many gallant Orchards; but in other counties they are very rare: But if there were as many more, even in any county, they would be very profitable. I know in *Kent*, that some advance their ground even from five shillings *per* acre to five pounds by this means; and if I should relate what I have heard by divers, concerning the profit of a Cherry-orchard about *Sittenburn* in *Kent*, you would hardly believe me; yet I have heard it by so many, that I believe it to be true: namely, that an Orchard of twenty acres of *Cherries* produced, in one year, above a thousand pound; but now the trees are almost all dead: It was one of the first Orchards in *Kent*. Mr. *Cambden* reports, that the Earl of *Leicester's* Gardener, in *Q. Elizabeth's* reign, first began to plant *Flemish Cherries* in those parts; which, in his time, spread into sixteen other parishes, and were then sold at greater rates than now; yet I know that ten or fifteen pounds an acre hath been given for *Cherries*, more for *Pears* and *Apples*.

2. There is a great Defect in the ordering of Orchards, as being not well pruned, but full of *Moss*, *Mistletoe* and *Suckers*; and oftentimes the ground is pack'd too thick of trees, for they should stand at least twenty feet asunder: neither

ther will ill husbands bestow dunging, digging, or any other cost on Orchards, which if they did it might pay half their rents in some places. One told me, for a secret, a composition to make trees bear much and excellent fruit, which was this: first, in an old tree to split its root, then to apply a composition made of pigeons-dung, lees of wine, or stale urine, and a little brimstone, (to destroy the worms.) It hath some probability of truth; for by experience I know, that a bushel of pigeons-dung hath caused a tree to grow, and bear, which for divers years before stood at a stand; but concerning the splitting the roots, I know not what to say. Some old Authors affirm this ought to be done; because the roots may as well be hide-bound as other parts of the tree, and not able to attract its nourishment; and when the root is split it will speedily send forth divers small fibrous roots, which are the principal attractors. It were good that some would give us an exact account of this experiment. But some will object against Orchards, that they spoil much ground, and therefore ought to be planted only in hedges. To this I answer,

1. That *Plum-trees* and *Damsons* may very well be planted in hedges, being ordinarily thorny plants. This is used very much in *Surrey* and *Kent*; where the *Plums* usually pay no small part of the rent: yet I never saw, in these southern parts of *England*, any *Apples* or *Pears* thrive in an hedge, unless a *Crab* or a *Wilding*, or some *Sweeting*, of little worth. How they thrive in *Herefordshire* and those places, I know not.

2. The Inconveniences of Orchards planted at twenty or thirty feet distance, is not worth speaking

speaking of : for this is the usual course in *Kent* ; when they plant any ground, they exactly place them in rank-and-file, and then plough their lands many years, and sow them with corn, till the Orchard begins to bear fruit ; then they lay them down for pasture, which pasture is not extraordinary s^our, but hath these advantages above other pastures :

1. That it is sooner grown by fourteen days in the spring than the meadows, and therefore very serviceable.

2. In parching summers here is plenty, when other places have scarcity.

3. They are great shelters for cattle, especially sheep, who will in those places, in great sn^ows, scrape up meat, which in other places they cannot do : and if the pasture were s^our, yet the loss is not great, for it will be a convenient place for the hogs to run in ; who must have a place for that purpose, where there are no commons.

4. I say, that the Benefits are so many by Orchards. They affording curious walks for pleasure, and food for cattle, both in the spring early, and also in the parching summer, and nipping snowy winter : they afford fuel for the fire, and also shades from the heat, physick for the sick, refreshment for the sound ; plenty of food for man, and that not of the worst ; and drink also, even of the best : and all this without much labour, care, or cost ; who therefore can justly open his mouth against them ?

A third Defect is, That we do not improve many excellent fruits, which grow among us very well ; and that we have as yet many fruits from beyond sea, which will grow very well with us. I pass by the general and great ingorance that

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is amongst us, of the variety of *Apples*, of which there are many sorts which have some good and particular uses; most men contenting themselves with the knowledge of half a score of the best, thinking the virtues of all the rest are comprehended in them: as also of the variety of *Pears*, which are incredibly many. A Friend of mine, near *Gravesend*, hath lately collected about two hundred species. I know another in *Essex*, (Mr. *Ward*) who hath nigh the same number. I hear of another in *Worcestershire*, not inferior to these. In *Northamptonshire* I know one who hath likewise collected very many. So that I dare boldly say, there are no less, in this island, than five hundred species; some commended for their early ripeness, some for excellent tastes, some for beauty, others for greatness, some for great bearers, others for good bakers, some for long lasters, others for to make Perry, &c. But to our purpose. I say many rare fruits are neglected: for instance,

1. In the *Small-nut*, or *Filberd*, which is not much inferior to the best and sweetest *Almonds*.
2. The great *Damson*, or *Prune-plum*, which grows well and bears full in *England*.
3. *Almonds*, which grow well and bear good fruit: I have seen divers bushels on one tree in my brother's orchard.
4. *Walnuts*, which is not a fruit to be despised.
5. *Vines* and *Mulberries*; but of these presently, in another place. I might likewise add *Currants*, *Rasberries*, of which excellent drinks may be made.
6. *Quinces*. A Gentleman, at *Pritchwell* in *Essex*, who had a tree from beyond sea, hath the best in *England*, and hath made above thir-

ty pounds of a small piece of ground planted with them, as I have heard from his own wife's mouth. And therefore it is by reason of our ill Husbandry, that we have *Quinces* from *Flanders*, *Small-nuts* from *Spain*, *Prunes* from *France*, and also *Walnuts* and *Almonds* from *Italy*, and *Chestnuts* (which I had almost forgot) from *Portugal*. And now I cannot but digress a little, to tell you a strange and true story, with my opinion of it. In divers places of *Kent*, as at and about *Gravesend*, in the country, and elsewhere, very many of the prime Timbers of their old barns and houses are of *Chestnut-wood*, and yet there is scarce a *Chestnut-tree* within twenty miles of that place, and the people altogether ignorant of such trees. This shews, that in former times those places abounded with such timber: for people were not so foolish surely in former times to run up and down the world, to procure such huge maffy timbers for barns, and such buildings, whenas there was plenty of *Oaks* and *Elms* at their doors. And farther, it shews, that these trees will grow again with us to a great bigness. This puts into my mind the story of the *Moor-logs*, which are found in divers places of the North of *England*, in *Moors* many foot deep; which logs are long and black, and appear to to be a kind of *Fir* or *Pine*: and yet in those places people are altogether ignorant of these trees, the country not producing any of these species. The first story of *Kent*, which I know to be true, causes me to wonder the less at the latter: for I see, that a species of wood may be destroy'd, even totally in a place. And,

I know, that in *Virginia* and *New-England*, *Pines*, *Firs*, and *Cedars-trees* grow wonderfully thick in such *Moors*, or *Swamps*; and being
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light wood, and easily wrought, they are continually used, while they last, for buildings. Farther, I suppose these Moors were Commons, which the poor used to resort to for firing; and how soon great woods will be consumed by them, every one making what havock he pleases, all men know. As concerning their being so deep in the ground, I suppose, that when wood was abundant in those places, every one cut what they pleased, and left what was not for their turns, which being in moist places was soon glutted with moisture, and made ponderous; by which means it soon buried itself, as ships do on quicksands; or perhaps the turf (which hath a peculiar vegetative faculty, for where it is exhausted, it soon grows again) in time hath grown over them; the people permitting it, because wood, once sobb'd in wet, is of little use, as we see by piles on the marsheside, scarce any man vouchsafing to carry them home. The blackness of this wood proceeds, as I suppose, from the sooty fume, or evaporation of the black turf, (which endeavours, as all earths do, to reduce all things into its own nature; which though it be not able fully to accomplish, yet it introduces divers dispositions and qualities, as blackness in the wood.) Some suppose, that these *Moor-logs* have lain there ever since the Flood, with whom I will not contend, seeing that any wood, if it be kept from the air continually moist or dry, will endure even thousands of years without putrefaction.

C H A P. VII.

Concerning the Defects of Fruits, in not improving them for the best ends and purposes.

Normandy, which produces but little wine, makes abundance of cider and perry, which they estimate equally to wine, if it be made of good fruit. The ordinary perry is made of *Choaky-pears*, very juicy, which grow along by the highway-sides, which are not to be eaten raw. In *Biscay* in *Spain*, where wine is scarce, they make cider of a certain sweet *Apple*, which hath a little bitterness in it, and is like our *Snouting*; and the cider is very good. And truly here in *England*, if you would make cider and perry of the best sorts of fruits, which is rarely done, (for we think any fruit good enough for that purpose) we might make drinks not inferior to the *French* wines, which are usually spoil'd before they come to us, their spirits soon evaporating. There are two ways of making cider and perry: one, by bruising and beating them, and then presently to put them in a vessel to ferment, or work (as it is usually called) of themselves. The other way is, to boil the juice with some good spices, by which the rawness is taken away, and then to ferment it with some yeast, if it works not of itself. This is the best way; and I have tasted cider thus made of an excellent delicate taste. Neither let any complain of the windiness; for it is only want of use. When I had, for two or three years, continually drank wine beyond sea, the strongest beer for two or three weeks was windy to me, as cider will be to any; and afterwards, when I went to *Paris*,
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the wine of that place was as troublesome as *English* beer for a little time. How much wine might be saved, and also malt, if *English*-men would take those good courses which other nations do; and, consequently, how much advantage would this island reap thereby? If I was an house-keeper in the country, I would make excellent Beer, Ale, Cider, Perry, Metheglin, and Wine of our own grapes, and if my friends would not drink these, they should drink water, or go away thirsty. I would scorn to honour *France* so much as men usually do; and the *Spaniards* and *Italians* should not laugh at us, and say, That we can as well do without bread, as their wines, currants, &c. Thus may many other excellent drinks be made out of our fruits: not to speak of those which are made of our grain, as *Barly*, *Wheat*, &c. Yet, I must tell you, that I know an ingenious man, who can, without malting *Barly*, make a drink not inferior to wine, and a greater quantity of aqua-vitæ out of it, and with less cost than the ordinary way, by a peculiar fermentation of his own; which time will discover. There is another ingenious man, who out of *Damsons*, and other sweet *Plums*, can make a drink not inferior to the best wines, and abundance of aqua-vitæ. Many ladies know how to make *Cherry* and *Raspes* wines: and Sir *Hugh Plattes*, in his *Closet for Ladies*, discloseth many secrets of this kind; as also for *Conserves* and *Marmalades*, which are things both delightful and profitable. I have a kinsman, who can even out of *Blackberries* make a very pleasant drink; which curiosity he is unwilling to publish. *Glauber*, an excellent chymist, hath divers secrets of this kind, even to the advancing of *Haws*, *Hips*,

Canker-berries, *Slows*, to excellent aqua-vitæ's, drinks, and vinegars, which he himself first invented. In *Russia*, in the spring-time, it's an usual custom to pierce the bark of the *Birch-trees*, which, at that time, will weep much liquor, and yet like children be little the worse*: this the poor ordinarily drink for necessity; it's a pleasant, healthful drink: and also the rich men, because it's an excellent preservative against the stone.

The means to advance this profitable and pleasant work are these:

1. To raise nurseries of all sorts of *Apples*, *Pears*, *Plums*, *Cherries*, which Gentlemen may do for a small matter, and then plant out these trees, when they are grown big enough. The best and cheapest way to raise all nursery wares, is done thus: *Plums* may be raised either of stones, which, when you have eaten the *Plums*, may be presently pricked into the ground; or by slips, which you may find about the old trees. *Apples* may be raised by kernels (*Crab-kernels* are the best) which ought to be preserved in dry sand till the spring, lest they grow mouldy; or a *Crab-stalk* may be fetched out of the woods and grafted. Some trees, as *Sweetings*, *Codlings*, *Quinces*, will grow very well of slips. *Cherries* are very well raised by stones, (the *Black-Cherries* are the best,) which as soon as you have eat them, are to be hoven into beds made very fine, the ranges a foot distant: beware lest you let them heat, and take heed of the mouse. I have seen *Cherry-stones* and *Apple-kernels* grow two foot and a half in one year; and, consequently, in few years they would be fit to be transplanted.

The

* *Helmont*.

The Art of Grafting or Inoculating, a Gentleman will learn in two hours.

2. For the advancing of ingenuities in this kind, as that of making vinous-drinks out of *Apples, Plums, &c.* I advise all Gentlemen to try divers experiments in those kinds, with the following cautions:

1. That they attempt not great quantities at first, which perchance will be chargeable and troublesome; for by a gallon they may have as much certainty as by a hoghead.

2. Not to be discouraged if they succeed not well at first dash: for certainly there are many ingenuities in these fruits which time will discover.

3. Proceed by fermentation: for every liquor which will ferment, hath a vinous spirit in it, and without fermentation even the best fruits will have none.

Lastly, fermentation is done either *in liquido*, or *humido*; and herein consists some mystery. I have forgot to speak of *Apricocks, Peaches, Melicotores*, which are fine, pleasant fruits, yet very dangerous; and therefore called by the *Italians, Mazzo-francese*, that is, *Kill-Frenchman*. I wish Ladies and others to take heed of surfeiting by these and some other dangerous *Plums*.

C H A P. VIII.

Concerning Vines.

I Cannot relate the various sorts of *Vines*, which are even infinite; *Rome* having in it usually forty or fifty sorts of *Vines*, and all very good; other places of *Italy*, *Spain*, and *France* have also great variety: I therefore pass them by, as also the manner of managing them, because it is described in the *Country-Farm*, and also by *Bonovil*, a *Frenchman*, who, at the command of *K. James*, wrote a short treatise of *Vines and Silk-worms*, for the instruction of the plantations of *Virginia*. I shall only, according to my method, shew you the Defects among us in this particular plant, and the best remedies for them.

And first, tho' I think wine is the great blessing of God, which hot countries especially enjoy, as temperate countries do milk, butter, and cheese in abundance, and the coldest and barrenest, fowl and fish in an incredible number; God of his goodness distributing some peculiar blessings to every country: Notwithstanding, I dare say, it's probable, that vineyards have formerly flourished in *England*, and that we are to blame, that so little is attempted to revive them again. There are many places in *Kent* call'd by the name of Vineyards, and the grounds of such a nature, that it seems probable they have been such. I hear farther, by divers people of credit, that by records it appears, that the tithe of wine in *Glocestershire* was in divers parishes considerably great; but at length *Gascony* coming into the hands of the *English*, from whence

whence comes most of the strong *French* wine, call'd high-country wine, and the custom being small, wine was imported into *England* from thence, better and cheaper than we could make it; and it was thought convenient to discourage vineyards here, that the greater trade might be driven with *Gascony*, and many ships might find employment thereby.

Some fond astrologers have conceited, that the earth being grown older, and therefore colder, hath caused the sun to descend many degrees lower to warm and cherish it; and one argument which they bring for this opinion, is, that *Vines* and *Silkworms* are found in those countries, where in former times they were unknown. But if these fond men had considered the good husbandry in these times, with the blessing of God on it, they had not run into such foolish imaginations. This is true indeed, that the *Roman* soldiers, who had *Alsatia* given them to live in, which is one of the best and most southern places of *Germany*, mutiny'd, because they thought it so cold that *Vines* would not grow there, and that therefore they should be deprived of that delectable liquor: whereas we find at this present day *Vines* flourishing many hundred miles more towards the north, both in *France*, *Lorrain*, and *Germany*; and that they are crept down even to the latitude of *England*; for the *Rhenish*-wines grew within a degree of the west-southern places of this isle; and *Paris* is not two degrees south of us, yet *Vines* grow three-score miles on this side *Paris*, as *Beaumont*; yea, the wines of these places are the most delicate; for what wine is preferred before the neat *Rhenish* for ladies, and at table? And truly, in my opinion, though I have travelled twice through
France,

France, yet no wine pleased me like *Vin d' Ache* and of *Paris*, especially about *Rueill*, which is a very fine, brisk wine, and not fuming up to the head and inebriating, as other wines. I say therefore it is very probable, that if *Vines* have stept out of *Italy* into *Alsatia*, from them to these places, which are even as far north as *England*, and yet the wines there are the most delicate, they are not limited and bounded there: for one hundred miles, more or less, causeth little alteration in heat or cold, and some advantages which we have will supply that defect. But not to insist too long on probabilities, I say, that in *England* some ingenious Gentlemen usually make wine very good, and long lasting, without extraordinary labour and costs. To instance in one †, who in *Great-Chart*, in the *Wild of Kent*, a place very moist and cold, yearly makes six or eight hogsheads, which is very much commended by divers who have tasted it; and he hath kept some of it two years, as he himself told me, and it has been very good. Others likewise in *Kent* do the same: and lately, in *Surrey*, a Gentlewoman told me, that they having many grapes, which they could not well tell how to dispose of; she, to play the good housewife, stamp'd them to make verjuice; but two months after, drawing it forth, they found it very fine, brisk wine, clear like rock-water: and in many other places such experiments have been made. I therefore desire ingenious men to endeavour the raising of so necessary and pleasant a commodity; especially when *French* wine is so dear here, and I suppose is likely to be dearer; I question not but they shall find good profit and pleasure in so doing; and that the state will give

† Sir Peter Kicard.

give all encouragement to them: and if the *French* wine pay excise and custom, and the wines here are toll-free, they will be able to afford them far cheaper than the *French* can theirs, and supply the whole isle, if they proceed according to these rules.

I. To chuse the best sorts of *Grapes*, which are most proper for this isle; and tho' there are many sorts of *Grapes* among Gardeners, yet I recommend four sorts especially to them: and I desire that they be very careful in this particular; for it is the foundation of the work: if you fail in this, you fail in all; for I know that *Bourdeaux-Vines*, which bear very great grapes, make verjuice only at *Paris*, and that the tender *Orleans-Vine* doth not thrive there.

The first sort is the *Parsely-Vine*, or *Canada-Grape*; because it first came from those parts, where it grows naturally: and tho' the country is intolerably cold, yet even in the woods, without manuring, it so far ripeneth this fruit, that the Jesuits make wine of it for their mass; and *Raisiné* (which is the juice of the grape newly press'd and boil'd to a syrur, and is very sweet and pleasant) for their lent-provision, as you may read in their *Relations*. And this *Vine* seems to be made for these northern countries, because it hath its leaves very small and juicy, as if it were on purpose to let in the sun; and it ripeneth sooner than other grapes, as I have observ'd in *Oxford-Garden*.

The second sort of *Vine* is the *Rhenish-Grape*; for it grows in a temperate country, not much hotter in summer than *England*; and the wine is excellent, as all know.

The third sort is the *Paris-Grape*; which is much like the temper of *England*, only a

little hotter in summer. This *Grape* bears a small bunch close set together, very hardy to endure frosts and other inconveniences, and is soon ripe; so that the vintage of *Paris* is sooner ended than that of *Orleans*, or *Bordeaux*: and tho' it is not so delicate to the taste, as some other grapes, yet it makes an excellent brisk wine.

The fourth sort is the *Small-Muskadell*; which is a very fine pleasant *Grape*, both to eat and to make wine. In *Italy* it usually grows against their house-walls; and of this they make a small, pleasant wine, a month or two before the ordinary vintage. It is a tender plant in respect of the other *Vines* in the fields. These *Vines*, I know, are the most convenient for this isle, because they bear small bunches; and its grapes soon ripen, and are hardy to endure frosts and bad weather.

2. To chuse convenient places. For this end I advise them, first, to plant *Vines* on the south-side of their dwelling-houses, barns, stables, and out-houses. The Gentleman of *Kent*, whom I mention'd before, uses this method; and to keep the *Vines* from hurting his tiles, and that the wind may not wrong them, he hath a frame made of poles, or any kind of wood, about a foot from the tiles, to which he ties the *Vines*; by this means his *Vines*, having the reflection of the yard, sides of the houses, and tiles, ripen very well, and bear so much, that one old *Vine* hath produced nigh an hoghead of wine in one year. And I wish all to take this course; which is neither chargeable, nor troublesome, but very pleasant: and if all this island would do thus, it is incredible what abundance of wine might be made, even by this petty way.

3. If that any Gentleman will be at the charge of making a Vineyard, let him chuse a fine, sandy,

sandy, warm hill, open to the south-east, rather than to the south-west: for tho' the south-west seems to be hotter, yet the south-east ripens better, as I have seen in *Oxford-Garden*; because the south-east is sooner warm'd by the sun in the morning, and the south-west winds are the winds which blow most frequently, and bring rain, which refrigerate the plants: and such a place is very requisite; for in other places *Vines* don't thrive, even in *France*: for if you travel betwixt *Paris* and *Orleans*, which is above thirty leagues, you shall scarcely see a vineyard, because it is a plain, champion country. So likewise betwixt *Fontarabia* and *Bordeaux*, in the southern parts of *France*, for an hundred miles together; because the land is generally a barren, sandy plain, where only heath abounds and *Pine-trees*, out of which they make turpentine and rosin, by wounding of them; and tar and pitch, by the burning of them. And if any find such a fine, warm hill, and dung and fence it well, he hath a great advantage of most of the vineyards of *France* by this conveniency, than they have of our isle by being a hundred miles more south; for most of their vineyards are in large fields not enclosed, on land that is stony, and but indifferently warm. But some will say, that the wet weather destroys us. It's true, that the wet will destroy all things; sheep, corn, &c. yet no man will say, that therefore *England* will not produce and nourish these creatures; and if extraordinary wet years come, they spoil even the *Vines* in *France*. But take ordinary years, and our moisture is not so great, (tho' some abuse us, and call *England*, *Matula cæli*;) but the *Vines*, especially those I have mention'd before, will come to such perfection as to make good

wine: and if extraordinary rains fall, yet we may help the immaturity by ingenuity, as I shall tell you anon; or at worst make vinegar, or verjuice, which will pay costs.

The following advantages we have of *France*:

1. This isle is not subject to nipping frosts in *May*, as *France* is; because we are in an isle, where the air is more gross than in the continent; and therefore not so piercing and sharp, as it plainly appears by our winters, which are not so sharp as in *Padua* in *Italy*: neither are we subject to such storms of hail in summer, which are very frequent in hot countries, and for many miles together spoil their *Vines*, so that they cannot make wine of the grapes: for those grapes which are touched by the hail have a sulphurous and a very unpleasant taste, and only fit to make aqua-vitæ. Farther; sometimes in *France*, casks for their wines are so dear, that a tun of wine may be had for a tun of cask: and the custom and excise which is laid on wines here, is as much again as the poor *Vigneron* of *France* expects for his wine. Not to speak of the ill managing of their *Vines*, especially about *Paris*; where poor men usually hire an acre or two of *Vines*, which they manage at their spare hours, and most commonly pack in so many plants on their ground, for to have the greater increase, that the ground and *Vines* are so shaded by one another, that I have wonder'd that the sun could dart in his beams to mature them. And therefore I cannot but affirm again, that we may make abundance of wine here with profit, the charges of an acre of vineyard not being so great as of *Hops*: an hundred sets, well rooted, at *Paris* cost usually but four or six *sous*, or pence; where I have bought many: two thousand will plant an
acre

acre very well; fifty shillings a year is the ordinary rate for the three diggings with their crooked instrument call'd *Aventage*; and the increase usually four tuns for an acre, which will be profit enough. And tho' I refer all to *Bonovil*, and others, who have written of the managing of *Vines*, I should think it adviseable to have a *Vigneron* from *France*, where there are plenty, and at cheaper rates than ordinary servants here, and who will be very serviceable also for gardening.

2. I will briefly tell what I have seen. In *Italy*, through all *Lombardy*, which is for the most part plain and champion, their *Vines* grow in their hedges on *Walnut-trees*, for the most part: in which fields they speak of three harvests yearly, *viz.*

1. *Winter-corn*, which is reaped in *June*, &c.

2. *Vines* and *Walnuts*, which are gathered in *September*.

3. Their *Summer-grains*, as *Millet*, *Panicle*, *Chiches*, *Vetches*, &c. *Buck-wheat*, *Fru menton*, or that which we call *Virginia-wheat*, and *Turnips*, which they sow in *July* when their *Winter-corn* is cut and reap'd, they reap in *October*. In *France* their *Vines* grow three different ways: in *Provence* they cut the *Vine* about two foot high, and make it strong and stubbed, like as we do our *Osfers*; which stock beareth up the branches without a prop.

2. About *Orleans*, and where they are more curious, they make frames for them to run along.

3. About *Paris* they tie them to short poles, as we do hops. In other parts of *France* they usually make trenches, or small ditches, about three or four foot from one another, and therein
plant

plant their *Vines*, about one and a half deep ; which is a good way, and very much to be commended : but if we, here in *England*, plant *Vines* as we do *Hops*, it will do very well, but let them not be pack'd together too thick, as they do in *France* in many places, lest they too much shade the ground, and one another. In *Italy* when they tread their grapes with their feet in a cart, they pour the juice into a great vessel, or vat, and put to it all their husks and stones, which they call *grasp*, and let them ferment, or (as we say) work together twelve or fourteen days, and usually they put one third of water to it ; this makes a wine less furious, *garbo* or rough, and therefore a good stomach-wine ; but it spoils the colour, and takes away the pleasant, brisk taste. In *France* so soon as they have pressed out their liquor with their feet, they put it in hogheads, and after in their press squeeze out what they can, out of the *grasp* ; which serves to fill up their hogheads while they work, which is usually three or four days, and then they stop them close. This is also the way used in *Germany* ; and is the best, for it makes a fine, gentle wine, with a curious colour. In *Germany*, when the grapes are green, they make a fire in their cellars in stoves, by which means their wines work extraordinarily, and digest themselves the better. This course we must also take here in *England* some years ; for it helps the rawness of all liquors very much. There is an ingenious *Dutchman* † who hath a secret, which as yet he will not reveal, how to help maturation, by a composition applied to the roots. The composition which I have spoken of before, made of brimstone and pigeons-dung, is excellent for that pur-

† *Glauber.*

purpose; as also lees of wine, blood, and lime used with moderation. He also knows how to make four grapes produce good wine: I suppose his way to be this; all juice of grapes newly squeezed is sweet, and which may by itself alone be made into a sweet syrup, which the *French* call *Raisiné*. Farther, in the evaporation of liquors, which have not fermented, or wrought, the watery part goes away first.

3. Fermentation gives a vinous taste, and makes a liquor full of spirits.

You may then easily guess at the way, and perhaps he may add also some sugar and spices, as the vintners do when they make Hippocras. I know a Gentleman, who hath made excellent wine of raisins, well boiled in water, and afterwards fermented by itself, or with barm; it is usually call'd Mead. I likewise know, that all sweet juices will make fine vinous liquors, as *Damsons*, if they be wrought or fermented ingeniously: but whosoever goes about such experiments, let him not think that any thing is good enough for these purposes; but let him use the best he can get: for of naughty, corrupt things, who can expect they'll produce that which is excellent and delicate?

C H A P.

C H A P. IX.

Concerning Hemp and Flax.

THE Defect of us in this kind is so obvious, that all the world takes notice of it, and it is (next the neglect of fishing) the greatest shame to the nation; for all know that we have as good land for these seeds, as any in *Europe*; and that the sowing of them requires neither more labour, cost, or skill than other seeds; and that the materials made from these are extremely necessary: For how miserable should we be without linnen, canvasses, cordage, and nets? How can we put our ships to sea, which are the bulwarks of this isle? And yet we are necessitated to have these commodities from those who would destroy (I will not say the nation, but I may boldly say) our shipping and trade. I hope that this will more seriously be considered by those at the Helm of our State. I will freely and plainly relate how this Defect may easily be remedied, according to my judgment:

1. To compell by a law, that all farmers who plough and sow fifty or one hundred acres of land, should sow half an acre or an acre of *Hemp* or *Flax*, or pay five or ten shillings to the poor of the parish where they live: or some law to this purpose: for there is no man but hath land fit for one of these, *Hemp* requiring a stiff land, *Flax* light land.

In *K. Edward* the VIth's days, something was enacted to this purpose. In *Henry* the VIIIth's reign, there was a law enacted, that every man should sow his lands, and that no man should enclose them, lest he should turn 'em to pasture,

sture, (for we have had great dearth in *England* thro' the neglect of tillage;) which laws are still in force. But there need not any force now to compell men to till and sow their lands, for they have at length found the sweetness, and willingly go about it for their own profit's sake, and now we suppose (and not without cause) that enclosing is an improvement. And concerning *Hemp* and *Flax*, I say, if they were once accustomed to sow them, they would never leave it, as I see farmers do in *East-Kent*, scarce a man but he will have a considerable plot of ground for *Hemp*, and about *London* far greater quantities of *Flax* is sown than formerly.

2. It is convenient that every parish through the nation should have a stock to set their poor to work, that the young children and women might not run up and down idle, and begging or stealing (as they do in the country) of Apples, Pease, Wood, Hedges, and so by little and little are train'd up for the Gallows.

3. That a severe law should be enacted against those who run up and down, and will not work: for if all knew that they may have work at home, and earn more within doors, honestly, than by running roguing up and down, why should they not compell them to it? And tho' some may think the parishes will lose much by this way, because that the stock wrought will not be put off but with loss, as perhaps ten pounds will be brought to eight pounds; yet let them consider how much they shall save at their doors, how many inconveniencies they are freed from; their hedges in the country shall not be pulled, their fruits stoln, nor their corn purloined: and farther, that the poor will be trained up to work, and therefore fit for any ser-

vice ; and in their youth learn a calling, by which they may get an honest livelyhood ; and I dare say, their assessments for the poor would not be so frequent, nor the poor so numerous : and the benefit which would redound to the nation would be very great.

4. The charitable deeds of our forefathers ought to be enquired after, that they be not misplaced, as usually they are, but be really bestowed for the good of the poor that are laborious, as in *London* is begun ; and if there be any that will not work, take *St. Paul's* rule, who best knew what was best for them. I dare not advise to take in part of Commons, Fens, &c. and to improve them for this use, lest I should too much provoke the rude merciless multitude. But to return to my discourse. I say, that sowing *Hemp* and *Flax*, will be very beneficial :

1. To the owners of land : for men usually give in divers places three pounds *per* acre, to sow *Hemp* and *Flax* (as I have seen at *Maidstone* in *Kent*, which is the only place I know in *England* where thread is made ; and though nigh a thousand hands are imploy'd about it, yet they make not enough for this nation) and yet get good profit. How advantageous will this be to those who have drain'd the *Fens*, where doubtless *Hemp* will flourish and thicken the ground ; (for *Hemp* desires stiff, moist land, as *Flax* light and dry :) and likewise to those in the North of *England*, where land is very cheap ? I hope in a little time *Ireland* will furnish us with these commodities, if we be idle ; for land there is very cheap, and those seeds need no inclosure ; for cattle will not touch them, neither doth it fear the plunderer, either in the field or barn.

2. It's

2. It's profitable to the sower. I know that they usually value an acre at ten or twelve pounds, which costs them usually but half the money. Whether there be *Flax* that will yield thirty or forty pounds *per acre*, as some report, I know not.

3. To the place where it is sown; because it sets many poor to work. I wish it were encouraged more in the North than it is; because there is many poor, who would willingly take pains; and though spinning of linnen be but a poor work, yet it is light, and may be called womens recreation, (and in *France* and *Spain* the best citizens wives think it no disgrace to go about spinning with their rocks;) and though in some parts the poor think it nothing to earn four or six pence a day, and will as soon stand with their hands in their pockets as work cheap; yet in the North they account it well to earn three pence or four pence by spinning, which they may do.

Lastly, it would be very beneficial to this nation, and save many thousand pounds, I may say hundred thousands, which are exported, either in cash or good commodities; and we should not be beholden to *Holland* for fine Linnen and Cordage, nor to *France* for Poldavices, Locram, Canvasses or Nets, nor to *Flanders* for Thread; but might be supply'd abundantly with these necessary commodities even at our own doors.

C H A P. X.

Concerning Dunging and Manuring Lands.

THERE is no small Defect in dunging and manuring lands, because that all manner of manuring and amending lands is not known to every one, and also they do not employ all they know to the best use. I will therefore set down most of the ways I have seen in *England* and beyond sea, by which land is improved, and the best ways to use the same.

1. To begin with Chalk, which is as old a way as *Julius Cæsar's* time, as he himself reporteth in his *Commentaries*. Chalk is of two sorts:

First, a hard, strong, dry Chalk, with which in *Kent* they make walls, burn lime, &c.

Second kind is a small, unctuous Chalk: this is the Chalk for land, the other helps little; only it makes the plough go easier in stiff lands. Broomy land is accounted the best land for Chalk and Lime, but it helps other lands also; especially if you Chalk your ground, and let it lie a year or two, which is the way used in *Kent*, that it may be matured and scatter'd by the sun and rain, otherwise if it be turned in presently, it is apt to lie in great clods, as I have seen it twenty years after. Chalk also sweetens pasture, but doth not much increase it, and kills rushes and broom.

2. Lime, which is made of divers sorts of stones, is an excellent thing for most lands, and produces a most pure grain. One hundred and sixty bushels is usually laid on an acre; but I suppose, if men laid but half the dung on the
ground

ground as they usually do, as also lime and chalk, and dung and lime it oftener, it would be better husbandry: for much dung causes much weeds, and causes corn to lodge; and too much chalk forces the land too much; so that after some good crops it lies barren many years. It's good husbandry likewise to lay down lands before they be too much out of heart; for they will soon recover; otherwise not.

3. Ordinary Dung, which every one knows: let it not be exposed to the sun too much, nor let it lie in a high place; for the rain will waste away its fatness. It's observable, that earth the more it is exposed to the sun the better it is; as we see land is much improv'd by often ploughing, for the sun and dew engender a nitrous fatness, which is the cause of fertility; but dung is exhausted by the sun, as it appears by the folding of sheep, which profits little if it be not presently turned in; therefore a shepherd, if his time would permit, should turn up the ground with an how to sow *Turnips*, as Gardeners do. I have seen ordinary Dung on dry lands in dry years to do hurt, and often causes weeds and trumpery to grow.

4. Marl. It's of divers kinds: some stony, some soft, some white, some yellowish, but commonly blew. It's in most places in *England*, but not known by all: the best marks to know it, is to expose it to the air, and to see if the sun or rain cause it to shatter, and if it be unctuous; or rather to take a load or two, and lay it on the midst of your fields, and to try how it mendeth your lands. It's excellent for corn and pasture, especially on dry lands. In *Essex* the scourings of their ditches they call Marl, because

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cause is looks blew like it; it helps their lands well.

5. Snaggreet: which is a kind of earth taken out of the rivers, full of small shells. It helps the barren lands in divers parts of *Surrey*. I believe it's found in all rivers. It were well, if in other parts of *England* they took notice of it.

6. Owse out of marsh ditches has been found very good for white chalky land: as also Sea-mud and Sea-owse is used in divers parts of *Kent* and *Suffex*.

7. Sea-weeds.

8. Mr. *Carew*, in his *Survey of Cornwall*, relates, that they use a fat Sea-sand, which they carry up many miles in sacks; and by this they have very much improved their barren lands. It is worth the while to try all Sea-sands: for I suppose, that in other places they have a like fertilizing quality.

9. Folding of Sheep, especially after the *Flanders* manner, viz. under a covert, in which earth is strew'd about six inches thick, on which they set divers nights: then more earth must be brought and strew'd six inches thick, and the sheep folded on it; and thus they do continually winter and summer. I suppose a shepherd, with one horse, will do it at his spare hours, and indeed sooner than remove his fold; and this folding is to be continued, especially in winter, and doth the sheep good; because they lie warm and dry. And truly, if I am not mistaken, by this means we may make our sheep to enrich all the barren dry lands of *England*.

10. Ashes of any kind: Seacoal-ashes with Horse-dung the gardeners of *London* much commend for divers uses. It's great pity that so many

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many thousand loads are thrown into waste places, and do no good.

11. Soot is also very good, being sprinkled on ground; but it's too dear, if it be of wood, for it's worth sixteen pence or two shillings a bushel.

12. Pigeons or Hens-dung is incomparable: one load is worth ten loads of other dung, and therefore it's usually sown on *Wheat* that lies a-far off, and not easy to be help'd: it's extraordinary likewise on a hop-garden.

13. Malt-duft is exceeding good in corn-land: Blood for trees; also Shavings of Horns.

14. Some commend very much the Sweepings of a ship of Salt, or droffy Salt and Brine: it's very probable, because it kills the worms; and all fertility proceeds from Salt.

15. I have seen in *France* poor men cut up *Heath*, and the *Turf* of the ground, and lay them on a heap, to make Mould for their barren lands. *Braks* laid in a moist place, and rotted, are used much for Hop-grounds, and generally all things that will rot, if they were stones, would make dung.

16. In *New-England* they fish their ground, which is done thus: In the spring, about *April*, there comes up a fish to the fresh rivers, called an *Alewife*, because of it's great belly, and is a kind of shad, full of bones: these are caught in wiers, and sold very cheap to the planters, who usually put one or two cut in pieces into the hill where their corn is planted, called *Virginia-wheat*, for they plant it in hills, five grains in an hill, almost as we plant *Hops* (in *May* or *June*, for it will not endure frosts) and at that distance: it causes fertility extraordinary for two years, especially the first; for they have had
fifty

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fifty or sixty bushels on an acre, and yet plough not their land; and in the same hills plant the same corn for many years together, and have good crops; besides abundance of *Pompions*, or *French Kidney-beans*. In the North parts of *New-England*, where the fisher-men live, they usually fish their ground with Cods-heads; which if they were in *England* would be better employ'd. I suppose that when Sprats are cheap, men might mend their Hop-grounds with them, and it would quit cost: but the dogs will be apt to scrape them up, as they do in *New-England*, unless one of their legs be tied up.

17. *Urine*. In *Holland* they as carefully preserve the cows urine, as the dung, to enrich their land: old urine is excellent for the roots of trees. *Columella*, in his book of *Husbandry*, saith, that he is an ill husband that doth not make ten loads of dung for every great beast in his yard, and as much for every one in the house, and one load for small beasts, as hogs. This is strange husbandry to us: and I believe there are many ill husbands by this account. I know a woman who lives five miles south of *Canterbury*, who saves in a pail, all the droppings of the houses, I mean the urine, and when the pail is full, sprinkles it on her meadow, which causes the grass at first to look yellow, but after a little time it grows wonderfully, that many of her neighbours wonder'd at it, and were like to accuse her of witch-craft.

18. *Woolen-rags*; which *Hertfordshire* men use much, and *Oxfordshire*, and many other places: they do very well in thin, chalky land in *Kent* for two or three years. It's a fault in many places, that they neglect these, as also *Linnen-rags*, or *Ropes-ends*, of which white and
brown

brown paper is made. It's strange that we have not Linen-rags enough for paper, as other nations have; but must have 'em from *Italy, Fraunce,* and *Holland.*

19. *Densbyring** (so called in *Kent*, where I only have seen it used, though by the word it should come from *Denbighshire*,) is the cutting up of all the turf of a meadow, with an instrument sharp on both sides, which a man with violence thrusts before him, and then lays the turf on heaps, and when it's dry they burn it, and spread it on the ground. The charge is usually four nobles an acre, which the goodness of a crop or two repays.

20. Mixture of lands. *Columella*, a famous old writer, says, that his grandfather used to carry sand on clay, and on the contrary to bring clay on sandy grounds, and with good success. Lord *Bacon* † thinks much good may be done thereby; for if chalk be good for loamy land, why should not loam be good for chalky banks?

21. I may add Enclosure as an improvement of land: not only because that men, when their grounds are enclosed, may imploy them as they please; but because it gives warmth, and consequently fertility. There is one in *London*, who promised to mend lands much by warmth only, and we see that if some few sticks lie together, and give a place warmth, how speedily that grass will grow.

22. Steeping of grains. The Ancients used to steep *Beans* in salt-water: and in *Kent* it's usual to steep *Barly*, when they sow late, that it may grow the faster; and also to take away the soil: for wild *Oats*, *Cockle*, and all, save *Drake*, will swim; as also much of the light corn, which

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to

* Mr. *Cambden.*

† *Natural History.*

to take away is very good. If you put Pigeons-dung into water, and let it steep all night, it may be as good as half a dunging. Take heed of steeping *Pease* too long; for I have seen them sprout in three or four hours.

23. Is the sowing of coarse and cheap grain, and, when they are grown, to plough them in. For this purpose the Ancients used *Lupines*, a plant well known to our gardeners: and in *Kent* sometimes *Tares* are sown, which when the cattle have eaten a little of the tops, they turn them in, with very good improvement for their ground.

C H A P. XI.

Concerning the Improvement of our Meadows.

I Will not deny but we have good husbands, who dung and marl their Meadows and Pasture-land, and throw down all mole and ant-hills, and with their spud-staff cut up all thistles and weeds; and that they likewise strow ashes on their ground to kill the *Moss*, and salt for the worms, and they do very well; but yet there are many who are negligent in these particulars, for which they are blame-worthy: but the Defects of which I intend to speak of, are these following. *Cato*, one of the wisest of the *Romans*, saith, that *pratam est, quasi paratum; always ready, and prepared*; and prefers Meadows before the *Olive-gardens*, (altho' the *Spaniards* bequeath *Olive-trees* to their children, as we do cottages, or *Vines*, or corn; because Meadows bring in a certain profit) without labour and pains, but the other requires much cost and pains, and are subject to frosts, mildew, hail, and locusts: but
for

for the honour of Meadows, I may add, the stock of Meadows is of greater value, and the commodities which arise from them are divers, and of greater value than corn, as butter, cheese, tallow, hides, beef, and wool; and therefore I may conclude, that *England* abounding in Pastures more than other countries, is therefore richer; and I know (what others think I care not) that in *France* acre for acre is not comparable to it. *Fortescue*, Chancellor of *England*, saith, that we get more in *England* by standing still, than the *French* by working. But to speak of the Defects amongst us.

1. We are to blame, that we have neglected the great *Clover-grass*, *Saint Foin*, and *Lucerne*.

2. That we do not float our lands, as they do in *Lombardy*, where they mow their lands three or four times yearly, which consist of the great *Clover-grass*. Here the excellent *Parmesan-cheeses* are made; and indeed these pastures far exceed any other places in *Italy* and all *Europe*. We, in *England*, have great opportunities by brooks and rivers in all places to do so; but we are negligent: yet we might hereby double, if not treble our profits, kill all rushes, &c. But he that desires to know the manner how to do this, and that profit that will arise thereby, let him read Mr. *Blith's* book of Husbandry, lately printed.

3. That when we lay down land for Meadow, or Pasture, we do not sow them with the seeds of fine sweet grass, *Trefoil*, and other excellent herbs. Concerning this you may read a large *Treatise* of the *Country-Farmer*; for if the land be rich, it will put forth weeds and trumpery, and perhaps a kind of four grass little worth; if it be poor, ye shall have thistles, *May-weed*,

and little or no grafs for a year or two. I know a Gentleman, who at my entreaty sowed the bottom of his *Hay-mow* with *Oats*; and tho' his land were worn out of heart, and naturally poor, yet he had that year not only a crop of *Oats*, but he might, if it had pleased him, have mowed his grafs also; but he spared it, which was well done, till the next year, that it might make a turf and grow stronger. By this husbandry lands might be well improved; especially if men did consider the diversity of grasses, which are ninety sorts, and twenty three of *Trefoil*. I know a place in *Kent*, which is a white chalky-down, which ground is sometimes sown with corn a year or two, and then it rests as long or longer: when it is laid down it maintains many great sheep, and very lusty, fit for the butcher; and yet there scarce appears any thing that they can eat, which hath caused divers to wonder, as if they had lived on chalk-stones. But I more seriously considering the matter, thoroughly viewed the ground, and perceiv'd that it naturally produced a small *Trefoil*, which it seems is very sweet and pleasant; it's commonly call'd *Trefolium luteum*, or *Lupulinum*, that is, *yellow* or *Hop-Trefoil*: and I am persuaded, if the seed of this *Trefoil* were preserv'd, and sown with *Dates*, when they intend to lay it down, it would very much advance the Pasture of that place; therefore I desire all ingenious men seriously to consider the nature of the *Trefoils*, which are the sweetest of grasses, and to observe on what grounds they naturally grow, and also the nature of other grasses, which (as I have said before) are no less than ninety sorts naturally growing in this isle; some on watry places, some on dry, some on clay,

clay, others on sand, chalk, &c. some on fruitful places, others in barren; by which means, I suppose, a solid foundation might be laid for advancing the Pasture-lands of all sorts thro' the island: for I know some plants, as the *Orchis*, call'd *Bee-flower*, &c. which will thrive better on chalky, barren banks, than any garden, tho' the mould be never so rich and delicate, and the gardener very diligent to cherish it: and why may not the same property be in grasses? For we see divers benty grasses to thrive, especially on barren places, where scarce any thing else will grow. I must again and again desire all men to take notice of the wonderful grass which groweth near *Salisbury*, and desire them to try it on their rich Meadows.

C H A P. XII.

Concerning Waste Land.

IT is a common saying, that there are more waste lands in *England*, in these particulars, than in all *Europe* besides, considering the quantity of land. I dare not say this is true; but hope if it be so, that it will be mended. For of late much has been done for the advancement of these kinds of lands; yet there are still great Defects. In the times of popery all in the island were either soldiers or scholars; scholars, by reason of the great honours, privileges, and profits, the third part of the kingdom belonging to them; and soldiers, because of the many and great wars with *France*, *Scotland*, *Ireland*, *Wales*, &c. And in those times gentlemen thought it an honour to be careless, and to have

have houses, furniture, diet, exercises, apparel, &c. yea all things at home and abroad, soldier-like: musick, pictures, perfumes, sauces, (unless good stomacks) were counted, perhaps unjustly, too effeminate. In Queen *Elizabeth's* days, ingenuities, curiosities, and good husbandry began to take place, and then Salt Marshes began to be fenced from the sea; and yet many were neglected, even to our days, as *Hollhaven* in *Essex*, *Axtelholm-Isle* in *Yorkshire*. Many thousand acres have lately been gain'd from the sea in *Lincolnshire*, and yet more are to be taken in there and in other places. *Rumsey-marsh* in *Kent*, consisting of 45,000 acres and upwards, as *Cambden* relates, is of some antiquity, where the land is usually lett for thirty shillings per acre, and yet one penny per week constantly is paid, through the whole level, for the maintenance of the wall, and now and then two pence: whereas ordinary salts are accounted dear at five or six shillings per acre; so that the improvement is very considerable: the same I may say of *Fens*, especially that great *Fen* of *Lincoln*, *Cambridge*, and *Huntingdon* shires, consisting, as I am inform'd, of 380,000 acres, which is now almost recovered; and a friend of mine told me very lately, that he had offer'd a mark per acre for nine hundred acres together, to sow *Rape* on, which formerly was scarcely valued at one shilling per acre. Very great therefore is the improvement of draining of lands, and our negligence very great, that they have been waste so long, and as yet so continue in divers places: for the improving a kingdom is better than the conquering a new one.

2. I see likewise no small faults in this land, by having so many Chaces and Forests, where
brambles,

brambles, brakes and furzes grow ; whereas these trumperies might be cut up, and pot-ashes made of them, and the ground imploy'd profitably for corn, or pasture. I know a forest by *Brill*, in *Buckinghamshire*, taken in, and the land is usually lett, being now well enclosed, for four or five nobles per acre.

3. Sort of waste land is dry, heathy Commons. I know that poor people will cry out against me, because I call these waste lands ; but it's no matter : I desire ingenious Gentlemen seriously to consider, whether or no these lands might not be improved very much by the husbandry of *Flanders*, viz. by sowing *Flax*, *Turnips*, great *Clover* grass, if that manure be made by folding sheep after the *Flanders* way, to keep it in heart ?

4. Whether the rottenness and scabbiness of sheep, murrain of cattle, diseases of horses, and in general all diseases of cattle, do not generally proceed from Commons ?

5. If the rich men, who are able to keep great stocks, are not great gainers by them ?

6. Whether Commons do not rather make poor, by causing idleness, than maintain them ; and such poor, who are train'd up rather for the gallows or beggary, than for the commonwealth's service ?

7. How it comes to pass, that there are fewest poor where there are fewest Commons, as in *Kent*, where there is scarce six Commons in the county of considerable bigness ?

8. How many do they see enrich'd by the Commons ; and if their cattle be not usually swept away by the rot, or starv'd in some hard winters ?

9. If

9. If poor men might not imploy two acres enclosed to more advantage than twice as much in a Common?

10. And lastly, if all Commons were enclosed, and part given to the inhabitants, and part rented out, for a stock to set all the poor to work in every county? I determine nothing in this kind, but leave the determination for wiser heads.

Parks. Though I can't but reckon Parks amongst lands which are not improv'd to the full, but perceive considerable waste by them, by brakes, bushes, brambles, &c. growing in divers places, and therefore wish there were fewer in this island; yet I am not so great an enemy to them as most are, for there are very great uses of them; as,

1. For the bringing up of young cattle.
2. For the maintaining of timber; so that if any have occasion to use a good piece of timber, either for a mill-post, or a keel of a ship, or other special uses, whither can they go but to a Park?
3. The skins of deer are very useful, and their flesh excellent food. Not to speak of the medicinal uses, nor of acorns for hogs, &c. But some will object, that the plough never goes there. To which I answer, it's no matter; for I cannot but say, as *Fortescue* chancellor to *Henry VI.* did, That God hath given us such a fruitful land, that without labour we have plenty: whereas *France* must dig and delve for what they have. And I suppose, that I could maintain two things which are thought great paradoxes, *viz.* that it were no loss to this island, if we did not plough at all, if we were certain of having
corn

corn at a reasonable rate, and likewise vent for all our manufactures of wool.

1. Because the commodities from cattle are far more stable than corn; for cloth, stuffs, stockings, butter, cheese, hides, shoes, tallow, &c. are certain every where; corn scarcely in any place, constantly in none.

2. Pasture employs more hands, which is the second paradox; and therefore pasture doth not depopulate, as it is commonly said; for *Normandy* and *Picardy* in *France*, where there are pastures in a good measure, are as populous as any part of *France*: and I am certain, that *Holland*, *Friezland*, *Zealand*, *Flanders* and *Lombardy*, which rely altogether on pasture, are the most populous places in *Europe*. But some will object and say, that a shepherd and a dog formerly have destroy'd divers villages. To this I answer, that we know what a shepherd and a dog can do, *viz.* look to two or three hundred sheep at most, and that two or three hundred acres will maintain them, or the land is extremely barren; and that these two or three hundred acres, being barren, will scarcely maintain a plough, (which is but one man and two boys,) with the horses: and that the mowing, reaping, and threshing of this corn, and other work about it, will scarcely maintain three more with work thro' the whole year. But how many people may be employ'd by the wool of two or three hundred sheep, in picking, sorting, carding, spinning, weaving, dying, fulling, and knitting, I leave to others to calculate. And farther, if the pastures be rich meadows, and go on dairying, I suppose all know, that one hundred acres of such land employs more hands than one hundred acres of the best corn-land in *England*,

land, and produces likewise better exportable commodities. And farther, if I should grant, that formerly the shepherd and his dog did depopulate, yet I will deny that they do so now: for formerly we were so unwise as to send over our wools to *Antwerp*, and other places, where they were manufactur'd; by which means one pound often brought ten unwrought to them; but we set now our own poor to work, and so save the depopulation. Yet, I say, it's convenient to encourage the plough, because we cannot have a certainty of corn, and carriage is dear, both by sea and land, especially into the inland countries, and our commodities by wool cloy the merchants.

4. Rushy Lands. *Blitb* tells us good Remedies for these inconveniences, viz. making deep trenches, often mowing, chalking, liming, dunging and ploughing.

5. Furze, Broom and Heath. These can hardly be destroy'd, but at length they will up again; for God hath given a peculiar propriety to every kind of earth, to produce some peculiar kinds of plants, which it will observe even to the world's end, unless by dung, marle, or chalk you alter even the very nature of the earth. In *Gallicia*, in *Spain*, where such barren lands very much abound, they do thus; first, they grub them up as clean as they can; of the greater roots and branches they make fire-wood; the smaller sticks are either employ'd in fencing, or else are burnt on the ground; afterwards the land being plough'd twice, at least, they sow *Wheat*, and usually the crop is great, which the landlord and tenant divide according to a compact; then the ground rests, and in three or four years the *Furze* or *Broom* will recover their former

mer growth, which the painful husbandman grubbeth, and does with it as formerly. I set this down, that you may see how laborious the *Spaniard* is in some places, the poverty of the country compelling him to it.

6. There are other inconveniences in land, besides weeds and trumpery, *viz.* ill tenures, as copy-hold, knight-service, &c. so that the possessor cannot cut any timber down without consent of the Lord; and when he dies must pay one or two years rent. But these are not in the power of the poor husbandman to remedy; I therefore pass them by; yet hope that in little time we shall see these inconveniences remedied; because they much discourage improvement, and are (as I suppose) badges of our *Norman* slavery.

To conclude; it seems to me very reasonable, and it will be a great encouragement to laborious men, to improve their barren lands, if they should have recompence for what they have done, according as indifferent men should judge, when they leave it, as is the custom in *Flanders*.

C H A P. XIII.

Concerning Woods.

I Have likewise observ'd some Defects in Woods, which I shall briefly declare, with the best way to remedy the same.

1. It's a great fault, that generally thro' the island the Woods are destroy'd, so that we are in many places very much necessitated both for fuel, and also for timber for building and other uses; so that if we had not coals from *Newcastle*, and boards from *Norway*, plough-staves and pipe-staves from *Prussia*, we should be brought to great extremity, and many mechanicks wou'd be necessitated to leave their callings.

2. That our Woods are not order'd as they should be; tho' Woods are especially preserved for timber for building and shipping, yet at this time it's very rare to see a good timber-tree in a Wood.

3. That many of our Woods are very thin, and not replenished with such sorts of Wood as are convenient for the place.

4. That we fell continually, and never plant or take care for posterity.

These Deficiencies may be thus remedied:

1. To put in execution the statutes against grubbing of Woods, which are sufficiently severe. It's well known, we have good laws; but it's better known, they are not executed. In the *Wild of Kent* and *Suffex*, which lies far from the rivers and sea, and formerly were nothing but Woods, liberty is granted for men to grub
what

what they please; for they cannot want firing for themselves; and they are so seated, that neither firewood, nor timber can be transported elsewhere. I know a Gentleman who offer'd good *Oak* timber at six shillings and eight pence per tun, and the land in those parts in general is very good. About *Tunbridge* there is land which formerly was Wood, now let for thirty shillings per acre; so that to keep such lands for Wood would be both loss to the owner and to the island: But in other parts of the island it is otherwise, and men are much to be blamed for destroying both timber and fuel. I have seen at *Shooters-bill*, near *London*, some Woods stubbed up, which were good ground for Wood, but now are nothing but *Furze*; which is a great loss, both to the owner and to the country; for the land is made worse than it was formerly. I conceive there are lands, which are as naturally ordain'd for Woods, *viz.* mountainous, craggy, uneven land, as small hills for *Vines* and *Olives*, plain lands for corn, and low moist lands for pasture; which lands, if they are stubbed, do much prejudice the commonwealth.

2. That all Woods should have such a number of timber-trees per acre, according to the statute. There is a good law for that purpose; but men delude both themselves and the law; they, every felling, cut down the standers which they left the felling before, lest perchance they should grow to be timber, and leave twelve small standers, that they may seem to fulfill in some measure the statute; but it's a mere fallacy, and deprives the statute of its principal end, which is, to preserve timber.

3. The best remedy against thinness of Woods, is, to plash them and spread them abroad,

broad, and cover them partly in the ground, as every country-man can direct: by this means the Wood will soon grow rough and thick. It's good husbandry likewise to fill your Woods with swift growers, as *Ashes*, *Sallow*, *Willow*, and *Asp*, which are also good for hop-poles, hoops, &c. *Sycamore* is also a swift grower. In *Flanders* they have a kind of *Salix*, call'd by them *Abel-tree*, which speedily grow to be timber.

4. That some law be made, that they which fell should also plant, or sow. In *Biscay* there is a law, if any cut down a timber-tree he must plant three for it; which law is put in execution with severity, otherwise they would soon be undone; for the country is very mountainous and barren, and depends wholly on iron-mines and shipping: their Woods are not coped there, but only pollards, which they lop when occasion serves. I know one who was bound by his landlord to plant so many trees yearly, which accordingly he did, but always in such places that they might not grow. In *France*, near to the borders of *Spain*, they sow *Asb-keys*, which when they grow to such a bigness that they may be slit into four quarters, and big enough to make pikes, then they cut them down; and I have seen divers acres together thus planted: hence come the excellent pikes, call'd *Spanish-pikes*. Some Gentlemen have sown *Acorns*, and it's a good way to encrease Woods, though the time is long. I doubt not but every one knows, that it's excellent to plant *Willows* along the water side, and *Ashes* nigh their houses, for firing: for they are good pieces of husbandry, and it's pity that it's not more put in practice. There is a Gentleman in *Essex*, who hath planted so many *Willows*, that he may lop two thousand every year:

year : if others were as ingenious, we should not want firewood ; *Osiers* planted in low moorish grounds do advance land from five shillings per acre to forty shillings, fifty shillings, or three pounds, and upwards : it's much used westward of *London* ; and these *Osiers* are of great use to basket-makers. There is a sort of small *Osier*, or *Willow*, at *Saint Omers*, in *Flanders*, which grows on islands that float up and down ; it's far less than that which the western men call *Eights* ; with this they make their curious fine baskets : this plant is worth procuring, being so nigh ; *John Tredescant* hath some plants of it. There is a plant likewise in *England*, call'd the *Sweet-Willow* ; it's not only good for shade and firing, but, as I am inform'd, the leaves do not sour the grass, but the cattle will eat them sooner than *Hay* : if this be so, it may be of singular use for meadows.

5. That those things which mightily destroy Woods may be restrain'd, as iron-works are : therefore the state hath done well to pull down divers iron-works in the forest of *Dean*, that the timber might be preserv'd for shipping ; which is accounted the toughest in *England*, and when it's dry, as hard as iron : the common people used to say, that in *Queen Elizabeth's* days the *Spaniards* sent an Ambassador purposely to get this Wood destroy'd. How true this is I know not ; but without question it's admirable Wood for shipping ; and generally our *English Oak* is the best in the world for shipping, because it's of a great grain, and therefore strong ; but the *Oaks* of other countries have a finer grain, and more fit for wainscot : and in this kind our forefathers have been very provident, for we have an act, of long standing, prohibiting iron-works within

within twenty miles of *London*, and within three miles of the river of *Thames*: though you may find iron-stone in divers places, as in the great gravel-pit at *Woolwich*. There are some ingenious men, who have lately got a patent for making iron with sea-coal: I hope they will accomplish their desires, for it would wonderfully advance this island, and save Wood. There are two faults in sea-coal in respect of melting iron-ore:

1. That it is apt to bake together, or cake.
2. It hath a sulphureous fume in it, which is an enemy to metal, and consumes it, as we see by our iron-bars in windows at *London*; so that the metalline nature of the iron-stone is much wasted by it, and that which remains is very brittle, and will be *could-shire*. I know by the mixture of coal beaten with loam, and thoroughly dry'd, one, if not both, of these inconveniences may be taken away. In the duke of *Cleveland*'s country, they use half turf and half charcoal. There is a way by making a kind of barter with loam, urine, &c. which will cause charcoal to last very long, as I am informed: but these discourses belong to another place.

C H A P.

C H A P. XIV.

Concerning Bees.

I. **I**T is a great Defect in *England*, That we have no more Bees, considering that they are neither chargeable (requiring only a few straws for a house) nor troublesome; and this island may maintain ten times as many: for tho' a place may be over-stocked with these animals, as with the greater, yet I know no part of this land that is so; and I know divers places which would maintain many hundred hives, where scarce one is to be seen.

Our Honey is the best in the world, and Wax a staple commodity. That cold country *Muscovy*, not comparable to ours, has far greater quantity than we have. It's incredible what quantity is found in the woods, if the story of the man be true, who fell up to the ears in honey, and had there perish'd, had not a bear, on which he caught hold, pulled him out. I have enquir'd, how it comes to pass that there is so great store of honey in *Muscovy*, considering the winters are extream cold, and also very long; and I am credibly inform'd, first, the spring when it begins, comes extraordinary fast, that the days are very long, and the summer far dryer than ours in *England*, so that the Bees are not hindered by continual showers, as they are some years in this isle: and lastly, that the country abounds much with *Firs* and *Pine-trees*, which the inhabitants usually cut, that the gum, rosinous, or turpentine substance may sweat forth, to which places the Bees come, and pre-

sently fill themselves, and return laden. And perhaps for these very reasons Bees thrive very much in *New-England*.

2. We are defective in the ordering of them. Not to speak of the negligence of particular men, which is very frequent; nor to write a general story of ordering them, because it requires much paper; and Mr. *Leveret* and *Butler*, especially the latter, hath written so exactly, and upon his own experience, that little can be added to it: only in a point or two I differ from him, of which I will speak briefly.

1. That we must take and destroy all the Bees for their honey, and not drive them, as they do in *Italy*, once or twice a year.

2. That if a swarm be poor with little honey, that swarm ought to be taken, because it is poor; so that the rich stocks are destroyed, because they are rich, and the poor swarms, because they are poor: so that be they rich, or be they poor, they must be destroyed. An *Italian* reports, that in the city of *Askaly* there was a law made, that none should destroy a swarm of Bees, unless he had a just cause; accounting it a part of extream injustice and cruelty, to take away without cause, both the goods and lives of such good and faithful servants. I am credibly inform'd, that an *English* Gentleman, beyond sea, gets many hundred pounds yearly, by keeping Bees, after an ingenious manner; which is thus: he hath a room made very warm and close, with glass windows, which he can open at his pleasure, to let the Bees fly abroad when he pleases, where he keeps his Bees and feeds them all winter with a sweet composition made of molasses, flowers, sweet wine, milk, raisins, &c. (for with such things as these

these they usually feed the Bees in *Italy*;) and oftentimes in summer, when the weather is rainy, windy, or so disposed, that the Bees cannot conveniently go abroad, he feeds them at home with divers sweet things, and gathers divers flowers and lays them among them, and sticks up many fresh boughs in divers places of his rooms, that in swarming-time they may settle on them: by these means he preserves all his swarms, and gathers an incredible quantity of honey and wax; and truly this way seems to me very probable: for,

1. We know the Bees, (even as we say of the Ants) will work continually, even night and day, winter and summer, if they were not hinder'd by darkness, cold, and moisture.

2. That Bees do not only make honey, (for I suppose, that they have a peculiar propriety of making honey, as the Silk-worms silk) out of mildews, or honey, but also out of all sweet things, as sugar, molossoes, &c.

3. That many sweet things may be had, far cheaper than honey; which, I suppose, the Bees will transmute into perfect honey. This way, I conceive, would be very advantageous to us in *England*, for the preserving of late swarms, and also for the enriching of old stocks, so that we need not destroy them, but might drive them from hive to hive, and set them to work again; and truly I think there is no place in the world so convenient for this purpose as *England*; tho' our Winters are long, yet they are not so very cold, but Bees would be stirring in them: and our summers are so subject to winds and rain, that many times there is scarce a fine day in a whole week: and molossoes, refuse
K 2 sugar,

sugar, sweet wort, milk, &c. may be had at reasonable rates.

I hope e're long to give an exact account of this experiment, and desire those who have any ingenuities of this kind, freely to communicate them. I have not observ'd many things more of importance concerning Bees, in my travels; only in *Italy* they make their hives of thin boards, square in two or thee partitions, standing either above one another, or very close, side to side; by which means they can the better borrow part of their honey when they please. In *Germany* their hives are made of straw, to which they have a summer door, as they call it, which is nigh the top of the hive, that the Bees when they are laden, may the more easily enter and discharge themselves of their burthens.

4. We are to blame, that we do not imploy our honey in making metheglin: it's true, that in *Herefordshire*, and *Wales*, there is some quantity of this liquor made; but for want of good cookery it's of little worth, but usually of a brown colour, of an unpleasent taste; and, I suppose, commonly made of the refuse honey, wax, dead bees, and such stuff as they ordinarily make it of elsewhere: for the good housewife thinks any thing good enough for this purpose, and that 'tis pity to spoil good honey by making mead: but I know, if one take pure, neat honey, and ingeniously clarify, scum, and boil it, a liquor may be made not inferior to the best sack, muskadine, &c. in colour like to rock-water, that some curious palates have call'd it *Vin Greco*, rich and racy *Canary*; not knowing what name to give it for its excellency. This would bring very great profit, not only

to the publick, by saving many thousand pounds, disbursed for wines thro' all the world; but would be very advantageous to private families, who use to entertain their friends very nobly, wines being at present intolerably dear and naught; I hope therefore e're long to see it put in execution. An excellent drink, not much unlike this, may be made of sugar, molosses, raisins, &c. of which I have already spoken, yet think it fit to put you in mind of it again.

C H A P. XV.

Concerning Silk-worms.

IT is a great Defect here in *England*, that we do not keep Silk-worms (which in *Italy* are called *Cavalieri*) for to make silk. I know that is a great paradox to many, but I hope by this short discourse to make this truth to appear plainly. The original of Silk-worms, by what I read in histories, is from *Persia*; where infinite numbers are still maintain'd, and the greatest profits of that great monarch arise from thence. *China* also abounds very much with silk. In *Virginia* also the Silk-worms are found wild among the *Mulberry*-woods, and perhaps might be managed with great profit in those plantations, if land were not so scarce and dear. I suppose the Silk-worm of *Virginia* is produc'd by the corruption of the *Mulberry*-tree, as *Cocchineal* from *Ficus Indica*, or *Indian Fig-tree*: for some ingenious and curious men, who have strictly observed the generation of insects, find, that every plant hath an insect which grows out of its corruption, (as divers sorts of lice from

from animals;) and that these insects do usually feed on that plant out of which they were made, as lice on the same animals from whence they are engender'd. I know a gentleman † in *London*, who hath three or four hundred insects, and can give a very good account of their original feedings; and also Mr. *Moreney*, in *Paris*, hath a large book of the same subject. But to return to our purpose: I say that we had Silk-worms first from *Persia*. In *Justinian's* time, about a thousand or eleven hundred years ago, some Monks presented a few to him at *Constantinople*; where, in his time, they began to plant *Mulberries*: from thence it came to *Italy*, about three or four hundred years since: for the ancient writers of Husbandry, as *Cato*, *Pallad*, and *Columell*, do not so much as mention these creatures: and at length these have passed over the mountains into *France* within an hundred years; where they flourish so much, that, if we will believe their own authors, they bring greater profit than the wine and corn of that large country. I know that *France* hath silk enough to maintain their excess of apparel, and to export plushes, velvets, &c. If these worms can thrive, not only in the parch'd *Persia*, but also in *Greece*, *Italy*, yea in *France*, which differs not much from the temper of *England*; why should we think, that they are confined to that place, and must move no farther northward? for they have come many hundred miles toward the north, why not one or two hundred more? And we see that *Mulberries*, which is their food, thrive here as well as in any place. But some will object, that our air is too cold and moist. To which I answer:

1. That

† M. *Marsha*'.

1. That those who write of Silk-worms, say, that you must take heed that you make not the place too hot, for too much heat may destroy: and therefore that you must set the windows open to let in the cold air.

2. We know, that moistness of air rather encreases such insects, and nourishes them. Indeed, if moisture hurts, 'tis because it corrupts their food, and causes a flux among them: but this is easily prevented, as I shall shew you anon. But to be short, it's not only my opinion that Silk-worms will thrive here, but the solid judgment of King *James* and his Council confirms the same; as you may see by his letter to the deputy-lieutenants of every county, wherein many weighty reasons are contain'd to convince men of the same; which letter you'll see presently.

Lastly, we find by experience, that Silk-worms will thrive here, and therefore the matter is out of question: for divers ladies, gentlewomen, scholars, citizens, &c. have nursed up worms to perfection, tho' they have had little skill in the managing of them; and likewise not such accommodations as are necessary for them; and more would they have done, if they could have had *Mulberry*-leaves. I am informed that one near *Charing-Cross* makes a good living by them; as also another by *Ratcliff-Cross*: and therefore if we can bring up an hundred, why not a thousand, yea, an hundred thousand, if we had food for them? Truly, I know no reason to the contrary, neither could I ever find one, that could speak any thing to the purpose against the business. And I must tell you, that the ordering of this Worm is very easy, none need to be bound prentice to the trade;

trade ; the special business is to be careful in feeding them, and keeping them sweet ; which things children use to do.

First, endeavour to get store of *Mulberry*-trees, which are of two sorts, the white and the black. The white grows greatest, and hath a fine leaf, and sweetest, and therefore fittest for the young worms. This is easily propagated by slips, as *Quinces*, *Codlings*, &c. The black *Mulberry* is difficultly propagated by slips, but must be raised from seeds, sown either at *Michaelmas*, when the *Mulberries* are eaten, or kept in dry sand till the spring, and then sow or hoe them in, as other seeds and stones, and must be diligently weeded. This grows not so great a tree as the former : the leaves are rougher and harsher, and fitter for the Worms when they are strong and ready to spin. When your trees are grown to a good bigness, you may plant them forth, as is usually done for walks or orchards, or in waste places, as they do in *Italy*, (for the fruit is little worth, only the leaves are useful,) where I have seen the trees as bare of leaves at midsummer as at midwinter. There are two sorts of Silk-worms, the *Spanish* and *Calabrian*. The *Spanish* is the smaller and more tender, and makes a finer silk. The *Calabrian* is greater and more hardy, and makes more silk, but coarser. This sort seems to be the best for this country. When the *Mulberry*-trees begin to bud, take the eggs of your Silk-worms, and lay them on a piece of stuff, or say, (some use to bathe them first in warm *Malmsey*, and say that it makes them stronger,) and carry them about you in the day in a box, in the night lay them under your bed, or in a warm oven, till the worms begin to
come

come forth, then lay a piece of paper of the wideness of the box, full of holes, on them, and on the paper lay *Mulberry-leaves*, and as fast as they hatch they will crawl forth, and stick to the *Mulberry-leaves*; which remove into other boxes till all be hatch'd; then when they have past their second sickness, feed them on shelves, two foot broad and eighteen inches one from another. The room where you keep your worms must neither be a low place, nor nigh the tiles; but a middle room, warm and dry, yet sometimes a little cold air is good.

Take heed of rats and mice, as also of hens, robinredbreasts, sparrows, and other birds; for they will eat them.

They have four sicknesses; the first, twelve days after they are hatch'd; and from that time at the end of every eight days: their sickness holds two or three days, and then they are to be fed but very little.

The whole time that the worms feed is about nine weeks: feed them twice a day at least: at first, when they are small, give them a few leaves; and as they grow big, more, and feed them oftener. Let your leaves be dry and well air'd upon a table, or cloth, before you give them; and gather not your leaves till the dew be off, and in dry seasons, if you can possibly. You may keep your leaves gather'd three or four days, or longer.

Keep your shelves and boxes very clean: and take heed you touch not your worms with your hands when you remove them; but don't move them when they are sick.

In cold moist weather set a pan of coals in the room, and burn a little *Benjamin*, *Juniper*, &c. especially when they are young, viz. the

first five weeks; but afterwards, unless it be extraordinary cold, give them air, and keep them not too hot, and let the room be well scented with herbs.

Let not your Worms be too thick on the shelves: if any die, or be sick, remove them soon, lest they infect the rest.

As soon as by the clear amber-colour of your Worms, you perceive that they would spin, make arches betwixt your shelves with *Heath* made clean, branches of *Rosemary*, *Lavender*, &c. where the Worms will fasten themselves, and make their bottoms in two or three days, and about twelve or fourteen days after will come forth; before which time you must take away the bottom, which you will use for silk, and kill the Worm within, by laying the bottoms in the sun two or three days, or in an hot oven.

The bottom, which you will keep for seed, lay in a warm place till the Worms come forth; which put on some pieces of old say, grogram, or velvet, made fast to some wall: there they will engender, and the male having spent himself falls down and dies; the female, when she hath laid her eggs: which eggs, when they are gray, you may gently take them off with a knife, and keep them in a piece of say in a dry place till hatching-time come.

The winding of the silk off the bottom requires a peculiar wheel, which an artificer must make: one pound two ounces of the bottom yieldeth from one ounce to three of silk.

An ounce of *Spanish* seed yields ordinarily six, eight, or ten pounds of silk; and the Worms will eat two hundred and fifty pounds of leaves: the *Calabrian* worms being greater,

eat nigh three hundred weight, and yield eleven or twelve pounds of filk.

To conclude: I desire all men seriously to consider, what advantage this business will bring to this island, if it be brought to perfection. Truly I know nothing hinders it but want of *Mulberry-trees*, which will in little space come to a considerable bigness. And though I commend those who endeavour to advance this work in plantations, and prefer it before *Tobacco*; yet I know that it cannot be done for want of hands; whereas in *England* we have plenty of women, children, old folks, lame, decrepid, &c. who are fit to be overseers of this work. And I wonder gentlemen do not go about a thing so pleasant and profitable, (for three, four, or five at most, will attend as many Worms as will make forty or fifty pounds worth of filk, in two or three months) and the Worms eat only leaves, which are of no value: neither is there any considerable trouble about the Worms, unless it be the twelve or fifteen last days. I hope, if particular men will not endeavour to advance this work for their private profit, yet the state will for the publick good, it being the best way I know to set all the poor children, widows, old and lame people to work, and likewise will save this nation many hundred thousand pounds *per Annum*. And the way to accomplish this work may be done without grievance to the subject, (*viz.*) to command every one to plant or sow so many *Mulberry-seeds*, which may easily be procured from beyond sea, &c. But I leave state-matters to states-men, I am none.

A copy of K. James's Letter to the Lords Lieutenants of the severall Shires of England, for the increasing of Mulberry-trees, and the breeding of Silk-worms, in order to make Silk in England.

JAMES Rex.

Right trusty and well-beloved, we greet you well.

“ IT is a principal part of the Christian
 “ care, which appertaineth to gover-
 “ nors, to endeavour by all means possible to
 “ encrease among their people the knowledge
 “ and practice of all arts and trades, whereby
 “ they may be weaned from idleness and the
 “ enormities thereof, which are infinite, and
 “ exercised in such industries and labours, as
 “ are accompanied with evident hopes, not
 “ only of preserving people from the shame
 “ and grief of penury; but also for raising and
 “ increasing them in wealth and abundance,
 “ the scope which every free-born spirit aims
 “ at, not in regard of himself only, but also
 “ in regard to the honour of his native coun-
 “ try, whose commendations are no way more
 “ set forth than in the people's activity and in-
 “ dustry. The consideration whereof, having of
 “ late occupied our mind, who always esteem our
 “ people's good, our necessary contemplation,
 “ we have conceived, as well by our own rea-
 “ son, as by information from others, that
 “ the making of silk, might be as well effect-
 “ ed here, as it is in the kingdom of *France*,
 “ where the same hath of late years been put
 “ in practice. For the climate of this isle is
 “ not so different from that country, especi-
 “ ally

ally from the hither parts thereof, but it is
to be hoped, that those things which by
industry prosper there, may by like industry
be propagated here, and have the like suc-
cess; and many private persons, who for their
pleasure have bred those Worms, have found
no experience to the contrary, but that they
may be nourish'd and maintain'd here, if
provision were made for planting of *Mul-*
berry-trees, whose leaves are the food of the
Worms. And therefore we have thought
good to let you understand, that tho' in suf-
fering this invention to take place, we shew
our selves an adversary to our own profit, in
regard to our customs for silk brought from
beyond sea, which will receive some diminu-
tion: nevertheless, when there is a question
of so great and publick utility to come to
our kingdom and subjects in general; and
whereby (besides multitudes of people of both
sexes and all ages) such as in regard of im-
potency are unfit for other labour, may be
set to work, comforted and relieved; we are
content that our private benefit should give
way to the publick. And therefore being per-
swaded, that no well affected subject will re-
fuse to put his helping hand to such a work,
as can have no other view in us, but pro-
moting the welfare of our people, we have
thought good in this form only to require
you (as a person of the greatest authority in
the county, and from whom the generality
may receive notice of our pleasure with more
conveniency than otherwise) to take occasion
either at the *Quarter-sessions*, or at some o-
ther publick place of meeting, to perswade
and require such as are of ability, (without de-
scending

“ scending to trouble the poor, for whom we
 “ seek to provide) to buy and distribute in
 “ your county, the number of ten thousand
 “ *Mulberry* plants, which shall be deliver’d
 “ unto them at our city of, &c. at the rate
 “ of two farthings the plant; or at six shillings
 “ the hundred, containing five score plants.
 “ And because the buying of the said plants at
 “ this rate may at first seem chargeable to our
 “ said subjects, (whom we would be sorry to bur-
 “ then) we have order’d that in *March* or *A-*
 “ *pril* next there shall be deliver’d at the said
 “ place a good quantity of *Mulberry*-feeds,
 “ there to be sold to such as will buy them;
 “ by means whereof the said plants will be de-
 “ liver’d at a smaller rate than they can be af-
 “ forded, being carried from hence: having
 “ resolv’d also in the mean time that there
 “ shall be publish’d in print, plain instructions
 “ and directions both for the increasing of the
 “ said *Mulberry*-trees, the breeding of the Silk-
 “ Worms, and all other things necessary to be
 “ understood for the perfecting a work so com-
 “ mendable and profitable, as well to the plan-
 “ ter, as to those that shall use the trade.
 “ Having now made known unto you the mo-
 “ tives as they stand with the publick good,
 “ wherein every man is interested (because we
 “ know how much the example of our own
 “ Deputy-Lieutenants and Justices will further
 “ this cause, if you and your neighbours will
 “ be content to take some good quantities here-
 “ of, to distribute upon your own lands;) we
 “ acknowledge that all things tending to plan-
 “ tation, increase of science, and works of
 “ industry, are things so naturally pleasing to
 “ our own disposition, as we shall take it for
 “ an

“ an argument of extraordinary affection to-
“ wards our person : besides the judgment we
“ shall make of the good disposition in those
“ that shall express in any kind their ready
“ minds to further the same, and shall esteem
“ that in promoting the same they seek to fur-
“ ther our honour and contentment. For having
“ seen in few years space past, that our brother
“ the *French* King hath, since his coming to
“ that crown, both begun and brought to per-
“ fection the making of silks in his country
“ (whereby he hath won to himself honour, and
“ to his subjects a marvellous increas of wealth)
“ we should account it no little happiness to us,
“ if the same work (begun among our people
“ with no less zeal to their good, than any
“ prince can have to the good of his) might
“ in our time produce the fruits which there it
“ hath done : whereof we nothing doubt, if
“ ours will be found as tractable and apt to
“ further their own good, now the way is
“ shew'd them by us, as those of *France* have
“ been to conform themselves to the directions
“ of their king.

“ Given under our signet at our palace of
“ *Westminster*, the sixteenth of *Novem-*
“ *ber*, in the sixth year of *England*,
“ *France* and *Ireland*, and of *Scotland*
“ the two and fortieth.

C H A P. XVI.

Concerning the Husbandry of other Places.

BEing ignorant of the Husbandry of other Places (*viz.*) what feeds, what fruits, what ploughs, harrows, gardening-tools they have; how they manage and improve their lands; what cattel they have; how they feed and fatten them; and how they improve their commodities, &c.

For there is no country where they are such ill Husband-men, but in some particular or other, they excell. As we see even in the several counties of this island, every county hath something or other, wherein they outstrip their neighbours. And that much profit may arise from hence, in this nation, is manifested by that excellent treatise, which is published by you, concerning the Husbandry of *Flanders*, wherein are briefly set down divers particulars very useful for us here in *England*, and formerly unknown. And without question, *France*, *Spain*, *Italy*, *Holland*, *Poland*, *Germany*, &c. have many excellent things, both for Husbandry, Physick, Mechanicks, worth the manifesting, and very beneficial to us: so likewise there are divers things in our plantations, worth the taking notice of in Husbandry. To pass by the southern plantations, as *Barbadoes*, *Antegoa*, *Saint Croix*, *Christopher*, *Mevis*, *Monferrat*, where the commodities are only Cotton-wools, Sugars, Gingers, Indigoes, which our cold climate will not produce; and also Tobacco, which grows also with us, about *Norwich* and elsewhere: we will only sail upon our northern
 planta-

plantations, *Virginia*, *New-England*, and instance in a few things. Why may not the *Silk-grass* of *Virginia*, the *Salsaparella*, *Sassafras*, *Rattlesnake-weed* (which is an excellent cordial) be beneficial to us, as also their *Cedars*, *Pines*, *Plum-trees*, *Cherries*, great *Strawberries*, and their *Locusts* (which is a prickly plant, a swift grower, and therefore excellent for hedges) be useful to us? So for *New-England*, why should we think that the *Indian-corn*, the *Marsh-wheat*, that excellent *Rye*, the *Pease* (which never are eaten with magots) the *French*, or *Kidney Beans*, the *Pumpions*, *Squashes*, *Water-melons*, *Musk-melons*, *Hurtle-berries*, *Wild-hemp*, *Fir*, &c. of those parts, are altogether uselefs for us? as also *Cramberries* (which are so call'd by the *Indians*, but by the *English*, *Bearberries*, because it's thought the bears eat them in winter; or *Barberries*, by reason of their fine acid taste like *Barberries*) which is a fruit as big and as red as a *Cherry*, ripe only in the winter, and growing close to the ground in bogs, where nothing else will grow? They are accounted very good against the *feurvy*, and very pleasant in tarts. I know not a more excellent and healthful fruit.

But some will object, They will not grow here, for your fore-fathers never us'd them. To these I reply; and ask them how they know? Have they try'd? Idleness never wants an excuse; and why might not our fore-fathers, upon the same ground, have held their hands in their pockets, and have said, that *Wheat* and *Barley* would not have grown among us? And why should not they have been discouraged from planting *Cherries*, *Hops*, *Liquorice*, *Potatoes*, *Apricocks*, *Peaches*, *Melicotones*, and from sowing *Rape-seeds*,

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seeds, Colliflowers, great Clover, Canary-seeds, &c. and many more of this kind? And yet we know, that most of these have been brought to perfection, even in our days; for there is a vicissitude in all things, and as many things are lost which were known to our fore-fathers, (as well the purple colour, &c. as you may read in *Pancirol*) so many things are found out by us, altogether unknown to them, and some things will be left for our posterity. For example, not to speak of Gunpowder and Printing, nor of the new world and the wonders there, which notwithstanding are but a few hundred years standing: I say twenty ingenuities have been found even in our days, as Watches, Clocks, Way-wisers, chains for Fleas, divers mathematical instruments, Short-writing, Microscopes, by which even the smallest things may be discerned, as the eggs, eyes, legs and hair of a mite in a cheese. Likewise the Selenoscope, which discovers mountains in the moon, divers stars, and new planets, never seen till our days. But to return to our purpose, I say that in Husbandry it is even so; for the ancients us'd divers plants which we know not, as the *Cytisus*-tree, so much commended for cattle; as also their *Medick*-fodder, which *Columbus* saith endures ten years, and may be mow'd four years, seven times in a year, and one acre he esteems enough for three horses. This fodder likewise is accounted very sweet and healthful, whereas the plants which are usually call'd *Medicæ's* with us, are annual plants, and have no such rare properties. So we are ignorant what their *Far* or fine Bread-corn was, what their *Lupine*, *Spury*, and an hundred of this kind, as you may read
read

read in *Matthiolus* or *Dioscorides*: so on the contrary, infinite are the plants which we have, and they knew not, as will appear by their small and our large Herbals; and daily new plants are discover'd, useful for Husbandry, Mechanicks and Physick; and therefore let no man be discourag'd from prosecuting new and laudable ingenuities. And I desire ingenious Gentlemen and Merchants, who travel beyond sea, to take notice of the Husbandry of those parts, viz. what grains they sow; at what time and seasons; on what lands; how they plough their lands; how they dung and improve them; what cattle they use, and the commodities thereby; also what books are written of Husbandry, and such like: and I intreat them earnestly not to think these things too low for them, and out of their callings; nay, I desire them to count nothing trivial in this kind, which may be profitable to their country, and advance knowledge. And truly, I should thank any Merchant that could inform me in some trivial and ordinary things done beyond sea, viz. how they make *Caviare* out of sturgeon's rows; in *Muscovy*, how they boil and pickle their sturgeon, (which we *English* in *New-England* cannot as yet do handsomely;) how the *Bologna-sausages* are made; how they ferment their bread without yeast; of what materials divers sorts of baskets, brooms, frails are made; what seed grout or grutze is made of; and also how to make the *Parmisan-cheese* of *Italy*, which is usually sold here for two shillings, or two shillings and six-pence *per* pound; or the *Angelots* of *France*, which are accounted better cheeses than any made in *England*; as also the *Holland-cheeses*, which are far better than our ordinary
cheeses,

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cheeses, and yet these sorts of cheeses are not made of mare's milk, as some think, but from the cows, and our pastures are not inferior to theirs, &c.

2. I desire ingenious men to send home whatsoever they have rare of all sorts; as first, Animals, the fine-wool'd sheep of *Spain*, *Barbary* horses, *Spanish* jennets, &c. and so likewise all sorts of Vegetables not growing with us, as *Pannick*, *Millet*, *Rice*, which grows in the fenny places of *Millan*; and why may it not grow in our fens? and the best sorts of grains or fruits in use amongst us. Perhaps there is *Wheat* that is not subject to smut or mildew; perhaps other feeds will give double increase, as *Flax*, *Oats*, *Pease*; and divers other things of importance there are beyond sea, which may be useful to us; as the *Askeys*, the *Cork*, *Acorns*, the *Scarlet-oak*, *Sweet-annise*, which grows abundantly in *Millan*, *Fenel*, &c. *Tilia* or *Linder*-tree for baste ropes, &c. *Spruce-pines* for masts and boards, seeing that they are swift growers, and many will stand in a small piece of ground: they have formerly grown here, and some do flourish in our gardens, and in *Scotland*. I think this ought seriously to be considered: for although we have plenty of *Oaks*, yet what will it profit for shipping without masts? And how difficult it is to get great masts above 22 inches diameter, is very well known. Many things I might add of this kind, but for brevity's sake I refer you to Mr. *John Tredescant*, who hath taken great pains herein, and raiseth daily new and curious things.

3. Consider that these ingenuities may be profitable, not only to the publick, but also to private men; as we see by those who first plant-
ed

ed Cherries, Hops, Liquorice, Saffron, and first sowed Rapeseed, Colliflowers, Woad, Would, early Pease, Asparagus, Melons, Tulips, Gilliflowers, &c. and why may we not find some things beneficial to us also?

C H A P. XVII.

Of our ignorance of the Metals, Minerals, &c. produced in England.

TH O' it may seem to many that these things little concern the Husbandman, who usually is not a Naturalist, but only endeavours to know his own grounds and the seeds proper for it, and seldom pierceth into the bowels of the earth: yet if we consider that out of the earth he hath Marl, Lime-Stone, and Chalk, for the enriching his lands; and also Loam and Sand for buildings; oftentimes Fuel for fire, &c. it will plainly appear, that it is necessary for him to know all subterraneous things, and to be a petty natural philosopher, and that the knowledge of these things will be very beneficial to him. And here I cannot but take notice of a great defect among us, *viz.* that we have not the natural history of all the Sands, Earth, Stones, Mines, Minerals, Metals, &c. which are found in this island: it would not only advance Husbandry, but also many other mechanic arts, and bring great profit to the publick. I hope some ingenious man will at length undertake this task; for the Lord hath blessed this island with as great variety as any place that is known, as shall in part appear anon; and it may be proved by that great variety which is found near the *Spaw*-waters in *Knarefborough*,

borough, as Dr. *Dean* relates in his book call'd the *English Spaw: Or the glory of Knareborough, springing from several famous fountains there adjacent (called the vitrol, sulphurous, and dropping Wells) and also other Mineral waters*; whose words are these: "Here is found not only white
 " and yellow Marl, Plaister, Oker, Rudd,
 " Rubrick, Freestone, an hard Greet-stone, a
 " soft Reddish-stone, Iron-stone, Brimstone,
 " Vitriol, Niter, Allum, Lead and Copper:
 " (and without doubt divers mixtures of these)
 " but also many other Minerals might perhaps
 " be found out by the diligent search and in-
 " dustry of those who would take pains to la-
 " bour a little herein."

This letter will not permit me to make a compleat Natural History of the things of this isle; yet I shall relate divers things, which may be as hints to set some others to work, which I have found in Mr. *Cambden* and others; and shall briefly instruct the Husbandman what he ought to take notice of for his own and other's good. And first, if he live nigh the sea, let him take notice of those things the sea casts, for it hath with us cast up Ambergrease, which is worth so much gold; with which not long since a fisherman of *Plymouth* greased his boots, not knowing what it was: sometimes it casteth up Jet and Amber, as at *Whitby* oftentimes. In former times we had Oysters which had very fair great pearls in them, of good worth; and at this time some of them are found in *Denbigh-shire*; Coperas-stone likewise is found along the sea coasts of *Kent, Essex, Sussex, Hampshire*, out of which Coperas is made; a thing very useful for dyers, curriers, &c. Also Sea-weeds are not to be slighted; for in *Jersey* they have no
 other

other fuel among them ; and in *England* it is burnt to make Kelp for glassmen, and is also very good manure for divers lands ; also *Sea-owse* is not only good to lay on land, but at *Dover*, and other places, the inhabitants make brick thereof, call'd *Flanders-bricks*, &c. *Sea-sands* in *Cornwall* very much enrich their lands ; and in *Cumberland* out of a certain kind of Sand they extract Salt, &c.

2. Let him take notice of all sorts of Waters, which issue forth of the earth, differing from the ordinary, in colour, odour, taste: for it is well known how advantageous these Waters are oftentimes, not only to particular men, but also to the country about, and to the whole island ; as appears by the Waters of *Tunbridge* in *Kent*, and of *Epsom* in *Surry*, *Scarborough-spaw* in *Yorkshire*, and by the Allum-waters at *Newenham* in *Warwickshire*, like milk in taste and colour, and are excellent for the stone and wounds ; and also it appears by the Salt-fountains in *Worcestershire* and *Cheshire*, which furnish all those parts with an excellent fine white Salt: by the hot Baths in *Somersetshire*, and the luke-warm Waters by *Bristol*, &c. At *Pitchford* in *Shropshire* is a fountain which casteth forth liquid Bitumen, which the people use for pitch, &c.

3. Let him not despise the sorts of Sands which he finds ; for some Sands are for buildings, as the rough sorts ; others for scowering, others for casting fine metals, as *Highbate-sand* ; others for the glassmen, as a Sand lately found in *Suffex*. In *Scotland* there is a Sand, which contains a considerable quantity of gold : and in divers countries fine gold aboundeth very much in Sand ;

Sand; and if we may believe an excellent *Dutch* chymist, there is scarce any Sand without it.

4. Let him take notice of the Earth, Loams, Clays, &c. which have divers and necessary uses: as first, the stiffest Clays, as *Newcastle* and *Non-such*, are for the glassmen's pots, for crucibles, melting-pots; the less stiff for ordinary earthen ware, brewers, tiles, bricks, &c. white Clay is for tobacco-pipes. Marl of divers colours and stiffness is excellent for Husband-men. Fullers-earth is found in *Kent*, *Surry*, and lately in divers other places, for the great benefit of the clothier. Rub and Rubrick in *Yorkshire*, as also divers other in *Oxford* and *Glocestershires*, excellent for painters, &c. Turf for firing may be found in most parts of this isle, if people were industrious: necessity now and then compels them to be inquisitive, as it did lately in *Oxfordshire* and *Kent*, where it is found in good quantity. In *Holland* they have little fuel, save what is taken out of their ditches; and therefore it is truly said, that their firing is as it were fish'd out of the water, and it's indifferent good fuel. Coals are found in very many places, yet divers places are in great want of them.

5. Let him take notice of the several stones found in this isle, as of Freestones for building; Cobbels and rough hard stones for paving; Tomb-stones; soft sandy stones, commonly called Fire-stones, because that they will endure strong fires, and therefore fit for iron furnaces; and this property these soft stones have, that when they are white hot, a steel instrument will scarce touch them to hurt them. Alabafter is found at *Burton upon Trent*, and in *Staffordshire*, and at *Tisbury-castle*: excellent Marble at *Snotbil* in *Herefordshire*: a coarse Marble near *Oxford*; and

and in *Kent*, also at *Parbeck* in *Dorsetshire*; Mill-stones in *Anglesey*; in *Flintshire* and *Derbyshire* Lime-stones: Chalk in very many places, for divers uses: Allum-stone is found in *Anglesey*; but especially at *Gisborow* in *Yorkshire*, where the Allum-works are which serve this island: *Lapis Calaminaris* is lately found in *Somersetshire*, by which copper is made brass: Manganese, for those that make white-glass, is lately found in the north: the best Emery for polishing iron, in *Jersey*: Plaister at *Knareborough*; Black-lead in *Cumberland*, and nowhere else in *Europe*. There is a stone in *Durham* out of which they make salt. Diamonds are found about *Bristol* and *Cornwall*, very large but soft. There is a stone near *Beaver-castle* like a star: In *Yorkshire* another, like a serpent petrified: and also other stones round like bullets, which being broken have as it were a serpent in them without an head, &c.

6. Of all Minerals and Metals. Iron-stone is found almost in every county, and is profitable where wood is plentiful; the best is found in *Lancashire*, one load and a half making a ton of iron; it has been transported into *Ireland*, to mix with poor *Mini*. In *Richard* the Second's time a Copper-mine was found at *Wenlock* in *Shropshire*, but exhausted: in *Queen Elizabeth's* days one was found at *Keswick* in *Cumberland*; and lately in *Staffordshire*, *Yorkshire*, and near *Barnstable* in *Devonshire*, on which some Gentlemen intend speedily to work. Lead is found in *Durham-wall* and *Devonshire*: Brimstone in *Yorkshire* and *Wales*: Antimony in *Staffordshire*: a Silver-mine in *Cardiganshire*: a Gold-mine was discover'd in *Scotland* in king *James's* time; and many rich mines might be

discover'd in *England*, if the king's prerogative (which is, to take all royal mines to himself, *viz.* Silver, Gold and Copper) were so certainly abolished, that they which should find these Metals in their own lands, might safely dig them. But some will object and say, that many things are of little worth and profit. To these I answer, that God hath made nothing in vain, every thing hath his peculiar use, and though some things seem to be of little worth and contemptible, as Sand, Loam, Chalk; yet it hath pleased the wise Creator to make these things very necessary for man's comfortable subsistence, which they that want these things can testify: As for example, in *New-England*, where there is no Chalk nor Lime-stone, they are compelled to burn oyster-shells, cockles, to make Lime; or else they could hardly build any houses. The like I may say of Sand and Loam in divers places, where they are wanting.

2. I say that most of those things I have spoken of are very profitable in one place or other. To instance in some of the meaner sort; at *London* brick-men give fifty pounds *per* acre, only for Loam to make bricks, and pay three pounds *per* acre of yearly rent, and are to leave the land worth the same yearly rent: likewise I know a Chalk-cliff in *Kent*, not two acres of ground, valued at many hundred pounds; and that one column of Chalk, which is ten foot square, is valued at forty or fifty pounds, at eight pence *per* load. The Oker-mines of *Oxfordshire* and *Gloucestershire* are of great value, and so would others of that kind, if they could be found; so is the Blacklead-mine. Also the pits of Clay, Marl, Coal, Turf, &c. And therefore I desire all country-men to endeavour
to

to know all sorts of Stones, Clays, Earths, Oars, &c. and to teach their children the use of them, that they may know that this Sand is for building, this Loam for bricks, this Clay for pots, this Marl for corn-land: and if that they should find any Stones, Earths, which they know not, that they would lay them up till they meet with some ingenious man that can inform them. The richest Mines of the world have been found out by this means, if we will believe histories. And this I am sure of, that by this means they may much advance their knowledge, and be more profitable to the publick, their neighbours, and also to themselves.

C H A P. XVIII.

Of our ignorance of the virtues and uses of the Vegetables of England.

THE first Defect that I take notice of, is the ignorance of the ordinary seeds which are commonly sown amongst us: for usually the country-man contenteth himself with one or two sorts, and knows no more, when as there are very great variety; some of which agree with one sort of ground, some with another; as for example, there are very many sorts of *Wheat*, some called *White Wheat*, some *Red Wheat*, some *Bearded*, (which, as I have said before, is not so subject to mildews, as others) others not: some sorts with two rows, others with four and six, and some with one ear on a stalk, others with double ears, or two on the same stalk; *Red-stalk Wheat of Buckinghamshire*, *Winter Wheat*, *Summer Wheat*, which is sown abundantly in *New-England* in *April* and *May*, and reap'd ordina-

rily in three months; and many sorts more; not to trouble my discourse with *Spelt, Zea, Tiphine Wheat, or Olew, Far, Siligo, Alica*, which were used among the antients, but now unknown not only to the country-man, but even to the most learned botanists. So I may say that the ordinary yeoman is ignorant of the different sorts of *Barley*; for there is not only the ordinary *Barley*, but also *Big sprat Barley*, which hath lately been sown in *Kent* with good profit; also *Winter Barley*, sown in winter; *Barley* with four or six rows, *Naked Barley*, which require divers dispositions in land; some delighting in finer, others in stiffer grounds. So there is also *Winter and Summer Rice*, and twenty sorts of *Pease*; the *Schew*, the *Raith* or *Early-ripe Pease*, the *Roncival*, *Hastivers*, *Hot-arfes*, *Gray Pease*, *Green Pease*, *Pease* without skins, *Sugar Pease*, whose shells are sweeter than the *Pease* itself, and have been within these ten years plentifully sown in *Linclonshire* with profit; also *Fulham, Sandwich Pease, &c.* which require divers sorts of lands and seasons. So also there are divers sorts of *Oats*, white, black, naked, which in *New-England* serve well for oatmeal without grinding, being beaten as they come out of the barn; *Scotch, Poland, &c.* also *Buck Wheat*; divers sorts of *Tares*, of *Hemp* and *Flax*, altogether unknown to most country-men, but I hope hereafter they will be more inquisitive after them: for divers of them may be of good use on their lands.

2. That they are ignorant of the *Plants* and *Grasses* which naturally grow among us, and their uses, which likewise were made for to be food for cattle, and also for the service of man. This ignorance causeth them to admire, and to esteem

esteem even as miraculous, ordinary and trivial things; as for example, how it cometh to pass, that in one meadow an horse thrives very much and speedily, and yet a bullock will not in that place; and in another meadow, close by the former, the bullock will thrive, and the horse not: so also how it comes to pass, that conies and sheep will thrive well where there is scarcely any pasture, and yet come to nothing on commons, where there is a greater quantity of pasture; which proceeds from this cause, that some kind of plants are more agreeing and sweeter to one sort of cattle than to another, and every beast almost hath some plant or other, which they love exceedingly. I suppose, that observations of this kind might be very useful in Husbandry. These Deficiencies I will draw to three heads.

1. I say that divers plants (not to speak of fruits, because we have already spoken of them) that grow naturally in our island, may be very serviceable to the Husbandman, both for his pasture and corn-lands. To instance in some few: we see that divers sorts of *Vetches*, *Chiches*, *Tares*, &c. grow wild in divers places, which though they bear not so great and large crops, as some others already used; yet who knows what they would do if they were manured as other grains, and land proper for them? for we see that the transplanting of plants into gardens doth very much meliorate or better them; and without doubt all those grains which are in use with us, were at first picked out of the fields and woods, and by ingenious men found useful for man or beast; and of late divers have been found not known to our forefathers, as *Saint Fein*, *Lucern*; and why may not

94 *Of our ignorance of the virtues and*

not we find divers *Grasses, Vetches, Medicæ's,* wild *Pease,* &c. which as yet are scarce taken notice of?

2. There grow divers sorts of wild *Pease,* but to speak of two only.

First sort, which grows on the stony beaches of the sea, where there is little or no earth, the roots are many foot deep in the ground. In *Q. Mary's* days, in a dearth, the poor people gather'd divers sacks full of them, and they were no small relief to them: who hath tried whether they would thrive better on better land?

Second sort grows on dry barren land, and is commonly call'd the *Everlasting Pea,* which continually grows out of the same root. In gardens I have seen it grow ten years together, and larger at the end of ten years than the first. I have also seen it flourish on barren grounds, where *Oats* were burn'd away: who knows but these and other plants may be serviceable, if not for man, at least for beasts or pigeons? for in *New-England* the great flights of pigeons are much maintain'd by these. I am sure it were good to make experiments of these and divers others.

2. Head, is the ignorance of the mechanical uses of Herbs and Trees, for even for these uses most plants have some peculiar property. To instance in a few: We know that *Elm* is for wheels, and the best wood to make herrings red; *Oak* is for the ship-wright, joyner, tanner: *Horn-beams, Beech,* for the mill-wright; *Line-tree* for bass-ropes; old *Elder* without pith is very tough and fit for cogs of wheels, tooth-pickers; *Pear-tree* for Mathematical instruments and Engravers, &c. *Osfers* for baskets; *Walnut* for gun-stocks; *Asp* for hoops; *Box,*
Ash,

Ash, for a hundred uses ; and much more might be spoken of this kind, if time would permit. So likewise divers plants are for painters, as you may see in *Battee's* experiments : some for the dyers ; but as yet we know but four (*viz. Woad, Woad, Green-wood, and Madder*) among twelve hundred plants and upward, which grow wild with us. I could wish some ingenious man would take the pains to search out the mechanical uses of plants ; surely it were a good way to advance mechanicks, who in their callings usually go round, as horses in a mill, and endeavour very little to advance or know the causes of their operations. I know a gentleman who promises some things in this kind, and I hope will be as good as his word.

3d Head, is the ignorance of the very physical uses of plants : for tho' many hundred plants grow among us, yet but few of them are used physically, whereas there is scarce any one but may be useful in this kind. And truly in my opinion it is a great fault that we so much admire those things that are far fetch'd and dear bought ; when as oft-times they are gather'd in unseasonable times, and corrupted by long voyages by sea, counterfeited by merchants ; yea, we have very oft *quid pro quo*, and rank poysons, and do neglect those medicines which God hath given us here at home. I am credibly inform'd, that in former times, *Virga aurea* was in great use with us, and usually sold for eight pence *per* ounce, and brought from *France* ; but so soon as it was found growing plentifully in our hedges, it was cast forth of the apothecaries shops, as of little virtue. And tho' some will object, that our plants have little virtue, I say it's false ; for God hath tempered

pered them for our complexions: and we see very often that one simple medicine doth more good than the great compositions of the antients, which are rather *ad pompam* than for health, and seem to favour somewhat of the mountebank; because *Opium* is always an ingredient. And farther we see, that where any endemical or national disease reigns, there God hath also planted a specific for it; as the *Cochlear* or *Scurvy-grass* for the scurvy: in the *Baltick-sea*, where it is very frequent, and also in *Holland, England*. So in the *West-Indies* (from whence the great pox first came, and where it reigns very much, that not only man but other creatures are so infected with it, that even dogs die of that disease in our northern plantations, perhaps catching this infection by mingling with *Indian* dogs) there grow the specifics for this disease, as *Gujacum, Salsaperilla, Sassafras*, and the savages easily cure these distempers. Farther we see, that even the irrational creatures can find not only meat, but also medicines for themselves; as the dog, *Couchgrass* for a vomit; the dove, *Vervein*; the weasel, *Kue*; the swallow, *Celandine*; the toad, *Plantane*: and where is our reason that we cannot?

I therefore desire all country people, to endeavour to know these plants which grow at their doors; (for God hath not planted them there for no purpose, for he doth nothing in vain) and to collect together the plain simple medicaments of their grandames; by this means they may save many a forty pence: I mean preserve themselves and families, and neighbours, in good health. Some small treatises have of late been written, to shew the use of our plants in physick; and I hope ingenious men will
daily

daily more and more communicate the secrets of this kind, which they have in their hands, for the publick good.

C H A P. XIX.

Concerning Animals, Fish, Insects.

THEY that write of four-footed beasts reckon about one hundred and twenty species of them: half of them are scarce known among us. I suppose therefore that divers species are wanting, which may be useful. To instance in some: And

1. To begin with the Elephant; the greatest, wisest, and longest liv'd of all beasts: which abound very much in the eastern parts of the world, as *China*, *India*, and are accounted very serviceable both for the wars and for carriage, (fifteen men usually riding on his back together.) They are not chargeable to keep: why may they not be of use even here, when I am credibly inform'd an Elephant liv'd divers years here in a park? So that they can endure the coldness of this climate.

2. The Buffalo, which is as big as an ox, and serviceable both for the plough and for their milk. Their skins make the best buff; they will fare very hard, and live in fens and bogs, where nothing else can. In the dominions of the Duke of *Florence*, near *Pisa*, are many of them.

3. The honest and patient Afs, which was very much used in old time for carriage, (as the horse for war, and the ox for the plough) and in many countries at this time. They will eat

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Thistles,

Thistles, and live almost with nothing: They may save men (who are not able to keep an horse, because he is a great feeder) much labour.

4. Mules, which is a very strong and proud beast, and will carry far more than an horse, and are more sure-footed. I suppose, that they might be serviceable to the carriers here, as they are beyond sea.

5. Black Foxes, may be profitable; whose skins have been sold from twenty pounds *per* skin to ninety pounds. I might add divers more of this kind; as Musk-cats, Sables, Martines, Minks, Musk-squash, Guiney-pigs, and a sort of Cony, which some few have in *Hampshire*, whose fur is worth half a crown or three shillings *per* skin, being little inferior to Beaver, &c. but for brevity's sake I pass them over: as also divers sorts of Fowls, of good use; as a kind of Duck with a crooked bill, which lays constantly as Hens do; as also Hawks of divers sorts, of good value, which perhaps the countryman loves not, because they are enemies to his poultry.

Second Defect is, that we do not endeavour to advance the best kinds of the cattle which are among us. And

1. To begin with horses. The *French*-man that wrote a book, call'd *the Treasure politick*, says, that in *England* in *Queen Elizabeth's* days, we had not above three or four thousand horses worth any thing for war, and those only in noblemen's stables, which perhaps encouraged the *Spaniards* to invade us; but at this time we are known to have many thousand horses not inferior to the best in the world: yet I suppose, we might much meliorate our breed
by

by *Spanish Jennets, Barbary, &c.* And we are not so careful to increase good horses as we should be.

2. We are too negligent in our Kine, by not advancing the best species: for some sorts give abundance of milk, and better than others: some sorts are larger, more hardy, and will sooner fat, &c. *Lancashire*, and some few northern counties, are the only places where they are a little careful in these particulars.

3. We are not curious in procuring the best sort of Sheep, for bigness, soundness, and fine wool. I wonder that some of our sheep-masters have not procur'd of those exceeding fine-wool'd Sheep of *Spain*, whose wool costs the merchant nigh ten shillings *per* pound before it is exported: I suppose that it would for a time mend our wool, if not continue so for ever; for these sheep were first carried out of *England*, if we may believe stories, *Spain* not affording such Sheep before. *Dutch* Sheep are reported to have two or three Lambs ordinarily. *Dutch* Sheep are very large, with great tails; but their wool is very coarse, not only because of their coarse feeding, but also because in hot countries they ordinarily mingle with goats, and therefore in *Venice* ordinary porters will scarce eat any mutton. And here I cannot but relate, that all strangers very much wonder at two things in our Sheep, (not to speak of the fineness of wool:) And

1. That our Sheep, if they be found, seldom or never drink, even in summer, tho' they go on the driest chalky-lands; as it plainly appears in *Kent*, where there is scarce water for the great cattle: which proceeds from the moisture of our air, and abundance of rains and dews.

2. That our Sheep do not follow their shepherds as they do in all other countries : for the shepherd goes before, and the Sheep follow like to a pack of dogs. This disobedience of our Sheep does not happen to us, as Popish priests tell their simple flocks, because we have left their great shepherd the Pope ; but because we let our Sheep range night and day in our fields without a shepherd, which other countries dare not for fear of wolves and other ravenous beasts, but are compell'd to guard them all day with great dogs, and to bring them home at night, or to watch them in their folds.

Third Defect in this kind, is the neglect of Fish-ponds, which are very profitable : for Fish usually live by such worms and flies as are ingender'd in the ponds, and require no charge. Concerning the ordering of them, and the profit of them, read Mr. *Vaughan's Golden Grove*. And surely it would be a great benefit to this island if we had Fish at reasonable rates. I cannot therefore pass by two extream abuses, which exceedingly destroy Fish, and are in no wise to be permitted.

1. That divers poor men keep many swine, and in nets, or otherwise, catch many vessels of the young fry of Fish, and feed their swine with them.

2. That the fishermen in the river have the meshes of their nets so streight, that they take many sorts of Fish when they are too small, and do destroy more Fish than they take. I hope these abuses will be reform'd with all severity. To this head I may add Decoys, which are very frequent in *Holland*, and profitable ; but very rare with us in *England* : yet might be very profitable and delightful.

Fourth

Fourth Defect, is our ignorance of the Insects of this island. And tho' it may seem ridiculous to many, to affirm that Magots, Butterflies, should be of any importance; yet I desire them to consider, that we have our honey, the sweetest of food, from Bees; which are cattle of this kind: also all our silks, sattins, plushes, and bravery from the poor Silk-worm, which may be call'd a Magot, Caterpillar, or Butter-fly, &c. the richest of our colours from the Cochineal, which is one of this sort. Gum-lac is made by Ants; some are used for food, as Locusts, &c. as you may read in *Musset's* book *de Insectis*. Many of these likewise are used in physick, as Cantharides, Wood-fows, Lice, &c. Some think, that medicines, transcending even the chymists, may be had out of these; for every plant, which hath a medicinal virtue, is also sublim'd up into this living quintessence: and therefore I commend divers ingenious men, as Mr. *Marshal*, and others, who have collected many hundred sorts of these; and I hope they will communicate e'er long their experiments to the world.

C H A P. XX.

Concerning divers things necessary for the good of Cattle.

I. **T**HAT we are ignorant of the divers diseases of cattle and their cures. To run over all the diseases of cattle and their cures would be too long: you may read them in Mr. *Markam's* works, *the Country Farmer*, and others. I will instance only two; which, some years, sweep away cattle as the plague doth men, *viz.* the Murrain amongst great cattle, and the Rot among sheep. And tho' divers have wrote concerning the cures of these diseases; yet we do not find that effect which we desire, and therefore I hope some will attempt to supply this defect, and write a good treatise about the diseases of cattle. Of these two diseases I shall briefly declare my mind. And

I. Of the Murrain, which proceeds from an inflammation of the blood, and causes a swelling in the throat, which in little time suffocateth the cattle. The especial causes of this disease are an hot and dry season of the year; which dries up the waters, or at least does so putrify them that they are unwholsome; and also the letting of carrion lie unburied. This disease is thought to be infectious; but perhaps it may proceed from one common cause, as the rottenness of sheep. The best way to keep your cattle from this disease, is to let them stand in cool places in summer, and have abundance of good water, and speedily to bury all carrion: and if any of your cattle be infected, immediately let them
blood,

blood, and give them a good drench, &c. By these means divers have preserved their cattle, when their neighbour's have perish'd.

2. Concerning the Rot of sheep, not to speak of the Pelt-rot, or sheep that are starved; but of the ordinary Rot, called by some the White-Rot, and is a kind of dropsy, their bellies are full of water, and their liver discolour'd. I have seen out of the livers of sheep tending to Rottenness, living creatures, leaping like small flounders; which without doubt in a little time will destroy the liver, and consequently produce an indisposition not unlike to the Rot. The common people say, that these worms are caused by the over-heatings of sheep, and that Rottenness proceeds from a plant call'd *Cotyledon*, or *Marsh-penny-wort*, which is of a very sharp taste, and therefore not likely that sheep will eat it; but it may be a sign of wet rotten land, as *Broom* is of sound and dry land. This is certain, that in wet moist years sheep die very much of the Rot, and in dry years on the same ground they hold sound; and yet I have heard that in *Ireland*, which is far moister than *England*, Rottenness of sheep is not known. It were therefore well worth the labour of an ingenious man to enquire into the causes of these indispositions in sheep.

The means which have been found very effectual for the curing of these diseases, are these; first, to drive your sheep up to dry lands, or to keep them in the fold till the dew be off the grass, or to feed them some days with fine dry hay, especially of salt meadow, or to put them into salt marshes; for in those places sheep never rot; or to drive them to some salt river, and there to wash them and make them drink
of

of the water; this will kill the scab, and also the ticks, and fasten the wool. But if you have not the conveniencies before mention'd, then rub their teeth with salt; or rather make a strong pickle with salt and water, and force them to drink thereof. Some dry pitch in an oven, and add to the pickle, and have found good success. For these medicines exsiccate the superfluous humidities, open obstructions, and kill worms. Some commend the antimonial cup, as a cardinal medicine against all diseases of cattle.

Of Feeding.

II. We are ignorant of divers ingenuities concerning feeding and fattening of cattle and other creatures. To instance in some: And

I. Of the horse; who is a great feeder. In *Kent* and *Hertfordshire* they usually cut all their *Oats* and *Pease* small, and give them with their chaff; by this means the horses sooner fill themselves, and eat all the straw up. Some put horse-meat into a bag, and so order it that a little only lies in the manger, which when that is eaten up more falls down, and not before; by this way horses do not blow their meat, nor throw it out of the manger with their noses. A farther good piece of husbandry they use, which is this; when their horses are well fed at night, they fill the rack with *Wheat* or *Barley*-straw, and so leave them; the horse perceiving that that which is in the rack is not very pleasant, lies down and takes his rest, which is as good to him as his meat: if he rises in the night, and falls to the rack and manger, as he usually does, and finds
nothing

nothing but straw, he sleeps till the morning; but if it be *Hay*, *Tares*, or *Pease*, the jade will pull all down and spoil it, and likewise will be hinder'd from his rest; by which double damage insues. Currying and dressing of horses ought not to be forgot; it is half as good as their meat. Brimstone and Elecampain roots are the especial ingredients for his physick.

2. Of the feeding and fattening of cows. We usually feed cattle with straw in racks in the yard, or turn them to the fields, and there let them feed as much and how they please; which hath many inconveniences: as first, cattle spoil as much with their heels as they eat, especially if the ground be moist, or if the flies be very troublesome, and they blow, and stench, and tumble much; and if the fly is busy, they run up and down, and over-heat themselves, and fat very little; so that oftentimes in *June* or *July* they fatten as little as at *Christmas*, and most of their dung is lost by this means, &c. But in *Holland* they do thus; they keep their cattle housed winter and summer: for the winter-provision they lay in not only *Hay* but also grain, which they buy in summer and bury in the ground: and also *Rapeseed*-cakes, and sow *Turnips* not only for themselves but their cows also. They slice the *Turnips* and their tops, and with *Rapeseed*-cakes and grains, they make meshes for their cows, and give it them warm, which the cows will stop up like hogs; and by this means they give much milk. In the summer time they mow the great *Clover-grass*, and give it them in racks; so that their cattle are not troubled with pinching frosts nor rains, nor with the parching sun in summer; neither with the fly, nor do they over-heat themselves,

selves, or spoil half so much meat; and are always as fat as their masters, or bacon-hogs. The dung and urine they carefully preserve, and thereby keep their meadows and *Clover-grass* (which are constantly mowed twice or thrice yearly) in good heart. And indeed cattle ought not to go among *Clover-grass*, because it usually grows with long haum (as they call it) like *Pease*, which if it be broken will not thrive. In *Bermudas* they have a peculiar way of fattening their cattle, not used any where else that I know, which is with *Green-fennel*, that grows in that island plentifully.

There is a plant in *Essex*, call'd *Myrabis*, or *Cow-parsley*, which grows fast and early in the spring, which they give their cattle at the beginning of the year, and they eat it well.

It is an ill custom that is used almost every where, to let hogs lie in their dirt and dung when they are fattening; for all creatures generally do hate and abhor their own dung: and an hog is the cleanliest of all creatures, and will never dung nor stale in his stie, if he can get forth, which other creatures will: and tho' he tumble in the dirt in summer, yet that is partly to cool himself, and partly to kill his lice, for when the dirt is dry, he rubbeth it off and destroyeth the lice thereby.

Sir *Hugh Platts*, in his writings, sets down divers ingenious ways of fattening poultry, &c. and more may be found out daily. The *Jews* have a peculiar way of fattening geese, with milk, figs, raisins, and other sweet things, by which they make the liver of an extraordinary bigness, and is a dish much valued by them.

In

In *Moorfields* there is one that keeps many hundred coney with grains and bran: and some others who keep the great laying ducks, with these things and blood, to their great advantage. I have seen a book translated out of *French*, which teaches how to gain divers hundred pounds *per ann.* by fifty pound stock in hens. I suppose about *London*, where eggs are so dear, great profit might be made by them. Turkeys may be kept with great profit where there are many meadows, as in *Suffolk*. In *Berkshire* many keep tame pheasants, and have gain'd well thereby.

Of Improvements in the Dairy.

III. We do not know how to improve the commodities proceeding from cattle to the best advantage: as for example, Our ordinary butter might be better scented and tasted: some ladies have fine ingenuities in this kind. We cannot make cheese comparable to the *Parmisan*, nor so good as the *Angelots* of *France*. Our ordinary cheese is not comparable to the *Holland* cheese; wherealso divers sorts of cheeses are made of divers colours: but I cannot much commend their green-cheeses, which are made of that colour by sheeps-dung, &c. But I hope in short time our good housewives will scorn that any shall excell them.

C H A P. XXI.

Concerning the want of divers things which are necessary for the accomplishment of Agriculture.

I. **T**HAT we have not a System or compleat book of all the parts of Agriculture. Till the latter end of Queen *Elizabeth's* days I suppose that there was scarce a book wrote of this subject; I never saw or heard of any. About that time *Tusser* made his Verses, *Scot* wrote about a *Hop-garden*, and *Gouge* translated some things. Lately divers small treatises have been made by Sir *Hugh Platts*, *Gabriel Platts*, *Markham*, *Blieth*, and *Butler*; who do well in divers things; but their books cannot be call'd compleat books, as you may perceive by divers particular things not so much as mention'd by them. The *Country Farmer*, translated out of *French*, is copious enough; but it's no ways fram'd or squar'd for us in *England*: and I fear the first authors went on probabilities, and hear-says, rather than experience. I hope some ingenious man will be encouraged to undertake a work so necessary and commendable.

2d Defect is, that Gentlemen try so few experiments to advance this honest and laborious calling, when many experiments might be made for a small matter; for half a pole square will give as certain a demonstration as an acre, and a pottle as a hoghead. I hope in time there will be erected a college of experiments, not only for this, but also all other mechanical Arts.

3d Defect is, that Gentlemen and Farmers do not meet and communicate secrets in this kind, but keep what they have experimented themselves, or known from others, as *Sybil's* leaves: I mean, as rare secrets not to be communicated. I hope that we shall see a more communicative spirit among us e'er long. And, Sir, I cannot but desire you, if you have any thing more in your hands of *Gabriel Platts's*, or any man's else, that you would with speed publish them.

4th Defect is, we want a place to which men may resort to find such ingenious men, as may be serviceable for their ends and purposes; and also know where to find such seeds and plants as they desire, as the great *Clover-grass*, *Saint Foin*, *La Lucern*, &c.

5th Defect is, that men usually covet great quantities of land, yet can't manage a little well. There were among the ancient *Romans* some appointed to see that men till'd their lands as they should do, and if they did not, to punish them as enemies to the publick: perhaps such a law might not be amiss with us; for without doubt the publick suffers much by private men's negligence. I therefore wish men to take *Columel's* counsel; which is, *Laudato ingentia rura, exiguum colito*. For *melior est culta exiguitas*, &c. as another saith, or as we say in *English*, *A little Farm well till'd is to be preferr'd*: for then we should not see so much waste-land, but more industry, greater crops, and more people imploy'd than are at present, to the great profit of the common-wealth.

C H A P. XX.

The necessity of God's Blessing on the Husband-Man's Labour.

TH O' the Husbandman has been laborious and diligent in his calling these last years, yet our crops have been thin, our cattle swept away, and scarcity and famine hath seized on all parts of this land; and if we had not been supply'd from abroad, we had quite devour'd all the creatures of this island for our sustenance; and yet we could not be satisfied, but must have devour'd one another. And therefore to conclude, tho' I desire the Husbandman to be diligent and laborious in his calling, yet I counsel him to *break off his sins by repentance*, to have his eyes towards him who is the *Giver of every good thing*, and to pray daily to him for his blessings, who *giveth freely to them that ask*. And tho' all callings ought to look up to him that is *on high*, yet the country-man especially; for he hath a more immediate dependence on him than any other: for if the Lord withhold his *fat dew from Heaven*, or the *former or later rain*, it is in vain that the Husbandman rise up early and go to bed late, and eat the bread of *carefulness*: for we know, that it is the Lord that *maketh barren places fruitful*, and he likewise that *turns fruitful lands into barrenness*, (as the land of *Canaan*, which was very fruitful even in the time of the *Canaanites*, but now a barren desert;) and therefore I again desire the country-man to walk as it becomes a *Christian*, in all *sobriety, righteousness, and godliness*: not to
trust

trust to his confidence in his own labours and good husbandry; but on the Lord that hath made all things: for tho' even St. Paul himself doth plant, and Apollo doth water, yet it is only the Lord that giveth increase and plenty, which he will not deny to those that fear him; for they shall want nothing that is good.

And thus, Sir, I have written to you very largely my thoughts concerning the Husbandry of this island, and partly what I have seen in my travels. Good Sir, be not offended at my long and impertinent stories, my rude language, and unmethodical discourse. It was, if not to satisfy, yet somewhat to gratify the universal goodness of your spirit, and care of the publick, which God has enrich'd you withall. And these are only my first thoughts, which in haste I have huddled together. I hope (if the Lord send life and health) my second thoughts shall be better: but whatsoever I have done, pray look on it as coming from one who is desirous to serve you, and to advance the publick good, according to the talent the Lord hath given him. Thus I commit you to the protection of the Almighty: and rest,

S I R,

Your humble Servant,

Anno 1651.

R. WESTON.

F I N I S.

And thus, Sir, I have written to you very
happily, and thoughtfully, and with the
of this kind, which I have seen in
my travels. Good Sir, do not offend at my
loss of the French language, my trade language,
and unscientific discourse. It was, it is not to
satisfy, yet somewhat to gratify the universal
goodness of your heart, and care of the pub-
lic, which God has entrusted you withal. And
these are only my first thoughts, which in haste
I have jumbled together. I hope (if the Lord
send life and health) my second thoughts shall
be better: but whatsoever I have done, pray
look on it as coming from one who is desirous
to serve you, and to advance the publick good,
according to the talent the Lord hath given
him. I had committed you to the protection of
the Almighty: and tell me,

2 A R

John Smith Esq

June 1651

R. WESTON

F. I. W. I. S.







