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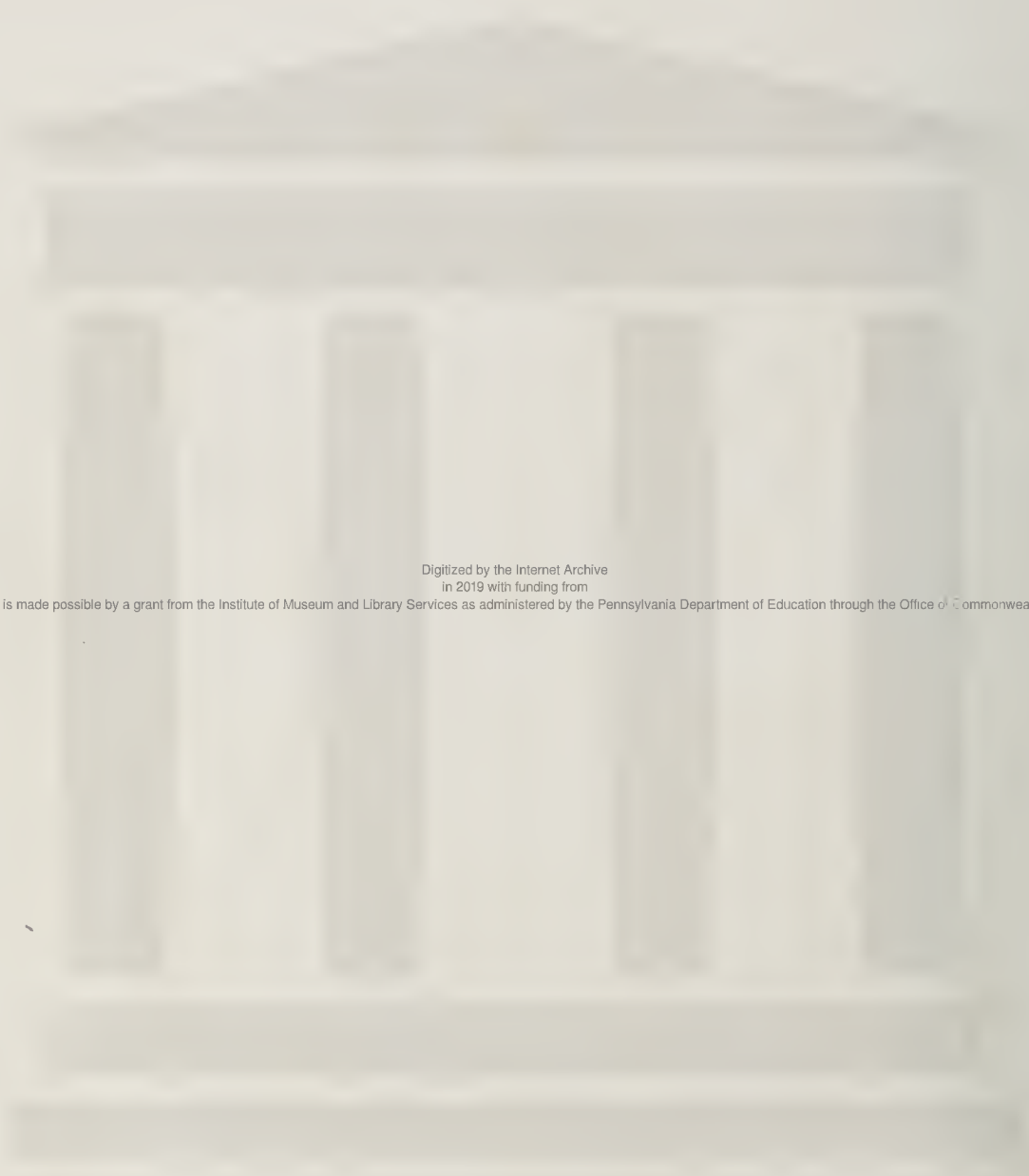
L. Junius Moderatus Columella



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L. JUNIUS MODERATUS COLUMELLA

OF

H U S B A N D R Y.

IN

T W E L V E B O O K S:

AND HIS

B O O K

CONCERNING

T R E E S.

Translated into *English*, with several Illustrations from
PLINY, CATO, VARRO, PALLADIUS, and other
antient and modern AUTHORS.

Ecclesiastes, Chap. V. Ver. 9. *The Profit of the Earth is for All; the King himself is served by the Field.*

Ecclesiasticus, Chap. VII. Ver. 15. *Hate not Husbandry, which the Most High hath ordained.*

Virg. Georg. Lib. I.

————— *Pater ipse colendi
Haud facilem esse viam voluit, primusque per artem
Movit agros, curis acuens mortalia corda.*

L O N D O N :

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IN

BR O O K

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T H E

P R E F A C E .

THE Art of Husbandry is so necessary for the support of human life, and the comfortable subsistence and happiness of mankind have so great a dependence upon it, that the wisest Men in all ages have ascribed its original to GOD, as the Inventor and Ordainer of it: and the wisest and most civilized Nations, who have best understood their true interest, have always endeavoured to promote and improve it; and have never failed to acknowledge, and honour, as public Benefactors, all such as contributed any thing towards the same. In antient times, nothing was more honourable than Pasturage and Tillage; for even Princes themselves did not then think them unworthy of their study and application.

WITHOUT entering into any detail of the gradual progress this Art seems to have made in the different ages of the world, it may be sufficient to observe, that, in proportion as either private Families, or Nations of Men, fixed themselves in settled habitations, and applied themselves to this necessary Art, they accordingly prospered, and increased in number and power; and that such as applied themselves the most assiduously to all the different branches thereof, always made the greatest figure in the world.

THE *Greeks* applied themselves very early to this study, and seem to have been great Proficients in it; to which, no doubt, the precepts of their wisest Men, who delighted therein, contributed very much. *Hesiod*, the most antient of their Poets, who lived above two centuries before the foundation of *Rome*, instructed not only the Men of his own times, but also succeeding generations; and many of his precepts of Husbandry have been preserved to this very day. Many other

learned Men also amongst them improved the knowledge and reputation of this Art to such a degree, that it was very early esteemed a most honourable employment, even not below Royal Majesty itself. Thus we see, that *Homer*, that Prince of Poets, who knew the dignity, decency, importance, and value of things more than any Man, in his beautiful description of *Achilles's* shield, contrived and curiously wrought by *Vulcan* himself, represents the King standing in a furrow, with his royal sceptre in his hand, over-seeing the Reapers cutting down the ripe corns, and greatly rejoicing in the fruit of his labours, and his servants preparing a dinner for them under an oak. And, no doubt, in after-times, that Art was brought by them to much greater perfection; for that inquisitive people borrowed knowledge of all their neighbours, and their wisest Men travelled in quest thereof, into all those countries where they had any expectation to find it.

THE *Greeks*, by their intercourse and communication with *Italy*, transmitted their knowledge and improvements into some parts of that delightful country: nevertheless it is very probable, that, for several centuries after the foundation of *Rome*, this Art made but very little progress among the *Romans*; nor were they much acquainted with that regular Culture practised in *Greece*, *Asia*, and other Eastern countries; but, in process of time, as they extended their dominions, and became acquainted with the neighbouring nations, their knowledge in this Art increased; and that wise and discerning people discovered the great and manifold advantages of Agriculture; its natural tendency, not only to secure against the calamities of famine, to which they had sometimes been exposed, but to prevent distempers, increase the number of their people, harden their bodies, and make them more robust, and able to endure the fatigues of a military life, when the service and interest of their country should require it; so that their greatest Men, their Generals, Senators, and gravest Philosophers, did all they could to encourage and promote it, not only by precept, but by their own example: and though, during the hurry and confusions of war, it met with great interruption, and advanced but slowly, and they could not carry it to that degree of perfection they desired; yet we see, that, in the midst of their triumphs, after they had subdued a rival Republic, they seem to have seriously considered the necessity of promoting it more effectually: And their Senate, that august assembly of disinterested Patriots, always intent upon promoting the public good, and far from thinking that they wanted no further instruction, ordered the twenty-eight books of *Mago*, a *Carthaginian* General, which he
had

had written upon this subject, to be translated into *Latin*; and, in this work, some Men of the greatest quality had a principal hand. And by this decree it appears, that the *Romans* were sensible, that, in point of Husbandry, the *Carthaginians* had greatly the advantage of them; which both *Varro* and *Columella* seem also to acknowledge, by calling *Mago* the *Parent of Husbandry*.

THE *Romans*, by extending their empire over all *Greece* and *Asia*, and opening a free communication with all those countries where Husbandry seems first to have flourished, made great improvements in this Art, and carried it to great perfection; and, as they extended their conquests northward and westward, they carried it along with them; and, at length, introduced it into this island, where, at their first arrival, they, no doubt, found it but very rude and imperfect.

WHAT contributed most to the propagation of this useful Art, was the great number of books, both in *Greek* and *Latin*, written upon this subject by Authors not only eminent for learning, but of exalted station and quality; some of which have been preserved to this day: and, as none of them have treated of it so copiously, in all its different branches, as *Columella*, who seems to have made it the study and the business of his whole life, and to have perused all the Authors that went before him, there is reason to think, that a translation of this polite Author into *English* will be looked upon rather as a work of some use and advantage, than of mere curiosity and amusement; especially if it be considered, that he has given us not only a complete system of the *Roman* Husbandry, but also a distinct account of the private œconomy of that wise and prudent people; for, by the many wise precepts and directions he gives, relating to this last, we may easily observe, what was their method in the management and government of their Families; which, if carefully imitated, as far as different circumstances will allow, might, even at this present time, contribute greatly to the interest and regular government of the greatest Families. Or even suppose no further advantage were to be expected from such a performance, but the gratification of our curiosity, which certainly is not the case; yet, even in this light, it is hoped, it will not be unacceptable to such as are not well acquainted with the original, and cannot otherwise have the satisfaction they may innocently desire; for, in matters of far less importance than most of the things here treated of, the politest Nations in *Europe* have always received kindly every attempt to make them acquainted with whatever had any relation to that great people; especially this Nation, in
which

which has been so long preserved that noble, generous, free, independent, and public spirit, which was once the glory of that Republic, before luxury, covetousness, and ambition, had corrupted Mens hearts.

IN *Italy, France, and Germany*, attempts have been made to translate this celebrated Author into their respective languages; whether any such attempt has been made in this kingdom, I know not: some bits and scraps, here-and-there, I have indeed seen in *English*; how much mangled, misrepresented, and misunderstood, in many instances, is obvious enough to such as are judges, and will be at the pains to consider them. To vindicate so polite an Author from any injustice of this nature, to perpetuate his memory, and make him more known and useful to the world, are motives sufficient enough to justify an attempt to give a full and just Translation. Whether these, or any other motives, have determined me to undertake this work, I believe nobody will think it worth their while to inquire. If I should say, it was a desire to profit and please the public, it would be received with deserved contempt, as the common pretence of the most frivolous undertakings: tho', perhaps, good-nature may be apt to think, that my not having levied contributions by subscriptions, but printed it at my own expence, is a strong presumption of the truth of such an assertion. What most concerns the Purchaser or Reader, if any vouchsafe to be such, is to know, whether the work be tolerably well done: this is humbly submitted to the judgment of such as understand the original: oversights, and mistakes in small matters, notwithstanding all the care taken to avoid them, probably there are many; but as to capital errors, in perverting the sense of the Author, in things essential, and of greater importance, it is hoped there are few. I have endeavoured to give his meaning in as plain and intelligible words as I could, without adding or diminishing; and have been scrupulously careful only to translate, and not to make a commentary, so that to some, it is probable, the Translation may appear rather to be too literal. I have been obliged to retain many original words, which cannot be rendered without a long circumlocution, there being no words in our language exactly answering to them; and, as these words often recur, the same circumlocutions would have been a blemish in the Translation: I therefore thought it better to give an explication of them apart by themselves, to which the Reader may have recourse, till they become familiar to him. Thus, for instance, *jugerum* was a common measure of land amongst the *Romans*, as an

Acre is amongst us ; but if it were translated by *Acre*, as is commonly done, it would give the Reader a false notion of the thing, because the English *Acre* is above one third larger than the Roman *jugerum*. Thus all their measures of capacity, both liquid and dry, as *culeus*, *amphora*, *urna*, *modius*, *congius*, *sextarius*, *hemina*, *cyathus*, *ligula*, &c. cannot be rendered by any names of measures in common use amongst us ; for none of them, from the greatest to the smallest, do exactly correspond : therefore it was necessary to retain them, and the Reader may easily satisfy himself, by turning to the short account I have given of them.

As the whole of this Translation stands in need of indulgence, so no part of it ought more humbly to deprecate the severity of the Critic, than that of the citations from *Virgil*, and of the Tenth Book, which is all in Hexameter verse. It would not have given any great satisfaction to have translated them into prose : therefore, that the whole might bear some resemblance to the original, I have endeavoured to render them into blank verse : but, as this is a province I am but very little acquainted with, I hope the defects of this performance will be overlooked ; seeing I have only endeavoured to express the meaning of the Author, without any pretended ornamental additions of my own, confining myself to his own thoughts, and rarely adding an epithet to fill up a line, but what naturally belongs to the subject, and is included in the text.

As to the explanatory Notes which I have added to the Translation, I know very well, that some of them will be regarded by many as mere puerilities, and little accounted of by such as are of a more delicate taste : but it ought to be considered, that this Translation is not at all designed for such as can readily make use of the original, and are acquainted with classical learning : to such, no doubt, both the Translation and the Notes will be but very insipid, and of no use at all ; but to such as are not of this character, yet have a desire to know something of the *Roman* Husbandry, and domestic Oeconomy, it is hoped the Notes will not be altogether useless and unacceptable : for, as the Author frequently makes mention both of persons, places, and things, which probably they have little or no notion of, it is reasonable to suppose, that a brief account of them will not be altogether disagreeable, since nothing more is intended, than, by these short and imperfect hints, to make the Translation more intelligible and agreeable to them. I have sometimes also taken notice of some different

readings, and doubtful phrases and words, in order to give occasion to some judicious person, who may cast an eye upon them, to make some attempt to rectify them.

I WAS not unacquainted with the difficulty of translating this Author, so as to give any tolerable satisfaction either to myself or others, and even with the impossibility of rendering into *English* many things mentioned by him, and of finding proper words in the vast variety of things which he treats of; and that learned Men are not at all agreed about the *English* names of several herbs, trees, shrubs, fishes, fowls, &c. which exactly answer to their *Greek* and *Latin* names: but, as this is no hindrance at all to the right understanding of the most essential things, and of the general rules and directions, and other things of the greatest importance, both in Husbandry and Oeconomy, I cannot think but it is better to have a Translation, with some imperfections of no great importance, than to have no Translation at all. In the names of herbs, trees, shrubs, &c. I have followed some of our best Authors, particularly the ingenious Mr. *Miller*, whose knowledge in these things is well known to the world: and, in the proportion that the *Roman* measures, both of length and capacity, bear to the *English*, and in some other things, I could not follow a safer guide than the learned Dr. *Arbutnot*. In the great variety of different readings of the Text, I have chosen what I thought the most probable; but, for the most part, I have followed that excellent edition published by the learned *Gesnerus*, Professor of Eloquence and Poetry at *Ottinghen*, whose vast labour, and judicious observations, have greatly contributed to make not only *Columella*, but the other *Roman* writers upon Husbandry, more intelligible, and to restore them to their original purity.

As to *Columella* himself, we can know very little of him, but what we gather from his own words in this Treatise: *Pliny* indeed, and *Palladius*, often mention him; and *Vegetius*, who, in his Treatise of Farriery, frequently borrows from him, commends his flowing eloquence; yet they give us no further account of him. It seems evident enough, that he was a Spaniard; for *lib. viii. cap. 16.* he intimates, that he was a Citizen of the municipal city of *Cadix, nostro Gadium municipio*. He several times makes mention of his uncle *Marcus Columella*, as a person of great note and distinction, and as having an estate in the Province of *Bætica*: probably he was born of Roman parents;

Parents; for, no doubt, many *Romans* settled in that delightful country.

It does not appear at what time he removed to *Rome*; but there is some reason to think, that it was in the reign of *Tiberius*, if not before; for he says in his Third Book, that he had possessed lands many years in the Territory of *Ardea*, and that he wrote his Eleventh Book at the desire of one *Claudius Augustalis*, a young man of some learning and distinction. That this *Claudius* is the same who was afterwards Emperor, cannot indeed be affirmed for certain; yet it is not altogether improbable: for *Tacitus* tells us, that *Tiberius* made him a Fellow of the College of Priests, which he had instituted in honour of *Augustus*: and I know no reason why he may not be the person mentioned by our Author, who, probably, would neither have been influenced by him to write the said Book, nor would he have given him so honourably a character, if he had not been of superior rank; and the character given is, according to *Suetonius*, applicable to *Claudius* in his younger years. He speaks of *Cornelius Celsus* and *Julius Atticus*, as Men of his own time; and it is certain the first flourished in the reign of *Tiberius*. He several times makes mention of *Julius Græcinus*, without any intimation of the hard fate of that good Man, who was put to death by the Emperor *Caligula*; so that there is some reason to think, that he was living when *Columella* wrote. If what is above said be true, then he wrote a part of this Treatise in the reigns of *Tiberius* and *Caligula*.

In his Third Book he mentions *Annæus Seneca* as then living, and commends him for his great learning; but says nothing of his being advanced to the dignity of a Senator, nor of his being entrusted by *Claudius* with the education of *Nero* his adopted Son and Successor; which, probably, he would have taken some notice of, if *Seneca* had been then promoted to these dignities: so that it is reasonable to think, that he wrote this Book, at least, some time before this happened; probably in the first years of the reign of *Claudius*, who, in the seventh or eighth year thereof, adopted *Nero*, and committed him to the care of *Seneca*, the said *Nero* being then eleven or twelve years of age; and *Claudius* dying five or six years after, *Nero* succeeded, being only seventeen years old, according to *Suetonius*, and, as *Eusebius* says, in the year of our Lord 55. at which time, it is probable, *Columella* had finished his whole work. There is only one thing

which may give reason to think, that it was some time after this before he finished it; viz. in his First Book, *cap. 7.* he makes mention of *L. Volusius*, a very old rich Man, of Consular dignity; and his words seem to intimate, that he was then dead. But *Tacitus* says, that this *Volusius* died aged ninety-seven, in the 809th year of *Rome*, which was the 56th year of our Lord. If *Columella's* words must be so understood as to signify, that *Volusius* was dead when he spoke of him, then we must conclude, that it was some time after this before he published his work; but it was in *Seneca's* life-time, who was put to death by *Nero*, *Anno Domini 65.* Notwithstanding all that has been said, the precise time, either of his writing or publishing it, cannot be determined. I doubt not he employed many years about it, and wrote some parts of it in all the reigns above-mentioned; and that he did not write all the Books in the order they are now placed, several of them having no dependence on the foregoing; and that a great part of the First Book, being a Preface to the whole, was written last of all. However, it is evident enough, that he wrote in *Rome*, or in some part of *Latium*, by his manner of expression sometimes in mentioning these places.

THIS Treatise of Husbandry consists of Twelve Books, in which he has touched upon such a vast variety of things, and explained all the different branches of the Art with such perspicuity, and delivered his precepts with so great judgment, as show him to have been perfectly master of his subject; and, throughout the whole, there are so many evidences of his having been so well acquainted with all the different parts of learning; and that he had so carefully examined all the Authors, both *Greek* and *Latin*, that had treated of the same subject before his own time; and that to his theory he had added his own experience; as give us abundant reason to think, that no Man could ever have been better qualified to undertake such a work: so that the character he gives to *Marcus Columella*, his uncle, may very justly be applied to himself, *Vir acris ingenii, & omnibus disciplinis instructus, illustrisque Agricola*; having, to all his other opportunities of improvement in knowledge and experience, added that of travelling into foreign countries; for he tells us, that he had been in *Syria* and *Cilicia*; and it is not probable, that a Man of his character would pass by *Greece* without visiting it. All these Twelve Books he inscribes to one *Publius Silvinus*, of whom he gives us no particular account; only insinuates, that, at his desire and request, he had undertaken

undertaken and carried on the said work. We may reasonably think, that this *Silvinus* was a person of some considerable note and distinction, by the respectful manner in which he always addresses himself to him; and, as *Columella* mentions some lands that they both had amongst the *Ceretani*, a people in *Spain*, it is not improbable, that he also was a *Spaniard*.

BESIDES these Twelve Books, inscribed to *Silvinus*, there is a Book concerning Trees, wherein there is no mention made of him. This single Book appears to be a part of a former Essay of *Columella's* upon Husbandry; for, in the very beginning, there is mention made of a preceding Book concerning the Culture of Lands. What seems most probable is, that *Columella* having at first written more briefly upon this subject, it was so well received, that, at the pressing desire of his friends, he enlarged it, and put it into a new form, as we have it now, in Twelve Books; which being a complete System of Husbandry, his first Essay came to be less used, as being less perfect, and afterwards a part of it was lost: this some Transcribers, and the first Editors, not having considered, placed it as the Third Book of his Husbandry; which confounded the order of the whole, as has been more fully taken notice of in the Note annexed to this single Book.

COLUMELLA wrote upon several other subjects besides Husbandry. He tells us, *lib. xi. cap. i.* that he had written against Astrologers; not those who only observed the motions of the heavenly bodies, and made conjectures of what probably might, or commonly did, happen before, or after, or at the rising and setting of certain Stars; but such as he calls *Chaldæans*, who vainly pretended to foretel, with certainty, what alterations would happen in the air and weather, upon such and such days, &c. He also had formed a design to write of the Lustrations and Sacrifices in use among the Antients, for preserving the fruits of the ground, &c. But, whether he ever finished this work, is very uncertain; and I do not find, that any other thing, besides his Husbandry, has been preserved to our days. He was a great admirer of *Virgil*, and cites him upon many occasions; but seldom without some epithet or other, expressive of the great veneration and regard he had for him, and of the deference he paid to his judgment. He seems not only to have been a great lover of Poetry, but also no mean Poet himself; of which he has given

sufficient evidence in his Tenth Book, which, he says, he wrote in verse, not only to gratify *Silvinus*, but also in obedience to *Virgil*, who recommended that subject to the care of some future Poet: and, considering the nature and difficulty thereof, he has succeeded very well. He has not, indeed, greatly embellished his Poem with many new poetical conceits of his own, but he has introduced into it several old fabulous stories, and applied them dextrously enough to his own purpose: but, as his business was rather to instruct than to amuse, it is rather an advantage than a blemish to it, that it consists more of brief descriptions, and of plain directions and precepts, than of fictions; his expression, for the most part, being both poetical, natural, and agreeable enough.

HIS style, in the opinion of all good judges, is exceeding polite and elegant: and though the subject he treats of, and the persons for whose use he principally wrote, did not allow any great display of eloquence; yet, upon all occasions, he has so easy and natural a way of expressing himself; and, in different places, uses such a vast variety of words and phrases to express one and the same thing (which by no means darken, but greatly illustrate the subject); and in the beginning and conclusion of several of his Books, and in some other places of his work, he has given such remarkable instances of his eloquence, that he may very justly be reckoned amongst the most polite *Roman* writers; and, if he had applied himself to that study, he would, no doubt, have been ranked among the most eloquent Orators.

HE sometimes seems to recommend to Husbandmen some practices, which seem rather to be mere superstitious customs, than to have any foundation in Nature: but, as such things frequently occur in the best *Roman* Authors, and as the manner in which he mentions them shows that he laid no stress upon them, but rather reported them as things in common practice; these small deformities ought not to make any abatement of our value and esteem: for it must be said, that there are few antient Authors so much exempted from superstitious and groundless prejudices as *Columella*, who seems to have been a declared enemy to that sort of Men, who contributed most to establish and cherish them.

IT is very remarkable, that in no part of his work he has given us the least intimation, under whose administration public affairs then were, nor under whose Consulship he lived when he wrote any part of it; nor does he make the least reflection upon the state of public affairs; which shows his extreme caution, and the difficulty of the times he lived in: but he has not used so much reserve with respect to the temper and disposition, and the moral character, of the generality of mankind at the time he wrote; for he tells us very plainly, that the antient frugality, parsimony, temperance, moderation, and industry, were no more in fashion, yea, in a great measure, extinct and gone; and that unbounded luxury, ambition, covetousness, intemperance, and idleness, had succeeded in their room; that open robberies and depredations were carried on, even in the place of justice itself, by calumniating and accusing the innocent rich Man, in order to get possession of his estate: that the eloquent tongue, formerly employed in defence of the innocent and oppressed, was become mercenary and venal, and exerted itself in the defence and support of the guilty: that Men of estates, who formerly resided much in the country, governed their own families, and managed their own affairs, had committed the management of all to Bailiffs and Stewards, and had, in a great measure, deserted the country, and lived in town, abandoning themselves wholly to the pleasures and diversions of the same: that their Wives, not, as formerly, striving to excel in all parts of Housewifery, and taking upon themselves the whole burden of domestic affairs within-doors, were become so delicate, and such lovers of the town, that they could not endure to pass a few weeks in the country, and thought it greatly below themselves to cast their eyes upon the instruments of Husbandry; that, instead of manufacturing wool and flax at home for their own and their family's use, as the celebrated *Roman* Matrons were formerly wont to do, they could not endure home-made clothes, but, by flattering caresses, obtained of their Husbands such as were more costly; to purchase which, they often expended almost their whole yearly income: that Men, by their dissolute and intemperate living, and perverting the natural order of things, by turning night into day, and day into night, had so dissipated and wasted their natural strength, and their bodies were so enervated, that they were almost dead while alive, and death seemed to make no great alteration upon them, so that they soon became useless both to themselves, and to their country:

that

that many chose rather, by servile attendance, vain expectations, and fruitless solicitations, to consume their time, and their substance, than, by carefully improving and cultivating their paternal inheritance, raise for themselves a comfortable and honourable subsistence and revenue, free from all abject and slavish dependency. This shameful degeneracy from the virtue of their Ancestors, and general corruption of manners, at length proved fatal to the *Roman* state; and, generally speaking, the same causes produce the same effects.

T H E

C O N T E N T S.

B O O K F I R S T.

- Chap. I. **O**F the Rules which they who would live in the Country, and apply themselves to Husbandry, ought to follow.
- II. Of the most approved Situation and Qualities of Land.
- III. Of such Things as are principally to be considered, in viewing and examining Land before it be bought.
- IV. Of the Wholsomeness of Countries.
- V. Of Water...
- VI. Of the Position and Disposition of a Manor-house.
- VII. Of the Offices of a Master of a Family.
- VIII. Of Cattle, and of Herdsmen and Shepherds, and such as have the Oversight of Cattle.
- IX. Of what Size, and Plight of Body, the Slaves must be, which are to be assigned to every particular Work.

B O O K S E C O N D.

- Chap. I. That the Earth neither grows old, nor wears out, if it be dunged.
- II. Of the several Kinds of Land.
- III. Of the Care that is to be taken of Oxen when they are unyoked.
- IV. Of the Time of the Year when, and how Lands must be plowed.

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- Chap. V. *Of the Manner of dunging lean, thin Land.*
VI. *Of the several Sorts of Seeds.*
VII. *Of the several Sorts of Pulse.*
VIII. *Of the proper Time for Sowing.*
IX. *How many Modii of Seed a Jugerum of Land requires; and of the Cure of Seeds.*
X. *Of the proper Soil for every Kind of Pulse.*
XI. *Of the several Sorts of Fodder, of Medic or Lucern, Vetches or Tares, Miscelline, Oats, Fenugreek, the bitter Vetch, and the Chickpease.*
XII. *After what Manner, and with what Number of Labourers, each Sort of Corn and Pulse may be cultivated.*
XIII. *How many Day-Labourers may be assigned to every Sort of Land, in Proportion to the Extent of it, and to the Manner of cultivating it.*
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XVI. *At what Times Lands must be dunged.*
XVII. *After what Manner arable Lands may be reduced into Meadows.*
XVIII. *After what Manner Meadows, when they are made, must be cultivated.*
XIX. *After what Manner Hay ought to be managed, when it is cut down; and how it ought to be laid up.*
XX. *Of making and putting a Threshing-floor into due Order.*
XXI. *Of reaping Corns, and of threshing them.*
XXII. *What Things an Husbandman may lawfully do upon Holidays, and what not.*

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II. *What Vines must be planted for Food in Lands near the City.*
III. *That there is nothing of greater Advantage, and more expedient for Husbandmen, than to cultivate Vineyards.*
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- Chap. V. *In what Sort of Ground, and after what Manner a Nursery of Vines must be planted.*
- VI. *What Sort of Shoot or Cutting must be chosen, and from what Parts of the Vine it must be gathered.*
- VII. *How you may know and discover the Fruitfulness of a Vine.*
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- IX. *How you may make Aminean Vines fruitful.*
- X. *From what Part of the Vine the Plants must be chosen.*
- XI. *What Qualities you must have regard to in that Ground which you destine for Vineyards.*
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- XVI. *What Measure or Quantity of pastinated Ground may be sufficient for Vineyards.*
- XVII. *After what Manner, and at what Time a Vine is to be planted.*
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- XIX. *How long the Cutting ought to be.*
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A BRIEF EXPLICATION of a few Original Words retained
in this Translation.

Jugerum, a superficial measure of land among the *Romans*, consisting of 28800 *Roman* feet, which make ^{Engl. Feet. Dec.} 27849, 60. See a further account of it *lib. v. cap. 1.*

Modius, a dry measure of capacity, which contained a little more than a *Winchester* peck. See it further explained *page 64.*

Ligula signified at first a spoon, but was afterwards used as a measure, and is the smallest mentioned by *Columella*, and very little more than the 48th part of a pint.

Cyathus, a measure of liquid things: it contained 4 *ligulae*, and was a little more than the 12th part of a pint.

Hemina contained 24 *ligulae*, or six *cyathi*, and was a little more than half a pint.

Sextarius, a measure both of liquid and dry things: it contained two *heminae*, 12 *cyathi*, or 48 *ligulae*: it made a little more than a wine-pint; and it was so called, because it was the sixth part of the *congius*.

Urna, a measure of liquid things, which contained 24 *sextarii*, and amounted, in *English* measure, to 3 gallons 4 $\frac{1}{2}$ pints, and a small fraction more.

Amphora, contained 2 *urnae*, or 48 *sextarii*, amounting, in *English* measure, to 7 gallons, one pint, and a small fraction of a pint: it was also a measure of liquid things.

Culleus or *culeus*, the greatest measure of liquid things among the *Romans*: it contained 20 *amphorae*, in *English* measure 143 gallons, 3 pints, and a small fraction. See a more distinct account of these larger measures in *page 118.*

Sestertius, a *Roman* coin, of the value of two *asses* and a half; four of them made a *denarius*, which, by the best judges, is computed to be worth 7 d. $\frac{3}{4}$. *English* money. See a further account of it in *page 119.*

To *ablaqueate*, is to dig round a vine, or any other tree, in order to lay its roots bare, and expose them to the Sun, Wind, and Rain, and to cut off the superfluous roots, &c. See *page 168.*

To *pampinate*, is to strike off the superfluous shoots and twigs of vines, in order to make them more able to nourish their fruit, &c. See *page 196.*

To *sarcle*, or *sarculate*, is to move the surface of the ground hardened by the Sun, &c. in order to make it imbibe the Rain, and admit the warmth of the Sun, that so what grows upon it may thrive the better.

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L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

B O O K F I R S T.

The PREFACE. To PUBLIUS SILVINUS.

Ifrequently hear the principal men of our city blaming, sometimes the unfruitfulness of the ground, at other times the intemperateness of the weather, as hurtful to the fruits of the earth for many ages now past: some also I hear mitigating, in some measure, as it were, the foresaid complaints, because they are of opinion, that the ground, being, by its overmuch fruitfulness during the former part of its duration, become barren, and worn out of heart, is not now able, with its wonted bounty, to afford sustenance to mortals. Which causes, *Publius Silvinus*, I am fully persuaded, are very remote from the truth; because it is neither lawful to think, that the nature of the ground, which that original Former and Father of the universe endowed with perpetual fecundity, is affected with barrenness, as with a certain disease; nor does it become a wise man to believe, that the earth, which, having a divine and everlasting youth bestowed upon it, is called the *common parent* of all things, because it has always brought forth, and will henceforth bring forth, all things whatsoever, is grown old, like a woman.

B

(1) Nor,

(1) Nor, after all, do I think, that these things befall us from the distemperature of the weather ; but rather from our own fault, who commit our Husbandry to the very worst of our servants, as a criminal to a public executioner, which all the best of our ancestors were wont to treat with the greatest gentleness : and I cannot enough wonder, why they, who desire to learn eloquence, are so nice in their choice of an orator, whose eloquence they may imitate ; and they, who search after the knowledge of surveying or mensuration, and of numbers, look out for a master of the art they delight in ; and they, who are desirous of some skill in dancing and music, are exceeding scrupulous in their choice of one to modulate their voice, and teach them to sing agreeably ; and no less of a dancing-master, to regulate the gestures and motions of their body ; also they, who have a mind to build, send for architects, masons, and carpenters ; and they, who resolve to send ships to sea, send for skilful pilots ; they, who make preparations for war, call for men, who understand the art of war, and are acquainted with military affairs ; and, not to mention every particular, in that study which every one resolves to prosecute, he makes use of the wisest and ablest director he can find ; finally, every one sends for a person from the society and assembly of the wise, to form his mind, and instruct him in the precepts of virtue : but Husbandry alone, which, without all doubt, is next to, and, as it were, near akin to wisdom, is in want of both masters and scholars. For hitherto I have not only heard, that there are, but I myself have seen, schools of professors of Rhetoric, and, as I have already said, of Geometry, and of Music ; or, which is more to be wondered at, academies for the most contemptible vices, for delicately dressing and seasoning of victuals, for contriving and making up dainty and costly dishes for promoting gluttony and luxury ; and I have also seen head-dressers and hair-trimmers ; but, of Agriculture, I have never known any that professed themselves either teachers or students.

For, even suppose the city should want professors of the foresaid arts, nevertheless the commonwealth might be in a very flourishing condition, as in antient times ; for, of old, cities were happy enough, and will hereafter still be so, without ludicrous arts, yea, even without

(1) *Pliny*, in his *Natural History*, lib. 18. cap. 2. says, that the cause of the former plenty was, that the ground was at first cultivated by the hands of Generals, Consuls, Tribunes, and Senators ; but afterwards by Slaves, Criminals, and Malefactors, who bore upon their bodies the marks of their infamy, and did not cultivate it so carefully as those men of honour and virtue did.

advocates also (2) : but without Husbandmen, it is manifest, that mortals can neither subsist, nor be maintained. For which reason, what is come to pass, is the more like a prodigy, that a thing so necessary and convenient for our bodies, and the advantages of life, should, to this very time, of all things whatsoever; have had the least consummation; and that this perfectly innocent way of enlarging and preserving one's patrimony should be despised. For those other different, and, as it were, repugnant ways of doing this, are contrary and disagreeable to justice; unless we think it more agreeable to equity to have acquired booty by a military profession, which brings us nothing without blood and slaughter, and the ruin and destruction of others. Or, to such as hate war, can the hazard, uncertainty, and danger of the sea, and of trade, be more desirable? That *Man*, a terrestrial animal, breaking through the boundary and law of nature, and exposing himself to the rage of the winds and sea, should dare to commit himself to the waves, and, after the manner of the fowls of the air, always a stranger upon a far distant and foreign shore, wander over the unknown world? Or is usury, which is odious, even to those whom it seems to relieve, more to be approved? Or is, forsooth, that canine study and employment, as the antients called it, of snarling, and barking at, and slanderously accusing every man of the greatest substance; and that open robbery of pleading against the innocent, and for the guilty, which was neglected and despised by our ancestors, but even permitted and allowed of by us within the walls, and

(2) *Causidicus*, an appellation not very honourable amongst the *Romans*. *Quintilian*, in his *Institutions*, lib. 2. avoiding harsher terms, calls him *vocem mercenariam, inutilem litium advocatum*, a mercenary tongue, a promoter of law-suits, a wrangling advocate. Our author seems to have had men of this character in great contempt, who employed their eloquence either in pleading for the notoriously wicked, or against innocent persons. If the word *Causidic* were as well known as the word *Advocate*, it would be more expressive of the thing.

In our author's days, the *Romans* had lost their liberty, and were under a very tyrannical government; and, no doubt, many of them, being greatly dissatisfied with their present state, by their murmurings, and otherwise, made themselves obnoxious to the displeasure and resentment of their oppressors, who, by proscriptions, endeavoured to destroy all they suspected to be their enemies; and many of the orators of those days became informers and accusers; and, it seems, always pitched upon the richest, with a view to a share of the plunder. It is this *canine* eloquence, as they called it, which our author censures: *eloquence* employed in defence of innocence, and against the guilty, in support of truth against falsehood and calumny, and especially in directing the public counsels, appeasing popular commotions, and correcting public errors, is a divine endowment; in all ages had in the greatest reputation by the wisest nations, and justly promoted to the greatest honours: otherwise it is a very dangerous talent, especially in countries where haranguing and pleading at the bar is much in use, if the judges are not very sharp-sighted, to discern true reason from sophistry.

in the very *Forum* itself (3), more excellent and honourable? Or, should I reckon more honest and honourable, the most deceitful, lying, and beggarly hawking of a mercenary levee-haunter, who is constantly flying about from the threshold of one great man in power to that of another, and guessing, by the report of others, whether his patron is awake, or not? Nor, indeed, do the servants vouchsafe to answer him, when he asks what is a doing within-doors: or, should I think it more fortunate, after having met with a repulse from the porter with his chains upon him, to loiter and hang about the ungrateful and hateful doors, oft-times till it be late at night, and, by a most mean and pitiful servitude and attendance, purchase with disgrace the honour of the *Fasces* (4), or a government, or a command in the army or navy, and, after all, squander away one's own patrimony? For honour is not bestowed, as a reward, upon disinterested service and attendance, but upon such as make presents, and give bribes.

Now, if all good men ought to avoid these very things, and others like to them, there is still remaining, as I said, one way of increasing one's substance, worthy of a freeman, and a gentleman; which arises from Husbandry, of which if the precepts were put in practice, suppose it were but imprudently, by such as have not been instructed in it, provided nevertheless they were possessors and proprietors of the lands, which they cultivate, as was the antient custom, rural affairs would suffer less damage; for the industry and diligence of the masters, would, in many things, compensate the loss occasioned by ignorance; and they, whose own interest lay at stake, would not appear to be all their life-time willingly ignorant of their own business; but thereby becoming more desirous of learning, would attain to a thorough knowledge of Husbandry.

Now we disdain, and think it below us, to live upon, and cultivate our own lands ourselves, and look upon it as a matter of no moment, to make choice of a man of the best sense and skill we can find, for our Bailiff; or, if he be ignorant, at least, of a man of vigour, vigilance, and activity, that he may learn the more speedily what he is ignorant of. But, whether he be a rich man that purchases a piece of ground, he picks, out of his crew of footmen and chairmen, one that is the feeblest, and the most worn out with years, and banishes

(3) *Forum* signifies the building, or place, where public courts of justice were held; and matters of judgment pleaded and decided; or the court of justice itself.

(4) *Fasces* were the public ensigns of magistracy among the *Romans*, being a bundle of rods, with an ax, tied together, and carried before the magistrate.

him into the country : whereas that business requires, not only knowledge, but green age, and strength of body, to bear labour and fatigue : or if he be master of a middling estate, he commands one of his hirelings, who now refuses to pay that daily tribute of service required of him, and cannot thereby increase his income, to be director and overseer, who is ignorant of the business he is to have the oversight of (5). Which things when I observe, frequently considering and revolving in my mind, with how base and shameful an agreement and consent rural discipline is deserted, and worn out of use, I am in dread, lest it should be accounted villainous, and, in some measure, shameful and dishonourable, for free-born men. But when, by the records and writings of many authors, I am put in mind, that our worthy ancestors looked upon it as their glory, to take care of their rural affairs, and to employ themselves in Husbandry, from which (6) *Quintus Cincinnatus* came, and rescued the besieged Consul and his army, being called from the plough to the Dictatorship; and again, having laid down the *Fasces*, which, *when a Conqueror*, he more hastily surrendered, than he had assumed them when he was made *General*, he returned to the same steers, and his small manor of four *jugera* of land, left him by his ancestors (7) : and *Caius Fabricius* also, and

(5) *Ex mercenariis, aliquem jam recusantem, quotidianum illud tributum*, there seems to be something wanting in this sentence, to make it more intelligible, which I cannot pretend to supply : the intention of it must either be what I have expressed, or perhaps it may signify, that one of the hired servants, who refuses to serve for common wages, is promoted to the office of a Bailiff.

(6) *Quintus Cincinnatus* was made Dictator during the Consulship of *L. Minutius Carbetus*, and *C. Nautius Rutilus III.* Anno 296. from the building of *Rome*. The messenger from the Senate found him ploughing his four *jugera* of land, which he had in the *Vatican*, and which, from him, were called the *Quintian Meadows*. It is said, he was naked, and all covered over with sweat and dust. The occasion of his being chosen Dictator, was, because the Consul *Minutius*, and his army, were besieged in their camp by the enemy, and were in danger of being made prisoners of war. This story is elegantly told by *Livy*, dec. I. lib. 3, who says, it is worth their while to hear it, who despise all human things, in comparison of riches ; and think, that there can be no place, either for great honour, or for valour and virtue, but where there is great affluence of riches.

(7) *Columella* calls these four *jugera* of land, his *prædiolum avitum*, as if they came to him from his ancestors ; which is contrary to what *Festus* says, viz. *That the Quintian Meadows were so called, from Quintus Cincinnatus, because, after his Son was condemned, he sold all that he had, and purchased four jugera of land beyond the Tyber.* They made near two *English* acres and a half.

The *jugerum*, which many of our *English* translators render *Acre*, was much smaller than the *English* acre ; and it only imposes upon the reader, and gives him a false idea of this measure, to translate it thus ; so that I think it better to retain the original word, and give an explication of it in a note, than, by translating it *Acre*, convey a false notion to the mind of the reader.

and *Curius Dentatus* (8) ; the one, after having driven *Pyrrhus* (9) out of the confines of *Italy* ; and the other, after he had subdued the *Sabines*, did no less industriously cultivate, than they had bravely gained with their swords, their dividend of seven *jugera* of land a man, which they received of the land they had taken from the enemy.

And that I may not now unseasonably make mention of them one by one, when I behold so many other renowned and memorable Captains of the *Roman* nation, who were always in great reputation for this twofold study ; either of defending, or of cultivating, their paternal or acquired estates ; I perceive, that the antient custom, manners, and manly life of our ancestors, are disagreeable to our luxury, and voluptuous delicacy. For (as *Marcus Varro* (10) formerly complained in our grandfathers times) *all we, who are masters of families, having abandoned the pruning-hook, and the plough, have, in a sneaking manner, crept within the walls ; and rather move our hands in the Circus (11) and Theatres, than in our corn fields and vineyards :* and with astonishment we admire the postures of effeminate wretches ; because, by their woman-like motions, they counterfeit

The *Roman jugerum*, as our author informs us, consisted of 28,800 square feet, whereas the *English* acre consists of 43,560 square feet, which is about a *Roman jugerum* and a half ; and, according to the nearest computation, the *jugerum* consists of 2 roods, 18 square poles, 250,05 square feet ; and the proportion it bears to the *acre*, is very near as 10 to 16 ; and the *Roman* foot, according to the *English* standard, is 11,604 inches.

(8) *Curius Dentatus*, *an. urb.* 479. conquered *Pyrrhus*, and drove him out of *Italy*, and triumphed over him. *Plin. Nat. Hist. lib. 8. cap. 16.* *Florus, de Bello Tarentino* describes this war, victory, and triumph, very elegantly ; and, *lib. 1. cap. 18.* says, that, *Curius* preferred his own earthen ware to all the gold of the *Samnites* ; and that *Fabricius* rejected the offers of *Pyrrhus*, who would have made him Partner in the Government, if he would have betrayed his country. *Pliny* says, that they had but one saltfeller, and the bottom of it was of wood.

Fabricius, when Censor, removed *Ruffinus*, a man of consular dignity, from the Senate, because he had ten pounds of plate, judging it great luxury ; and forbid the most warlike Generals to have more silver plate than one goblet, and a saltfeller. In those days, the Generals baggage cost the public very little, and was no great incumbrance to the army. *Plin. Nat. Hist. lib. 23. cap. 12.* *Val. Max. lib. 4. cap. 3.* The seven *jugera* these two Generals possessed, amounted to $4\frac{2}{3}$ *English* acres.

(9) *Pyrrhus*, King of *Epirus*, was called by the *Tarentinians* to their assistance against the *Romans* : he fought with them several times very successfully, and reduced them to very great danger.

(10) *Marcus Terentius Varro* has these words in his second book of Husbandry : he was a famous philosopher and historian, and reckoned the most learned man among the *Romans*. Besides his books *de Re Rustica, et de Lingua Latina*, which are still extant, he wrote forty-one books of Antiquities, and several other tracts mentioned by several authors. He lived a few years before *Cicero*.

(11) The *Circus's* were places set apart by the *Romans*, for the celebration of several sorts of games, generally of an oblong figure, walled round, with ranges of seats for the conveniency of the spectators.

a sex which nature has denied to men ; and deceive the eyes of the spectators. Then, presently after, that we may come in good plight to public places of riot and debauchery, we consume and dry up our daily crudities in bagnio's ; and, by sweating out the moisture of our bodies, we endeavour to procure an appetite for drinking ; and spend the nights in libidinous gratifications and drunkenness, and the days in gaming, or sleeping ; and account ourselves happy, because we neither see the rising nor the setting of the sun. Therefore the consequence of this idle and slothful way of living is *bad health* : for thus the bodies of young men are so unbraced, relaxed, and enfeebled, that *death* will not seem to make any alteration or change in them.

But, verily, that true and genuine progeny of *Romulus*, being constantly exercised in, and inured to hunting, and no less to country business and labour, excelled in, and were highly esteemed for their exceeding great strength and firmness of body ; and, when the service of their country required it, in time of war, they easily supported the fatigues of a military life, being hardened by their laborious exercises in times of peace ; and they always preferred the country commonalty, to that of the city. For, as they, who still kept within the inclosures of the manor-house, were accounted more slothful and faint-hearted, than those who laboured the ground without doors ; so they who fauntered, and spent their time idly within the walls, under the shade of the city, were looked upon as more lazy and unactive, than those who cultivated the fields, and managed business relating to Husbandry. It is also evident, that their ninth-day Fairs or Markets (12), where they assembled themselves together, were established, and kept up, for this very purpose, that city affairs might be transacted every ninth day only, and rural affairs on the other days. For, in those times, as we said before, the people of quality, and principal men of the city, lived in the country, upon their own lands ; and when their advice about public affairs was wanted, they were sent for from their villas, to attend the Senate ; from which thing, they who were sent to summon them were called *viatores* (13) ; and while this custom was observed, and kept up,

(12) There was a Fair or Market at *Rome* every ninth day, for the country people to meet and sell their goods, and transact other business in town ; so that their *Nandinae* were not idle days, but appointed for business.

(13) *Viatores* : It seems by their first institution they were to be sent by the Senate to the country, to summon such as lived there, to attend the public service, and to conduct them to town : afterwards they were a sort of Beadles, or Sergeants, who went before the Tribunes of the people, and some other officers of lesser dignity.

by a most persevering desire of cultivating their lands, those antient *Sabines* (14), who became citizens of *Rome*; and our old *Roman* ancestors, tho' exposed on every hand to fire and sword, and to have their corns, and other fruits of the ground, wasted by hostile incursions, notwithstanding, laid up greater store of them, than we, who, by the permission of a long-continued peace, have had it in our power to enlarge and improve our Husbandry.

Therefore things are now come to such a pass, that in this *Latium* (15) and country where *Saturn* lived, where the gods taught their own children the art of cultivating the ground; even there we let, by public auction (16), the importation of corn from our provinces beyond sea, that we may not be exposed to a famine; and we lay in our stores of fruits and wines from the *Cyclad* islands (17), and from the regions of *Bætica* (18) and *Gaul*. Nor is it any wonder, seeing the vulgar opinion is now publicly entertained and established, that Husbandry is a sordid employment; and that it is a business

(14) The *Sabines* were a people of *Italy*, not far from *Rome*; they occupied the country that lies between *Umbria*, *Hetruria*, and *Latium*; between the rivers *Anien*, *Tiber*, *Nar*, and *Velino*: A great part of that country still retains its antient name. By a peace concluded with the *Romans*, the two people became united, and many of the chief *Sabine* families removed to *Rome*.

(15) *Latium*, a country of *Italy*, a great part of it now called *Campagna di Roma*: here *Saturn* retired, and concealed himself, when he was driven out of *Crete*, by his son *Jupiter*. And here, probably, *Saturn* afterwards reigned, as in some other contiguous parts, which from him were called *Terra Saturnia*.

(16) *Locamus ad hastam*. A spear was a sign and badge of power and authority amongst the antients, and used upon several occasions; and at all auctions public and private, it was set up to signify, that they were done by a lawful commission. *Ad hastam* & *sub hasta vendere, locare*, signify the same thing. When *Rome* became exceeding populous, they were obliged to import corn and wine from foreign parts; and tho' at first, probably, it was imported at the public charge, yet, afterwards, when the public advantage was not so much regarded, as the raising of money for supporting the power of the Emperors, certain undertakers paid a certain sum for liberty to import it, and sell it at a certain price, as may be gathered from *Suetonius* and others. The provinces commonly paid a certain quantity of corn, among other things, as a tribute, viz. the tenth part of their crop; and sometimes they were obliged to furnish a certain quantity of corn, at such a price as the Government thought fit: all this was to be brought to *Rome* at a great expence, for which there would not have been a very great demand, if they had cultivated their lands as they did formerly.

(17) *Cyclades*, islands in the *Ægean* sea, so called, as *Pliny* says in his *Nat. Hist. lib. 4. cap. 12.* from their lying round *Delos* in a circular figure: they are, according to him, fifty in number: He there gives an account of their extent, and distances from each other: they are now called *the Islands of the Archipelago*.

(18) *Bætica*, a part of *Spain*, containing *Andalusia*, and a great part of *Grenada*: it is the fertilest part of all *Spain*: it has its name from the river *Bætis*, which runs thro' the middle of it. *Pliny* says, that it excelled all other countries in the richness of its soil, goodness of its culture, and in a certain gaiety and agreeableness peculiar to itself. This river is now called the *Guadalquivir*.

which

which does not want the instruction of a master. But as for myself, when I consider and review, either the greatness of the whole thing, resembling some vastly extended body ; or the number of its parts, as so many members in particular ; I am afraid, lest my last day should surprize me, before I can acquaint myself with the whole of rural discipline.

For he that would profess himself to be perfect in this science, must be exceedingly well acquainted with the nature of things ; must not be ignorant of the several latitudes of the world ; that he may be sure of what is agreeable, or what is repugnant, to every climate ; that he may perfectly remember the time of the rising and setting of the stars, that he may not begin his works when winds and rains are coming upon him, and so frustrate his labour. Let him consider the temperature and constitution of the weather, and of the present year ; for neither do they, as it were by a settled law, always wear the same dress ; nor does the Summer or Winter come every year with the same countenance : nor is the Spring always rainy, nor the Autumn moist : which I cannot believe any man can know beforehand, without an enlightened mind, and without the most excellent arts and sciences.

Now very few have the talent to discern the great variety itself of the ground, and the nature and disposition of every soil, what each of them may promise or deny us. Yea, when has any one man whatsoever had the opportunity to contemplate all the parts of this art, so as throughly to understand the use, advantage, and management of all sorts of corns, and of tillage, and the various and different sorts of earth, most unlike to one another ? of which, some deceive us by their colour, some by their quality : and, in some countries, the black earth, which they call brown, or dusky, deserves to be commended ; in others, that which is fat, and red-coloured, answers better : in some countries, as in *Numidia* in *Africa*, the rotten sands surpass, in fruitfulness, the strongest soil whatsoever ; in *Asia* and *Mysia* (19), thick glutinous earth produces the greatest abundance of any. And in these very sorts, who is it that knows throughly what a hilly situation may refuse, and by his reason finds out also what a low plain situation, what land that is cultivated, what woody land, what moist and grassy land, what dry and dirty, will either

(19) *Mysia*, a country in *Lesser Asia*, extending mostly westward, towards the *Hellespont*. It was divided formerly into the Lesser and Greater. Both parts are now called *Natolia*, subject to the *Turks*.

yield or refuse? And *who is it that thoroughly knows every thing that is requisite* in planting and preserving trees and vineyards, of which there are innumerable kinds; and in purchasing, breeding, and keeping all sorts of cattle; since we have also taken in this as a part of Husbandry; whereas the Graſier's knowledge and ſkill is diſtinct and ſeparate from the art of Husbandry? Nor is this paſtoral knowledge of one ſort only; for horſe-cattle requires a way of management very different from that of herds of oxen; and ſheep-cattle different from theſe; and even in this kind itſelf, the *Tarentinian* (20), requires a different method from that which has coarſe and hairy wool. The goat-kind requires a different treatment, and in this kind itſelf, that which wants horns, and is thin of hair, is treated otherwiſe than that which has horns, and rough-briſtly hair, ſuch as we ſee in *Cilicia* (21).

Moreover, the buſineſs of a hog- or pig-feeder is different from that of a ſwineherd, and they have different ways of feeding: nor do the ſmooth-coated ſwine, that have no hair upon them, and ſuch as are thick of hair, require the ſame climate, or delight in the ſame ſtate of weather; nor are they to be managed and brought up after the ſame manner. But not to inſiſt any more at preſent upon the different ſorts of cattle, under which denomination, and as a part of which, the management of poultry, and of bees, is placed; and what man has extended his ſtudy ſo far, as to know, beſides the things I have already reckoned up, the ſo many different ſorts of ingraftings; the ſo many different ways of pruning; and to put in practice the culture of ſo many different ſorts of apple-trees, and of pot-herbs, and of ſo many different ſorts of fig-trees, ſo as to beſtow his care upon Roſeries alſo, when even greater things are neglected by moſt people? altho' even theſe things have now begun to bring in no ſmall revenue to many. For meadow-lands, willow-grounds, brooms and reeds, tho' they require but ſmall care and induſtry, yet they always require ſome.

(20) *Tarentum*, in the kingdom of *Naples*, antiently a very famous city, commodiouſly ſituated in the entry to the *Adriatic*. *Florus* ſays it was built by the *Lacedaemonians*; it was once the head of all *Calabria*, *Apulia*, and *Lucania*: it was ſo powerful as to make war with the *Romans*, with the aſſiſtance of *Pyrrhus*, and many other people, at firſt with great ſucceſs; but at length was intirely defeated and ſubdued.

(21) *Cilicia*, a very well-known country in *Aſia Minor*, bordering on *Syria* on the eaſt, *Pamphylia* on the weſt, mount *Taurus* on the north, and the *Cilician* ſea on the ſouth. It is now called *Caramania*, and ſubject to the *Turks*.

After this enumeration of so many and various things, I am not ignorant, that if, from such as concern themselves with affairs of Husbandry, I shall require all the qualifications of the Husbandman we seek for and describe, such as learn, will go on very slowly in their studies; who, being terrified thro' despair of ever attaining to a science of so vast an extent and variety, will not attempt what they have no hopes of being able to obtain. Nevertheless, as *Marcus Tullius* has already said very rightly, in his book *de Oratore* (22), *That it is fit, that they who have an earnest desire diligently to search after, and put together, things the most useful to mankind, and after they have carefully weighed and considered them, to publish them to the world, should try all things.* Nor, if either that strength and excellency of genius, or the furniture, help, and assistance of the celebrated arts be wanting, ought we presently to sink into idleness and sloth, but prosecute with perseverance what we have prudently hoped for. For affecting to be at the very top of our profession, it will be honour enough for us, if we be seen in the second rank. Did not the *Latian* muses receive not *Accius* (23) and *Virgil* only (24), into the most secret recesses of their temple, but bestowed the sacred seats also upon them that were next to them; and even upon them that were far from being next to them? Neither did *Cicero's* eloquence (25), which, like lightning, bore down every thing in its way, deter *Brutus* and *Cælius*, *Pollio*, *Messala*, and *Catullus* (26), from prosecuting the same

(22) Our author expresses the sense, not the very words, of *Tully*, *cap. 1. de Orat.*

(23) *Accius*, a famous tragedian; he flourished in the 615th year of *Rome*. *Quintilian*, *lib. 10.* says, that he and *Pacuvius* were in the highest reputation, for the gravity of their sentences, the weight of their words, and authority of their personages.

(24) *Virgil*, of all poets, either among the *Greeks* or *Romans*, deservedly reckoned next to *Homer* himself. He was in great favour with *Augustus*, who saved his divine *Æneid*, as he called it, from the flames; he having at his death desired it might be burnt. *Pliny* calls him *Lux doctrinarum altera*, alluding to *Homer*, whom he calls *Fons ingeniorum*.

(25) *Cicero*, the greatest master of eloquence, that ever *Rome* produced; justly admired in his own time, and in all ages ever since; and must always be, as long as men have any taste for learning. He was called, not only the Father of *Roman* eloquence, but the Father of his country, the great assertor of its liberty, which he had often saved, and at last died a victim to it, having been murdered by order of *Marc Antony*, whose usurpations he had courageously withstood. He is so well known, and his character so well described by many authors, and especially his life so elegantly written by the learned *Dr. Middleton*, that it is superfluous to say any thing here of so great a man.

(26) *Brutus*, &c. These were five famous orators, cotemporary with *Tully*. *Brutus* was one of the conspirators against *Julius Cæsar*, and, with *Cassius*, endeavoured to restore the republic. We have an oration of *Cicero's*, for this *Cælius*. *Asinius Pollio* wrote an history of the civil wars, *Horat. lib. 2. Ode 1.* *Priscian* quotes his annals in several places. *Suetonius in Aug.* often mentions him. *Virgil* inscribed an eclogue to him. We have a letter of his to *Tully*, *lib. 10. ad fam.*

study. For neither did the renowned *Cicero* himself, by being terrified with *Demosthenes* (27) and *Plato's* (28) thunder, give over his pursuit: nor did the divine *Homer* (29), the father of eloquence, with his mighty floods of eloquence, extinguish the desires and studies of them that came after him. Do we see, that those artists of lesser reputation indeed, who, for many ages past, were admirers of *Protogenes* (30), *Apelles* (31), and *Parrhasius* (32), did abandon and give over their labour? Nor were *Bryaxis* (33), *Lysippus* (34), *Praxiteles* (35), or *Polycletus*, of the following age, so astonished at the beauty of *Jupiter Olympius*, and of *Minerva*, by *Phidias* (36), that they had not the courage to try what they could perform, or what length they could come themselves. But, in every kind of science, they who excel

(27) *Demosthenes*, a famous orator of *Athens*; he was a hearer of *Plato*. *Quintilian* says of him, *Pene lex ipse dicendi fuit*, The law or standard of eloquence.

(28) *Plato*, a renowned philosopher, and a very eloquent orator of *Athens*, scholar to *Socrates*. He was not content with the knowledge he acquired in his own country, but travelled into *Egypt*, to acquaint himself with the learning of the priests of that country; and into *Italy*, to converse with the *Pythagorean* philosophers. He flourished in the 98th Olympiad. His life is written by *Marcilius Ficinus*.

(29) *Homer*, the prince of poets, and *Fons ingeniorum*, as *Pliny* styles him, lived about 2700 years ago. *Pliny*, *Hist. Nat. lib. 7. cap. 16.* says, that he lived about 1000 years before he wrote, which was in the reign of the emperor *Vespasian*. It seems, his admirers placed him among their gods: for we read of a temple he had at *Smyrna*: and our author calls him, *Deus ille Mæonius*. They say, his father's name was *Mæon*, from which he is sometimes called *Mæonius*.

(30) *Protogenes*, a famous painter. He lived in *Rhodes*, was cotemporary with *Apelles*, and yielded to none but him.

(31) *Apelles*, the prince of painters, lived in the time of *Alexander* the Great, who would be painted by none but him. He was of the Island of *Coos*, and flourished in the 112th Olympiad.

(32) *Parrhasius*, as *Athenæus* says, *lib. 12.* was born at *Ephesus*. The *Athenians* made him free of their city. *Pliny* is very copious in the description and commendation of their best pieces, which were mostly purchased in *Greece*, and brought to *Rome*.

(33) *Bryaxis*, a famous *Athenian* statuary, as *Pausanias* says, *lib. 1. Attic.* He was employed by *Artemisia*, in building a tomb or monument to the memory of her husband *Mausolus*, king of *Caria*, who died about the 106th Olympiad. This tomb was reckoned the most perfect of its kind in the whole world.

(34) *Lysippus*, a famous engraver and statuary, in the time of *Alexander* the Great, who, as he would not suffer any to paint him but *Apelles*, so none to engrave him but *Lysippus*. *Pliny*, *Hist. Nat. lib. 34. cap. 7.* says, he finished 1500 pieces, all so artfully wrought, that any one of them might have made him famous. He was a *Sicyonian*, and flourished in the 114th Olympiad.

(35) *Praxiteles* and *Euphranor*, both flourished in the 104th Olympiad; and *Polycletus* the *Sicyonian*, in the 87th Olympiad, according to *Pliny*.

(36) *Phidias*, a famous sculptor. He flourished in the 84th Olympiad, about the 300th year of *Rome*. He made a statue of *Jupiter Olympius*, of ivory and gold, which none ever attempted to emulate; and one of *Minerva*, which, for its exquisite workmanship, was called *The Beauty*, καλλιμορφος, or καλλιση. *Plin. lib. 34. cap. 8.*

are admired and reverenced, and they who are of a lower class meet with their deserved praise. 'Tis the very case here: What, suppose the person, whom we desire to make a complete Husbandman of, has not attained to the perfection of his art, nor to the sagacity and knowledge of *Democritus* (37), or *Pythagoras* (38), in universal nature; or to the foresight of *Meton* (39); or *Eudoxus* (40), from their knowledge of the motions of the stars and winds; nor to the learning of *Chiron* (41) and *Melampus* (42), in the management of cattle; nor to the prudence and skill of *Triptolemus* (43) and *Aristeus* (44); in tilling and cultivating the ground? Nevertheless, he will have made great proficiency, if he be equal to our *Tremellius's*, *Saserna's*, and *Stolo's* (45): for Agriculture is capable of being managed, neither with too much delicacy and niceness; nor, on the other hand, in a gross and bungling manner: for that is far from being true, which most

(37) *Democritus*, a famous philosopher of *Abdera*, a city of *Thracia*. He travelled over a great part of the world in quest of knowledge; he was a hearer of *Socrates*; and a patient of *Hippocrates*, who declared he was of a sound mind, when his friends imagined he was mad. He wrote of husbandry, and flourished in the 80th Olympiad. *Diogenes Laertius* gives an account of his life and writings.

(38) *Pythagoras*, a very famous philosopher of *Samos*. After he had travelled into *Chaldea* and *Egypt*, he came into *Italy*, and taught philosophy in that part of it called *Magna Græcia*, where he had a vast number of scholars, who made a great figure afterwards in the world. He was a man of such excellent morals, that he contributed much to reform that, and other countries, from their savage and wicked disposition and manners. *Diogenes Laertius* says, that he flourished in the 60th Olympiad.

(39) *Meton*, a very antient philosopher; he first published at *Athens* his *ἐννεαδεκάτηρεια*, or cycle of the moon, of 19 years. See *Diodor. Siculus, lib. 12.* and *Petavii Uranologia.*

(40) *Eudoxus*, a very famous astronomer of *Cnidus*. He flourished in the 96th Olympiad, and was a hearer of *Plato*. *Laertius* gives an account of his writings.

(41) *Chiron*, a famous astronomer and physician, of *Thessaly*: *Æsculapius* was his scholar. *Pindar. Pyth. Ode 3.* He was tutor to *Achilles*, and the inventor of physic.

(42) *Melampus*, a famous diviner and physician of *Argos*. *Homer, Statius*, and others celebrate him. *Pliny* frequently mentions him, and says, *lib. 27. cap. 5.* that one kind of *Ellebores* is from him called *Melampodion*.

(43) *Triptolemus*, the inventor of the plough; and of Husbandry, according to *Servius, Virg. Georg. lib. 1. cap. 163.* He was the son of *Celeus*, who reigned in *Eleusis* in *Attica*. *Ceres* taught him the art of Husbandry. *Vide Hyg. Fab.*

(44) *Aristeus*, by *Pliny* and *Diodorus*, is said to be the inventor of honey and oil. *Vide Just. lib. 14.*

(45) *Tremellius*, father and son, *Saserna, Stolo*, famous Husbandmen, or writers upon Husbandry, many years before *Columella*. Their writings are lost, but what was valuable in them we have in our author.

This *Stolo*, probably, is the same, who, having made a law, that no citizen should purchase above 500 *jugera* of land, was condemned by his own law, having purchased 500 *jugera* in his son's name, *Val. Max. lib. 8. cap. 6.* *Varro de re rustica, lib. 1. cap. 2.* Perhaps he is the same, who first invented *pampination*, or cutting off the suckers and other superfluous branches of vines, &c. and was therefore called *Licinius Stolo*. *Stolo* signifies a sucker.

people

people have believed, that Husbandry is exceeding easy, and requires no great penetration or sharpness of wit. There is no occasion, at present, to discourse more of it in general, forasmuch as I am resolved to explain it, in all its parts, in some distinct books, separately; which I shall prosecute each in its own order, after I shall have spoken first of such things, as I think do principally belong to the whole discipline in general.

C H A P. I.

Of the Rules which they, who would live in the Country, and apply themselves to Husbandry, ought to follow.

LET him, who applies himself to the study of Husbandry, know, that those principal things following, and of the greatest importance, must be called to his assistance: *Prudence and knowledge of his business; ability to spend and lay out money upon it; and a willingness to act.* For, after all, as *Tremellius* says, He will have the best cultivated lands, who both knows how to cultivate them, is able to do it, and has also a willing mind. For, neither *knowing* nor *willing* can be of any use to any person whatsoever, without those expences which the business requires: nor, on the other hand, can a *willingness to do, and to lay out money*, be of any advantage, without art; for 'tis the principal point in all business, *to know what must be done*, especially in Husbandry; in which the *will*, and the *ability* to support the expences, without knowledge, frequently bring losses upon the landlords; since works, imprudently done, render all expences ineffectual. Wherefore a diligent master of a family, who has it at heart to follow a sure method of increasing his substance, by the culture of his land, ought, above all things, to be careful to advise with, and consult the wisest Husbandmen of his own time, upon every thing; and search diligently the histories and writings of the antients; and to consider the opinions, precepts, and directions of every one of them; and examine whether all the things, which the antients have left us, upon record, are agreeable to the Husbandry of this present time; or if some things are not disagreeable to it.

For I have found, that, formerly, many memorable authors were fully persuaded, that by the long continuance of things in the same state, the quality and constitution of the heavens, and of the air, are changed;
and

and that *Hipparchus* (1), the wisest professor of astronomy among them, has left it us in writing, that the time would come, when the poles of the world should be moved out of their place ; and *Saserna*, no contemptible author of Husbandry, seems to have believed this also. For in that book of Husbandry which he wrote, and left behind him, he brings this argument to prove, that the constitution of the heaven is altered ; viz. that those countries wherein formerly no plants, either of vines or of olives, which they set in the ground, could be preserved, because of the continual violence and severity of the winter, have now plentiful vintages, and abound both in wine and in oil ; the former cold being now much abated, and the weather become mild and warm. But whether this reason be true or false, let us yield it to astronomical learning. But as to the other precepts and rules of Husbandry, we must not dissemble with the Husbandman, nor conceal from him, that whereas the *Carthaginian* writers from *Africa* have delivered to us very many things relating to the same, yet our Husbandmen find fault with many things they have written ; and shew us, that they are false. As *Tremellius*, for example, who, complaining of this very thing, notwithstanding, excuses it, because the soil, air, and climate, of *Italy* and *Africa*, being of a different nature, cannot produce the same increase, or yield the same plenty.

But whatever those things be, which, because of the rural discipline of our times, are not agreeable to the opinion or practice of the antients, they ought not to deter the learner from reading. For, with the antients, there are many more things which deserve to be commended and approved by us, than to be rejected. Moreover, there is a great multitude of *Greeks*, who lay down rules and precepts for Husbandry ; of whom the chief, that most celebrated poet, *Hesiod* the *Bæotian* (2) has contributed not a little to our profession. Afterwards, *Democritus* the *Abderite*, *Xenophon* (3) a follower of *Socrates*,

(1) *Hipparchus*, a very famous astronomer, of *Nice*, in *Bithynia*. He flourished in the 154th Olympiad. *Pliny* says, *lib. 2. cap. 13.* that he lived about two hundred years before his time.

(2) *Hesiod*, a very antient poet. Some say he was of *Cuma* in *Æolis*, and afterwards removed to *Astra* a city in *Bæotia*, and hence called the *Ascrean Bard*. Some say, he lived before *Homer* ; others say, after. *Vide Aul. Gell. lib. 17. cap. 21.* *Pliny* says, his book of Husbandry was lost in his time, and that he was the first who gave precepts upon that subject.

(3) *Xenophon*, a great admirer and follower of *Socrates*, as we see, by his *Memorabilia Socratis*, among his other works. He was both a great Captain, and a great Philosopher. His life is written by *Laertius*. He was in great reputation in the 95th Olympiad.

Architas (4) the *Tarentinian*, and those two *Peripatetics*, the master and the scholar, *Aristotle* and *Theophrastus* (5), who all sprung from the fountains of wisdom, gave further assistance to it.

The *Sicilians* also have prosecuted this business with no ordinary care, *Hieron* (6), and *Epicharmus* his scholar (7), *Philometor*, and *Attalus* (8). *Athens* also has produced a great number of writers, of which the most approved authors are *Chæreas*, *Aristandros*, *Amphilochus*, *Euphron*; *Chrestus* the son of *Euphron*, not, as many think, the *Amphipolitan*, who himself is also esteemed an excellent Husbandman, but he, who was a native of *Attica*.

The *Islands* also greatly cultivated this study, and had it in great estimation; as witness *Epigenes* of *Rhodes*, *Agathocles* of *Scio*, *Eua-gon* and *Anaxipolis* of *Thasus*. *Menander* and *Diodorus* also, who were of the same country with *Bias*, one of the seven wise men, laid claim, among the first, to the knowledge of Agriculture. Nor did *Bacchius* and *Mnasseas* of *Milesium*, *Antigonus* of *Cyme* (9), *Apollonius* of *Pergamus* (10), *Dion* of *Colophon*, *Hegesias* of *Marogna* (11), yield to these. For, indeed, *Diophanes* the *Bithynian* (12) abridged, and reduced into six books, the intire works of *Dionysius* of *Utica*, who, in many volumes, had, in a very diffuse manner, interpreted

(4) *Architas*, a great *Pythagorean* philosopher, of *Tarentum*. He taught *Plato* Geome-try, who was born in the 4th year of the 88th *Olympiad*.

(5) *Aristotle* and *Theophrastus*, two well-known philosophers: The first was a hearer of *Plato*, when eighteen years of age, in the hundred and fifth *Olympiad*. The second flourished in the hundred and fourteenth *Olympiad*, and had his name from his divine eloquence, *a divinitate loquendi*, as *Cicero* says.

(6) *Hiero*, or *Hieron*, was King of *Sicily*, a Prince of very great note: he reigned at *Syracuse* in the seventy-fifth *Olympiad*. See *Val. Max. lib. viii. c. 13*. *Pindar* dedicates some of his odes to him.

(7) *Epicharmus* was of *Syracuse*, a great philosopher, and a poet, called *Siculus vates* by *Horace*, *lib. ii. ep. 1*. a hearer of *Pythagoras*, he wrote carefully of medicines proper for cattle, says our author, *lib. x*.

(8) *Philometor* and *Attalus*. Our author makes them *Sicilians*, and two distinct persons; but *Varro*, *lib. i. c. 1*. seems to say, that *Philometor* was only the surname of *Attalus*, he being so called from his dutifulness to his mother. We read of one *Attalus*, King of *Pergamus*, who had the honour of being called *amicus populi Romani*, the friend of the *Roman* people, to whom he left his Kingdom. Probably he is the same; for he wrote several curious pieces, some of which, probably, were upon Husbandry.

(9) *Antigonus* was of *Cyme* in *Æolis*, therefore called *Cymæus*.

(10) *Apollonius Pergamenus*. The scholiast upon *Nicander* quotes him.

(11) *Hegesias* of *Maronea*, or *Marogna*, as it is now called, a city in *Thrace*, *Vitruvius*, *lib. viii. c. 4*. as having, with infinite study and care, explained the properties of plants, and the virtues of waters.

(12) *Diophanes*; *Varro* calls him a *Nicean*, from *Nice*, a city in *Bithynia*. He dedicated his Abridgment of *Dionysius* of *Utica* to King *Deiotarus*, *Varro*, *lib. i. c. 1*. *Suidas* says, that *Asinius Pollio* epitomized them also in four books.

Mago the *Carthaginian*, and other, notwithstanding more obscure authors, whose countries we have not been informed of, have contributed something to our study: They are those following: *Androtion*, *Æschrion*, *Aristomenes*, *Atbenagoras*, *Crates*, *Dadis*, *Dionysius*, *Euphyton*, *Euphorion* (13). Nor with less fidelity have *Lyfimachus* and *Cleobulus*, *Menestratus*, *Pleutiphanes*, *Persis*, *Theophilus*, to the utmost of their power, brought in tribute to us.

And that we may now at length bestow the freedom of the city of *Rome* upon Husbandry, (for as yet, by these authors, she was only of the *Greek* nation) let us now make mention of the famous *Marcus Cato* the *Censor* (14), who taught her first to speak *Latin*; after him, of the two *Saferna's* (15), the father and son, who instructed her more carefully; and, next, of *Scrofa Tremellius* (16), who made it eloquent; and of *Marcus Terentius* (17), who exactly polished and perfected her; and afterwards, of *Virgil*, who made her also mighty and powerful in verse. Nor, lastly, let us think it below us, to make mention of *Hyginus* (18), who was, as it were, a *Pedagogue* to her. Nevertheless,

(13) *Androtion*, &c. *Varro* says of all these, that he had not found what country they were of: so it is needless to trouble the reader any farther about them, seeing nothing certain can be said of them, most of their writings being now lost: only we may observe how numerous the writings upon this subject were, and how praiseworthy it was of old reckoned, to have contributed never so little to the improvement of it.

(14) *Cato* the *Censor*, a man of great reputation for learning and wisdom. *Pliny*, in his *Nat. Hist.* says, he was famous for his triumph and censorship, but much more for his learning, and the precepts he gave to mankind concerning every thing that might be the object of their desire, especially agriculture, being, by the confession of the age he lived in, the best Husbandman; and that there was nobody that pretended to equal him. He was called *Censorius*, for the remarkable severity wherewith he exercised his office of *Censor*. His whole life was a censure of the follies and faults of his fellow-citizens. He died, as *Pliny* says, the very year when *Carthage* and *Corinth* were taken, in the 106th year of *Rome*. *Pliny* wrote about two hundred and thirty years after him. He was an excellent general, an excellent orator, and an excellent senator. See his character elegantly described by *Liv. Dec. 4. Lib. ix.* His book of husbandry is still extant.

(15) *Saferna*, father and son. *Pliny* says, that they were the most antient, and the most celebrated Husbandmen after *Cato*. *Marcus Terentius Varro* frequently quotes them. They were of the *Hostilian* family.

(16) *Tremellius Scrofa* was cotemporary with *Varro*, *lib. i. c. i.* who says of him, *Cui hæc ætas defert rerum omnium rusticarum palmam*, All owned his superior knowledge in Husbandry. He was a General also, and commanded an army upon the *Rhine*.

(17) *Marcus Terentius Varro*, much celebrated by *Tully*, *Pliny*, and others, as the most learned man amongst the *Romans*. Besides his books *de re rustica*, and *de lingua Latina*, which, though incorrect, are still extant, he wrote many books of antiquities, and of several other subjects, which are all lost: He was born about the six hundred and thirty-seventh year of *Rome*, was cotemporary with *Pompey*, *Cæsar*, &c.

(18) *Caius Julius Hyginus* was a native of *Spain*, and the Emperor *Augustus's* freedman, and keeper of his library; a great intimate of *Ovid* the poet. Some say he was of *Alexandria*, and brought by *Cæsar* to *Rome* after the taking of that city. He wrote several

theless, above all, let us pay the greatest veneration and respect to *Mago* the *Carthaginian* (19), the father of Husbandry. For those twenty-eight memorable volumes of his were, by a decree of the senate, translated into the *Latin* tongue. Nevertheless, men of our own times, *Cornelius Celsus* (20), and *Julius Atticus* (21), have deserved no less Commendation. For *Cornelius* comprised the whole body of this art in five books, and *Julius Atticus* published one single book, of one species of culture relating to vines; whose disciple, as it were, *Julius Græcinus* (22), took care, that two volumes of the like precepts, concerning vineyards, which he had composed in a more facetious and learned style, should be transmitted to posterity.

These, therefore, O *Publius Silvius*, call to council, and advise with them, before you make any contract with Husbandry. Nevertheless, be not of such a disposition of mind, as to think, that, by their opinions, you will obtain the whole of the thing you desire: for the records, or memorials, which such writers have left, rather instruct, than make an artist. In arts, *use* and *experience* are masters, and bear the sway: nor is there any art whatsoever, where one may not learn by committing mistakes. For, when any thing, by wrong management, has turned out unsuccessfully, we avoid that which has formerly deceived us: and the instructions of a teacher cast a light upon the right way. Therefore, the rules and precepts we lay down, do not promise to bring this science to perfection, but to lend it a helping hand; nor

books, which are lost; his *astronomicum præticum* is still extant. Our author commends him highly in several places, particularly in his ninth book, *cap. 2*.

(19) *Mago*, whom our author calls the *Parent* of Husbandry, wrote twenty-eight books on this subject in the *Carthaginian* language. *Dionysius* of *Utica* translated them into *Greek*, and sent them to the prætor *Sextilius*. He was a great captain; and the *Roman* senate, after the taking of *Carthage*; paid so great honour to him, that they ordered his books to be translated into *Latin*, and committed the work to such as were most skilful in the *Carthaginian* language, *Pliny*, *Nat. Hist. lib. xviii. c. 4* Where he says, that among foreign nations it was reputed a princely employment, to deliver precepts concerning the cultivation of the ground, as *Hieron*, *Archelaus*, *Xenophon*, *Mago*, and several others did.

(20) *Cornelius Celsus* flourished in the time of the Emperor *Tiberius*. He was called the *Latin Hippocrates* for his great learning in physic. His books on that subject, still extant, sufficiently evidence his great ability in that learned profession. *Quintilian* says, *lib. xii. c. 11*. that he not only gave precepts of eloquence and history, but also of the art of war and husbandry.

(21) *Julius Atticus* was cotemporary with *Columella*.

(22) *Julius Græcinus* was father to *Julius Agricola*, whose life we have, written by *Tacitus*. He was of the senatorian order; remarkable for his study of eloquence and wisdom; and, by his virtues, drew upon himself the indignation of *Caligula*. *Seneca de beneficiis, lib. ii. c. 21*. has a very remarkable expression: “*Julius Græcinus*, an excellent person, whom “*Caligula* slew for this very reason, because he was a better man than it was expedient for “a tyrant any one should be.”

will any person, purely by having read over the rules we have prescribed, become an adept in Agriculture, unless he have both a willing mind, and a heavy purse to put them in practice: wherefore we promise, that they will be as helps only to such as study this art; but will be of no use by themselves, but in conjunction with other things. Nor, indeed, will either these assistances, as we said before, nor constant labour, the experience of the Bailiff, nor plenty of money, and a heart to lay it out, have so powerful an influence, as the master's own presence alone; for unless he himself come often, when least looked for, while business is doing, as in an army, when the general is absent, all business is at a stand, and duty is neglected. And I verily believe, that *Mago the Carthaginian* pointed out this to us, by beginning his writings with such sentences as those: "Whoever has a mind to purchase land, let him sell his house, lest he rather chuse to live in his house in town, than in that in the country. He, who takes greater delight in his house in town, will have no occasion for a manor in the country." Which precept, if it could be observed in these times, I would by no means change.

Now, forasmuch as civil ambition often calls most of us from the country, and oftener detains us, when we are called from it; consequently I think, that an estate near the city is most commodious, that so a man, how busy soever he may be, may be able to make an excursion every day, after the public business is over. For they, who purchase lands at a distance from town, not to speak of those beyond-sea, yield up their estates to their servants, as if they were their heirs; and, which is worse, they do it in their own life-time: for certain it is, that they are not only corrupted and debauched by their masters being at so great a distance from them; but, being once corrupted, expecting that, after the flagitious actions they have committed, others will be sent in their room, they apply themselves more to plundering and rapine, than to Husbandry.

C H A P. II.

Of the most approved situation and qualities of land.

Therefore I am of opinion, that land ought to be purchased near the *city*, where the owner may frequently come, and also give out, that he will come oftener than he really intends. For, under this

apprehension, the Bailiff and the servants will be in their duty; but, whenever he has an opportunity, let him stay in the country, and not pass the time he stays there in idleness and ease, and lolling in the shade, or keeping within-doors. For it becomes a diligent master of a family, frequently to go round every corner and inch of his own land, and at all times of the year, that he may the more wisely consider the nature of the soil, either in the boughs and leaves of trees, or in the grass and herbs, or in the fruits of the ground, when they are come to maturity; and not be ignorant of what is right and proper to be done in it: for that is an old saying, and of *Cato*, *That that land is scurvily used, whose owner does not teach nor direct what must be done, but bears his Bailiff* (1). Wherefore, let it be the chief care of one, who either possesses lands of inheritance from his ancestors, or who is about to purchase them, to know, what kind of ground is most approved of, that he may either be without what is unprofitable, or purchase that which deserves to be commended. And, if fortune shall favour and assist our desires, we will have land in a wholesome air, a fertile and rich soil, partly champain, and partly on little hills, gently declining to the east, or to the south; with some parts of the ground cultivated, and other parts woody and rough; nor far from the sea, or a navigable river, by which the fruits of it may be exported, and all sorts of commodities imported.

Let the champain part, divided into meadows, and arable lands, willow- and reed-groves, lie below the house. Let some of the hills be void of trees, that they may serve for corn only, which nevertheless thrives better in moderately dry and fat champain lands, than on high and steep places. Therefore the higher corn-lands also ought to have some level parts, and be of a gentle and easy descent, and as like a champain situation, as possible. Then, let other of the hills be clothed with olive-yards and vineyards, and copses for producing props for supporting vines, and afford wood and stone, if necessity forces you to build; as well as pasture for cattle: and let springs of constantly-running water send down rivulets into the meadows, and gardens, and willow-groves: nor let there be wanting flocks and herds of great and small cattle, and other sorts of four-footed beasts, feeding upon both the cultivated ground, and the thickets. But this situation, which we desire, is difficult and rare to be found, and falls to the share of very few. That situation is next to it, which has most

(1) This ancient saying is not in *Cato* in so many words, as we now have him; only *let not the Bailiff think himself wiser than his Master.*

of these qualities : and that is tolerable, which has not a very few of them.

C H A P. III.

Of such things as are principally to be considered, in viewing and examining Land, before it be bought.

Porcius Cato (1), indeed, was of opinion, that there were two things chiefly to be considered, in examining and purchasing of land, the *wholsomeness* of the *air*, and the *fruitfulness* of the *place*; of which if either the one or the other should be wanting, and notwithstanding any one should have a mind to dwell there, he must have lost his senses, and ought to be conveyed to his kinsfolk, to *take care of him*. For no man in his senses ought to lay out money in cultivating a barren soil : nor, on the other hand, can the owner of a pestilentious, though very fertile and fat land, live to partake of the fruits thereof; for, where one must lay his account to be exposed to certain danger, there, not only the reaping the fruits, but the life also of Husbandmen, is dubious; or rather, death is more certain than getting money.

After these two principal things, he farther added those following, as no less necessary to be examined and considered; *viz.* the *road*, the *water*, and the *neighbourhood*. A convenient road contributes much to the advantage of lands. The first advantage, which is the greatest of all, is the owner's own presence, who will come there the more willingly, if he is not afraid of being plagued with the badness of the road. The next is, the conveniency for importation and exportation of all sorts of utensils; which thing increases the value of such fruits of the ground as we lay up in store, and lessens the charge of the things we bring home: for they may be carried, with less expence, to places, where one may come without much trouble or fatigue.

(1) *Porcius Cato* has not these very words, but the substance of them; and those words, *ad cognatos & gentiles deducendum*, are taken out of *Varro*, and are agreeable to the law of the Twelve Tables, which deprived prodigals and madmen of the management of their estates; and by them the antients signified, that a man was mad, or had lost his senses. The *Roman* lawyers say, that the *agnati* were relations by the father's side, and that the *gentiles* were those of both father and mother; and to them the commission of lunacy, as we term it, was granted.

Nor is it of small advantage to be carried cheap, if you make use of hired horses when you travel, which is more expedient, than to keep horses of your own. The servants also, who are to follow the master of the family, will not with reluctance begin their journey on foot.

As to the goodness of the water, that is a thing so manifest to every body, that there is no occasion to enlarge upon it; for who can have any doubt, but that that water is to be accounted the best, and the most approved, without which none of us can prolong his life, either in health, or in sickness? As to the conveniency and advantage of a good neighbour, this is, indeed, what we cannot have any certainty of. Sometimes *death*, and divers other causes, common to him and us change him: and therefore some people reject *Cato's* opinion, who nevertheless seem to be mightily mistaken. For, as it becomes a wise man, with great courage and resolution, to support accidental misfortunes, so it is acting like a madman, for one to make a bad fortune for himself; which that man does, who, with his own money, purchases a wicked neighbour, since, from the very cradle, if he be descended of free-born parents, he might have heard, that *No man would lose his ox, if neighbours were not naught* (2); which is spoken not only of an ox, but also of every other part of our estate: so that many have rather chosen to be without dwelling-houses, and have fled from their own habitations, because of the injuries of their neighbours: unless we think, that it was for some other reason, that whole nations have abandoned their native soil, and gone to a different part of the world, I mean the *Achæans* (3), the *Hiberians* (4), the *Albanians* (5), as did also the *Sicilians* (6); and, that I may touch upon our own original, the *Pelasgians* (7), the *Aborigines* (8), the *Arcadians*;

(2) This line is taken out of *Hesiod*.

(3) Those *Achæans* here mentioned seem to be a people of that name, who, *Pliny*, lib. vi. says, inhabited the utmost or eastmost parts of the *Euxine* sea, whom our author supposes to have fled out of *Greece*, because they were oppressed by their neighbours, and still retained the name of their country.

(4) *Hiberi*, a people of *Asia*, who are supposed to have left their native country, and to have come into *Spain*, to which they gave the name of *Hiberia*. It is commonly writ *Iberia*.

(5) The *Albani* were also a people of *Asia*, and contiguous to the *Iberi*.

(6) The *Siculi* were a people of *Latium*, who went over to *Sicily*, settled there, and gave their name to that island.

(7) *Pelasgi*, a people of *Greece*, who of old came into *Italy*, and settled in *Umbria*, and other places. *Pliny* says, they settled also in old *Latium*.

(8) *Aborigines* were also originally of *Greece*. They came over, and settled in *Latium*. *Aurelius Victor* says, they were called *Aorigines*, a *Greek* name, from their inhabiting the tops of mountains. Others say, they were called *Aberrigines*, wanderers or vagabonds; and, by changing one letter, and leaving out another, they were afterwards called *Aborigines*.

dians (9); than because they could not endure their wicked neighbours.

And, that I may not speak of public calamities only, history has given us an account of some private persons also, both in the countries of *Greece*, and in this very *Italy* itself, who were detestable neighbours: unless that the famous *Autolycus* (10) could be a tolerable neighbour to any one; or that *Cacus* (11), who inhabited mount *Aventine* brought any joy to his neighbours, that dwelt upon mount *Palatine* (12). I rather chuse to make mention of things that are past, than of the present, that I may not name my own neighbour, who does neither suffer a tree of any considerable length to stand upon our ground, nor a nursery, without hurting it, nor any thing of a stake or prop to stand tied to a vine, nor even the cattle to go out to pasture, unless there be one to watch them; so that it was with very good reason, as far as I can judge, that *Marcus Porcius* thought, that such a pest ought, by all means, to be avoided, and, among the first things, forewarned him, that was determined to be an husbandman, not to come near to it of his own accord.

To the other precepts we add that which one of the seven wise men delivered to posterity for ever: *A measure is best*: that a *measure*, a *due proportion*, or *bounds*, ought to be observed and kept in all things. And let that be understood as spoken, not only to those, who are going about other business, but to those also, who are about purchasing land; that they would not buy what is of a greater extent, than the calculation they have made of things will bear. For, to this, has a reference, and is applicable, that excellent and famous sentence of our own poet (13); *Commend large fields, but cultivate what's small*; which antient precept, handed down to us, that most learned man, in my opinion, pointed at, and expressed it in verse; for, it is a saying worthy of the *Carthaginians*, a most acute people, *that the land ought to be weaker than the Husbandman*; for since, of neces-

gines. They, with other strange people, were the root, as *Pliny* says, from whence the *Roman* people sprang.

(9) The *Arcadians*, a people of *Peloponnesus*, sent also colonies into *Italy*, some of which settled in *Latium*.

(10) *Autolycus*, a famous robber, frequently mentioned by *Homer*, as grandfather of *Ulysses*, by his mother.

(11) *Cacus*, a famous cow-stealer, who dwelt on mount *Aventine*. He stole *Hercules's* cattle, as he passed that way, for which he knocked out his brains, *Livy*, dec. I. lib. i. *Virgil*, in his *Æneid*, lib. viii. gives a beautiful description of him, and makes him a great monster.

(12) Two of the seven hills on which the city of *Rome* is built.

(13) *Virg. Georg. lib. ii. 412.*

sity, he must wrestle with it, if the ground prevail, the owner must be crushed to pieces: nor is it to be doubted, but that land of a large extent, not rightly cultivated, will yield less, than that of a narrow extent, exceedingly well cultivated. Wherefore, after the expulsion of the Kings, those seven *jugera*, which *Licinius* (14) the *Tribune* of the people, distributed to each man, yielded a greater revenue to the ancients, than our largest fields, which lie fallow, do now. Indeed, *Curius Dentatus* (15), whom we mentioned a little before, having, by his successful conduct, obtained a victory, when the people, as a reward of his excellent valour, bestowed fifty *jugera* of land upon him, thought, that it was a greater estate, than was suitable, either to one that had been Consul, or that had had the honour of a triumph: and, having refused this public reward bestowed upon him by the people, he contented himself with the same proportion the common people enjoyed.

Afterwards also, when our victories, and the utter destruction of our enemies, had laid desolate, and subdued, a vast extent of land; yet it was criminal in a Senator to have above fifty *jugera* (16) in his own possession: and *Caius Licinius* (17) was condemned by his own law, because he had by an immoderate desire of enlarging his estate, exceeded that measure which he had settled and promulgated during his magistracy, having brought in a bill for that purpose, when he was Tribune of the people, and passed it into a law: and this was done, not more because it was a symptom of pride and ambition, to take up and occupy so much place, than because it was infamous and dishonourable, that a *Roman* citizen should, by possessing, in a new and unprecedented manner, more ground than his patrimony enabled him to cultivate, abandon those lands, which the enemy, by running away, had laid

(14) *Liciniana jugera*. *Varro*, lib. I. cap. 2, says, that this distribution was made three hundred and sixty-five years after the expulsion of the kings, which was in the year of the city 244. so that this dividend of land was made in the 609th year from the building of *Rome*. We read also of a distribution of seven *jugera per man*, made by a decree of the senate, after the conquest of *Veii*, *Tit. Liv.* dec. I. lib. 5.

(15) *Curius Dentatus* was created Consul, for the first time, in the year of the city 463. He refused the present the people offered him; and, as *Pliny*, in his *Nat. Hist.* lib. 8. cap. 3. says, in a speech he made, affirmed, that he was a pernicious citizen, that could not be content with seven *jugera* of land; which was the quantity allowed to the common people, after an end was put to monarchical government.

(16) *Columella* says, that the quantity of land allowed by the *Licinian* law, was only fifty *jugera*; but he must be corrected by *Varro*, lib. I. c. 3. *Livy*, Dec. I. lib. 7. and *Plin. Nat. Hist.* lib. 18. c. 3. who all have five hundred *jugera*.

(17) *Caius Licinius Stolo* was Tribune of the people in the year of the city 387. To elude the law, which he himself had made, he emancipated his son; and, as has been said, put 500 *jugera* in his name, over-and-above what he possessed and held in his own name. He was accused by *Popilius Lænas* the Consul, condemned, and severely fined. *Val. Max.* lib. 8. cap. 6. *Liv.* Dec. I. lib. 7.

waste, and left without inhabitant. Therefore, as in all other things, so also in purchasing lands, a *measure* must be observed: for so much ought we to endeavour to obtain, as is necessary to make it appear, that we have bought what we ourselves might enjoy, not wherewithal we might be burdened; and to take away the enjoyment of them from others, after the manner of those over-mighty men, who possess the bounds of whole nations, which they are not indeed able to go round on horseback, but leave them to be trampled upon by cattle, and wasted and destroyed by wild beasts, or keep them occupied by citizens that are indebted to them (18), and their chained slaves, where they are both confined, and put to hard labour. But every man's own moderate desire, capacity, and estate, will be a measure to him. Nor indeed is it enough, as I said before, to be determined to have lands in your possession, if you are not able to cultivate them.

C H A P. IV.

Of the Wholsomeness of Countries.

THE precept given us by *Cæso* (1), comes next to be considered, which *Cato* is also said to have made use of; *viz.* That they who are about to make a purchase, ought often to review the land they have a mind to purchase. For, at first view, it neither discovers its faults, nor its hidden good qualities, which afterwards more easily shew themselves to such as consider, and look over it again and again. Also our Ancestors have left us a *formula*, as it were, of inspection and examination of land that is fat and fertile; of the quality of which we shall speak in its own place, when we come to treat of the several

(18) It was a custom amongst the *Romans*, to have their creditors delivered up to them; whom they kept in custody, and obliged them to hard labour; and sent them to their estates in the country, to cultivate the ground, and improve their lands, as they did many of their slaves. And this restraint and confinement of fellow-citizens for debt, the *Romans* called *nexus civium*, which frequently occasioned many complaints and disturbances in the state, from the cruelty and hard-heartedness of creditors: nevertheless, it must certainly be much more eligible, to be put to labour the ground, in a wholesome air, with food and raiment, than to starve and rot in a stinking prison.

(1) *Cæsonianum præceptum*. Who this *Cæso* was, I find not. There were several great men of this name, about the year of the city 275, and afterwards. Some of them, no doubt, were men of knowledge in Husbandry, and their precepts preserved to posterity. *Cato* has the same precept in a few words equivalent: *Think it not enough once only to go round the land you design to buy, lib. i. cap. 3.*

kinds of land (2). Nevertheless, in general, that which I have, as it were, to testify, and frequently to declare and publish to all the world, is, what that most renowned Captain, *Marcus Attilius Regulus* (3), in the first *Carthaginian* war, is reported to have said, That as we must not purchase land, even suppose of the fruitfullest soil, if it be unwholsome; so neither must we purchase what is barren, though it be never so wholsome. Which advice *Attilius* gave with greater authority to the Husbandmen of his own time, as he had acquired skill by experience. For histories tell us, that he dwelt in *Pupinia* (4), where the land is both pestilentious, poor, and unfruitful. Wherefore, as it is the part of a wise man, not to purchase every-where; nor to be deceived, either with the allurements of its fruitfulness, nor with the neatness, compactness, or delightfulness of the place; so it is the part of a truly industrious master of a family, to make fruitful and profitable, whatever he has either purchased, or otherwise got into his possession. For our ancestors both prescribed, and left upon record, many remedies for an unwholsome air, whereby its infectious destructive influence might be allayed; and, in lean and barren land, the prudence and diligence of the Husbandman may overcome the barrenness of the soil. These things we shall certainly be able to accomplish, if we will believe, and receive, as from an Oracle, what the truest Poet ever lived says (5):

“ Take care to learn before, and to observe;
 “ The winds, and changing temper of the air,
 “ The soil, and native genius of each place,
 “ What fruits it bears, and what it will refuse.”

Nevertheless, let us not content ourselves with the authority of Husbandmen, either of former, or of the present time, and overlook or neglect our own examples, and the new experiments we shall have made; which, tho' in some particulars it is detrimental, yet, upon the whole, becomes gainful to us; because there is no land that is cultivated, but yields some profit: at the same time, by attempting and making trials, the proprietor of the land gains this point, that it is

(2) *Lib. ii. cap. 2.*

(3) *Marcus Attilius Regulus* was Consul in the year of the city 459.

(4) *Pupinia*, a place in *Latium*, near *Tusculum*, of which *Varro* gives a frightful account; *lib. i. cap. 9.* “ In it were to be seen, neither tall trees, nor fruitful vines, nor the *Marsian* fig-tree, nor thick straw; and that most of the trees and meadows were withered and dried up, and overgrown with moss.”

(5) *Virgil Georg. lib. i. 42.*

gradually formed, and brought to the best state and condition it is capable of, and to yield all that it possibly can. This thing also improves and makes the most fertile lands turn to greater advantage: therefore we must never cease to make variety of experiments. Also we must be more daring, and hazard more, in a rich fat soil, because the effect will neither frustrate our labour, nor our expences.

But as it is of great imporrance, what kind of ground, and after what manner we cultivate; so also, after what manner the manor-house is built, and how advantageously it is situated and disposed: for history informs us, that many have greatly erred in this point, as those most excellent men, *Lucius Lucullus* (6), and *Quintus Scævola* (7); of which, the one built a greater, and the other a smaller *villa* than the extent of their land required, both which extremes are hurtful to a man's estate. For we are not only at greater charges in building large and wide houses, but also it costs more to keep them in repair: and when they are smaller than the ground requires, the fruits of it perish and decay. For both moist and dry things, which the earth produces, are easily spoiled, if either there are no houses at all to bring them into; or if, by being too streight, they are inconvenient. For a master of a family, in proportion to his estate, ought to have as good and convenient an habitation as possible, that he may the more willingly both come into the country, and also live in it.

It will also be more agreeable to the man, if his wife also accompany him: and as her sex, so also is her mind more delicate; wherefore she must be allured and engaged with something pleasant and agreeable, to stay the more patiently with her husband. Therefore, let the Husbandman build elegantly; nevertheless, let him not be a *Builder*; and let him take in such an area for his building, that, as *Cato* (8) says, neither the *villa* may seek for land, nor the land seek for a *villa*. We shall now explain what manner of situation the whole of it must have. The building which you begin, as it ought to be placed in a wholesome region, so also in the wholesomest part of the country. For the sur-

(6) *L. Lucullus*, a very famous Roman General, who conquered *Mithridates*, King of *Pontus*, and drove him into *Armenia*. He undertook that war *anno urb. cond. 680*. After he returned with immense riches, he gave himself up intirely to luxury, magnificent buildings, &c. He exceeded all the Romans in statues, pictures, villas, &c. He was at immense charge in making fish-ponds at *Baia*, near *Naples*. His land could scarcely contain his buildings. On the contrary, *Quintus Scævola* had so small a *villa*, that he had not where to bestow the fruits of his land.

(7) *Q. Mucius Scævola* was famous for his knowledge in the civil law, and for his eloquence; mentioned by *Cicero*, *lib. ii. de Orat.* He was killed by *Marius*, in the civil wars. There was one of this name Consul, *an. urb. 659*.

(8) *Cato*, *lib. i. cap. 3*.

rounding air, when it is corrupted, brings very many causes of hurt and offence to our bodies. There are some places, which are not very hot about the time of the summer solstice; but, in the colds of winter, have a dreadful appearance, and are intolerably cold, as they say of *Thebæ* in *Bæotia* (9). There are other places, which are warm in winter, but burning hot in summer, as they affirm is the case of *Chalcis* in *Eubæa* (10). Let therefore a temperate air be sought for, which is neither excessively hot, nor cold; which sort of air commonly the middle of a hill enjoys, because neither being depressed, is it torpid with the hoar-frosts in winter, or torrid with hot vapours in summer; nor being elevated to the tops of the mountains, does it rage, at all times of the year, with the motions of the winds, and with rains, when below they are very gentle. This situation therefore upon the middle of a hill is the best; provided nevertheless, that the place swell out, and be prominent a little, lest a torrent, formed by the showers, when it flows from the top of the hill, shake or pluck up the foundations.

C H A P. V.

Of Water.

AND let there be either within the manor-house a spring that never dries up, or let it be brought into it from without. Let wood for fire, and forrage, be near at hand. If running-water cannot be had, let well-water be sought for hard-by, which may neither lie too deep, and be difficult to draw, nor be of a bitter or brackish taste. But if these also fail you, and the small hopes of spring-water force you, let large cisterns, after all, be provided for men, and ponds for cattle, for gathering and keeping rain-water, which is the most proper and suitable to the health of the body; and this you may have exceeding good, if you convey it, in earthen pipes, into a covered

(9) *Bæotia*, a country in *Greece*, bordering upon *Attica*, of a foggy unwholesome air, but good for cattle. The inhabitants were, by the ancients, reckoned dull and stupid. The chief city of it was *Thebes*, now called *Stibes*, and a small village. *Bæotia* borders upon *Doris*, *Phocis*, *Attica*, and *Corinthus*, now called *Stramulipa*, and subject to the *Turks*.

(10) *Eubæa*, an island east of *Achaia* in *Greece*, now called *Negroponte*, separated from *Achaia* by a narrow sea (*Euripus*). Its chief city is *Chalcis*. They say it is about 130 miles long, and 30 broad. It was long subject to the *Venetians*; but now in the hands of the *Turks*. The *Euripus* is now called the *Streight of Negropont*, and is so narrow, that *Eubæa* is joined to *Achaia* by a bridge.

cistern. Next to this is running-water, which has its source upon the mountains, provided it tumbles down headlong over the rocks, as at *Guarcenum* (1) in *Campania*. Well-water is the third, either that which is found upon rising ground, or not in the lowest part of the valley. The worst of all is marsh-water, which creeps and slides along with a slow motion. That which always stagnates in a marsh, is pestilent; nevertheless this same water, tho' of a hurtful nature, yet, in winter, being softened and allayed by the showers of rain, abates of its bad quality: from which we understand, that rain-water is exceeding wholesome, because it also purges out the pernicious quality of poisonous water (2): but this we have said to be the most approved for drinking. But rivulets, that have a strong current, and a fall, contribute very much to moderate the heats, and to the delightfulness of places, which, if the situation of the place will allow it, whatever quality they may have, provided they be sweet, ought, by all means, in my opinion, to be brought into the villa.

But if the river be at a greater distance from the hills, and if the wholesomeness of the place, and the higher situation of its banks, shall allow you to place your house upon the current, nevertheless you must take care, that it have the river rather behind than before it; and that the front of the building be turned from the troublesome and hurtful winds peculiar to that country, and turned towards those that are most friendly; for most rivers are covered and hid from you with hot mists in summer, and with cold mists in winter, which, unless they be carried off by the greater force of the winds that blow upon them, prove destructive both to men and cattle. But, as I said, in such places as are wholesome, it is best to turn the front of the manor-house towards the east or south; and, in such as are unwholesome, towards the north. And a villa looks always rightly to the sea, when it is beat upon and

(1) *Guarcenum* in *Campania*. There is no mention of this place by *Pliny*, or any other author I have seen. Probably there is an addition or transposition of one or two letters. *Pliny* mentions several times *Mons Gaurus*, and *vinum Gauranum* in *Campania*. This mountain lies near to *Baiæ* or *Puzzuolo*; and, on the side of the hill looking towards these places, there is excellent wine; so that our author perhaps means some town that stood near this hill, and took its name from it.

(2) Rain-water, by most authors, is accounted the wholesomest. *Vitruvius* says, that the lightest and most subtile particles are extracted from all the fountains, and carried up into the air, by the constant motion of which, it is agitated, strained, and liquefied; and then it falls to the earth. *Hippocrates*, *Galen*, &c. commend it, because it is light, sweet, clear, and thin. Some authors say, that summer rain-water, which falls in time of thunder, is better than that of common showers; and that water of melted snow or ice is the worst of any. *Cornelius Celsus* ranks them thus, with respect to their weight; rain-water, spring-water, river-water, well-water; next to these, that of snow and ice; that of a lake is weightier, and of a marsh is heaviest of all.

sprinkled with the waves thereof, but never from the bank, or when it is a little removed from the shore: for it is better to have fled back to a great than to a small distance from the sea; for the intermediate distances are of a grosser air. Nor indeed must there be a marsh near the buildings, nor a public highway adjoining: for the former always throws up noxious and poisonous steams during the heats, and breeds animals armed with mischievous stings, which fly upon us in exceeding thick swarms; as also sends forth, from the mud and fermented dirt, envenomed pests of water-snakes and serpents, deprived of the moisture they enjoyed in winter; whereby hidden diseases are often contracted, the causes of which, even the physicians themselves cannot thoroughly understand: and also, at all times of the year, the dampness and moisture rots and spoils the implements of husbandry, household furniture, and the fruits of the ground, that are either laid up in store, or not as yet brought into the house. And the latter is a burden to your estate, by the plunderings of travellers that pass by, and the constant entertainment of those that come to lodge with you.

Wherefore I advise you to avoid these inconveniencies, and to build a manor-house neither by the highway, nor in a pestilential place, but at a great distance from them, and upon a higher situation; and that the front of it be directed to the rising of the sun at the time of the equinox; for this kind of situation keeps an equal balance, and a well-adjusted medium between the winter and summer winds. And the more declining towards the east the ground is, on which the building stands, the more freely will it receive the cool passing breezes in summer, and be less incommoded or hurt with storms in winter, and so be thawed with the rising sun, that the frozen dews may melt: for that ground is reckoned almost pestilential, which is not within the reach of the sun, and not exposed to breezes warmed with the same; which if it want, there is no other thing of any efficacy to dry up and wipe off the nocturnal hoar-frosts, and any sort of rust, mildew, or filth, that fixes upon it. And these things are not only destructive to men, but also to all sorts of cattle, and to every green thing whatsoever, and to their fruits.

But whosoever has a mind to build upon a sloping area, let him always begin at the lower part; because when the foundations are begun from the more depressed place, they will not only easily support their own superstructure, but also serve as a butteridge and underpropping against such things, as shall afterwards be applied to the upper part, if peradventure he has a fancy to enlarge the villa: for the buildings that have been raised before from the lower part, will powerfully
resist

resist and bear up against those that, being placed above them, shall lean and rest upon them. But, if the uppermost part of the rising ground, being made the foundation, shall have received the weight of its own superstructure, whatever you join to it afterwards from the lower part, will become full of cliffs and chinks; for a new building, when it is built and joined to an old, and that which is fresh to what is full of chinks, it, as it were, struggling against the weighty load that presses upon it, gives way; and that, which was first built, will press upon that which gives way, and, being gradually weighed down, will be pulled down headlong with its own weight. Therefore this fault, in the way of building, must be avoided when the foundations are first laid (3).

C H A P. VI.

Of the Position and Disposition of a Manor-house.

AL SO let the measure, size and number, of the several parts of the villa be proportioned to the whole inclosure (1), and let it be divided into three parts; one for the use of the city, another for the rustics, and a third for the fruits of the ground. Again, let that for the city be distributed in such a manner into summer and winter apartments, that the bedchambers for winter may look towards the sun-rising in the middle of winter; the dining-rooms to the sun-setting at the time of the equinox. Again, let the summer bedchambers be so contrived, as to receive the sun at noon at the time of the equi-

(3) The last sentence of this fifth chapter is somewhat perplexed; and, as *Ursinus* says, it seems necessary to change *surgenti* into *urgenti*, in order to make it tolerable sense, which I wish were justified by some good manuscript.

(1) Whole inclosure (*universo conscripto*) signifies the whole ground taken in and inclosed to build the villa upon. These villas, among the *Romans*, while their ancient simplicity lasted, were but very mean buildings, simple accommodations for their servants, and receptacles for the fruits of the ground, and a small apartment for the master and mistress of the family, &c. But, as their riches and luxury increased, they became much more magnificent; and a sumptuous and magnificent villa seems to have been the darling pleasure, even of the wisest and most moderate among them: so that they seem to have expended more upon their houses in the country, than they did upon those in the city: And even private citizens, when *Rome* was, in a manner, mistress of the world, seem to have exceeded most of our modern princes in the circumference, architecture, magnificence, and conveniences of their villas. And when those of private persons were so stately, what must those of more eminent station have been, as that of *Mæcenus*, *Lucullus*, *Cicero*, &c.? As for those of the *Cæsars*, &c. so frequently mentioned by antient authors, they were, no doubt, beyond what we can imagine.

nox (2); but let the dining-rooms of that season look to the sun-rising in winter. Let the bathing-places be turned towards the sun-setting in summer, that they may be well lighted in the afternoon, and till the evening. Let the places for walking in be so situate, with respect to the south, that they may receive much sun in winter, and very little in summer.

But, in the rustic part, there shall be placed a large and lofty kitchen, that the timber-work may not be exposed to the danger of fire, and that all the servants belonging to the family may stay in it conveniently at all times of the year. Cells for such servants as are not in bonds (3), will be best contrived, when they are made to look to the south, so as to receive the sun at the time of the equinox; and, for such as are in chains, a most wholesome subterraneous prison-workhouse (4), receiving its light from very many narrow windows, and so high from the ground, that one may not be able to touch them with his hand (5).

Such

(2) *Speſtet meridiem æquinoctialem.* As the meridian of a place is the same throughout the whole year, and, when the sun comes to that line, it is still the same with respect to the house; yet, as the sun rises higher and higher upon that line, till it comes to the solstice, so here the author must mean, that the bedchambers be so contrived, as to receive the sun when it comes to the meridian at the time of the equinox.

(3) *Servis solutis.* The Romans suffered such of their slaves as they had confidence in, and were not apprehensive of their running away, to be without chains; but such of them as they feared might make their escape, they kept in chains, and shut them up at night: others of them were put in chains for crimes, and kept prisoners as long as they thought proper.

(4) *Ergastulum,* among the Romans, was a subterraneous building belonging to every considerable villa. It properly signifies a workhouse; but it was made use of as a prison, wherein they confined their slaves at night, that they might not make their escape; and therein they shut up, and kept to hard labour, such of their slaves as were guilty of any misbehaviour. These private prisons soon became great grievances, and great complaints were brought against them in Augustus and Tiberius's time, not only because of the great cruelty of masters, but because Roman citizens and strangers were unlawfully shut up and detained in them; for which reason these private prisons were intirely suppressed by Adrian, and other succeeding Emperors.

(5) *Varro, l. i. c. 11, 12.* gives the following directions relating to the building of a villa: 'A villa must be built proportionable to the land belonging to it, that there may be room for laying up the fruits thereof in their several storehouses, which must be contrived according to the quantity of each sort of fruit. If your land abound in wine, your wine-cellar must be the larger; if in corn, your barns. You must especially take care, that there be water within the inclosure of the villa; if not, as near as possible. The first thing is to have it springing up within the villa; the next is to have it constantly running into it. If there be no living-water, cisterns must be made within doors for men, and ponds in the open air for cattle. You must take care especially to place your villa at the bottom of a hill covered with wood, where there may be wide pastures; and that it be exposed to the most wholesome winds that shall blow in that country. That which is placed toward the rising of the sun at the time of the equinox, is the most convenient, because

Such stables must be made for the cattle, as cannot be incommoded either with the heat or the cold. Let there be double ox-stalls for cattle broken for labour, one for summer, and one for winter. But for other sorts of cattle, which, it is proper, should be within the manor-house, let there be places, partly covered, partly in the open air, surrounded with high walls, that, in the one, they may take their rest during winter, and in the other in the summer-time, without being exposed to the fury of wild beasts. But let all the stables be so ordered, that no water may run into them; and that all the moisture that is formed and gathered therein, may slide out as quickly as possible, that neither the foundations of the walls, nor the cattles hoofs, may be rotted and spoiled. The stalls for the oxen must be ten, or at least nine, feet broad. This measure will be sufficient both for the cattle to lie down in, and for him that yoketh them, and driveth the plough or the wain, to go round them, and do what offices are proper to be done to them while unyoked. It is not proper, that the mangers be placed higher, than that an ox or an horse may be able to feed standing without inconveniency.

Let there be an habitation made for the Bailiff hard-by the gate, that he may have a view of them that go out and come in; and one for the Steward (6) above the gate, for the same reasons; nevertheless let him be near to, and have his eye upon, the Bailiff (7): and let them both

‘ because in summer it has the shade, in winter the sun. If you are forced to build hard-
 ‘ by a river, take care you do not place your villa fronting to it, because, in winter, it
 ‘ will be vehemently cold; and, in summer, not wholesome. You must also advert, if there
 ‘ be any marshy places near it, both for the reasons before-mentioned, and because they
 ‘ dry up; and certain small animals breed therein, which the eyes cannot perceive; and
 ‘ they come through the air, and enter into the body by the mouth and nostrils, and occa-
 ‘ sion dangerous distempers. And care must be taken, that the villa look not towards those
 ‘ parts, from whence unwholsome grievous winds use to blow; and that you place it not
 ‘ in a hollow valley, but rather build upon an eminence; for, where there is a thorough
 ‘ air, if any thing noxious is brought in, it is more easily discussed. Moreover, that which
 ‘ is illustrated by the sun the whole day, is more wholesome; because the little beasts, if
 ‘ any breed near it, and are brought into it, are either blown out of it again, or soon perish
 ‘ by the driness of the place. Sudden showers and torrents, or rapid rivers, are dangerous
 ‘ to those, who have houses in low and hollow places; and the sudden incursions of bands
 ‘ of thieves and robbers, because they can more easily surprize those who are not aware of
 ‘ them. From these inconveniencies the higher places are safest.’

(6) *Procurator*, no doubt, is the Steward; and, according to our author, he is to have a watchful eye over the Bailiff, and consequently a superior officer; tho’ *Popma* says he is *socius villici, & omnibus rebus administer*. He kept the family accounts, and those of the whole estate. The name is applicable to a great many different things, of which a man may have the oversight committed to him.

(7) *Villicus*, properly was an officer, who had the direction of cultivating the ground, and employing the servants for that purpose, according to their several capacities; and to see that they did their business, had their victuals, cloaths, &c. duly given them. He was

both have a magazine hard-by, where all the implements of Husbandry may be laid up. Let cells be placed for the Herdsmen and Shepherds hard-by their own cattle, that they may have the conveniency of fallying out easily at any time to take care of them. Nevertheless they ought all to lodge as near to one another as possible, that so the diligence and care of the Bailiff may not be too much extended, when he goes round all the different parts; and that they may be witnesses among themselves of each other's diligence or negligence.

As to that part appropriated for the fruits of the ground, it is divided into an oil-cellar, a place for the wine and oil-presses, a wine-cellar, a place for boiling must (8), hay-lofts, straw and chaff-lofts, storehouses, and barns, that such of them as are even with the ground may be used for keeping of moist things, as wine and oil for the market; but that such things as are dry may be gathered together, and laid up in lofts, as all sorts of corn, hay, leaves, straw, chaff, and all the other sorts of forrage. But let the granaries, as I said, be accessible only by ladders; and let them receive air from the north by very small windows; for that quarter of the heavens is the coldest, and the least moist of any; both which contribute much to the preservation of corn laid up in granaries. There is the same reason for the wine-cellar's being placed in the lower part of the house, which ought to be at a great distance from the baths, oven, dunghil, and other nastinesses, which send forth a stinking smell; nor ought it to be at a lesser distance from cisterns, cascades, or spouts of water, from which there is a moisture attracted, which corrupts and spoils the wine.

Nor does it escape me, that there are some who think, that a barn, covered with an arched roof, is the best place for laying up corn in, the ground or earthen floor of which, before it is paved, or any other flooring laid upon it, being dug up, and moistened with fresh lees of oil, and not with what has salt in it, is beat close together with rammers, like *Signinian* work (9). Then, after it is fully dry, they cover

an officer of great trust among the *Romans*, especially those who applied themselves to agriculture. He had the oversight and care of the whole villa.

(8) *Defrutarium* was the place where they boiled their must, in order to reduce it to one third, or an half, of the first quantity. The first they called *defrutum*, the second *sapa*, according to our author, *lib. xii. c. 21*. Of this must, boiled in to a certain quantity, or *rob of grapes*, as I sometimes call it, the antients made great account: they mixed it with their wines, in order to preserve and keep them from spoiling; they preserved their fruits with it, and, as may be seen in this author, applied it to several uses.

(9) *Signia*, a town in *Latium*. The inhabitants were called *Signini*. They, it seems, contrived a plaister or flooring made with bruised tiles, or sheards of earthen vessels, and lime, tempered together. With this composition they made very durable floors, &c. and this they called *opus Signinum*. See *Plin. nat. hist. lib. xxxv. cap. 12*.

it over, in like manner, with floorings made of bruised tiles, which, instead of water, have been tempered and wrought with lees of oil, mixed with lime and sand, and which, with great force, are beaten down with rammers, and smoothed; and all the joinings of the walls and the floors are buttoned with bolsterings made of bruised brick or tile: for, as buildings commonly crack and fall into chinks in these parts, they afford holes and lurking-places for subterraneous animals. But the granaries are also distinguished with partitions or corn-bings, that every sort of pulse may be placed separately by itself. The walls are plaistered with clay well wrought with lees of oil, with which, instead of straw, are mixed the dry leaves of the wild olive; or, if these cannot be had, those of the olive-tree. Then, when the foresaid plaister is dried, it is sprinkled over again with the lees of oil; and, after it is dried, the corn is brought in. This seems to be the most proper of any thing for preserving corn, or any other fruits of the earth whatsoever, that are laid up in store, from receiving hurt from wevils, and such-like animals, which, unless they be carefully laid up, are quickly consumed by them.

But this kind of barn, which I have described, unless it be situated in a dry part of the manor-house, corrupts, with mouldiness and dampness, even the strongest grain whatsoever. And, if there be no moisture there, corns may be also kept in pits under-ground, as in certain provinces beyond sea, where the ground, being dug up after the manner of wells, which they call *siros* (10), receives the fruits which itself produced. But we, in our regions, which superabound in moisture, rather approve of such a barn as is raised high above-ground, and of this careful way of making the floors and the walls of it; for, as I said before, the floors and sides of the barns, being thus secured, hinder the wevil to get in. Many think, that, when this kind of destructive pest gets into the corn, it may be thrown out, or checked, if the corns that are gnawn, be winnowed in the barn, and, as it were, cooled and refreshed. But this is intirely false; for, by so doing, those animals are not thrown out, but are mixed with the whole heaps of corn;

(10) *Siros*, in Greek *σειρῆς*, subterraneous granaries, or caves for holding corn, or holes dug in the ground. Some think it is originally a *Persian* word. *Varro*, *lib. i. c. 57.* says, that they were in use in *Cappadocia* and *Thrace*; and that they made use formerly of such repositories for their grain in some parts of *Spain*, and about *Carthage*; that they covered their bottoms with chaff and straw, and took great care, that no moisture should get into them, or the air reach them, except when they brought them out for use; for, where no air comes, the wevil does not breed. Wheat, he says, laid up in this manner, will keep even forty years without spoiling; and millet a hundred. He adds, that, when they open them, they must stay some time before they go down into them, for fear they be stifled.

which, if they continue as they are, without being moved, only suffer damage in the upper parts, because the weevil never breeds below the space of an hand-breadth; for it is much better to expose that only which is already spoiled, than the whole, to danger: for, when you have occasion to use it, it is easy, after you have taken away that which is damaged, to make use of that which is lower, and altogether sound. But tho' I may seem to have mentioned these things out of their proper place, yet I have not done it unseasonably.

The oil and wine-presses, and the oil-cellars especially, ought to be warm, because every kind of liquor is more easily dissolved or kept fluid with a gentle heat, and is more bound up and congealed with cold. Oil, if it freezes, which seldom happens, will grow musty, and corrupt. But as natural heat is wanted, which is procured by the situation and the climate, so there is no occasion for fire, or the flame of a candle, because the taste of the oil is spoiled by smoke and soot: for which reason the oil-press ought to receive light from the south quarter, that so we may be under no necessity of making use either of a fire or a lamp, when the olive-berries are pressed.

Let the caldron-room, where your sodden wine, or rob of grapes, is made, be neither narrow nor dark, that so the servant, who has the charge of boiling it down to a certain quantity, may go about his business without inconveniency. The smoke-room also, wherein wood, that has not been long cut, may be speedily dried, may be made in the rustic part of the manor-house, joining to the rustic baths; for these are also necessary for the servants to bathe in, but only upon holydays; for the frequent use of them is, by no means, proper for strengthening the body.

Repositories or storehouses for wine will be rightly placed above those places, from whence, for the most part, smoke arises; for wines grow old more quickly, and attain to early maturity, by an uninterrupted communication of smoke to them: for which reason there ought also to be another loft, whither they may be removed, lest, on the other hand, they be tainted with too much fumigation. As to what relates to the situation of the manor-house, and the disposition of the several parts thereof, enough has been said.

Moreover, it is necessary, that those things also be about a manor-house; an oven and a mill, of such bigness as the number of the future inhabitants shall require; two ponds at least, the one for the service of cattle, and for geese; the other in which we may steep lupines, willows, rods, and other things, which are proper for our occasions. Let there be also two dunghils, one which may receive new off-scourings
and

and filth, and keep them a whole year; and a second, from which the old may be carried. But let both of them have their bottoms somewhat shelving, with a gentle descent, in the manner of ponds, both well built and paved, that they may not let the moisture pass through; for it is of great importance, that the dung retain its strength by the juice of it not being dried up; and that it be continually soaked in liquor, that so, if there be any seeds of thorns or grasses thrown into it, with straw or chaff, they may perish, and, when carried out into the fields, not fill the corns with weeds. Wherefore skilful Husbandmen, whatever sweepings they carry out of the folds or stables, they put hurdles made of rods upon them, and cover them, and don't suffer them to dry with the winds, or be burnt up with the violent heat of the sun.

The threshing-floor, if it can be conveniently done, must be so placed, that the Master, or the Steward at least, may look down from his apartment into it. That is the best which is paved with flint, because the corns are both quickly beaten out, when the ground does not yield to the beating and thumpings of the hoofs of the cattle, and of the threshing-instruments; and also when the same are winnowed, they are cleaner, and without stones and small clods of earth, which commonly a threshing-floor, made of earth, throws up during the threshing. And there ought to be a shed built adjoining to the threshing-floor, especially in *Italy*, because of the inconstancy of the weather, into which the corn, that is half-threshed, may be carried, and sheltered, if a sudden shower should unexpectedly happen: for, in some countries beyond-sea, where there is no rain in summer, there is no occasion for this. The orchards and gardens must be inclosed or walled round, and be near at hand, and in that part, into which all the dung and dirt of the poultry-yard and bagnios, and the rotten lees squeezed out of the olive-berries, may flow; for both the pot-herb and the tree is made glad and thrives with this kind of nourishment.

C H A P. VII.

Of the Offices of a Master of a Family.

AFTER the owner has got into his possession all these things, either ready prepared to his hand, or has put them into this order and condition himself, as in all other things, so principally with respect to men, his own chief care is requisite; and these are either farmers,

farmers (1), or servants loose or kept in chains. Let him treat his farmers with civility, and shew himself easy and gentle towards them, and more greedily exact their work than their payments from them; because this is both less offensive to them, and, upon the whole, is of greater advantage; for, where land is carefully cultivated, for the most part, it brings gain, and never any loss (except when storms and tempests (2), or the outrageous violence of robbers, surprize them); therefore the farmer dares not demand an abatement.

But neither ought the landlord to be tenacious of his own right in every thing to which he has bound his tenant; such as in exacting punctual payment upon the very days the money becomes due, and wood and other additional duties, over and above his rent, the care of which brings greater trouble than expences to peasants. Nor indeed must we exact all that the law allows; for the antients thought, that the *rigour of the law was the greatest oppression and vexation*: nor, on the other hand, must we intirely give up our claim and right, because even the best of debtors, as *Alphius the usurer* (3) is reported to have said very truly, become bad, by not being called upon to make their payments. And I myself have heard *Lucius Volusius* (4), an antient man, who was Consul in our memory, and a very rich man, affirm, that that landlord's estate was the most happy, which had tenants that were natives of it, and, by a long familiarity, even from their very cradles, always retained them, as if they had been born upon their own paternal inheritance. And indeed it is my opinion, that frequent letting of the ground is a bad thing; but that nevertheless a farmer that lives in town is the worst, who chuses rather to cultivate land by his servants,

(1) The *Romans* frequently lett their lands to freemen, who either paid them in kind, or in money, so much yearly; or they gave them a certain allowance for their labour, and the landlord had the remainder. Sometimes they cultivated them by their slaves, under the care and direction of a Bailiff, as has been already mentioned.

(2) Unusual stormy tempestuous weather was, by the *Romans*, called *vis major cæli*. The *Greeks* called it *ἄστυ βίαν*, whereby they signified, that storms of wind, hail, lightning, &c. which prove destructive to the fruits of the ground, are calamities sent by Heaven for the punishment of mortals. And it may be remarked, as an instance of the equity of their laws, that, in the opinion of their greatest lawyers, when the fruits of the earth were thereby more hurt than the tenant was able to bear, he was not to sustain the loss; *non debet conductori esse damnosa, leg. 19. digest. tit. 2. locati conducti*. The landlord, I suppose, not only lost his rent for that year, but also maintained his tenant, if all was swept away, as frequently happens in those countries.

(3) *Alphius*, a famous usurer, whom *Horace* mentions in his second epode; a man who understood his own interest mighty well, and how to place his money to the best advantage.

(4) *Lucius Volusius Saturninus* was Consul in the year of the city 808. He is called *Quintus Volusius* in the *Fasti*. He is several times mentioned by *Pliny*, particularly *lib. vii. c. 14*, & *c. 48*. as having lived to a very great age.

than by himself. *Saferna* used to say, that, from such a man as this, instead of your rent, you have commonly a law-suit: for which reason we must be at some pains to retain people that live constantly in the country for our farmers, and such as may continue with us, when either we are not at liberty to cultivate our land ourselves, or that it is not expedient to do it by our servants; which nevertheless does not happen but in those regions, which are uninhabited and desolate, by reason of the badness of the air, and the barrenness of the soil. But when the air is tolerably wholesome, and the land tolerably good, it never happens, that every man's own care does not bring him in more from his land, than that of a farmer; nor does it ever happen, even suppose you commit it to a Bailiff, unless either the greatest negligence or rapaciousness of the servant intervene; both which crimes, there is no manner of doubt, are, for the most part, either committed or cherished by the master's fault, seeing he has it in his power to beware either not to set such a person over his affairs, or to take care to remove him after he has appointed him.

Nevertheless, in lands that lie at a great distance, to which a master of a family cannot easily make excursions, it is more tolerable to have any kind of land in the hands of farmers, that are freemen, than of Bailiffs, that are slaves, but especially corn-land, which a farmer cannot at all destroy, and turn topsy-turvy, (as he may do vineyards, and plantations of trees for supporting vines) and which servants do great mischief to, who lett out your oxen to hire, and feed both them and the other cattle very sordidly; nor do they carefully plow the ground; and charge to your account much more seed sown, than what they have really sown. But neither do they assist what they have committed to the earth, in such a manner, as that it may yield a good increase. And, when they have brought it into the threshing-floor, while they are threshing it, they daily lessen it, either by their knavish tricks or negligence; for they both steal it themselves, and neglect to keep it safely from other thieves. Neither do they faithfully bring to their account what they have laid up in store. So it comes to pass, that both the agent and the other servants are transgressors, and the land is often defamed and decried. Wherefore I am of opinion, that a manor of this kind ought to be lett, if, as I said, it must be deprived of the presence of the landlord.

C H A P. VIII.

(I) *Of Cattle, and of Herdsmen and Shepherds, and such as have the Oversight of Cattle.*

THE next care is concerning servants, what office or business it may be proper to set such and such of them over, and to what works to destinate each of them: therefore I premonish, that we take care not to institute and appoint a Bailiff out of that kind of servants, who have pleased with their body; nor indeed of that order, who have exercised any city-trades, or delicate crafts. This kind of slaves is sluggish and sleepy, accustomed to ease and idleness, sports and diverting fights in the *Campus Martius*, the *Circus*, and the *Theatres*; to dice, tipling-houses, and common stews; and they never cease to dream of the same follies, which when they have transferred into Husbandry, the master does not sustain so much loss in the servant himself, as he does in his whole affairs.

One must be chosen, who is hardened to rural labour and business from his infancy, and is well known by trials of his capacity. Nevertheless, if you have no such person as this, let one of those be set over your affairs, who have undergone a laborious servitude; and he must be of such an age as to be past the *prime of his youth*, but not as yet upon the borders of *old age*; lest the *first* lessen his authority to command, seeing those that are more advanced in years think it below them to obey a stripling; and lest the *second* succumb under the weight of a most laborious employment. Let him be therefore of a middle age, of firm strength, skilful in rural affairs, or at least a person of the greatest diligence and care, that he may learn the more quickly: for it is not the way to forward our business, that one should command, and another teach; for he is, by no means, capable of exacting and seeing work rightly done and finished, who learns, from one that is subject to him, what, and in what manner it must be done.

Also one that is illiterate, provided he have a very tenacious memory, may do the business conveniently enough. *Cornelius Celsus* says, that a Bailiff of this stamp oftener brings money to his master, than his book; because, not knowing letters, he may be less able to forge,

(1) The title of this chapter is very improper, there being no mention therein either of cattle, or of those that take care of them; but only of the Bailiff and his office, and the care and attention that a master of a family ought to bestow, both upon him and his other servants.

contrive, and frame accounts by himself, or may be afraid to do it by another, because he will be privy to his villainy. But whatever he be who is your Bailiff, you must assign him one of your women for a mate to live with him, that she may restrain him, and yet be a help to him in some things.

The same orders must be given to the Steward or Agent, that he may not have any intimate correspondence with any of the domestics, and much less with a stranger. Nevertheless, if he shall know any one of them to be active and forward in managing and dispatching business, let him condescend to admit him sometimes to his table, upon an holiday, as a mark of his respect. Let him offer no sacrifices but by the order and direction of his master. He shall not admit into the house any diviners or cunning-women; both which kinds of persons, with their vain superstition, drive ignorant and unexperienced minds to expences, and afterwards to flagitious practices. Neither shall he know any thing of the city, or of any fairs or public markets, unless it be in order to buy or sell any thing belonging to himself; for a Bailiff, as *Cato* says (2), ought not to be a walker or rambler, nor to go out of his bounds, unless it be in order to learn something relating to Agriculture; and this is to be allowed, if it be so near at hand, as he may be able to come soon back again. Let him not suffer any foot-paths, or new boundaries or land-marks, to be made in the land; neither let him entertain any guest, unless he be his master's friend, or intimate acquaintance and relation.

As the Bailiff must be restrained from these things, so he must be exhorted to take care of all the implements of Husbandry, and iron tools, and that of them he lay up well repaired, and keep in safe custody, double of what the number of the servants requires, that there may be no occasion to borrow from neighbours; because there is more lost in the servants day's work, than is spent in the price of things of this sort. Let him keep all the servants neat, and rather usefully than delicately cloathed, and carefully secured from the wind, cold, and rain; all which are provided against, and kept off, with leather-coats with sleeves, coats made up of many patches, and short frocks with cowls. If this be done, no day is so insupportable, wherein something may not be done in the open air.

Let him not only be a skilful artist, with respect to every thing relating to Husbandry, but also be furnished with the virtues of the mind, as much as his servile disposition and temper of mind does admit, that

(2) *Cato*, v. 2.

he may neither govern with remifness, nor with cruelty. Let him always cherish fome of thofe that are good; nevertheless let him alfo spare thofe that are not fo good as they ought to be, fo that they may rather fear his feverity, than deteft and abhor his cruelty. This point he may gain, if he will rather chufe carefully to keep thofe that are under his command from committing faults, than, by his own negligence, lay himfelf under a neceffity of punifhing delinquents. And there cannot be a *stronger guard* fet even upon the wickedeft man living, than a rigorous exacting of his work. Let the Bailiff always make his appearance, and fhew himfelf, that the daily tasks may be performed; for fo both the overseers and directors of fuch and fuch particular works will carefully execute their offices; and the reft of the fervants, after they are fatigued with their work, will rather fet their mind upon reft and fleep, than upon pleafure and paffime.

Now, I wifh that thofe antient, but excellent customs, which are now become obfolete, could be brought again into ufe: *Let him not make ufe of the fervice of any of his fellow-fervants, but in affairs belonging to his mafter. Let him not eat but in the fight of all the fervants, nor any other thing but what is given to the reft; for thus he will take care, that both the bread be well baked, and the other things be wholfomely prepared. Let him not fuffer any body to go without the bounds, unlefs he be fent by himfelf; but neither let him fend them himfelf, unlefs when great neceffity obliges him. Neither let him carry on any bufinefs or commerce of his own, or employ his mafter's money in buying either animals, or any other things, in order to fell again; for this trafficking diverts the Bailiff from the care of his mafter's affairs, and never fuffers him to balance accounts with him, and to pay him to the full; but, when he is required to pay the money, inftead of the money, he fhews the goods.*

Nevertheless, upon the whole, this one thing, above all others, muft be required of him; *viz.* that he do not think himfelf to know any thing whatfoever, which he is ignorant of; but that he always feek to learn what he does not know: for, when it profits much to do any thing fkilfully, then it hurts more to have done it amifs. For there is one thing, and that only, which bears fway, and is the turning point in Hufbandry; *viz. to do, once for all, whatever the method and manner of the Culture requires;* for whenever the imprudence or neglect is rectified, the thing itfelf has already fufained damage; nor does it afterwards yield fuch abundant increafe, as both to reftore itfelf fo far as it is loft, and to recover and make up the gain you might have got by it in times paff.

As to the other servants, those following precepts must, for the most part, be observed; and I don't repent, that I myself have kept them carefully; *viz.* that I would oftener, and with greater familiarity, speak to rural than to town servants, provided they had behaved themselves tolerably well; and when I understood, that their constant labour was alleviated by the master's gentle behaviour and affability, I would sometimes also jest and be merry with them, and allow them greater liberty to have their jests. This also I often do: I deliberate and advise with them concerning any new works, as with persons that have more skill, that thereby I may know what sort of genius, and what stock of prudence, every one of them has. Then, I also observe, that they set about that work more willingly, which they have been consulted about, and which, they think, has been undertaken by their advice.

Now, it is the usual practice of all people that are circumspect, and they never fail, to review the slaves that are confined in the workhouse; to examine very narrowly, if they are carefully chained, and whether the places of their confinement are strong and secure enough; or whether or not the Bailiff has bound any person without the master's knowledge, or put him under closer confinement: for the Bailiff ought to be exceeding careful of those two things; *viz.* that whomsoever the master of the family has inflicted this punishment upon, he (the Bailiff) should never release him from his fetters, but by his permission; and whomsoever he has put in bonds by his own authority, he should not loose him, before the master knows it. And the master of a family ought to inquire so much the more narrowly about this kind of servants, lest they be injuriously treated, either as to their apparel, or any other thing allowed them; inasmuch as they, being subject to more persons, as Bailiffs, Directors, and Overseers of the works, and Keepers of the prison and workhouse, are more liable to suffer injuries; and, on the other hand, are more to be dreaded, when they are hurt either by cruelty or avarice. Therefore let a diligent master inquire both of themselves, and also of the other servants that are not in bonds, who are most to be credited, whether they receive all their just dues, according to his appointment; and let him examine into the goodness of the bread and drink, by tasting them himself, and review and examine into their cloathing, mittens, and shoes; and let him often give them liberty and opportunity to complain of those, who either use them barbarously, or cheat and deceive them. We indeed are as careful to do justice to, and avenge those, who complain with any appearance of justice, as to correct and punish those, who raise seditions and uproars among the servants, and calumniate their Overseers and Directors;

and, on the other hand, we bestow rewards upon those, who behave themselves with activity and diligence.

To women also, who have been more fruitful than ordinary, who, for a certain number of children, ought to be honoured and respected, we have sometimes given rest from labour, and also their liberty, when they had educated and brought up many sons; for she, that had three sons, was exempted from labour; and she, that had more, obtained her liberty also. For this justice and care of a master of a family contributes much to increase his estate.

But, whenever the master of a family returns from the city, let him remember to pay his devotion to his household gods. Then, if it be a proper time, and early in the day, let him presently, if otherwise, the next day, carefully visit and survey his bounds, and review all the parts of his land, and consider, whether his absence has not occasioned some relaxation in the discipline and watch; whether any tree, whether any vine, whether any fruits of the ground, are out of their place, and gone. Then let him also muster all his servants, and number his cattle; and look over all the tools belonging to the ground; and his household furniture. All which things if he purpose and resolve to do for many years, when old age shall come upon him, he shall enjoy the advantages of a regular and well-ordered discipline; nor shall he ever be so decrepit or worn out with years, as to be despised by his servants.

C H A P. IX.

Of what Size and Plight of Body the Slaves must be, which are to be assigned to every particular Work.

WE must also tell you, to what business or works we think every particular habit of body and mind proper to be appointed. The sedulous and most frugal you must make Overseers and Masters of your works; for both these qualities contribute more to this business, than either stature or strength of body; because this employment and service is an office of diligent watchfulness, and of art. The genius or disposition of the mind, tho' necessary in a Herdsman, or in one that labours with oxen, nevertheless is not enough, unless the hugeness of his voice, and the bulk of his body, make him formidable to the cattle. But let clemency moderate his strength, because he ought to be more
terrible

terrible than cruel, that the oxen, not being worn out and consumed with the vexation of labour, and blows at the same time; may both be obedient to his commands, and hold out for more years. But what the offices of Masters and Overseers of the works, and those of Herdsmen, and Labourers with oxen, are, I shall treat of again in their own place. It suffices at present to have taken notice, that, in these, tallness and strength of body is of very great importance, but, in those, of none at all; for, as I said, we should make the tallest of our servants Ploughmen, both for what I have already mentioned, and also because there is no work in Husbandry, wherewith a tall man is less fatigued, because, in plowing, he leans almost erect upon the plough-tail.

A servant for low labour and drudgery may be of any size, provided he be fit for enduring labour. Vineyards don't so much require tall men, as such as are broad and brawny, and have long arms; for this make of body is more convenient for digging, pruning, and other parts of culture relating to them.

Agriculture does not require sobriety and moderation so much in this particular business of vine-dressing, as in other parts of it; because a vine-dresser ought to do his work both in the company of many others, and also under the eye of a monitor. And, for the most part, wicked fellows are of a more quick and active spirit, which the nature and quality of this work requires; for it requires not only one that is robust, but one that is quick, active, and dextrous to attend upon it: therefore vineyards are commonly cultivated by slaves kept in chains. Nevertheless there is nothing that a sober man, of the same nimbleness and activity, will not do better than a rogue. I have inserted this, that nobody may think, that I entertain any such opinion; as to chuse to cultivate the ground rather by malefactors, than by innocent men. But this is what I think, that the business of servants should not be confounded, so that all of them should be put upon doing all things; for that is not at all for the interest of the Husbandman, either because not any one of them believes, that any particular work does properly belong to him; or because, when he has done his utmost endeavours, he believes, that he does not promote his own proper business, but that which is common to all; therefore he slackens his hand, and very much withdraws himself from the labour: nor yet can a fault, which is done by many, be found out to be done by any particular man; for which reason the Ploughmen must be separated from the Vine-dressers, and the Vine-dressers from the Ploughmen, and these from the Drudges.

The classes also, into which you rank your servants, must be made not to consist of more than ten men, which the antients called *decuries*,
and

and did most approve of, because this determinate number might be most conveniently watched over, and observed, while they were doing their work, and their multitude not confound the diligence of their Monitor, who leads the way. Therefore, if the land be of a considerable breadth, the classes must be led forth to different quarters, and the work so divided, that they may neither be by ones nor by twos; because, when they are dispersed, they are not easily watched over, and kept to their business. Nevertheless there ought not to be above ten together, lest, on the other hand, when there is too great a number together, each individual may think, that the work does not belong to him. This way of ordering and disposing them not only raises emulation, but discovers the slothful also; for whilst every one is striving to forward the work, then the punishment of loiterers is just, and seems inflicted without murmuring or complaint. But while we are giving precepts and directions to the future Husbandman concerning such things as he must chiefly look after and take care of before-hand, *viz.* the wholesomeness, the road, the neighbourhood, the water, the situation of the manor-house, the extent of the ground, the several sorts of tenants and servants, the distribution of the several offices and works, by these we come now, in due time, to the culture of the ground itself; of which we shall presently discourse at great length in the following book.

L. JUNIUS

 L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

B O O K S E C O N D.

C H A P. I.

That the Earth neither grows old, nor wears out, if it be dunged.

YOU ask me, *Publius Silvius*, what I don't refuse to inform you of without delay; Why, in the very beginning of the first book, I immediately confuted the opinion of almost all the antients, who have spoken of Husbandry; and rejected, as false and erroneous (1), their judgment, who think, that the earth, being wearied and worn out by a long-continued cultivation, and become barren by the filth, nastiness, and mouldiness it has contracted, in a long succession of years already past, is now become old? I am not ignorant, that you have a great veneration for the authority, both of other illustrious writers, and especially for that of *Tremellius*; who, after having, in an elegant and learned manner, written and published very many precepts of Husbandry, being certainly carried away and allured by too great a regard for the antients, who treat of the like subject, did, without any foundation, believe, that the *earth*, the *parent of all things*, like the female sex, being now spent and worn out with

(1) *Pliny* also, in his *natural history*, confutes the opinion of those, who think, that the earth is become old, and less fruitful than formerly; and charges its unfruitfulness upon its want of due cultivation, *lib. xvii. c. 5.* and in other places.

old age, was become unfit for the production of fruits. Which thing I myself would also acknowledge, if she produced no fruits at all: for a woman is then reckoned to be arrived at barren old age, not when she ceases to bring two or three children at a birth, but when she is neither able to conceive or bring forth at all. Therefore, after the days of her youth are past and gone, tho' a long life still remains, yet bearing of children, which is denied to years, is not restored to her: but, on the contrary, when the earth is abandoned, and left destitute of men, either by their own choice, or by some accident, yet, when they return to it again, and cultivate it, it pays the Husbandman with a very large usury for the time it ceased. Therefore the earth's old age is not the cause of the small quantity of her fruit, seeing that, when once old age has invaded and come upon her, she has no regrefs, no way to recover herself, to take heart, and grow young again.

Nor indeed does the weariness and faintness of the ground diminish the fruit that is due to the Husbandman; for it does not become a wise man to be induced to believe, that, as in men *weariness* follows upon, and is occasioned by, too violent exercise of the body, or the weight of some burden, so it is with land, by its being tossed and tumbled by frequent cultivation. Why is it therefore, say you, that *Tremellius* positively affirms, that woodlands, which were never tilled, when they are first cultivated, bring forth abundantly; but, soon afterwards, they don't thus pay the labour of the Husbandman? He sees, no doubt, what comes to pass; but why, it is so, he does not thoroughly understand. For land, which has lain long uncultivated, and which, from being all covered over with wood, has been lately reduced into corn-land, ought not therefore to be reckoned the more fruitful, because it has lain untilled, and is younger; but because, being fattened, as it were, with the more plentiful nourishment, which it received from the leaves and herbs, which it naturally produced, during the course of many years, it has strength enough to bring forth, educate, and bring to perfection, the fruits that grow upon it. But when the roots of the herbs, which are torn up and broken with spades and ploughs, and the woods which are cut down with the ax, have left off nourishing their *mother* with their leaves, and when such leaves as fell down from shrubs and trees in the autumn, and lay upon her, are, presently after, turned over with the sock, and mixed with the lower ground, which, for the most part, is leaner, and afterwards consumed, it follows, that the ground, being deprived of its former nourishment, grows lean.

It is not therefore from weariness, as very many have believed, nor from old age, but indeed from our own slothfulness, that our cultivated
lands

lands don't so bountifully answer our expectation as formerly; for we might receive a greater product, if the earth were refreshed and cherished with frequent, seasonable, and moderate stercoration: of the culture of which we shall now discourse, as we promised in the first book.

C H A P. II.

Of the several Kinds of Land.

THEY who had the greatest skill and experience in Husbandry, O *Silvanus*, have said, That there are three kinds of land (1), *champain*, *hilly*, and *mountainous*. They approved most of a *champain*, situated not upon a perfectly equal and even plain, nor exactly upon a level, but somewhat declining; of a *hill* rising gently, and by degrees; and of a *mountain* not lofty and rugged, but covered with plenty of wood and grafs. And to each of these kinds they assign six different species of land; *viz.* that of a fat or lean, loose or dense, moist or dry soil; which qualities, compounded and mixed alternately with one another, make very many varieties of land. To enumerate them, is not the business of the ingenious Husbandman; nor indeed is it the business of any art to wander over all the different species, which are innumerable; but to begin with generals, which can be easily joined together by the thoughts of the mind, and brought within the compass of words.

Therefore we must have recourse to certain conjunctions, as it were, of qualities, that are unlike or contrary to one another, which the *Greeks* call *συζυγίας ἐναντιοτάτων*, and we shall tolerably well call the *matching*

(1) *Varro, lib. i. cap. 6.* describes the conveniencies and inconveniencies of these three different situations of land: 'In champain lands, he says, the heat is greater, as in *Apulia*, where it is very grievous. Lands that are mountainous, as those of *Vesuvius*, are lighter, and so more wholesome. They who cultivate low lands, suffer greater inconveniency in summer; but high lands more in winter. Low grounds are both sown and reaped earlier in the spring, than those that are high. Some things grow taller and stronger upon mountains, because of the cold, as firs and oaks, &c. Other things thrive best below, because it is warmer, as the *almond-tree*, and the *Mariscan fig-tree*. Corn-lands are most esteemed upon plains; vineyards upon little hills; and woods upon mountains. They who inhabit champains, are best accommodated in winter, because then the meadows have plenty of grafs, and trees can then be tolerably well pruned. On the contrary, it is more convenient living upon mountains in summer, because then there is plenty of forrage there, when all things are withered and burnt up below; and the culture of trees is more commodiously performed, because there the air is colder. A champain, which tends or declines equably towards one part, is better than that, which lies exactly upon a level.' With several other observations too tedious to mention.

or *joining together of discordant things*. And we must also inform you, that, of all the things which the earth brings forth, there are more of them which thrive better upon a champain, than upon a hill, and in a fat foil, than in a lean. As to things growing in foils naturally dry, or well watered, we don't find out, which of them exceed in number, seeing it is certain, that such as delight in dry places are almost infinite, as are also those that delight in moist; but there is not any one of them, that does not grow up better in loose and open ground, than in that which is close and dense; which our countryman *Virgil* also, after he had reckoned up the other commendable qualities of fruitful land, added (2),

- ‘ A loose and crumbling foil; for, with the plough,
- ‘ We strive to make it such.’

For to cultivate is no other thing but to open, and loosen, and ferment the earth; therefore the same land, which is both fat, and loose, and crumbling, yields the greatest profits, because, at the time that it yields the most, it requires the least, and what it requires is done with very little labour and expence. Therefore such a foil may very justly be said to be the very best of any.

Then, next to this, is the *fatty-thick dense foil*, which rewards, with great increase, the charges and labour of the farmer. A *place that is well watered* is reckoned in the third rank, because it can yield fruit without any charge. *Cato*, who preferred the product of meadows to all other products of lands whatsoever, called this the best. But we are now speaking of moving and agitating the earth, and not of letting it lie still.

There is no kind reckoned worse, than that which is dry, and likewise dense and lean; because it is both cultivated with difficulty, and, when it is cultivated, it does not so much indeed as thank you: nor does it turn to good account, when you turn it to meadows or pastures. Therefore this land, whether it be tilled, or lies fallow, will always give the Husbandman reason to wish he had never meddled with it, and is to be avoided as if it were pestilential; for *this* brings forth *death*, but *that*, *famine*, death's most frightful and cruel companion, if we give credit to the *Grecian* muses, which cry aloud (3),

- ‘ With famine to consume and pine away,
- ‘ And slowly die at last, what wo so great?’

(2) *Virg. Georg. lib. ii. 204.*

(3) Διμῶ δ' αἰχμητῶν θανάτῳ καὶ πότμῳ ἐπισπᾶν;

But now we shall rather take into consideration that kind of land which is more fruitful, which must be considered under two different views; *viz. as cultivated*, and *as covered with wood*. We shall first speak of reducing woodlands into the form of arable ground; because clearing of land is of an older date than the cultivating of it. Let us therefore consider a place that is not cultivated, whether it be dry or moist, full of wood and trees, or rugged and craggy, and full of stones; whether it be covered with rushes or with grass, and encumbered with fern-plots, and nurseries of other shrubs. If it be wet, let the abundance of moisture be first drained and dried up by ditches. Of these we have known two sorts, *blind* or *bidden*, and *open*. In thick and chalky grounds they are left open; but, where the ground is more loose, some of them are made open, and others of them are also shut up and covered; so that the gaping mouths of such of them as are blind may empty themselves into those that are open. But it will be proper, that the open ones be wider towards the upper part, and sloping and narrow towards the bottom, like ridge-tiles inverted; for such of them, whose sides are perpendicular, are presently spoiled with the water, and filled up with the falling down of the ground that lies uppermost.

Moreover, these blind works ought to be made by sinking furrows three feet deep, which, after they are half-filled with stones and bare gravel, are made even, by throwing upon them the earth that you digged out of them; but, if you have neither stones nor gravel, you must make, as it were, a rope of sprays tied together, of such a thickness, as the bottom of the narrow ditch may receive it when it is pressed together, and, as it were, exactly fitted to it. Then it must be stretched all along the bottom; and, after treading cypress or pine-boughs upon it, or, if these cannot be had, any other boughs, let it be covered with earth, having placed at the head and mouth of the ditch two great stones only, instead of pillars, and one single stone above these, after the manner of little bridges, that this kind of structure may support the bank, that it may not be shut up, and the water hindered either to run into it, or out of it.

There are two ways of managing tracts of land that are covered with wood, shrubs, and bushes, either by extirpating the trees by the very roots, and removing them; or, if they be thin, by cutting them down, and setting them on fire, and plowing up the ground. But it is easy to clear stony ground, by picking up the stones; and, if there be a great number of them, some parts of the ground must be taken up with building them into certain piles, that so the other places may be clear of them; or the stones must be buried in furrows dug very deep: which never-

theless is only to be done, in case the low wages of the labourers engage you to do it.

The destruction of bulrushes and grafs is *trenching*; and of fern, frequently plucking them up by the roots, which may be done even with the plough; for, when they are often pulled up, within the space of two years they die, and the more speedily also, if, at the same time, you dung, and sow with lupines or beans, that, with some return and profit, you may cure the distemper of the ground; for it is certain, that fern is the most easily killed by sowing and dunging: but, if you cut it with a weeding-hook, as it grows up from time to time, which is business for a very boy, its liveness is destroyed within the foresaid time.

But now, after the method of clearing rough uncultivated land, follows the care of lands, that are newly broken up and cultivated; of which I shall presently declare my opinion, after I shall have given such precepts and directions to such as desire to inform themselves of the nature of corn-lands, as must be first learned.

I remember, that very many of the antients, who have written of Husbandry, have declared, that the peculiar *sweetness* of the ground; the *abundance of herbs and trees, and the fruit*, they produced, and its *black or ashy colour*, were, as it were, acknowledged uncontested and undoubted signs of land that was fat, and would bear corns in abundance. As to the rest, I am doubtful; but, as to the *colour*, I cannot enough admire, that both other writers, and also *Cornelius Celsus*, a man not only well acquainted with Husbandry, but also with universal nature, should have been so much mistaken, both in their judgment, and also in their eye-sight, that so many marshes, and so many fields also full of salt-pits, which, for the most part, are of the foresaid colours, did not occur to them: for we scarcely see a place, which is not either of a black or ashy colour, provided it contain any water that moves slowly; unless I myself perhaps am deceived in this, that I don't think, that exceeding good corn can grow or thrive well either in a marshy or slimy, or in a bitter and cufy soil, or in plains lying upon the sea-side, which are full of salt-pits. But this error of the antients is too manifest to want to be confuted by many arguments.

The colour therefore is no certain authority, nor sure evidence, of the goodness of arable lands; and therefore *corn-land*, that is, *rich fat land*, must rather be judged of by other qualities; for as the strongest cattle have different and almost innumerable colours, so also the strongest lands have a great number and variety of them. Therefore as we must take care, that the ground, which we mark out by its colour for cultivating, be fat, yet this is but of very little importance by itself, if it
want

want sweetness; both which we may inform ourselves of in a manner expeditious enough: for you sprinkle a very little water upon a clod of it, and knead it with your hand; and if it be glutinous, and if, when pressed with the gentlest touch, it sticks to your fingers, and, as *Virgil* says (4),

- ' When handled, clammy grows, and sticks, like pitch,
- ' Fast to the fingers;'

And if, when the same is thrown against the ground, it does not crumble, and fall into small bits, this tells us, that, in such matter, there is a natural inherent juice and fatness; but also, if after having thrown the earth out of some trenches, you would replace and put it up very close, and tread it down again, when, with some kind of ferment, as it were, there is more than enough of it for filling up the trench, it will be a certain sign, that it is fat; and when there is not enough, but somewhat wanting, we may be sure, that it is poor and lean; and, when it exactly fills them, that it is middling: tho' these things I have now mentioned may possibly seem not to be so true signs, as if the earth were somewhat of a blackish colour, which is best tried and approved by the increase of the fruits it produces.

We shall also know it by its taste, if out of that part of the land, which displeases us most, there be clods dug, and soaked in an earthen vessel, and thoroughly mixed with sweet water, and carefully strained, in the manner of dreggy wine, and then carefully examined by the taste; for whatever taste the water shall have, which it has derived from the clods, such we shall say the ground has.

But, besides this experiment, there are many things, which may shew, that the earth is both sweet, and fit for corn, as *the rush, the reed, grass, the dwarf-elder, bramble-bushes, wild plum-trees*, and many other things, which are also known to them that search for water, and are not nourished but by the sweet veins of the earth. Nor must we be contented with the appearance of the surface of the earth, but carefully search to find out the quality of the matter that lies below, whether it be earthy, or not. But it will be sufficient for corns, if the ground below be equally good two feet deep. The depth of four feet is abundantly enough for trees.

When we have thus carefully examined and made experiments upon these things, we must prepare the land for sowing the seed. And the land yields no small increase, if it be carefully and skilfully manured:

(4) *Virg. Georg. lib. i. 250.*

wherefore almost all the most antient writers have written of, and described, the form or method of this work, which Husbandmen might follow as *maxims*, and as a law, in tilling their lands.

It is therefore proper, that, when the oxen are at work, they be yoked close to one another, that they may go the more gracefully, with a lofty air, and their heads elate; and that their necks may be the less weakened, and the yoke be fitted to, and fit the better upon, their necks (5); for this way of yoking is most approved: for that which is in use in some provinces, of fastening the yoke to their horns, is rejected almost by all, who have written any precepts or directions for Husbandmen. Nor is it without reason; for the cattle can exert themselves, and use greater efforts, with their necks and breasts, than with their horns; and, by this method, they tug and strain with the whole bulk and weight of their body; but, by that, they are put to great torment, by pulling back their heads, and turning their faces exactly upward; and, with a very light plough-share, they scarcely wound the uppermost part of the earth: and therefore they till the ground with smaller ploughs, which are not strong enough to rip up the fallow grounds or lay-lands (6), which are plowed very deep; and, when they are thus plowed, it is a great advantage to every green thing that grows upon them: for, when corn-lands are thoroughly plowed with a deep furrow, both the corns and the fruits of trees grow the larger, and they yield a greater increase. Therefore I differ from *Celsus*, who, fearing the expence, which is greater in oxen of a larger size, advises to manure the land with small plough-shares and coulter, that so it may be performed with oxen of a smaller size; not knowing, that there is a greater revenue from the great plenty of the fruits of the ground, than the charges of purchasing greater cattle can amount to, especially in *Italy*, where the land, being planted with trees for supporting of vines, and with olives, requires to be opened and tilled deeper, that

(5) It seems the dispute about placing the yoke upon oxen, whether it be best to fix it upon their head or their neck, is not yet determined, seeing, in different parts of *Italy*, at present, they use it both ways, tho' what our author says against fixing it to their horns seems very reasonable; and one may easily observe, that oxen labour more when they draw with their heads, than with their necks. It seems, in *Epirus* they fastened them to their horns; for *Callimachus* calls the oxen *κεράλλεις*, because, says the scholiast, they draw the plough with their horns.

(6) *Novalia*, *novalium*, or *novalis ager*, which I translate fallow-grounds or lay-lands, properly signifies land that has never before been tilled or cultivated. *Pliny* indeed calls sometimes *novalis ager*, that which was sown every other year; he also calls by the same name land, from off which old wood has been cut. But most authors mean, by *ager novalis*, land which rests one year, and is sown the other. *Isidorus* says, that it both signifies land tilled for the first time, and also that which rests every other year, in order to renew its strength.

so the uppermost roots of the vines and olives may be cut with the plough-share; which, if they remain in the ground, are hurtful to the fruits of it; and that the lower roots, when the ground is thoroughly manured, and plowed very deep, may more easily receive nourishment from the moisture.

Nevertheless that method of *Celsus's* may be very proper and fit for *Numidia* and *Egypt*, where, for the most part, the ground, being void of trees, is sown with corns; and it is sufficient, that this sort of land, which is of a light, loose, and crumbling mould, with fat sands, as it were, loose ashes, be moved with the lightest plough-share. But the ploughman, who governs the oxen, must walk upon the plowed ground, and, at every other turning, hold the plough obliquely, and, by turns, to furrow with a strait and full plough, so as not to leave in any place the ground unplowed and unmoved, which is what Husbandmen call a *balk*.

When the oxen come to a tree, he must keep them in strongly, and make them step slowly, lest the plough-share, being driven with greater force against the root, give a shock to their necks, or lest the ox strike with great violence with his horn against the stock of the tree, or lightly touch the trunk with the extremity of the yoke, or break off a branch. Let him rather terrify them with his voice, than with blows; and let strokes be the last remedies when they refuse their work. Let him never provoke a steer with the goad; for it makes him pull back, and gives him a custom of kicking. Nevertheless let him sometimes put him in mind with his whip. Neither let him stop half-way before he come to the turning; but let him give them a little rest at the end of the furrow, that so the ox, in hopes of resting, may, with greater agility, pull the whole length. But to draw a longer furrow than one hundred and twenty feet, is hurtful to the cattle; for, when it exceeds this measure, they are fatigued more than they ought to be.

When they are come to the turning, let him push the yoke forward, and hold in the oxen, that their necks may cool, which quickly contract a burning heat (unless they are constantly cooled); and from this arises a swelling, and then ulcers. Let the Ploughman make no less use of a chip-ax than of the plough-share; and let him search after, and dig up, all the broken stumps and uppermost roots, wherewith land, planted with trees for supporting vines, is always pestered and embarrassed.

C H A P. III.

Of the Care that is to be taken of Oxen, when they are unyoked.

AS soon as the Ploughman has unyoked the oxen from their work, let him rub them down while they are girt, and press their back strongly with his hands, and pull their skin once and again, and not suffer it to stick fast to their body; for this kind of disease is very hurtful to oxen. Let him rub their necks strongly, and pour pure wine into their jaws, if they be extremely hot. It is enough to give two *sextarii* to each of them. But it is not proper to ty the oxen to their cribs, till they have left off sweating and panting. Then, when it is due time to feed them, it is not proper to give them much food, nor their whole portion, but in parts, and little by little; which when they have eaten up, they must be led out to water, and inticed to drink by whistling, that they may drink the more willingly: and, when they are brought back, they must be satiated with a larger allowance of fodder. What has hitherto been said of the office of a Ploughman, who has oxen under his care, is sufficient. Our next business is to give directions also about the proper seasons for manuring all sorts of cornlands.

C H A P. IV.

Of the Time of the Year when, and how Lands must be plowed.

FAT champain lands, which contain water the longest, must be tilled, for the first time, when the season of the year begins to grow warm, after they have brought forth all their herbs, and their seeds are not yet come to maturity; but they must be plowed with so numerous, thick, and close furrows, that it may scarcely be discerned which way the Plough-share was drawn: for thus all the roots of the herbs are torn up, and killed. But let (1) fallow-land be so reduced into

(1) *Vervactum* seems to signify the very same as *ager novalis*, land newly broken up, or fallow-land, and as our author in this 4th chapter, no doubt, understands it, when he orders it to be plowed several times over, that it may be reduced into dust; and he opposes it to *ager restibilis*, which was plowed and sown every year. The first, he says, requires double the labour that the second does. *Pliny* says indeed, that it is called *vervactum*, from the time of the year it is plowed in, *quasi vere actum*, i. e. *aratum*.

dust, by plowing it over and over again, that, when we sow it, it may require very little or no harrowing at all; for the antient *Romans* said, that *that land was ill manured, which wanted harrowing after the seed was sown.* The Husbandman ought frequently to examine and try, whether it be rightly plowed or not; and not only with his eyes, which are often deceived, the balks lying hid with the earth spread upon them, but let him examine it also by feeling it, which is less liable to deceit, when a firm and stiff pole is applied to, and put through, the cross furrows. If it has penetrated equally; and without meeting with any resistance, it is manifest, that the whole ground so far has been moved; but, if any harder part has resisted it as it passed, it is a demonstration, that the fallow-ground is not yet plowed up. When the ploughmen see this frequently done, they dare not be guilty of making balks: therefore wet champain lands ought to be tilled after the 13th of *April*. When they have been tilled about this time, you must let the days about the time of the solstice intervene; which is about the 23d or the 24th of *June*; and then they must be plowed a second time, and then a third time about the beginning of *September*; for all that have skill in Husbandry agree, that, from the summer solstice till that time, it is not proper to plow, unless the earth be thoroughly wet with sudden and unexpected showers, like winter-rains, as it sometimes happens. And, when this really happens, there is nothing to hinder, why fallow-lands, that have been plowed in the spring, may not be manured in the month of *July*.

But whenever land is plowed, we must observe never to touch it when it is miry and dirty, nor when it is half-wet with small showers; which sort of land peasants call various or speckled, and carious (2): and it is such, when, after long droughts, a light rain has only wet the upper part of the clods, but has not reached to the under part. For such corn-lands as are plowed when full of slime and dirt, are not in a condition to be handled the whole year after; and, in seed-time, are neither fit for sowing nor harrowing: but, on the other hand, such as are plowed when they are various or speckled; continue barren for three

(2) *Terra varia & cariosa.* Cato says, Beware you stir speckled and carious land either with cart or cattle. Pliny, in his *nat. hist.* explains this short expression very elegantly and fully thus: *What, says he, can be meant by this short phrase, carious ground, which Cato seems to be so much afraid of, as to forbid us almost to tread upon it? Let us compare it with the rottenness of wood, and we shall find in it those defects, which he so much abhors, dry, fistulous, or spongy, rusty, rugged, hoary, eaten, consumed, and full of holes, like a pumice-stone. Cato said more in one word, than can be expressed by the most copious language; for hereby are signified certain imperfections of the soil, proceeding not from old age, which cannot be attributed to the earth, but from its own nature; and therefore it is weak and unfruitful, and unfit for every thing.*

whole years. Therefore, in lands that must be plowed, let us chiefly follow a middle temperament, that they may neither want juice, nor abound in moisture; because too much moisture, as I said, makes them slimy and miry, and such as are dried up with droughts cannot be rightly managed; for, either by the hardness of the ground, the plough-share is rejected and thrown out, or, if it has penetrated in any part, it does not cleave the ground into small clods, but pulls it up in great turfs; which lying in the way, the land is so entangled, that it cannot be so rightly plowed a second time as it ought to be; because, by the weight of these turfs, the plough-share is thrust out of the furrow, as if some solid thing, sunk deep into the earth, did stand in its way; whereby it comes to pass, that balks are also made when it is plowed a second time; and the oxen are very much hurt by the ruggedness and grievousness of the work.

Moreover we may here add, that all ground whatsoever, tho' exceeding rich, nevertheless has its lower part poorer and hungrier; and when great sods are raised, they pull up the poor ground; whereby it comes to pass, that the more unfruitful matter, being mixed with that which is fatter, makes the crop of corn the less plentiful; also the expences of the Husbandman are much heightened by the slow progress that his work makes: for the usual tasks cannot be performed when the ground is become hard. Therefore, in drought, I advise, that what is already plowed be plowed a second time; and that rain be expected and waited for, which, by moistening the earth, may make its culture easy to us. But a *jugerum* of such land is dispatched by one labourer in four days; for it is easily tilled at first with two days labour, and plowed a second time with one, and a third time with three fourths of a day; and, with the fourth part of a day's labour, it is sown, and reduced into ridges. Husbandmen call them *ridges*, when the ground is so plowed, as that the accumulated part between two furrows, at some tolerable distance the one from the other, may afford a dry seat for the corns.

Hilly ground, where the soil is fat, must be tilled, for the first time, in the month of *March*, after the trimestrian sowing (3) is finished; but presently in *February*, if the warmth of the climate, and the dryness of the country, advise you to it. Then they must be plowed a second time from the middle of *April* till the solstice; and for the third time in the month of *September*, about the equinox. And a *jugerum* of such land is thoroughly cultivated with the same number of days labour

(3) *Trimestrian sowing* is of that sort of wheat, or other grain, which grows up, ripens, and is cut down about three months after it is sown. It is sown in the spring, where frosts and snows begin very early. This kind of wheat is common among the *Alps*.

as wet and oufy champain lands. But, in plowing, it must especially be observed, that the furrow be always drawn cross the hill; for, by this method, the difficulty arising from the acclivity of the ground is surmounted and broken, and the labour both of men and cattle is most commodiously lessened. Nevertheless, as often as we plow it a second time, the furrow must be drawn oblique, sometimes a little toward the higher, and sometimes toward the lower parts of the hill; so that we may plow it the second time toward both parts, and not labour the ground always in the same track.

Let poor lean land, which lies upon a level, and abounds in water, be first tilled about the latter end of the month of *August*, and then plowed a second time in *September*, and made ready for sowing about the equinox. But this kind of ground is more expeditiously laboured than any other; and therefore fewer days labour are bestowed upon it: for three are sufficient for one *jugerum*. Also slender, meagre, rising ground must not be plowed in summer, but about the first of *September*; because, if it is cut up before that time, it becomes barren, and loses its juice, and is burnt up with the summer sun, and has no strength remaining in it: therefore it is best to till it, for the first time, between the first and the thirteenth day of *September*, and soon afterward to plow it a second time, that it may be in a condition to be sown when the first rains fall about the time of the equinox. Nor in such land must the seed be sown on the ridges, but in the furrows.

C H A P. V.

Of the manner of dunging lean thin Land.

NEVERTHELESS it will be proper to dung lean thin land before we plow it a second time; for, by this kind of nourishment, as it were, it gathers strength. In champain lands the heaps of dung must be laid thinner, and on hills thicker, and they must be about five *modii* each; and, upon a plain, it will be sufficient to leave an interval of eight feet between them every way; but, upon declining ground, two feet less. But we are of opinion, that this should be done when the moon is declining; for this thing frees the corns from weeds. But a *jugerum* of land, which is dunged thicker, requires twenty-four loads (1), and that

(1) *Vebes stercoris*, a load of dung, *Columella* says, contains eighty *modii*, *lib. xi. cap. 2.* Each *modius* contained sixteen *sextarii*, and a *sextarius* is supposed to contain twenty ounces

that which is thinner eighteen. It is proper, that the dung, after it is spread, be presently plowed in, and covered with earth, that it may not lose its strength by the exhalation of the sun; and that the ground, being mixed with it, may grow fat with the foresaid nourishment: therefore, when the heaps of dung are laid in order upon the land, a greater number of them ought not to be scattered, than the ploughmen are able to plow down and put under ground the same day.

C H A P VI.

Of the several Sorts of Seeds.

FORASMUCH as we have taught you to prepare the earth for the seed-time, we shall now treat of the several sorts of seeds. The chief and the most profitable corns for men are common wheat (1), and bearded

of rain-water; so that a *modius* contained about three hundred and twenty ounces, or twenty-six *Roman* pounds eight ounces of rain-water: by which computation we may judge of the capacity of a *modius*, wherewith they measured their dung. The learned Dr. *Arbutnot*, who has carefully examined the *Roman* measures, both liquid and dry, says, that the *modius* was equal to 1 peck 7 solid inches and $\frac{68}{80}$ parts of an inch, or in other words, 1.0141 peck *English* measure.

(1) *Triticum*, common bare wheat, which has very little husk upon it, was, according to *Varro*, a name given formerly to all sorts of grain beaten or bruised out of ears by trituration or threshing; but afterwards it was given to a peculiar species of grain, of which there are many sorts, which take their name from the places where they grow; as *African*, *Pontic*, *Assyrian*, *Thracian*, *Egyptian*, *Sicilian*, &c. which differ from one another in colour, bigness, and other properties, too tedious to relate. One sort has its ears without beards, and is either of winter or summer. Another sort is armed with long beards, and grows up sometimes with one, sometimes with more ears. Of these the grains are of different sorts: some of them are white, some reddish, some round, others oblong, some large, others small. Some sorts are early ripe, others late in ripening; some yield a great increase, some are hungry, and yield little; some put forth a great ear, others a small. One sort stays long in the holl (folliculo); another frees itself very soon out of it. Some have a small stalk or straw; others have a thick one, as the *African*. Some are clothed with few coats, some with many, as the *Thracian*. Some grains put forth only one stalk, some many stalks. Some require more, some less time to bring them to maturity. For which reason some are called *trimestrian*, some *bimestrian*; and they say, that, in *Eubœa*, there is a sort, which may be brought to perfection in forty days; but most of these sorts, which ripen in a short time, are light, unfruitful, and yield very little, tho' they are sweet and agreeable to the taste, and of easy digestion. *Theophrastus* adds, that the wheat of *Pontus* was the lightest, and the *Sicilian* the heaviest, of any brought into *Greece*; but says, that that of *Bœotia* was heavier; and that the *athletæ* could not eat so much of it as of that of *Attica*. The cause of all these differences, he says, is in the climate, and the soil. *Pliny*, *hist. nat. lib. xviii. c. 7.* prefers the *Italian* wheat to all these; and says, that none is to be compared to it in whiteness and weight, by which it is most distinguished; and that foreign wheat was only to be compared to that, which grows in moun-

bearded wheat (2). We have known several kinds of common wheat; but of these we must chiefly sow what is called the *red wheat*, because it excels both in weight, and in brightness. The white wheat must be placed in the second rank, of which the best sort in bread is deficient in weight. The trimestrian shall be the third, which Husbandmen are mighty glad to make use of; for when, by reason of great rains, or any other cause, the early sowing has been omitted, they have recourse to this for their relief (It is a kind of white (3) wheat). The other sorts of wheat are altogether superfluous, unless any man has a mind to indulge a manifold variety, and a vain-glorious fancy. But, of bearded wheat, we have commonly seen four sorts in use; *viz.* that which is called *Clusian* (4), of a shining, bright, white colour; a bearded wheat;

tainous places in *Italy*. And that this was the common opinion of *Greece* above 140 years before the time of *Alexander the Great*, he proves from *Sophocles's Triptolemus*, where he calls *Italy fortunatam frumento candido*, fortunate for its white corn; and he says, that, in some parts of *Italy*, one plant has been seen to bear twenty-four ears; and that, in some places, the land is so fruitful, that one *modius* has produced a hundred. He says, that of all foreign wheat the *Bœotian* was the best, next that of *Sicily*, and then the *African*. The *Thracian* was the third for weight, next the *Syrian*, and then the *Egyptian*; and that the lightest wheat brought to *Rome* was that of *Gaul*, and of the *Chersonesus*, not exceeding 20 pounds the *modius*, which amounted to 240 Roman ounces, *i. e.* 18 pounds $2\frac{1}{2}$ ounces *Troy* weight, the *English* peck; that the *Sardum* wheat (I suppose he means *Sardinian*) weighed half a pound more; the *Alexandrian* and *Sicilian modius* weighed 20 pounds 10 ounces; the *Bœotian* 21 pounds; the *African* 21 pounds 9 ounces, all *Roman* weight, weighing only the pure grain. According to the weight of the wheat was the quantity of bread made out of it; and that it is a settled thing, that a *modius* of any wheat whatsoever, made into ammunition-bread, weighs always one third more than the grain; and that that is the best corn, which takes a *congius*, or ten pound weight, of water to knead it.

(2) *Adoreum far*. *Columella* sometimes mentions these two words conjunctly, sometimes separately; and, when separately, he uses them as synonymous. Authors do not agree what particular sort of corn this *far* signifies; but it appears probable, that it was a kind of husked bearded wheat. The antients called it *adoreum*, because they used it in some sacred ceremonies. Our author assigns this as a difference between the *adoreum* and the *triticum*, that the first has a firm and durable husk, and will bear moisture a long time, without sustaining any hurt; and, *cap. 9.* of this book, he says, that a *jugerum* of land requires almost double the quantity of *adoreum* more than it does of *triticum*.

(3) *Siligo*. *Pliny* says, that this is the most delicious and the daintiest of any sort of wheat, exceeding white, but without much substance or strength, only proper for moist tracts of land, such as those of *Italy*, and some parts of *Gaul*; that it never ripens equally; and that there is no sort of corn that suffers delay less, because it is so tender, that such ears of it as are ripe presently shed their grains; but, in the stalk, it is in less danger than any other corn; for it holds its ear always upright, and does not contain the dews, which occasion blasting and mildew.

(4) *Far Clusinum*, strong bearded wheat, which grew about *Clusum*, a very antient town in *Tuscany*, now called *Chiusi*. It was one of the first *Tuscan* colonies, and the seat of King *Porfenna*, who sided with *Tarquinius Superbus* against the *Romans*. It is about twenty miles from *Peruggia*, and ten from the lake *Trafimenus*. It is very little inhabited now, because of the badness of the air. *Pliny* says, that he has known a *modius* of this sort of corn weigh twenty-six pounds.

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which is called *venuculum* (5). One sort of it is of a fiery red colour, and another sort of it is white; but they are both heavier than the *Clusian*. The *trimestrian seed*, or that of three months growth, which is called *halicastrum* (6); and this is the chief both for its weight and goodness. But these sorts, both of ordinary common wheat, and of bearded wheat, must, for this reason, be kept by Husbandmen, because it rarely happens, that any land is so situated, that we can content ourselves with one sort of seed, some part of it happening, contrary to our expectation, to be either wet or dry. But common ordinary wheat thrives best in a dry place; and bearded wheat is less infested by moisture.

C H A P. VII.

Of the several Sorts of Pulse.

AS there are very many sorts of pulse or legumes, the most acceptable, and those which we see men make most use of, are *beans*, *lentils*, *pease*, *kidney-beans*, *tares*, *bemp-seed*, *millet*, *panic*, *sesam*, *lupins*, *linseed* also, and *barley*, because ptisan is made of it. Also the best of fodder for cattle are clover-grass, fenugreek, and vetches. Then next to these are chichlings and bitter vetches, and forrage which is of barley (1). But we shall first treat of those which are sown upon our own

(5) It is very difficult to determine what the author means by *far venuculum*. In the sixth book, *cap. 2.* he calls it *far vernaculum*, true Italian bearded wheat. He makes mention of a *vitis venucula* or *venucula*, which some call *venuncula*, from *Venusia* a town in *Apulia*. But it is strange, that it is not rather called *far Venusinum*, if he meant corn growing near this place. No doubt he intended to express a kind of wheat peculiar to some place or other, not easy now to determine.

(6) *Trimestrian seed*, called *halicastrum* I don't find in *Pliny*, or any other author in my hands, why this seed of three months growth is called *halicastrum*. Perhaps it may be so called, because of this sort of wheat they made that gruel or supping-stuff they called *alica*, and that it ought to be written *alicastrum*, without any aspiration. They made this *alica* of *zeia*, which is the same with *far*, which I suppose to be bearded and husked wheat. *Pliny*, *lib. xviii. cap. 5.* mentions *alica* as a sort of grain proper to be sown in the spring; and, both in that place, and *lib. xxii. sect. 16. edit. Paris.* by *Hardouin*, he takes it for that sort of grain, of which they made the gruel they called *alica*; which word seems to signify both that liquor, and the wheat of which it was made; and it seems to be so taken by *Cato*, *cap. 76.*

(1) *Farrago* seems to be derived from *far*. *Festus* says, that fodder for cattle, of several sorts of corn, cut for that purpose, was so called, as wheat, barley, tares, &c. Probably this sort of food was called *farrago*, because the *far*, or husked bearded wheat, was the chief ingredient in this mixture of several sorts of green corn. Sometimes it is called

own account, being mindful of that most antient precept, which advises us to sow last in cold places, sooner in warm, and soonest of all in such as are hot. But now we shall give directions, as if it were for a temperate climate.

C H A P. VIII.

Of the proper Time for sowing.

OUR poet is of opinion, that bearded wheat, as also other common wheat, ought not to be sown before the *pleiades* (1) set; which very thing he expresses in numbers thus:

- (2) ‘ If for rich crops of wheat, and strong bread-corn,
 ‘ Thou plow’st the ground, if corn’s thy only care,
 ‘ First let king *Atlas*’ daughters hide their heads
 ‘ At dawning of the morning.’

They are hid from our sight the thirty-first day after the autumnal equinox, which falls almost upon the 23d of *September*; by which we ought to understand, that the wheat seed-time consists of forty-six days; viz. from the setting of the *pleiades*, which happens before the 24th of *October*, to the time when the days are at the shortest; for so prudent Husbandmen observe it as a rule, neither to plow, nor to prune a vine, nor a tree, for fifteen days before the shortest day falls out, nor for as many days after it is past. We also are in no manner of doubt, but this is the proper season for sowing our seed in land that is temperate, and not all moist; but in places that are oufy, and meagre or cold,

ocymum or *ocimum*, as *Varro* says, *lib. i. cap. 31.* because it grows up quickly. But probably *ocymum* signifies a mixture of green bean-stalks, fitches, tares, and such-like, as bear-pods. But *farrago* properly signifies a mixture of wheat, barley, and such sorts of corn as bear ears, and not pods. Both *Columella* and *Pliny* say, it may be made of green barley alone. The word, which originally signified a mixture of several sorts, was afterwards used to express one sort; viz. *farrago ex hordeo*, forrage of green barley. Probably from this word comes the *French* word *fourage*, and the *English* word *fORAGE*.

(1) *Pleiades* are the seven stars in the neck of the constellation or sign *taurus* (the bull). They were called by the *Romans* *vergiliae*, because they rise in the spring, about the time of the equinox. The *Greeks* called them *pleiades*, from *πλέω*, to sail, because their rising pointed out the proper time for sailing in those days. The poets feign them to have been daughters of *Atlas* king of *Mauritania*, a great astronomer; and that, being placed in the heavens, they were called *Atlantides*.

(2) *Virg. Georg. lib. i. 219.*

or in such only as are not exposed to the sun, for the most part, it is proper to sow about the 1st of *October* (3),

‘ While th’ earth’s dry state and pendent clouds permit ; ’

that so the roots of the corns may grow strong, before they be-infested with winter-showers, frosts, or hoar-frosts.

But suppose the seed be sown in due time, yet care must be taken to make wide distances between the ridges, and frequent water-furrows, which some call drains or gutters, and so convey all the water out of the corn-lands into drains. Nor am I ignorant, that some antient authors have directed, that lands should not be sowed till the earth be thoroughly wet with rains, which, I don’t doubt, is for the advantage of the Husbandman, if they come in due time ; but if, as it falls out sometimes, the rains come late, it is right to commit the seed to the ground, tho’ it be thirsty ; and this is also practised in some provinces, where the constitution of the climate is such : for seed cast into a dry place, and harrowed in, does not rot, more than if it were laid up in a barn ; and, when a shower comes, what has been sown many days before rises up in one day.

Tremellius indeed affirms, that seeds sown before it has rained plentifully, are consumed by the fowls and ants, where the land is much dried by abundance of fair weather in summer ; and this we have often found, and still find, to be true. Nevertheless bearded wheat is more fit to be sown in this sort of land, than common wheat, because it has a husk wherein it is contained, which is firm and durable against moisture of any long continuance.

C H A P. IX.

How many Modii of Seed a Jugerum of Land requires ; and of the Cure of Seeds.

A *Jugerum* (1) of fat land requires, for the most part, four *modii* (2) of ordinary common wheat ; but, of middling land, five. If the soil is fertile, it requires nine *modii* of bearded wheat ; if it is middling,

(3) *Virg. Georg. lib. i. 214.*

(1) The *jugerum* was the most common measure of land amongst the *Romans*. It contained 28 800 *Roman* square feet ; and, compared with the *English* acre, which contains 43 560 square feet, is very near as 10 to 16, as has been said already.

(2) The *modius* was the largest common measure of capacity for things dry mentioned by

middling, it requires ten: for altho' authors are not fully agreed about the quantity, yet our own experience has taught us, that this quantity seems to be what is most proper. But, if any one refuses to conform to this, let him follow the precepts of those, who direct him to sow upon every *jugerum* of very fertile champain land five *modii* of common wheat, and eight of red bearded wheat; and they are of opinion, that seed must be allowed to middling lands in this proportion.

We are not indeed of opinion, that the quantity we have before mentioned ought always to be observed; for either the state and condi-

by our author. One may have very nearly an exact idea of the size of it, by comparing it with measures of capacity for things liquid, whose capacities are very exactly adjusted.

Rhemnus Fannius says, it was the third part of the *amphora* or *quadrantal*, which was a measure of a cubic form, the dimensions of the inside of which was a foot every way; and it was kept in the *Capitol* for a standard, and contained 80 pounds of rain-water; so consequently the *modius* contained 26 pounds 8 ounces of rain-water.

The same *Rhemnus Fannius* says, that it contained 16 *sextarii*. The *sextarius* was the sixth part of the *congius*, and from this it had its name. It is clear from several authors, that the *congius*, which was the eighth part of the *amphora*, contained 10 pounds of rain-water: so the *sextarius* contained 20 ounces; and consequently the *modius* contained 26 pounds 8 ounces, which come to about 24 pounds *Troy* weight: so that, if a vessel were made, containing this weight of clear rain-water, it would shew the capacity of the *modius* pretty exactly.

There is another way of guessing at the capacity of the *modius*, which may be gathered from *Pliny*, *lib. xviii. cap. 7.* where, comparing different sorts of wheat, he says, that a *modius* of *Gallican* wheat weighed about 20 *Roman* pounds, which is in *English Troy* weight 18 pounds 2 ounces and a half; that a *modius* of *Alexandrian* and *Sicilian* wheat weighed 20 pounds 10 ounces, which make 18 pounds 8 ounces *Troy* weight; with several other sorts not needful to be mentioned: so that, if a vessel were made, containing such a weight of the best and hardest wheat, it must come very near the *Roman modius*. But the exact way to determine the capacity of it, is to consider it as the third part of the *amphora*. The learned *Dr. Arbuthnot* makes it a little more than one peck *Winchester* measure.

Here it may be necessary to observe, how carefully the author adjusts the quantity of seed of different sorts of grain to be sown on the *jugerum*, varying it according to the quality of the ground; and, by observing the proportion the *jugerum* bears to the *English* acre, which, as has been often said, is near as 10 to 16, we may know the quantity, which, according to this author, ought to be sown in an acre of ground. We shall mention a few instances:

5	<i>Modii</i> of wheat	- - - - -	}	to the <i>jugerum</i> .
6	<i>Modii</i> of barley of two rows of grains	- - - - -		
6	<i>Modii</i> of beans	- - - - -		
3	<i>Modii</i> of pease	- - - - -		

Which in *English* measure is

Bush.	Pecks.		} <th rowspan="4" style="vertical-align: middle;">per acre.</th>	per acre.
2	0 $\frac{1}{2}$	Wheat		
2	1 $\frac{5}{6}$	Barley		
2	1 $\frac{5}{6}$	Beans		
1	0 $\frac{1}{2}$	Pease		

From the foresaid quantities and proportions one may easily know the proportions of the other sorts of seed of different grains mentioned in this chapter.

tion of the place, or of the season of the year, or of the climate, makes an alteration in it. The condition of the place *makes it vary*, when we sow the corn either in plains or upon hills; and these either fat, or middling, or lean. The state of the time or season varies it, when we sow our seeds in autumn, or when the winter is near at hand; for the former part of the seed-time allows us to sow thinner, but the latter part requires it to be thicker. The state and condition of the climate or weather makes it to vary, when it is either rainy or dry; for that (*i. e.* the rainy) requires the same as the former part of the seed-time, and this (*i. e.* the dry) as the latter part of it. But all sorts of corn thrive best in open, wide, champain land, declining and sloping towards the sun, and exposed to the heat of the same, and of a loose open soil; for hilly ground, tho' it may yield somewhat stronger wheat, yet not in so great quantity. Thick, chalky, and oufy ground nourishes the white winter wheat, and the husky, red, bearded wheat, tolerably well.

Barley does not bear with any place, but what is open, loose, and dry; and those require the very richest land, and that which rests and is agitated or laboured by turns every other year: this, *viz.* barley, requires no mediocrity; for it is thrown either into the fattest or the leanest ground. Those, if, after continual showers, if necessity requires, you scatter them upon ground that is yet slimy and wet, will support the injury: this, if you commit it to miry ground, intirely dies. But if the land is tolerably chalky and oufy, but not to a very great degree, there will be occasion for a little more of the common wheat, and of the white winter wheat, for seed, than five *modii*, as I said before. But if the place be dry, and loose, and open, and the same be either fat, or thin, and lean, four *modii* will be necessary (3). For lean ground, for a contrary reason, requires the same quantity of seed; for, unless it be sown very thin, it brings an empty small ear: but when, from one grain of seed, many stalks shoot out, tho' the seed be thin sown, yet the corn will grow up very thick.

Among other things also, we ought not to be ignorant, that land, planted with trees for supporting vines, requires a fifth part more seed, than that which is open, and free from trees. And we are still speaking of the autumnal sowing; for we reckon this the principal and the best.

(3) When the ground is fat, commonly several stalks grow up from one grain; and the reason he gives, why no more of this seed is to be sown upon lean ground, is, because, if a greater quantity were sown, it would not have strength enough to nourish all the stalks.

But there is another or second sowing, when necessity forces. Husbandmen call it the *trimestrian sowing* (4). This is practised to very good purpose in very cold and snowy places, where the summer is wet, and without great heats; but, in other places, it very rarely answers: which trimestrian sowing, nevertheless, it will be proper to dispatch and finish very quickly, and, without fail, before the Equinox. But, if the condition of the lands, and of the weather, will allow it, the sooner we sow, the better it will grow, and the more increase we shall have; for there is no seed by nature trimestrian, as some have believed, because the same seed, sown in winter, answers better. But nevertheless there are some seeds better than others, which endure the heats of the spring, as *white wheat*, and *Galatian barley* (5), and that kind of husked bearded wheat, which they call *halic astrum*, and the grain of the *Mariscan* bean: for, in temperate climates, the other corns ought always to be sown before winter.

But sometimes the earth uses to vomit up a salt and bitter oustiness, which, with its continually flowing noxious moisture, spoils and destroys the standing-corn, tho' they be almost ripe, and makes broad

(4) *Trimestrian seed* is a sort of wheat, which they sow in the spring, and which grows up and comes to perfection in three months. *Columella* says, that there is no seed naturally trimestrian. *Pliny* contradicts this, *lib. xviii.* and says, that there are some seeds or sorts of wheat, which ripen not only in three, but in two months. But, as father *Hardouin* says very justly, *Columella* does not deny, that there is such a seed; but only says, that it is not different from that, which, if sown in autumn, comes up better, and produces more.

(5) *Ordeum Galaticum*. *Palladius* calls this sort of barley *grave & candidum*, heavy and white; and advises to sow it in cold places about the first of *March*, but in very warm places about the 13th of *January*. Probably it was a corn brought from *Galatia*, a province of the *Lesser Asia*, and from thence had its name. This, and the *Phrygian* barley, were much commended for their whiteness, and yielding much meal. *Pliny* says, that some ears had two rows of grains, some more, even as far as six; and that there were some differences in the grains themselves, some longer, some shorter, some rounder, some whiter, some blacker, and some of somewhat of a purple colour; that the whiter sort was the least able to support tempestuous weather; that barley was the tenderest of all corns, and was not fit to be sown but in loose and dry ground. That which approaches to a purple colour is reckoned to yield more meal, and is more able to resist all the changes of the weather. See *Theophrast. hist. plant.* and *Plin. lib. xviii. c. 7.*

Ordeum cantherinum, horse-barley. *Cantherius* signifies a gelding. Probably this sort of barley is so called, because it is good for horses, as *Columella* seems to insinuate. But *Matthiolus* upon *Dioscorides, c. 79. p. 321.* thinks it is so called, *quia folliculo castratum enascitur*; by which, no doubt, he understood, that it came out of its hose free from husks, or much cleaner than other sorts of barley; for *Pliny* makes use of this word *castrare*, in several places, for cleansing and freeing the wheat from its husks, as *castrata siligo*, &c. And *Matthiolus* adds, that it grows chiefly in *France*; and that they call it there clean barley, *ordeum mundum*, because it falls from its husks of its own accord; whereas the other sorts are, with difficulty, separated from it: that the whitest sort of barley is the best, which is plump, weighty, and is easily boiled: and that the *Galatian* is the whitest and heaviest of any, and has two rows of grains.

plots of ground intirely bare, without so much as one stalk from all the seed that was sown upon it. It is proper, that marks should be set upon these bare plots, that, at a proper time, we may cure diseases of this kind; for where either this oufiness, or any other pest, intirely kills the corn, there we ought to spread pigeons dung, or if this cannot be had, cypress-leaves, and then plow them into the ground. But the principal remedy of all is, to make a deep furrow, and thereby drain and convey from thence all the moisture; otherwise the foresaid remedies will be usefess, and have no effect.

Some cover the seed-basket with the skin of an Hyena (6), and so sow the seeds out of it, after they have remained in it a little time, not doubting, but what is sown in this manner will grow up, and come to perfection. Some subterraneous pests also kill the corns after they are fully grown up, by consuming their roots. To prevent this, they use, as a remedy, the juice of an herb, mixed with water, which rustics call *Housleek* (7); for they sow the seeds, after steeping them one night in this medicament. Some people squeeze out the juice of a serpentine cucumber (8), and bruise the root of it, and dilute the same with water; and after having, in the same manner, soaked the seeds therein, commit them to the earth. Others, when the corn begins to be infested, sprinkle the furrows with this same water, or with unfalted lees of oil (9), and so remove the noxious animals.

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(6) *Hyena*. This is a beast resembling a wolf, with a mane, like a horse's, reaching all along its back. See *Aristotle de historia animalium*, and *Ælian's varia historia*. *Pliny*, in his viiith book, *cap.* 30. gives a particular account of it, and relates many particulars concerning it, which probably few people will believe till they see them. There are many of them in *Phrygia*; but they are more numerous in *Africa*; and they, who want to hear many strange things of them, may consult the forementioned authors.

(7) *Sedum*, in *Greek* called *αἴζωον*, because it lives always, housleek, or ay green, grows upon tiles or boards, but best upon tharched houses. Our author, *lib.* xi. says, that certain of the antients, as *Democritus*, &c. direct all seeds to be medicated with the juice of this herb, and to use the same as a remedy against little beasts, which destroy the roots of the corn; and that he found this to be true by experience. *Pliny* says the same, *lib.* xviii. *c.* 17.

(8) *Cucumeris anguinei*, serpentine cucumber. In some countries there is a sort of cucumber, which grows long, and somewhat winding like a serpent. *Lobelius* calls it *cucumis flexuosus*, the winding cucumber, so called, no doubt, from the shape of its fruit. It is also called by the *Latins* *cucumis sylvestris*, *erraticus*, and *asininus*, as *Pliny* says; and of the inspissated juice of this they make what they call *elaterium*, in officinal preparations, *humor collectus, in sole siccatus, & in pastillos firmatus*.

(9) *Amurca insulsa*, unfalted lees of oil. *Varro, de re rustica, lib.* i. *cap.* 64. calls it *humor aquatilis ex olea expressus*, and *humor aquatilis & recrementum*. It is the watery juice which flows out of the olive-berries, when they are first squeezed in the press, and comes before the oil. He calls it *recrementum*, the refuse and off scouring of it; and, tho' we call it *dregs*, yet it is really different from the sediment in the bottom of oil-vessels,

I have this further direction to give, that, when the corns are cut down, and brought into the threshing-floor, we should even then think of making provision of seed for the future seed-time; for this is what *Celsus* says, where the corn and crop is but small, we must pick out all the best ears of corn, and of them lay up our seed separately by itself. On the other hand, when we shall have a more plentiful harvest than ordinary, and a larger grain, whatever part of it we thresh out, must be cleansed with the sieve; and that part of it, which, because of its bulk and weight, subsides, and falls to the bottom of the sieve, must always be reserved for seed; for this is of very great advantage, because, unless such care be taken, corns degenerate, tho' more quickly indeed in moist places, yet they do so also in such as are dry. Nor is there any doubt, but that, from a strong seed, there may be produced that which is not strong; but that, which at first grew up small, it is manifest, can never receive strength, and grow large: therefore *Virgil*, as of other things, so of this particular concerning seeds, has reasoned excellently, and expressed himself in this manner:

(10) ' I've seen the largest seeds, tho' view'd with care,
 ' Degenerate, unless th' industrious hand
 ' Did yearly cull the largest. Thus all things,
 ' By fatal doom, grow worse, and, by degrees,
 ' Decay, forc'd back to their primevous state.'

But, if we take a grain of wheat of a bright red colour, and cleave it in two, we don't doubt but it is sound, if it have the same colour inwardly; but that which is whitish on the outside, and inwardly appears very white, ought to be looked upon as light, and without any substance. Nor let the white wheat deceive us, as if Husbandmen were to

vessels, which the word *dregs* commonly signifies. The antient Husbandmen made great account of this *amurca*, and used it many different ways, as may be seen in our author. They put it up in vessels as carefully as they did oil or wine; they used to boil it in two-thirds; and, after it was cold, they put it up in vessels; they used to moisten and season all their oil-vessels with it, that they might not drink up the oil; they prepared their threshing-floors with it, in order to drive away the ants, and to keep them from chapping; as also their barn-floors, and the plastering of their walls and granaries, they sprinkled with it; as also their wardrobes, to preserve their cloaths from moths, and other noxious animals; they sprinkled all their seeds with it; and with it they cured their diseased cattle, and trees also; they applied it to ulcers in the mouth; they anointed with it their bridles and shoes, and other things made of leather, and of brass also, to preserve them from rust, and to give them a fine colour; they also anointed with it all their wooden household furniture, and earthen vessels, wherein they kept their figs, &c. All which, with several other uses to which they applied it, may be seen in this elegant rustic writer.

(10) *Virgil. Georg. lib. i. 197.*

take:

take any great pleasure in it ; for it is but common wheat degenerated, and tho' it excels it in whiteness, yet it is far inferior to it in weight. But, in a climate of a wet constitution, it grows up very well, and brings a good increase ; and therefore is fittest for such places as are well moistened with frequent rains. Nor yet need we go far to seek it, or be at great pains to find it ; for all common wheat whatsoever, after the third sowing uponousy ground, changes into white wheat.

The next in use to these corns, is that sort of barley, which the country-people call *barley of six rows*. Some also call it *horse-barley*, because it both nourishes other animals, which are kept in the country, better than common wheat, and is more wholesome nourishment for man, than bad wheat ; nor is there any other thing, which, in times of scarcity, better supplies our wants, and is a greater relief to us, than it. It is sown in dry and loose ground, and in that which is either very strong, or thin and lean, because it is evident, that land grows lean and barren by bearing crops of it ; for which reason it is committed either to the fattest land, whose excessive strength it cannot hurt, or to that which is lean, to which no other thing is committed. If it be committed to fat ground, it ought to be sown, after it has been twice plowed, almost in the middle of the seed-time, after the Equinox : if to poor slender ground, it ought to be sown earlier. Five *modii* of seed will take up one *jugerum* of ground ; and, after it is a little ripe, it ought to be cut down more quickly than any other corn ; for, being of a brittle stalk, and its grain covered with no chaff, it quickly sheds ; and, for the same reasons, it is more easily threshed than other corns. But, after you have removed the crop it has produced, it is best to let the ground lie fallow for one year ; if not, to satiate it with dung, and drive out all the poison that yet remains in the earth.

There is also another kind of barley, which some call *Galatian*, others barley of two rows. It is of an extraordinary whiteness and weight ; so that, when mixed with wheat, it makes excellent food for a family. It is sown in the very fattest, but cold places, about the month of *March*. Nevertheless it answers better, if the clemency of the winter allows it, when it is sown about the 13th of *January*. A *jugerum* of land requires six *modii* of it.

Panic also and millet (11) must be ranked among corns, tho' I have already assigned them a place, and ranked them with legumes or pulse ;
for,

(11) *Milium* bears leaves like those of a reed, with a stalk two cubits long, thick, and jointed, and woolly, with a vast many roots, with panicles hanging down from the top of it, in which there are a vast many grains, somewhat roundish, solid, smooth, of a yellowish colour, covered with a thin coat. *Festus* says it is called *milium a milliari summa*, as if it consisted

for, in many countries, the Peasants are supported with victuals made of them. They require a light, loose, open ground. They not only grow very well, and bring a good increase, in gravelly, but also in sandy ground, provided the climate be moist, or the ground be well watered; for they greatly dread that which is dry and chalky. They cannot be sown before the spring, because they thrive best, and rejoice most, in warm weather. Nevertheless they are very safely committed to the earth in the latter part of the month of *March*. Nor do they burden the Husbandman's accounts with great expences; for, with four *sextarii* of them, they fill a *jugerum* of land. Nevertheless they require frequent farcling or hoeing, and weeding, that they may be freed from weeds. After they have put forth their ears, before the seeds open and gape with the great heats, they gather them by hand, and hang them up in the sun; and, after they are well dried, they lay them up very close; and, being laid up in this manner, they keep longer without spoiling, than other corns. Bread is made of millet, which, before it grows cold, may be eaten without any dislike. Panic, bruised in a mortar, and freed from bran, and millet also; in any time of scarcity, make a soup not at all to be disliked, especially with milk.

C H A P. X.

Of the proper Soil for every kind of Pulse.

FORASMUCH as we have now given abundance of precepts relating to corns, let us next discourse of the several sorts of pulse. *Lupines* (1) are first to be considered, because they require least labour, and

consist of a thousand grains. *Pliny* says, that the locks of the millet, which contain the grains, hang and bend downward, like fringes or hair, loose and incompact. To this day they make bread of it in *Italy*, which, when hot, is very agreeable.

Panicum is also ranked among the corns. It is altogether like millet in its leaf, root, and stalk; but differs from it in its panicles, which are a foot long, turning down towards the earth, not separated or divided, but compacted into thick clusters, consisting of hairy or bristly grains. *Pliny* says it is called *panicum*, from its panicles, with their tops bending downward in a languishing manner. It putteth forth its fruit grape-wise in bunches, without any divisions or partitions, no otherwise defended but by small skins or membranes. The stalk groweth smaller and smaller by degrees, almost as hard as wood. Some say it is called *panicum*, *quasi panis vicium*, *quod vice panis fungatur*, because it serves instead of bread, and men live upon it chiefly when there is a scarcity of wheat.

(1) *Lupinus* or *lupinum*. *Pliny* says, that they sow it presently *ex arvo*, as soon as it comes off the ground. Our author says *statim ex area*; by which they mean, that it may be sown presently after it is gathered in. It is sown not only for food, but also for dung-

ing

and are bought exceeding cheap, and, of all things that are sown, do most good to land; for they furnish the best dung for emaciated vineyards, and for corn-lands also, and they thrive well even in barren ground, and, when laid up in the granary, will last an age. When boiled and macerated, they nourish oxen exceeding well during the winter; and they very seasonably repulse famine also, if men are surprised with a scarcity of corn, and a dearth. They sow it presently out of the threshing-floor; and, of all kinds of pulse, these only require no rest in the barn; and, either in the month of *September* before the Equinox, or presently after the first of *October*, you may throw them upon unplowed fallow-lands; and, how slightly soever you cover them with earth, they bear with the Husbandman's negligence, without receiving any damage. Nevertheless they require warm weather in autumn, that they may take root quickly; for, if they have not gathered strength before winter, they suffer very much by the colds. What remains of your seed, you will lay up best in a loft where the smoke comes, because, if any moisture reaches them, they breed worms, and, as soon as they have consumed the little mouths or buds of the lupines, the remaining part cannot spring up. They, as I said, love poor lean land, and especially red land, like oker; for they greatly dread chalk, and don't come forth at all in slimy or miry ground. Ten *modii* of them take up one *jugerum* of land.

After these, it will be proper to commit the kidney-bean (2) to the earth, either in land that has lain fallow, or better in land that is fat,

ing land. It receives no hurt from pestiferous plants growing near it; for it destroys all other noxious weeds whatsoever. *Pliny* advises to gather them after it has rained, because, when they are gathered very dry, they shed, and fly from the reapers. *Crescentio*, a *Florentine* writer upon Husbandry both in *Latin* and *Italian*, says, that they sow them at different times, according to the use they make of them. If for dung, they sow them early in *August*; after they are grown up, they cut them hard by the ground, throw them into the furrow, sow corn upon them, and then plow the land over them; and they suffice for dung not only for one year, but you may, the next year, sow corn upon the same land without dunging it. He adds, that they may be sown among panic after the second hoeing; and, after the panic is taken away, they may stand to fatten the ground. It is best to sow them in *October* and *November* for a crop of seed. They must neither be weeded nor hoed; for they themselves, as has been said, destroy all weeds, and, having but one root, the hoe destroys them.

(2) *Phaseolus*, a kidney-bean. The grains resemble the kidneys of four-footed beasts. They are very frequent in *Italy*, both in gardens, and in the open fields. *Matthiolus*, who describes the different kinds of them, distinguished by their different colours, white, reddish, spotted, &c. says, that the grains of the white are less than the others, and are sown in the fields as other pulse; but the other sorts are sown in gardens, and other places, where they want shades; for, besides yielding fruit in due time, they shelter from the sun; for, with their tendrils, they climb up upon cottages, lodges, penthouses, palisades, rails, &c. and spread like a vine, or any other spreading vegetable.

and is plowed and sown every year. A *jugerum* of land requires no more than four *modii* of it.

The same method is to be observed with respect to pease (3), which nevertheless require an easy, loose, open ground, and a warm place, and a climate where it frequently rains. We may sow a *jugerum* of land with the same quantity of these as of kidney-beans, or a *modius* less in the very beginning of the seed-time after the autumnal equinox.

The fattest place, or that which is well dunged, is set apart for the bean (4), and if there be any old fallow-ground, of a low situation, which receives moisture from an higher part. Nevertheless we will first sow the seeds, then till the ground, and, after it is tilled, reduce it into ridges, and harrow it, that they may be covered with a larger quantity of earth, and lie deeper; for this is a very great advantage, that, when the seeds spring up, their roots may be sunk very deep in the ground. But, if we must make use of land that bore a crop of corn this very last year, after we have cut down the stubble, we will lay twenty-four loads of dung upon one *jugerum*, and spread it; and likewise when we throw the seeds upon unplowed ground, we will plow it in, and, after reducing it into ridges, harrow it; tho' there are some who deny, that beans ought to be harrowed in cold places, because the clods, which stand up above the ground, shelter them, while they are yet young and tender, from the frosts, and afford them some warmth, when pinched with cold.

There are some also who may think, that beans supply the place of dung; which I so interpret, as to think, that the ground does not grow fat by sowing them upon it; but that they consume the strength of the

(3) *Pisum*. *Matthiolus* says, that the pea has its name from *Pisa*, the place where formerly they grew very plentifully. It may seem superfluous to give any description of a thing so well known; but, as many people cast their eyes upon this, and other beautiful vegetables, without forming any distinct idea of them, it may not be amiss to bid them observe, that the pea grows up with a fistulous branched stalk, with many tendrils or claspers shooting forth from their tops, with numerous longish, thick, and flattish leaves, with a cylinder-like pod, with a round and white seed. It puts forth a flower or blossom in the form of a butterfly, about the nevil or middle of a purple colour, sometimes wholly white, with a weak root. The grains lie close upon one another in the pods. There are several sorts of them, which differ in colour, bigness, &c. Husbandmen commonly set branches of trees among the greater sort to support them. The same author says, that, in their whole substance, they have a certain similitude to beans, but differ in two things; *viz.* that they are not so flatulent, nor have they any detergent faculty; therefore they do not pass so quickly as beans.

(4) *Faba*, the bean, is the greatest of all legumes. Some sow it for fattening the land, and, when it begins to blossom, they plow it down; for, being a very juicy plant, when it rots under ground, it fattens it very much. The greater it is, the more it is stretched out into length; the lesser, the rounder it is. For the most part, there are only three in a pod, five at the most, and that very rarely.

earth less than other seeds: for I am fully persuaded, that the land which did bear nothing, is fitter for corns, than that which bore this husk the preceding year. Four *modii* of beans, as *Tremellius* thinks, and, as we think, six *modii*, will take up one *jugerum* of land, if the soil be fat; if it be middling, they will take up a little more. And they can neither endure a place that is lean, nor that which is foggy; nevertheless they often answer very well in thick close ground. A part of them ought to be sown in the middle of the seed-time, and a part in the latter end, which is called the *septimontial sowing* (5). The early sowing is more frequently the best; sometimes nevertheless the late is better.

It is not very right to sow them after the winter solstice, and worst of all in the spring, tho' there is also a trimestrian bean, which grows up and ripens in three months time, which is sown in the month of *February*; and of this a fifth part more seed is requisite, than of that which is sown early; but it makes very small straw, and not many pods: therefore I hear old Husbandmen commonly say, that they would rather have the straw of the early-sown bean, than the whole produce of the trimestrian sowing. But, whatever time of the year it shall be sown in, care must be taken, that the quantity we allot for seed be only sown upon the fifteenth day of the moon, if nevertheless, upon that day, she shall not run over and pass the direct rays of the sun, which the *Greeks* call ἀπόκρῆσιν (6); if not so, then let it be sown upon the 14th day, while the light is yet upon the increase, tho' we should not be able to cover all the seed presently; for it will suffer no manner of hurt from the night dews, or from any other causes, provided it be defended from the cattle and the fowls. But the antient Husbandmen, and also *Virgil* himself, were of opinion, that it should be steeped before-hand in lees of oil, or in nitre, and so be sown,

(7) ' That, in the bean's fallacious shell, the grain
 ' Might bigger grow, when o'er a mod'rate fire
 ' The moisten'd seed is warm'd, but soon remov'd.'

(5) The septimontial sowing was about the time they celebrated the feast they called *septimontium*, which was in the month of *December*, a little before the *saturnalia*. This feast was instituted, as some think, in remembrance of the seventh hill being taken within the inclosures of, and added to, the city, at which time they offered their sacrifices upon several, if not all, of the seven hills; and then the *Romans* sent gifts to one another. It was celebrated, not in a polite, but rustic manner, as is usual among villagers and mountaineers, probably in remembrance of their primitive simplicity.

(6) Ἀπόκρῆσις. When the moon passes over the rays of the sun diametrically opposite to her, it is called ἀπόκρῆσις τῆς Σελήνης ἀποκρέω, i. e. *repello, repulso*, as if the moon were driven, as it were, from the sun, when she begins to grow old or decrease.

(7) *Virgil. Georg. lib. i. 195.*

We have also found by experience, that the bean, being cured after this manner, when brought to maturity, was not so much infested by the wevil.

Also what we are going to say further, we lay it down as a precept from our own experience; *viz.* at the change of the moon, pull your beans before day-light. Then, when they are fully dried in the threshing-floor, before it be full-moon, beat them out of their pods, and, after they are cooled, bring them into the granary. When they are laid up in this manner, they shall suffer no damage from the wevil. And this, of all other sorts of pulse whatsoever, can be the most expeditiously threshed without horses, and cleansed without wind, in the following manner: Let a small number of bundles be placed loose at one extremity of the threshing-floor, the which let three or four men move forward with their feet the whole length of the threshing-floor, exactly through the middle of it, and beat the same with sticks or little forks. Then, when they are come to the other extremity of the threshing-floor, let them gather the stalks into heaps; for the seeds, that are beaten out, will lie upon the threshing-floor, and upon them the rest of the bundles will be beaten out by degrees in the same manner; and the hardest chaff will be removed and separated by the beaters; but the small, which falls with the beans from the pods, and settles with them upon the threshing-floor, will be severed from them after another manner: for when the heap, consisting of grain and chaff mixed together, shall be thrown together into one place, let it be thrown by little and little, with fans, to another place at a good distance, by doing which, the chaff, which is lighter, will fall on this side; the beans, which will be thrown farther, will come pure and clean to the place whither the winnower shall throw them.

It is proper, that the lentil be sown in the middle of the seed-time, when the moon is in her increase, till her twelfth day, in a thin, lean, loose soil, or in a fat and dry place especially; for, in the flower, it is easily corrupted with luxuriance, or over-rankness and moisture. And, that it may come forth the sooner, and grow big, they ought to be thoroughly mixed with dry dung, and scattered, after they have rested so four or five days.

We observe two different times for sowing them; the one early, about the middle of the seed-time; the other later, in the month of *February*. A little more than a *modius* of them will suffice for sowing a *jugerum* of land. And, that they may not be destroyed by the wevils, (for they eat them even when they are in the pods) care must be taken, that, after they are threshed out, they be put into water, and that the

firm and sound be separated from that which is empty, which presently swims above. Then let them be dried in the sun, and sprinkled with the root of *silphium* (8), bruised with vinegar, and let them be well rubbed; and so, after they are dried in the sun a second time, and then cooled, let them be laid up, if there be a greater quantity of them, in a barn, if a lesser quantity, in oil jars, or any other vessels, wherein salt-fish or flesh have been kept; which being filled therewith, when they are presently covered with plaister, whenever we shall bring them forth to use, we shall find the lentils sound. They may also, without being cured after this manner, be preserved very well, if they be mixed with ashes.

Linseed (9) must not be sown, unless it brings a great increase, in that country where you cultivate it, and the price it bears invites you; for,

(8) *Silphium*. *Columella* says, *lib. vi. cap. 17.* that the root, which the *Greeks* call *silphium*, was commonly called *laserpitium* in his time. *Pliny* says, that it was found in the province of *Cyrene*; that they called the juice of it *laser*; that it was of mighty esteem in physic, and sold for its weight in silver; but that, for many years, it had not been found there, because all the stalks of it, as soon as they sprout up, were eaten by the cattle constantly kept upon these lands by those who farmed them of the public; that formerly the inhabitants did not suffer cattle to come where it grew. He says, that it only grew wild, and did not bear with culture; that it had a large thick root, a ferulaceous stalk, leaves very like those of parsley; that the seed of it, from its flatness, (*planitie*) was called its leaf; that the leaves of it were of a golden colour, and were instead of its seed; and that they fell at the rising of the dog-star, and from these the *laserpitium* sprung; that both the root and the stalk were perfected in one year; that they took the juice of it two ways, *viz.* from its stalk, and from its root; that the first was far inferior to the second, and soon spoiled. *Pliny* gives a large account of this herb, *nat. hist. lib. xix. c. 3.* of its several sorts, and the uses to which it was applied, and of the ways of adulterating it; that the genuine sort is of a moderately red colour, and, when broken, white on the inside, and presently afterwards becomes transparent; that a drop or bit of it presently dissolves in water or spittle; that it is somewhat like myrrh (*σμυρριζων*); that the true *silphium* was become so rare, that, in his memory, only one stalk of it had been found, which had been sent to *Nero*, which he valued so much, that he kept it, with his gold and silver, in his treasure, and produced it as a great curiosity (the words are, *he brought it out of his treasure with his gold and silver*); that it was so kept by the *Cyrenians*, that it could not be exported, but by stealth. The curious may compare the description that *Pliny*, *Theophrastus*, and *Galen*, give of the *silphium* or *laserpitium* of their days, and see if it agrees with what they call now by that name. It is strange, that our author should recommend the use of the root of this herb for preserving lentils, seeing it was so rare to be found; but probably the herb, which they commonly called *laserpitium*, was not the genuine *silphium*.

(9) *Linum*, flax. This is so useful a vegetable to mankind, that, next to corn that sustains them, there is not any thing in nature of greater benefit to them. *Pliny*, in his *natural history*, says, it is sown in gravelly places, in land once plowed; that nothing makes greater haste; for it is sown in the spring, and pulled in summer. He mentions many nations, who, in his time, made a traffick of flax, and manufactured it: *Egypt* particularly was famous for it, and carried it into *Arabia* and *India*; and, even in his time, this manufacture was common throughout all *Gaul*; and he says, that the enemies of the *Roman* empire, who lived beyond the *Rhine*, were very dextrous at it; and that their women most beautiful garments were made of flax: so that, in his days, this useful manufacture

for, above all other feeds, it is hurtful to lands: therefore it requires the fattest place, and moderately moist. It is sown from the first of *October* till the rising of *aquila* (10) (the eagle), which is on the 7th of *December*. A *jugerum* of land is sown with eight *modii* of it. Some think it proper, that the seed be committed exceeding thick to lean ground, that the flax may come up small and fine; and they say, that, if it be sown in rich strong land, in the month of *February*, ten *modii* of it must be thrown upon one *jugerum*.

Sesamum (11), which is well watered, must be sown earlier; but such as is sown in land which wants moisture, must be sown from the autumnal equinox to the 15th of *October*. For the most part, it requires that crumbling, loose, rotten ground, which the *Campanians* call *black mould*. Nevertheless it does not thrive worse in fat lands also, and in ground gathered together from different places. And the same quantity of this seed is sown upon a *jugerum* of ground, as of millet and panic, and sometimes also two *sextarii* more. But I myself indeed have seen this seed sown in the months of *June* and *July* in the countries of *Syria* and *Cilicia*, and reaped in autumn, after it was fully ripe.

Chichlings, which are like to pease, ought to be sown in the month of *January* or *February*, in rich fertile ground, and in moist weather. Nevertheless, in some parts of *Italy*, they sow them before the first of *November*. Three *modii* of them fill a *jugerum* of ground. Nor is there any sort of pulse which does less hurt to land; but it very seldom answers, because, in the blossom, it can neither bear droughts, nor south winds; both which inconveniencies happen commonly at that time of the year, when it begins to cast its blossoms.

What they call the *ram-chich-pea* (12), and that other sort, which they

facture seems to have extended over all the *Roman* empire, and much farther. The use, both of the husk, and of its seed, seems to have been known many ages before in the eastern parts of the world, especially in *Egypt*, where the finest linen in the whole world was made long before the *Roman* empire made any figure in the world. The seed of it affords an oil of very great use, not only in physic, and many different trades, but for burning also, being more durable in lamps than oil-olive.

(10) *Aquila*, the eagle, a constellation of the northern hemisphere, commonly joined with *Antinous*.

(11) *Sesamum*. *Pliny* says, that it came first from *India*, where they make great quantities of oil of it, not only for lamps, but also for eating. *Theophrastus* says, that it has a stalk like millet, but thicker and higher, with red leaves, and grass-coloured flowers; and that its seed is shut up in seed-vessels, like poppy-feed. And *Pliny* says, that it has a ferulaceous stalk, a leaf of the colour of blood; and that the colour of the seed is white. *Theophrast. lib. viii.* says, that, of all seeds, it is the most troublesome to the ground, and emaciates it most.

(12) *Cicer*, a chich-pea. The *Greeks* call it ἐπέβινδος. *Pliny* says, that it has a certain saltish juice or liquor peculiar to itself; which, *Theophrastus* says, if too much rain wash away,

they call the *Punic* or *red chich-pea*, can be sown all the month of *March* in a moist climate, and in the fertilest ground; for it also hurts the earth: and therefore the wisest Husbandmen disapprove of it. Nevertheless, if it is to be sown, it must be steeped the day before, that it may spring out the sooner. Three *modii* are sufficient for one *jugerum*.

Hemp (13) requires fat, well-dunged, and well-watered ground, or that which is flat, moist, and manured very deep. They sow six grains of this seed upon a foot square, about the time that *Arcturus* (14) rises, which is toward the latter end of *February*, about the 24th or 25th day. Nor will it be amiss to sow it at any time till the vernal Equinox, if the constitution of the climate, or the weather, be rainy.

After these sorts of pulse, we must take navews and turneps into consideration; for both of them fill the bellies of rustics. Nevertheless turneps (15) are more useful, because they both yield a greater increase, and

away, it rots, and is destroyed by the worms. There are several sorts of it, as *Pliny* says, which differ in bulk, figure, colour, and taste. There is one sort of it *arietino capiti simile*, like a ram's head, which *Columella* calls *cicer arietinum*, and *Theophrastus* $\kappa\iota\sigma\iota\ \epsilon\pi\epsilon\beta\iota\nu\delta\omicron\iota$ and of this *Pliny* says there is both a black and a white sort. There is another sort, which they called *cicer columbinum*, because perhaps they fed doves with it. This they called also *cicer Venereum*, because they used it in *Venus's* vigils. It was white, round, smooth, and smaller than the ram-chich-pea, as *Pliny* says.

Cicercula, a chichling. It is a diminutive of *cicer*, a smaller sort of chich-pea, shaped like a pea. *Pliny* says, that that is the sweetest which is the likest the bitter vetch; and that the black and red is firmer than the white.

(13) *Cannabis*, hemp. *Pliny* says, the thicker it is sown, the smaller it is; therefore our author advises to set six grains upon a foot square of ground. When its seed is ripe, they strip it off its stalk about the autumnal equinox, and dry it in the sun, or wind, or in the smoke. The hemp itself is gathered after the vintage; so that, it seems, they gathered the seed before they pulled the stalks. There are two sorts of it, the male and the female. The male pours forth more branches from its stalk, making the appearance of a little tree. The female has much smaller stalks, and not branched as the other. Both male and female have leaves like the ash-tree, but smaller, and gradually serrated. They are larger and blacker in the male; and five or six of them come forth of one pedicle. The seed grows only upon the male, of an ash-colour, the marrow of which is sweet and white. The hemp that grows in *Italy* is reckoned very good, especially that of the territory of *Bologna*.

(14) *Arcturus*, a fixed star of the first magnitude, so called $\alpha\pi\delta\ \tau\eta\varsigma\ \delta\upsilon\epsilon\sigma\tau\eta\varsigma\ \chi\epsilon\ \alpha\pi\tau\epsilon$, because, *Servius* says, it is placed after the tail of the Greater Bear. It is in the constellation. *Arctophylax* or *Bootes*.

(15) *Rapum*, a turnep. *Pliny* says, that, if due order were to be observed, turneps ought to be considered next to corn, or at least beans, since nothing is of more use; for they grow for all animals: four-footed beasts delight in their leaves; and men are as well pleased with their tender leaves in their season, as with sprouts; and they are a great relief when there is a scarcity of corn, and often prevent a famine. He says, that, after corn and wine, they are the fruit, which the people, that live beyond the *Po*, have most in request. They may be sown where almost nothing else can be sown. They are nourished by the frosts, and fogs, and colds; and there are some of them of a wonderful bigness. *Pliny* says, he had seen some that weighed 40 pounds; and some authors affirm they have

and they are food not only for man, but for oxen also, especially in *Gaul*, where this kind of root affords nourishment for the fore-said cattle during the winter. Both of them require a rotten, crumbling, loose soil, and don't grow in thick close ground; but turneps thrive best in open plains, and moist lands. The navew (16) loves land that is shelving and dry, and which comes nearer to that which is lean and poor, therefore grows better in gravelly and sandy lands; and the quality of the place changes the seeds of both the one and the other: for, in a different soil, in two years time, turneps are changed into navews, and navews assume the likeness of turneps. In grounds that are well watered, it is right to sow them both after the summer solstice; but in dry, in the latter end of the month of *August*, or in the beginning of *September*. They require ground that is well manured over and over again, either with the plough or the spade, and satiated with plenty of dung; for this is of great importance, not only because they come forth better, and bring a greater increase, but because, after a plentiful crop of them, ground, thus managed, bears excellent corn. There must not be more than four *sextarii* of turnep-seed sown upon one *jugerum* of land; and a fourth part more of navew-seed must be scattered upon a *jugerum* of land, because it does not spread and inlarge itself into a broad belly, but strikes its slender root downward. And these things, we are of opinion, ought to be sown for the use of men, and those that follow next for the use of cattle.

have seen some of a much greater bulk: so that it is not a little wonderful, that, of so small a seed, there should grow, in three months time, so great a root. It is common to see, among the *Alps*, some of them weigh 30 pounds. The turneps about *Nursia*, a town of the *Sabines*, were in greatest esteem in our author's days. The next are those of mount *Algido* in the *Tusculan* land, next to mount *Albano*, about 15 miles from *Rome*. The *Amiternian* navews, which are of the same nature with turneps, rejoice equally in cold weather. *Matthiolus* says, that in *Insubria* (*viz.* the state of *Milan*, and some adjacent countries) they sow their turneps and navews as soon as the corns are taken off their lands in *June* and *July*; and, in the month of *October*, when the root is grown to its utmost size, they pull it up. In *Greek* the turnep is called γογγύλη, from the round form of its root.

(16) The *napus*, navew, is by some thought to be what the *Greeks* called βένιον but authors differ about it. And indeed if the *Greeks* called this root by this name from βένος, which signifies a little hill, or round rising ground, it must be different from the *napus*, which, our author says, was not round.

C H A P. XI.

Of the several Sorts of Fodder, of Medic, Vetches, or Tares, Miscelline, Oats, Fenugreek, the bitter Vetch, and the Chich-pease (1).

THERE are many sorts of fodder, as medic, vetches, miscelline or barley-fodder, also fenugreek (2) and oats, as also the bitter vetch, and the chich-pea. As for the rest, we don't think it worth our while to enumerate them, and much less to sow them. Nevertheless we except the *cythifus* (shrub-clover) of which we shall speak in those books we have written of the several kinds of sprigs or plants of trees. But, of all those that please us, the herb medic (3) is the choicest,

(1) *Gesnerus*, in his notes upon our author, thinks, that the construction in the beginning of this chapter confirms his opinion, that the present division we have of this author into chapters was not made by *Columella* himself; otherwise he would have begun this chapter in a different manner: and his opinion seems very well founded; for there are about ten accusatives without any verb to govern them, except you bring it from the last sentence of the foregoing chapter, which is not very common; whereas, if there were no new chapter, the construction would be natural enough; and either some word is wanting, or the author intended it as the continuation of the same sentence: so that I have translated them as if they were all nominatives, and added the substantive verb.

(2) *Farrago* has been before explained. *Pliny* says, that it was also made of the cleanings or refuse of the husked bearded wheat, and sometimes it had fitches mixed with it.

(3) *Medica*, medic. Father *Hardouin* says, it is now called *great trefoil*, or *Burgundy hay*, or *luzern*, more commonly *saintfoin*. *Pliny* calls it a foreign herb from *Greece*, and says, that it was brought thither by the *Medes*, during the *Persian* war, in the time of *Darius*; and that it is of so great value, that it deserves to be described amongst the first; for, from once sowing, it will last thirty years. Our author says, only ten, and from him *Palladius*. It has a jointed stalk and leaves, like trefoil; the higher it grows, the narrower are the leaves: that the ground where it is sown must be freed from stones, and well manured in autumn, then afterwards plowed, then harrowed twice or thrice, five days intervening, and then dunged. It requires juicy land, or must be well watered. It must be sown in *May*. All the ground must be covered thick with seed; and all the weeds, that grow amongst it, must be plucked up. There must be twenty *modii* of seed to a *jugerum* of land. If the ground be moist or weedy, it soon degenerates into meadow ground: so, when it is an inch high, it ought to be cleared of herbs, rather by hand than with a scythe. They cut it when it begins to blossom, and as often as it blossoms anew, which it does six times a year, at least four. It ought not to be suffered to ripen into seed, because the fodder of it is more useful, till it be three years old, and then it ought to be cut close to the ground. Thus the other herbs perish, while it suffers nothing, because of the deepness of its roots. *Matthiolus* says, that tho' this medic was formerly sown for fodder in all parts of *Italy*, and was known to every body, yet, in his time, he scarcely found any who ever had seen it, so far were they from sowing it. They say, that it abounds in *Spain*; and *Ruellius* says, it grows in *France*, and is there called the *greater trefoil* or *saintfoin*. From a long, small, woody root come forth several little stalks, a cubit

cest, because, when it is once sown, it lasts ten years; and it can bear to be cut down four times, and sometimes also six times, in a year, because it dungs the land; and all emaciated cattle whatsoever grow fat with it, because it is a remedy for sick cattle; and a *jugerum* of it is abundantly sufficient for three horses the whole year. It is sown as we shall hereafter direct.

About the beginning of *October*, cut up the place wherein you design to sow medic the next spring; and let it lie all winter to rot and grow crumbly. Then, about the first of *February*, plow it carefully a second time, and carry all the stones out of it, and break all the clods. Afterwards, about the month of *March*, plow it a third time, and harrow it. When you have thus manured the ground, make it, in the manner of a garden, into beds or divisions ten feet broad, and fifty feet long, that so it may be supplied with water by foot-paths, and that there may be an open access for the weeders on both sides. Then throw old dung upon it; and so, in the latter end of *April*, sow it in such a proportion, that each *cyathus* of seed may take up a place ten feet long, and five broad. After you have done this, let the seeds, that are thrown into the ground, be presently covered with earth with wooden rakes; for this is a great advantage to them, because they are very quickly burnt up with the sun. After the sowing, the place ought not to be touched with an iron tool, and, as I said, it must be raked with wooden rakes, and weeded from time to time, lest any other kind of herb destroy the feeble medic. You must cut the first crop of it somewhat later, after it has put forth some part of its seeds. Afterwards, you are at liberty to cut it down as tender and young as you please, after it is sprung up, and to give it to horses; but, at first, you must give it them more sparingly, till they be accustomed to it, lest the novelty of the fodder be hurtful to them; for it blows them up, and creates much blood: but water it very often after you have cut it. Then, after a few days, when it shall begin to sprout, weed out of it all herbs of a different kind. When cultivated in this manner, it may be cut down six times in a year; and it will last ten years.

cubit long, round, green, weak, and, for the most part, lying on the ground, about which grow leaves in the form of trefoil, first broader, then lesser, oblong, and serrated all round. The flowers or blossoms come forth in the form of *trefoils*, in the wings of the leaves, and form, as it were, a spike, of a blue colour, to which succeed pods resembling the shell of a snail, but narrower, and twisted like a ram's horn, contracted into two or three windings, which contain a minute, oblong, and yellowish seed. It varies in its flowers, which are blue, violet, purple-blue, and blackish, &c. They sow it in *Spain* for hay, and cut it down every month in summer. Thus far *Pliny*, and *Matthiolus* on *Dioscorides*.

But there are two times for sowing vetches (4); the first sowing is for fodder, when, about the time of the autumnal Equinox, we sow seven *modii* of it upon one *jugerum*. The second sowing is in the month of *January*, or even later, when we throw six *modii* of it upon a *jugerum*, for producing of seed. Both these sowings may be made in unplowed land, but better in that which is tilled. And this kind of seed especially does not love dews when it is sown; therefore it must be scattered after the second or third hour of the day, when all the moisture is dried up by the sun, or the wind: and no more of it ought to be thrown into the ground, than can be covered the same day; for, if the night come upon us before it be put under-ground, the least moisture spoils it. We must observe not to commit it to the earth before the twenty-fifth day of the moon; otherwise we commonly find, that the snail hurts it after it is sown.

It is proper to sow miscellany, or barley-fodder, in a place that is plowed and sown every year, and exceedingly well dunged, and which has had a second furrow. It turns out best, when ten *modii* of horse-barley are sown upon one *jugerum* of land about the time of the autumnal Equinox, but when the rains are impendent, that so, being sown, and watered with showers, it may come forth quickly, and take root, and become strong, before the violence of the winter; for, in cold weather, when other sorts of fodder fail us, this, when it is cut, is the best fodder we can give to oxen and other cattle; and, if you shall think fit to let them feed upon it, and eat it down frequently, while it is growing, it sufficeth till the month of *May*. But, if you have a mind to reap some seed of it also, the cattle must be driven away, and kept from it, after the first of *March*; and it must be defended from all harm, that it may be fit for producing a good crop of grain.

The same method is to be observed with respect to sowing of oats, which, being sown in autumn, are partly cut for hay or fodder, while they are yet green, and partly kept for seed. *Fenugreek* (5), which
Peasants

(4) *Ervum*, ἔρβος, bitter vetch. It is a plant with many sprays, full of leaves, lying upon the ground, its stalks and branches twisting and folding themselves with one another. Its leaves are small, somewhat longish, less than those of the lentil, many of them coming forth of one pedicle, rising out of it on each side at small distances, and one leaf by itself on the top. It has small flowers, inclining somewhat to purple, and sometimes to white. It bears a husk almost like the pea, but shorter and slenderer, in which is inclosed a round seed, the husk pressed in close betwixt each grain. It is of two sorts, white and red. Some say it is called ἔρβος ἀπὸ τῆ ἐξέπειεῖαι ὑπὸ τῶν βέων, because oxen feed on it, and are fattened thereby.

(5) *Fenugreek*, *Foeniculum*, fenugreek. This seed produces a plant like trefoil. It has its leaves all serrated, or jagged round, small stalks, several of them coming forth from one root, with small white flowers, from which come forth small crooked pods, like horns,
in

Peasants call *siliqua* (the husk), has two seasons for sowing, of which the first is in the month of *September* (when it is sown for fodder) about the time of the Equinox, the same days on which they sow vetches. The second is on the last day of *January*, or on the first of *February*, when it is sown for a crop of seed. But, in order to the first, we sow seven *modii*, and to the last six, upon one *jugerum* of ground. Both these sowings are made not incommodiouly on land before it is plowed; and care must be taken to plow it very close, but not deep; for, if its seed is buried deeper than four fingers, it does not come forth easily: for which reason some people, before they sow it, till the ground with the smallest ploughs, and so throw the seeds upon it; and, with rakes, cover them over with earth.

But the bitter vetch rejoices and thrives mightily in a lean, but not in a moist place, because, for the most part, it rotteth, and is spoiled with luxuriancy. It may also be sown in autumn, and equally well after the middle of winter, in the latter end of *January*, or during the whole month of *February*, provided it be before the first of *March*; which whole month Husbandmen deny to be suitable and agreeable to this sort of pulse, because, when it is sown at this time, it is hurtful to cattle, and especially to oxen, which it makes restive and headstrong, when they feed upon it, and eat it as fodder. They sow five *modii* of it upon a *jugerum*.

In that part of *Spain* they call *Bætica*, they give bruised chich-pease to oxen, instead of bitter vetches; which, after they have split and broken them slightly with the suspended millstone, they steep a little in water, till they grow clammy, and so mix them with chaff and bruised straw, and give them to the cattle. But twelve pounds of bitter vetches, and sixteen pounds of chich-pease, satisfy one yoke of oxen. This same is neither unserviceable nor unpleasant to men. In taste the chich-pea differs nothing from the chichling. It is only known and distinguished by the colour; for the colour is more obsolete or faded, and nearer to black. They sow them either after a first or second plowing, in the month of *March*, according as the richness of the soil requires, because four *modii* of the same, and sometimes three, and sometimes also two and a half, take up a *jugerum* of land.

in which is inclosed a yellowish fat seed, of a disagreeable smell. It is sown in fat ground in *February* and *March* in warm tracts of ground. From the form of its pod, it is called by the *Greeks* βυκέπας and αἰγυκέπας. *Pliny* calls it *silica* and *silicia*; and says, that the earth must only be scarified when it is sown, the furrow not deeper than four inches; and the worse it is handled, so much the better does it thrive: a very rare thing, that negligence should be profitable to any thing whatsoever!

C H A P. XII.

After what Manner, and with what Number of Labourers, each Sort of Corn and Pulse may be cultivated.

FORASMUCH as we have fully treated of the time when every thing must be sown, now we shew after what manner, and with what number of labourers, each of the things we have mentioned, must be cultivated. After we have finished our sowing, our next care is of *farcling* (1), concerning which authors are not agreed. Some deny that it is of any service, because the roots of the corn are laid open and uncovered with the *farcle*, some of them also are cut, and, if the colds come upon them, and surprize them, after *farcling*, the corns are killed by the frost; but that it is better to cleanse and weed them in due time. Nevertheless there are many who are of opinion, that they should be *farclied*; but that it ought not to be done at random, either after the same manner, or at the same time every-where; for, in lands that are dry, and exposed to the sun, as soon as the corns can bear *farcling*, they ought to be covered with the earth, after it has been thoroughly stirred, that so they may be able to sprout, and put forth their stem; which very thing must be done before winter, and then it must be done a second time after the winter is past; but that, in cold and marshy places, the corns ought to be *farclied*, for the most part, after the winter is over, but not covered with earth, but the earth thoroughly stirred with even, plain, smooth *farcling*. Nevertheless we find, that, in many countries, winter *farcling* is very proper, only indeed where the driness of the climate, and the gentle warmth of the weather, allow it. But neither are we of opinion, that that ought to be done every-where, but that we must conform to the custom of the inhabitants;

(1) *Sarculatio sive farritio.* I have seen these two words sometimes translated *weeding* or *raking*; but it is a very different work, and may be performed where there are no weeds. *Sarculare* is to open the surface of the earth, hardened by the severity of the winter, that so it may admit the fresh heat of the sun. *Pliny* gives this explication of the word; and this hardened state of the surface of the ground he calls *soli tristitiam*, as if, by the colds, the earth was made sad and depressed, from which it is relieved and made glad, as it were, by the admission of the warmth of the sun. I translate it mostly by a word which is not so common (*viz.* to *farcle*); but which, if commonly used, would better express this action, than to *hoe*, which is more than moving the surface only, if I mistake not; for thereby the earth is gathered and heaped up about the plant, which is not the meaning of the word *sarculare*; for our author, when he orders this to be done, always adds to the plain *farcling* *aggerare terram*, or *terra obruere*, &c. which shews, that *sarculare* does not express so much.

for countries have their own peculiar gifts and advantages bestowed by nature, as *Egypt* and *Africa*, where the Husbandman does not touch the corns, after he has sown them, till the harvest; because the constitution of the climate, and the goodness of the earth, are such, that scarcely any herb comes up but from seed sown, either because showers are rare, or because the quality of the ground does thus yield itself to them who cultivate it.

But, in those places where farcling is requisite, the corns that grow upon the ground must not be touched before they have intirely covered the furrows, even tho' the state of the weather allows it. It will be right to farcle common wheat, and husked bearded wheat, when they have begun to have four fibres or leaves (2); and barley, when it has five; beans, and other sorts of pulse, when they appear four inches above ground. Nevertheless lupins are excepted, farcling being hurtful to this seed, because it has but one root, which if it be either cut with the iron tool, or wounded, the whole stalk dies: and, tho' this were not the case, yet this culture would be superfluous, seeing this thing alone is so far from being annoyed with weeds, that itself destroys weeds. But other growing corns, which may be stirred even when they are wet, yet it is better to farcle them when they are dry; for, when they are managed after this manner, they are not annoyed with blasting and mildew. But barley, unless it be exceeding dry, ought not to be touched.

Many indeed think, that beans ought not to be hoed, because, being pulled up, and gathered by hand, they may both be separated from such other things as ought to be rooted up by the weeder, and also the grass and herbs, which are grown up among them, may be reserved for hay. *Cornelius Celsus* also is of this opinion, who, among the other advantages and good qualities of pulse, reckons this also; *viz.* that, after you have gathered the beans, you may, from the same place, cut a crop of hay. But it seems to me a sign of a very bad Husbandman to allow weeds to come up with any thing whatsoever that he has sown; for, if weeding be given over and neglected, it will diminish very much the increase of all sorts of corn and grain whatsoever: for it is not at all the part of a prudent Husbandman to apply himself more to procure fodder for cattle, than food for men, especially considering, that that may be obtained by the culture of meadows. And I am so much of

(2) *Postquam ceperit esse quatuor fibrarum.* Father *Hardouin*, in his notes on *Pliny's nat. hist.* takes these words to signify *after the roots begin to have four fibres*; but *Palladius*, who, in most places, follows this author, understands them of the leaves or blades which the stem putteth forth, *triticum & far sarritur quatuor foliorum, lib. ii. tit. 9.*

the opinion, that beans are to be farcled, that, I think, they ought to be thrice farcled; for, when they are thus cultivated, we find, that they not only multiply their fruit, but that a very small portion of their substance runs into the husks; and that a *modius* of them, when shaled and cleansed, will fill the *modius* almost as full as when they were intire; and that the measure is scarcely diminished by stripping them of their pods: and, in general, as we have already said, winter farcling is a very great help, and a vast advantage, when the weather is fair and dry, after the middle of winter is past, in the month of *January*, if there be no frosts. Moreover, it ought to be so done, that the roots of the corns may not be hurt, but rather that they be intirely covered, and the earth raised and heaped upon them, that the stalk may spread itself farther upon the ground (3). It will be of great use and advantage to have done this at the first farcling, but, at the second, it will be hurtful; for, when the corn has given over pullulating, if you cover it with earth, it will rot: therefore nothing more ought to be done in farcling it a second time, but to stir and move the ground equally. And this must be done immediately after the vernal Equinox is past, within twenty days, before the corn begins to knot; for, when it is farcled later, it is spoiled by the ensuing summer droughts and heats.

To farcling we must subjoin weeding (4); and we must take care not to touch the corn when it is in the blossom, but either before, or presently after it has cast its flower: for all kinds of corn and barley, and, in a word, whatever does not spring of a double seed (5), sends forth the ear from the third to the fourth knot; and, after it has put it all forth, in eight days it casts its blossom, and then continues to grow larger for forty days, in which, after the flower, it comes to maturity. Again, such as spring of a double seed, as the bean, the pea, the lentil, blossom forty days, and, at the same time, continue to grow larger.

(3) *Ut latius se humi frutex diffundat*, that the stalk may diffuse or spread itself the wider upon the ground. Perhaps the author also means, that, the earth being gathered together, and heaped upon the corns, not only its stalk may spread its blade, but that its root also may diffuse itself the wider.

(4) *Runcatio*, weeding, sets the roots of the corn at liberty, when it is jointed, by plucking up the useless weeds, and separates and severeth it from the green turf, and common grass, and other weeds, that choak it.

(5) *Duplicis seminis*. By double seed here some understand, that, when the seed of the bean, pease, &c. has been, for some time, committed to the ground, it divides itself into two distinct lobes, between which the germ or bud, which hitherto had lurked therein, unfolds itself, and comes forth; so that, afterwards, the lobes on each side stick to the plant like two leaves. It is certain, that wheat and barley, &c. when their seeds begin to bud in the earth, have a different appearance from beans, pease, &c. and do not separate and divide themselves after the same manner.

C H A P. XIII.

How many Day-labourers may be assigned to every Sort of Land, in Proportion to the Extent of it, and to the Manner of cultivating it.

AND that we may now reckon up with how many days labour the feeds we have committed to the earth may be brought to the threshing-floor; four or five *modii* of common wheat take up four days labour of the Ploughman, one of the Harrower, two of the Hoer or Sarcler, for the first time, and one when they are sarcler a second time, one of the Weeder, and of the Reaper one and an half; the sum of the whole, ten days labour and one half: five *modii* of white winter wheat require as many. Nine or ten *modii* of *sesamum* require the same number of days labour as five *modii* of common wheat.

Five *modii* of barley require three days labour of the Ploughman, one day's labour to harrow it, one and a half to sarcler it, and one to reap it; in all six days labour and one half. Four or six *modii* of beans, in old fallow-ground, take up two days labour of the Ploughman, and, in land that has been plowed and sown the same year, one day's labour: They are harrowed with one day's labour and an half; hoed with one day's labour and an half; hoed a second time with one, and a third time with one; and they are reaped with one day's labour. The sum of all the days labour is seven or eight.

Six or seven *modii* of tares, in old fallow-ground, require two days labour of Ploughmen, and, in that which bears a crop every year, one day's labour. Also they are harrowed with one day's labour, and cut down with one; in the whole, three or four days labour. Five *modii* of bitter vetches are sown with the same number of days labour, and harrowed with one; also they are sarcler, weeded, and cut down, with one day's labour each. They all together take up six days labour. Six or seven *modii* of *fenugreek* are put under-ground with the same number of days labour, and are reaped with one. Four *modii* of *kidney-beans* are put under-ground with the like number of days labour, are harrowed with one, and cut down with one. Four *modii* of *chicklings* require three days labour of the Ploughmen; they are harrowed with one day's labour, weeded with one, and pulled up with one. The whole amounts to six days labour. A *modius* and an half of *lentils* require the same number of days labour; they are harrowed with one, sarcler with
two,

two, weeded with one, and pulled up with one day's labour; eight days labour in the whole.

Ten *modii* of *lupins* are put under-ground with one day's labour, harrowed with one, and reaped with one. Four *sextarii* of *millet*, and as many of *panic*, take up four days labour of the Ploughmen; they are harrowed with three, and sowed with three days labour. It is uncertain with how many days labour they are pulled. Three *modii* of chick-pease are sown with the same number of days labour; they are harrowed with two, sowed with one, weeded with one, and pulled with three days labour; in the whole, ten days labour. Eight or ten *modii* of linseed are sown with four yoke of oxen; they are harrowed with three days labour, weeded with one, and pulled with three days labour. The whole amounts to eleven days labour.

Six *sextarii* of *sesamum* are cultivated with three yoke of oxen, so far as tilling the ground for them; they are harrowed with four days labour, sowed with four, and sowed a second time with two, and reaped with two; in the whole, fifteen days labour. Hemp is sown as we have already taught; but it is uncertain how great expence and care it requires. But medic is put under-ground, not with the plough, but, as I said, with small wooden rakes. A *jugerum* of its land is harrowed with two days labour, sowed with one, and reaped with one.

By this sum total of days labour we collect, that two hundred *jugera* of land may be manured with two yoke of oxen, as many Ploughmen, and six common labourers, provided it be free from trees; but, if it be planted with trees for supporting vines, *Saserna* affirms, that the same quantity may be well enough cultivated with the addition of three men more: which computation teaches us, that one yoke of oxen may suffice for one hundred and twenty-five *modii* of wheat, and as many of pulse; so that the whole autumnal sowing may amount to two hundred and fifty *modii*; and, after this, nevertheless, there may be seventy-five *modii* of trimestrian seed sown. And this is made out thus: The seeds, which are sown in twenty-five *jugera* of land, after four times plowing (1), require one hundred and fifteen days labour of Ploughmen; for this quantity of land, tho' exceeding hard, is tilled with fifty days labour, it is plowed a second time with twenty-five, and plowed a third time, and sown, with forty days labour. The several sorts of pulse employ and take up sixty days labour, that is, two months. Forty-five days also are computed for rainy weather and

(1) *Semina quæ quarto sulco seruntur.* By seeds sown in the fourth furrow is meant sown upon land plowed four times over; so likewise sown in one, second or third furrow, signifies once, twice, or thrice plowing.

holidays, in which they don't plow. Also, when the seed-time is over, we reckon thirty days, in which they rest from their labour: so they amount in the whole to eight months and ten days. Nevertheless, over and above, there are three months and twenty-five days of the year remaining, which we may spend either in sowing *trimestrian seed*, or in carrying of hay, and fodder, and all sorts of dung, and other things necessary for our use.

C H A P. XIV.

What Sorts of Pulse are hurtful to Lands, and what are of Benefit to them.

BUT the same *Saserna* thinks, that, by some of the seeds which I have mentioned, lands are dunged and helped; and that, on the contrary, by others they are burnt up and emaciated; and that they are dunged with lupins, beans, tares, bitter vetches, the lentil, chichling, and pease. As to lupins, I am in no doubt, nor yet as to the tare, when sown for fodder, provided that the plough follow it immediately after it is cut down green, and that the Plough-share tear up, and cover with earth, what the sickle has left, before it withers; for this supplies the place of dung. But if, after the fodder is cut down, the roots of it, that are left, shall wither in the ground, they will take away all the juice of it, and consume the strength of the earth; and it is likely, that this is the case with beans also, and the other sorts of pulse, wherewith the earth seems to be fattened: so that, unless it be ripped up as soon as the crop you have of them is taken away, they will be of no benefit at all to corns that are sown in that place afterwards. And *Tremellius* says also, that of all sorts of pulse that are pulled by hand, the poison of chich-pease and flax does most hurt to the ground; the one, because it is of a saline, and the other, because it is of an exceeding hot nature; which *Virgil* also intimates, by saying (1),

- ' A crop of *flax*, and *oats*, and *poppies* soak'd
- ' In *Lethe's* drowsy stream, burns up the ground.'

Nor is there any doubt, but the land is annoyed and worsted, both by these seeds, as also by *millet* and *panic*; but there is one present

(1) *Virg. Georg. lib. i. 77.*

medicine and sovereign cure for all ground that is worn out by crops of the foresaid legumes, *viz.* that you help and relieve it with dung, and, by this sort of nourishment, as it were, repair and restore its exhausted strength; and that not only for the advantage of seeds, which are committed to furrows made with the plough, but also for the benefit of trees and shrubs, which thrive much better with this sort of nourishment. Wherefore, if it is, as it seems to me, exceeding profitable to Husbandmen, I think it proper to discourse of it more carefully, considering, that tho' this thing has not been intirely neglected by antient authors, yet they have treated of it but very superficially.

C H A P. XV.

Of the several Kinds of Dung (1).

TH E R E are three principal sorts of dung; *that* produced by fowls, *that* by men, and *that* by cattle. Of fowls that is reckoned the best, which is brought out of pigeon-houses. Next to it is that which hens and other poultry breed, excepting nevertheless such as live in fens and marshes, and swimming fowls, as that of ducks and geese; for that is also hurtful. Nevertheless we approve most of pigeons dung, because we find, that it ferments the earth, when it is moderately scattered upon it.

The *second* is that which men make, if it be mixed with the other filth and sweepings of the manor-house; for it is naturally very hot by itself, and therefore burns up the ground. Nevertheless human urine, which you have let grow old for six months, is fitter for shoots

(1) Most of the rustic writers, both *Greek* and *Latin*, agree in their notions about dung; and, if they seem to differ at any time, it is only when they speak of the different application of it: so, when they seem to differ from our author, it is because they speak of applying it to trees, and he to corn-lands, &c.

Varro says, that pigeons' dung is the best of any, because it is exceeding hot, and ferments the earth; and he disapproves of that of water-fowl, as geese, ducks, &c. as other antient authors also do, because of its too great humidity. Pigeons dung is not to be spread upon land thick like other dung, but to be scattered very thin. Some mix it with the seed, and so sow it. They who lett their aviaries, often reserved the dung, and consequently lett them much cheaper.

Varro places the dung of goats, sheep, and asses, in the third rank; but *Columella* places that of asses before that of goats and sheep, for a very good reason, because these animals chew their food better. *Varro* seems not to approve of horse-dung for corn-lands; but says, that all dung of horses and other cattle is best for meadows, because it breeds many herbs.

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and young trees. If you apply it to vines, or to apple-bearing trees, there is nothing that contributes more to make them bear abundance of fruit; nor does this thing only produce a greater increase, but it also improves both the taste and the flavour of the wine, and of the apples.

Old lees of oil also, which have no salt in them, mixed with this, may very properly be made use of for watering fruit-bearing trees, and especially olives; for lees also applied by themselves are of great benefit to them; but both the one and the other is to be used chiefly during the winter, and even in the spring, before the summer heats, while the roots of the vines and the trees don't lie open and bare.

The dung of cattle obtains the third place, and in it also there is some difference; for that which the ass makes is reckoned the best, because that animal eats very slowly, and therefore digests more easily, and yields a dung that is well prepared, and fit for the land immediately. After these we have mentioned is sheeps dung, and next to it that of goats, and then that of horses, and other large cattle of all sorts. Hogs dung is reckoned the worst of all. Yea, ashes also, and soot, have been of great benefit to things that are either planted or sown; and the stalks of lupins, cut down, strengthen as much as the best of dung.

Nor am I ignorant, that there is a certain kind of land, and some places in the country, wherein neither cattle nor fowls can be kept; yet it is a sign of a slothful Husbandman, even in such a place as that, to be destitute of dung: for he may amass and put together any kind of leaves, and collections of any other things, out of thickets and high-ways; he may cut down ferns, without doing any injury to his neighbour; yea, he may even do him service by it, and mix them thoroughly with the dirt and sweepings of the court-yard; he may sink a pit, such as we directed to be made in our first book, for laying up dung in, and gather into it, in one heap, ashes and dirt of the kennels, sinks, and common sewers, straw, and stubble, and the other things that are swept out of the house.

But, in the middle of this same place, it is proper to fasten some oak-wood; for this will hinder mischievous hurtful serpents to lurk in the dung. These things must be done where the land is destitute of cattle; for where there are flocks and herds of four-footed beasts abiding for ordinary, there are some things, which ought to be cleaned every day, as the kitchen and the dairy; and some things on rainy days, as the cow-houses, the ox-stalls, and the sheep-folds. But, if you have only corn-land, there is no occasion to keep the several sorts of dung separate. But, if the ground is laid out and prepared for plantations of young trees, and for corns, and also for meadows, the dung must be laid up

separately, according to its kind, as that of goats and of fowls. Then the other sorts must be all gathered into the hollow place before-mentioned, and glutted with continual moisture, that so the seeds of the herbs, that are mixed with the stalks, and the straw and stubble, and other things, may rot. Then, in the summer-months, the whole dunghil must be thoroughly mixed and shuffled with spades, in the same manner as if you repastinated it, that it may rot the more easily, and be fit for corn-lands. And I think, that those Husbandmen are not very diligent, with whom each of the lesser cattle, in thirty days, makes less than one load of dung (2); and their greater cattle also less than ten loads each, and each of the men as many, who may draw together and amass into one place, not only the filth which comes out of their own bodies, but all the dirt that the house and the court-yard daily produce.

I have this further precept also to add, that all kind of dung laid up in due time, which has rested one whole year, is the most useful for corn; for it both has its strength as yet intire, and does not breed weeds; but so much the older it is, the less good it does, because it has less strength: therefore the very freshest dung ought to be thrown upon meadows, because it produces more herbs. And it is expedient, that this be done in the month of *February*, during the increase of the moon; for even this also contributes somewhat to a good crop of hay. What further use is to be made of dung, and after what manner it ought to be used with respect to every thing, we shall explain, when we come to treat of every particular thing by itself.

C H A P. XVI.

At what Times Lands must be dunged.

IN the mean time, whoever has a mind to prepare lands for corns, if he is resolved to sow his seed in autumn, let him lay small heaps of dung in due order upon it, in the month of *September*; but, if he designs to sow in the spring, let him lay his dung at any time in winter, while the moon is decreasing; so that a *jugerum* of plain level land may hold twelve loads of dung, and a *jugerum* of that which is hilly and shelving twenty-four loads; and, as I said a little before, let him not spread the heaps till he is going to sow. Nevertheless, if any thing

(2) *Veves stercoris*. Their load of dung contained 80 *modii*, *lib.* xi. 2. which amounts to about 20 bushels and almost 2 pecks.

has hindered him from laying the dung upon the land in due time, the next method to be taken is, to scatter all over the corns before you farcle them, as if you were sowing seed, the dust of the dung of the poultry-coops and aviaries; but, if you have not this, you must throw goats dung with your hand, and then, with hoes, mix it thoroughly with the earth. This makes corns thrive exceedingly.

Nor must the Husbandman be ignorant, that as land, which is not dunged, grows cold, so that, which is too much dunged, is burnt up; and that it is more for the advantage of the Husbandman to do this rather frequently than immoderately. Nor is it to be doubted, but watery land requires a greater plenty, and that which is dry a lesser quantity of it; the one, because, being chilled with continual moisture, it is thawed by applying this to it; the other, because, being warm of itself, and, by reason of the droughts, when it has assumed a larger quantity of it, is intirely parched: for which reason such kind of stuff must neither be given it too sparingly, nor yet in too great plenty. If nevertheless you are provided with no kind of dung, it will be of great advantage to it to do, what I remember *Marcus Columella* my uncle, a most learned and diligent Husbandman, was frequently wont to do; viz. to throw chalk or marle upon such places as abound in gravel; and to lay gravel upon such as are chalky, and too dense and stiff: and thus he not only raised great plenty of excellent corn, but also made most beautiful vineyards; for this same most skilful Husbandman denied, that dung ought to be applied to vines, because it would spoil the taste of the wine; and thought, that stuff gathered together out of thickets, and from among briars and thorns, or, in a word, any other sort of earth fetched from any other place, and carried to them, was much better for making a plentiful vintage.

But now indeed I am of opinion, that supposing the Husbandman were destitute of all these things, yet certainly the most expeditious and ready assistance of lupins can never be wanting to him, which, when he scatters them upon poor land about the thirteenth of *September*, and plows them in, and then, in due time, cuts them down, either with the plough-share, or the spade, will have as good effect as the best and strongest dunging whatsoever. But, in gravelly lands, lupins must be cut down after they have put forth their second flower; and, in lands which are full of red earth, after the third flower. There they are turned up while they are young and tender, that they may quickly rot; and here when they are grown stronger, that they may bear up and keep the more solid and stiff clods of earth the longer suspended, that
these,

these, being heated and dried up with the summer suns, may be opened, and resolved into dust.

C H A P. XVII.

After what manner arable Lands may be reduced into Meadows.

AND these things the plowman may be able to effectuate, if he not only makes provision of the several sorts of fodder I have mentioned, but also of a great plenty of hay, that he may better support and maintain his oxen, without which it is difficult to labour the ground conveniently and to advantage: and therefore the culture of the meadow, to which the antient *Romans* gave the precedence in agriculture, is also necessary for him. Also they gave it its name *pratium* (1), from its being presently ready, and because it did not require much labour. *Marcus Porcius* (2) did also make mention of those farther advantages; *viz.* that it would not be afflicted with stormy tempestuous weather as other parts of the farm; and, standing in need of very little expence, would yield a very good income every year, and that not of one particular sort only, because it would yield no less in pasturage, than in hay: therefore we take two kinds of it into consideration, of which the first is naturally dry, and the other well watered.

In a rich and fat champain land, a constantly running rivulet is not wanted; and the hay, which grows naturally in a juicy soil, is reckoned better than that which is forced by constant watering, which nevertheless is very necessary, if the leanness of the ground requires it; for a meadow may be made both in stiff and dense land, and also in that which is loose and open, tho' it be poor, if we have the conveniency of watering it. And it neither ought to be a plain of a hollow situation,

(1) *Pratium, quasi paratum*, always ready at hand, or because it was, as it were, a certain yearly income, that could be most depended on.

(2) *Marcus Porcius Cato*, in his first book, places the meadow in the fifth place only; so that, by his setting such a value upon meadow and pasturage, and yet not placing them in the first place, we may observe, that, when he enumerates the things, which one who purchases a manor ought principally to have in his eye, he does not rank them according to the value he set upon the things themselves; otherwise he would not have placed his willow-groves before the olive-yard or the corn-field. *Tully*, in his second book *de officiis*, and *Columella*, in his preface to his sixth book, seem to say, that he gave the preference to pasturing of cattle; and yet, as is said, in his own book, he places it in the fifth place; so that, it seems, he had no regard to the value of things in ranking them.

nor upon a very steep hill; not the former, lest it contain too long the water that gathers in it; nor the latter, lest it pour it off headlong in an instant. Nevertheless land that shelves gently, if it is either fat, or well watered, may be reduced into meadow; but such a level ground is most approved, which, having a very small gentle descent, does not suffer the showers, nor the rivulets that flow into it, to abide long in it; or, if any water comes upon it, it creeps off slowly: therefore, if in any part it be low and marshy, and the water stagnates upon it, it must be carried off by furrows; for either great abundance, or scarcity of water, is equally pernicious to grass of all sorts.

C H A P. XVIII.

After what manner Meadows, when they are made, must be cultivated.

BUT the culture of meadows is more a business of care, than of labour. The first and principal thing is, that we don't suffer plants with strong roots, or thorns, and herbs that grow up to a greater size, to remain in them; and that we extirpate some of them during the autumn, and before winter, such as *bramble-bushes, shrubs, rushes*; and pluck up others of them in the spring, as *endive* and *thorns*, that grow up about the time of the solstice; and that we neither allow a hog to feed therein, because, with its snout, it digs up and raises the turf, nor larger cattle, unless when the ground is exceeding dry, because they sink their hoofs into it, and bruise and cut the roots of the herbs. Moreover, in the next place, the leaner and pendent places must be assisted and refreshed with dung in the month of *February*, during the increase of the moon. All the stones, and if there be any other things, that lie in the way of the fithe, ought to be gathered together, and carried to a great distance out of the ground, and the meadows shut up, and left to grow, either sooner or later, according to the nature of the places.

There are also some meadows all covered over with nastiness, for want of draining, and other necessary culture, and with old or coarse thick moss, which Husbandmen use to cure, by throwing seeds from the hay-loft, or laying dung upon them, neither of which will be of so much benefit to it as laying ashes very often upon it. This thing kills the moss. Nevertheless these remedies are somewhat too slow; whereas the

the most efficacious is, to plow up the place afresh; but this we ought to do, in case we have entered into the possession of meadows already made to our hand; but, if we must either make new ones, or restore those that are old, (for there are many of them, as I said, which, thro' negligence, fail and decay, and become barren) it is expedient sometimes to plow them up, even to sow corn upon them, because such land, after lying long idle, brings a plentiful crop of corn.

Therefore, having plowed up in summer the place we have destined for a meadow, and manured it over and over again, during the autumn we will sow it with turneps, or navews, or even with beans; then the following year with corn. The third year we will plow it carefully, and intirely root out all the stronger herbs, bramble-bushes, and trees, that stand here-and-there in our way, unless that the advantage we reap by the trees, that are planted there, hinders us to do this. Then we will sow tares upon it, mixt with seeds of hay; then, with hoes and rakes, we will open and break all the clods; and level it, by drawing a hurdle or harrow over it; and dissipate all the hillocks, which, for the most part, the harrows make at the turnings; so that the mower's sithe may no-where strike against any thing.

But it is not proper to cut down these tares before they be fully ripe, and have dropped some of their seeds upon the ground that lies under them. Then we must bring in the mower and the hay-maker, and, after the grass is cut down, bind it up in bundles, and carry it out of the ground. Then we must water the place, if we have the conveniency of water, provided the earth be dense, and closer than ordinary: for, where the ground is open and loose, it is not expedient to convey a great quantity of water into it, before the mould is condensed, and bound together with the herbs; because the force of the waters washes away the earth, and, by uncovering the roots of the grass, does not suffer it to grow up: for this reason indeed we ought not to put cattle into meadows that are yet young and tender, and subsiding, but, with the sithe, cut down the grass when it springs up; for, as I have already said, the cattle fasten their hoofs into the soft ground, and, bruising and breaking the roots of the herbs in two, hinder them to spread gradually, and condensate it. Nevertheless, the second year we will allow smaller cattle to be admitted, after the hay harvest is over, provided the dryness and condition of the place will suffer it. Then the third year, when the meadow is become more hard and solid, it may receive greater cattle also.

But, upon the whole, care must be taken, that, at the time when the western winds begin to blow, about the thirteenth of the month of
February,

February, the grounds that are leaner, and lie higher, be dunged, and that there be hay-seeds mixed with the dung; for a higher rising ground yields nourishment also to those grounds which lie below it, when a shower coming suddenly upon it, or a rivulet carried through it, or water conveyed into it by hand, draws the juice of the dung along with itself into the lower part; and therefore prudent Husbandmen, even in plowed lands, commonly lay more dung upon a hill than a valley, because, as I said, the rains always carry the fatter matter down to the lower grounds.

C H A P. XIX.

After what manner Hay ought to be managed, when it is cut down; and how it ought to be laid up.

BUT it is best to cut down hay before it begins to wither; for you gather a larger quantity of it, and it affords a more agreeable food to cattle. But there is a measure to be observed in drying it, that it be put together neither over-dry, nor yet too green; for, in the first case, it is not a whit better than straw, if it has lost its juice; and, in the other, it rots in the loft, if it retains too much of it: and often, after it is grown hot, it breeds fire, and sets all in a flame. Sometimes also, when we have cut down our hay, a shower surprises us. But, if it be thoroughly wet, it is to no purpose to move it while it is wet; and it will be better, if we suffer the uppermost part of it to dry with the sun. Then we will afterwards turn it, and, when it is dried on both sides, we will bring it close together into cocks, and so bind it up in bundles: nor will we, upon any account, delay to bring it under a roof: or, if we cannot conveniently either carry the hay into the manor-house, or bind it up in bundles or trusses, it will certainly be proper to build it up in ricks, whatever part of it shall be dried in the manner it ought to be, and to form them into very narrow sharp points; for thus the hay is commodiously preserved from rains; and, tho' there should be none, yet it is not amiss to make the foresaid ricks, that so, if there be any moisture in the herbs, it may sweat out, and be dried up in the stacks: for which reason prudent Husbandmen, tho' they have already brought it under a roof, don't presently stow it, and put it up in mows, before that they suffer it to heat, and concoct itself, and then grow cool, after

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having thrown it loofely together for a few days. But now, after the hay-making, follows the care of the harveft.

C H A P. XX.

Of making and putting a Threfhing-floor into due Order.

LET the threfhing-floor alfo, if it be of earth, and not paved, that it may be fit for threfhing upon, be firft pared, then delved, and fmeared over with lees of oil, which have never been salted, and chaff, thoroughly mixed together; for this preserves the corns from being plundered by mice and ants. Then let it be levelled, and beaten clofe with rammers, or with a mill-ftone; and let chaff be again thrown upon it, and trodden into it; and fo let it be left to be dried by the fun.

Neverthelefs there are fome, who rather order a certain quantity of the beans, that grow at a fmall diftance, to be threfhed; and, after they have cut down and gathered the beans, they fmooth and prepare the place for a threfhing-floor: for, while the cattle tread out the pulfe, they alfo bruife the herbs and weeds with their hoofs; and fo the place grows bare and fmooth, and becomes a threfhing-floor fit for threfhing any thing whatfoever upon.

C H A P. XXI.

Of reaping Corns, and of threfhing them.

BUT, as foon as the corn is ripe, let it be cut down, before it be parched with the heats of the fummer-fun, which are exceeding great about the time that the Dog-ftar rife; for delaying is prejudicial to them, and occafions great damage: firft, becaufe it gives the corn as a prey to fowls, and other animals; next, becaufe the grain, and even the ears themfelves, quickly fall down from the withered ftalks and beards. But, if ftorms of winds, or whirlwinds, fhould furprife us, the greater part of it falls to the ground: for which reafons, no further delays ought to be made, but, when the corns are all over equally yellow, before the grains be intirely hardened, when they have contracted a reddifh colour, you muft begin to reap, that fo the corns may rather grow big in the threfhing-floor, and in the ftacks, than upon
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the corn-fields; for 'tis certain, if they be cut down in due time, they afterwards grow somewhat bigger. And there are several ways of reaping corn: many cut the straw by the middle with small cradle-sithes (1), or with sickles; and these are either made with a beak, or dented. Many gather the ears themselves with forked irons (2), others with ripples or combs (3); and this is very easy where the corn is thin, but most difficult where it is thick. But if the corn, with a part of the straw, is cut down with sickles, it is presently put together in a heap, or carried under a shed; and, being scorched from time to time with the sun, as opportunity offers, it is threshed. But, if only the ears of the corn are cut off, they may be carried into the barn, and then, in winter, beaten out either with staffs or flails, or bruised out with cattle.

But, if you have the conveniency of threshing the corn in a threshing-floor, there is no manner of doubt, but that business may be better

(1) Our author mentions four different sorts of reaping instruments, of which he gives no such particular description, as to make us exactly understand their figure. The *falces* were of different sizes, according to the uses to which they were applied; and *falx* seems to signify both a *sithe* and a *sickle*. It is probable they bore a great resemblance to those still in use, tho' the sickles seem not to have been shaped so much like a crescent as most of the modern ones are. It is not easy to tell what our author means by *falces verriculatae*, or what analogy there can be between *falx* and *verriculum*, which properly signifies a *drag* or *sweep-net*; and therefore it is very probable, that the true reading is *vericulatae*, which is as naturally formed from *vericulum*, the diminutive of *veru*, as *geniculatus* from *geniculum*, the diminutive of *genu*, and some other words of the like formation. If so, then these *falces vericulatae* did certainly resemble what they call cradle-sithes, which are much in use in *Kent*, and other places; and as these are framed of one or more long small pieces of wood, shaped and pointed at one end like a small spit (*vericulum*), which being so fixed in a small frame of wood, which rises out of the lower end of the handle, near where it is joined to the sithe, as to run parallel to the sithe, and placed at a small distance the one little spit above the other, they serve to support the stalks of corn when cut with the sithe, and keep them from falling backward towards the standing corn, till, by the swing of the sithe, they are thrown off towards the left-hand, where they lie in due order out of the way of the mower. It is not at all improbable, but this instrument, as most other things relating to Husbandry, might originally come from the *Romans*; and that those *falces vericulatae*, mentioned by our author, might have been framed very near after the same manner, but of a much smaller size, if they were used in *Italy*, where *Pliny* says, *senis ex dextra una manu secat*; but here he insinuates, that they managed the sithe with both hands in other countries. The sickles he distinguishes into two sorts, some with teeth, others beaked; both which sorts are still in use.

(2) The third instrument for reaping was the *merga*, by *Pliny* called *merges*, which no doubt took its name, as *Festus* says, from fowls, which dive into the water, and rise up again in a different place; for, as these dive in pursuit of the fish, so the reapers plunge this small forked instrument into the corn, that they may lift up handfuls of it.

(3) The fourth reaping tool was the *pecten*, a comb or heckle. *Pliny* says, that the ears of corn were cut away with this hand-heckle or comb put under them, just as they do with mens hairs when they poll them; and he seems to insinuate, that, when the straw was cut in the middle, the ears were stripped off *inter duas mergites*, between two forked instruments. They made use of these forked instruments both to gather the ears, and to throw the corn into heaps.

done with horses, than with oxen; and, if you have but few pairs or yokes of them, you may make use of the cart or dray made of rough boards, or of a sled (4); both which very easily bruise the straw: but it is better to beat out the ears themselves with cudgels or flails, and to cleanse them with fans; but, when the corns are mixed with chaff, let them be separated with the wind. The west wind, which blows gently and equally in the summer months, is reckoned excellent for this purpose: nevertheless to wait for it is a sign of a slow dilatory Husbandman; for, while we are waiting for it, a hard winter overtakes us: therefore, after the corns are threshed, they must be laid in heaps upon the threshing-floor in such a manner, as they may be winnowed with any breeze. But if, for many days, the wind is silent on every side, let them be cleansed with fans, lest, after the winds have been excessively dull, a vast storm destroy, and render useless, the labour of the whole year. Then the pure corns, if they are laid up for years, ought to be winnowed a second time; for, the cleaner they are, the less will they be eaten up, and destroyed by wevils. But, if they be designed for use immediately, it is to no purpose to cleanse them a second time; it is sufficient to cool them in the shade, and so bring them into the garner. Also no other care is to be taken of legumes, than of other sorts of corn; for those likewise are either for present consumption, or are laid up in store. And this reaping and gathering in of the harvest is the supreme and ultimate advantage and gain, which the plower proposed to himself, when he committed the seeds to the earth.

(4) *Traba* was a kind of dray made of boards full of teeth, with small wheels, which was drawn over the threshing-floor, in order to beat the corn out of the ears.

Tribulum, or *tribula*, was a plank stuck full of small flint-stones or iron, upon which they placed a great weight, and drew it with horses over the corn, which they had placed regularly upon the threshing-floor. Sometimes the driver sat upon it, and drove the oxen or horses backward and forward, and, partly by the feet of the oxen and horses, partly by the weight and friction of the machine, the grains were soon separated from the ears; and the straw was drawn by the teeth stuck in the planks, and by the small wheels, to the ends of the threshing-floor. This was the way of threshing in the eastern countries, as also among the Romans, *Varro, lib. i. cap. 52*. See also the prophet *Isaiab*, chap. xxviii. ver. 26. wherein there is mention made of the different ways of threshing. It was the custom in those days to thresh their corns in the fields, as they do at present in many hot dry countries, as soon as they are cut down.

C H A P. XXII.

*What Things a Husbandman may lawfully do upon Holidays,
and what not.*

BUT forasmuch as our ancestors thought it highly reasonable to give as strict an account of their idle and spare time, as of their time for business; we also think it proper to admonish Husbandmen what things they ought, or ought not to do, upon holidays; for there are certain things, which, as the poet says (1),

- ‘ Both civil and religious laws allow
- ‘ On festivals. No sacred laws forbid
- ‘ To drain our lands, or waters to dispense,
- ‘ Or with a hedge our corn-fields to surround;
- ‘ For birds hid snares to lay; to burn up briars;
- ‘ And bleating flocks in healthful streams to plunge.’

Tho’ the *Pontiffs* (2) deny, that we ought to make hedges round our corn-fields on holidays, they also forbid us to wash our sheep upon the account of the wool, but only by way of physic. *Virgil* has instructed us upon what considerations it may be lawful to wash a flock in a river upon holidays; and therefore added, *in healthful streams to plunge*; for there are diseases, upon the account of which, it may be of great advantage to bathe the cattle.

But the customs and rites of our ancestors allow also those things to be done on holidays; *viz. to bray husked and bearded wheat in a mortar*;

(1) *Virgil. Georg. lib. i. 268.*

(2) *Pontifices.* The Pontiffs were a college of priests first instituted by *Numa*, who chose them out of the senators. They were, at first, only four in number, but afterwards increased to eight, and then by *Sylla* to fifteen. Their office was to give judgment in all religious causes, and to inspect the manners of the inferior priests, and punish them when they saw occasion; to prescribe rules for public worship; to regulate the festivals, sacrifices, and all other things relating to religion. The mastership or headship of this college was one of the most honourable offices in the commonwealth; and *Numa* invested himself therewith. *Julius Cæsar*, *Augustus*, and most of the succeeding Emperors, exercised this office; and no wonder, considering the great dignity and power annexed to it, he being looked upon as the sovereign judge and arbitrator in all things both divine and human. The college had power to institute new religious rites and ceremonies, and were consulted by the people upon all religious occasions. See *Dionysius Halicarnassens*, and *Cicero*, in his oration for his own house. The head of the college was called *pontifex maximus*, not from his age or precedency, but from his power and authority.

to cut torches; to make tallow-candles; to cultivate a hired vineyard, or which we have undertaken to dress at a certain price; to purge and cleanse fish-ponds, ponds, and old ditches; to mow meadows a second time; to spread dung; to lay up and stow hay in the hay-lofts; to gather the fruits of an olive-yard, which we have hired, or undertaken to manage at a certain price; to spread apples, pears, and figs; to make cheese; to bring home trees, either upon our shoulders, or upon a pack-mule, in order to plant them: but we are not allowed to carry them with one that is yoked in a cart or a waggon, nor to sow or plant any thing, that we have brought home, nor to open the ground, nor to prune or lop trees; but you must not so much as do any thing relating to sowing, unless you have first sacrificed a puppy; nor cut hay, nor make it up in trusses, nor carry it home: nor is it lawful, according to the religious systems of the Pontiffs, to gather the vintage upon holidays, nor shear your sheep, till you have first offered a puppy in sacrifice.

It is lawful also to make rob of grapes, or foddren wine, by boiling the must in to one third of the first quantity, and to mix it with the wine (3). It is also lawful to gather grapes and olives for preserving. But it is not lawful to cloathe the sheep with skins. Whatever you do in your garden, relating to pot-herbs, is allowed; and, upon public holidays, it is not lawful to bury a dead man. *Marcus Porcius Cato* (4) said, that there were no days of vacation for mules, horses, and asses. The same author allows us to yoke oxen, in order to bring home wood and corn. We read in the books of the Pontiffs, that, only upon such holidays as were observed in private families on the tenth day after the death of any person (5), it is not lawful to yoke mules; but, on other holidays, it is allowed.

I am persuaded, that, in this place, some persons, after I have reckoned up the solemn feasts, will desire to know the custom observed by the antients in their lustrations which they made, and sacrifices which they

(3) *Defrutum*. I believe this word might properly enough be rendered *rob of grapes*, if any sort of rob be made without sugar. However, the thing is this: The antient *Romans* used to take a certain quantity of their best and sweetest must, and boil it in to a certain quantity. What they boiled in to one half of the first quantity, they called *sapa*; and that which they boiled in to one third, they called *defrutum*. With it they mixed and boiled several ingredients. This *defrutum* or *sapa* they applied to several uses, but chiefly they used it for preserving their wines, fruits, &c. They thought, that a certain quantity contributed much to preserve their wines from spoiling. They also made use of them for curing ailments both of men and cattle, as we shall see in the sequel of this work.

(4) *Cato*, cap. 138.

(5) *Feriv denicales*. These were holidays kept by private persons upon the tenth day after the death of any person in the family. They fancied, that the house was polluted by the dead body, and they were wont to make use of certain religious rites and ceremonies to purge the same.

offered for the fruits of the earth (6); nor do I refuse to be at the trouble of instructing them in these things: but I put it off to the book I design to compose, after I have done writing upon the whole art of Husbandry. In the mean time I shall put an end to the present argument, and, in the next book, shall give an account of what antient authors have written concerning vineyards, and plantations of trees for supporting vines, and what I myself have since found out by my own experience.

(6) It was the custom of the *Romans*, at certain times of the year, to lead sacrifices round their fields with great ceremony and attendance, and afterwards to offer them up to *Ceres*, or some other of their gods, with prayers, that they would preserve the fruits of the ground from thunder, lightning, storms, mildew, and all other plagues and misfortunes whatsoever. Private persons used always to lustrate their lands; and a part of their prayer to their gods was, that they would avert all pestilence, barrenness, &c. and prosper the culture of their lands, &c. Our author designed to write upon this subject; whether he did so, or not, I know not. If he did, I suppose nothing of it is come to our times.

L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

B O O K T H I R D.

C H A P. I.

What Kind of Vine may be proper for every Soil, and suitable to the State of the Climate.

THUS far of tillage, as saith that most excellent poet (1); for nothing hinders us, *Publius Silvinus*, who are going to speak of the same things, auspiciously to begin with the first words of that most renowned poem. The care of trees follows, which is even the greatest part of Husbandry. There are divers species of them, and of very different appearances; for there are several sorts of them, which (as the same author (2) tells us) *come of their own accord, no man compels*. Many of them also, after being planted with our own hand, grow up. But such of them, as are not produced by human assistance, are wild and savage, and bear apples or seeds agreeable to their several natures. But such of them, as have labour bestowed upon them, are fittest for producing fruit proper for food.

We must therefore speak first of that kind, which affords us nourishment; and it is divided into three different sorts: for, from a sprig, or shoot, or cutting, there proceeds either a tree, as the *olive*; or a shrub, as the champain *palm* (3); or a certain third thing, which I cannot pro-

(1) *Virg. Georg. lib. i. 1.*

(2) *Virg. Georg. lib. ii. 10.*

(3) *Palma campestris*, a champain palm. *Pliny*, in his *nat. hist. lib. xiii. c. 4.* mentions a sort of a palm-tree, that does not exceed a shrub.

perly call either a tree or a shrub, as is the *vine* (4). This, with very good reason, we prefer to all other stems whatsoever, not only for the sweetness

(4) All the antient rustic authors agree, that there is so great a variety in vines, that it would be both vain and unprofitable to attempt to enumerate or describe the different sorts of this useful and delightful little tree; so that they have only taken notice of some of the most commendable, which they have ranked into a few classes, according to their several characters. *Pliny* has indeed mentioned a great many in his *natural history*; but *Virgil* thought it enough to give a place in his admirable poem only to fifteen of them. Our author has ranked them in three classes, and has mentioned about fifteen of the first note, about twelve of the second, and seven or eight of the third note; but, of some of the same class and name, he makes different sorts, which have some peculiarity or other to distinguish them from each other, though they may seem to be the same to a superficial observer. He also mentions a few, to which he has assigned no class. Of all the different sorts, there are not many, which these authors have so particularly described, as to enable even a curious observer to distinguish and know them at present; for many of them they just name, with the character of being fruitful, early or late ripe, thriving in such and such a soil and weather, &c. without giving any particular description of their wood, leaves, flower, fruit, &c. as are necessary to make them easy to be known to after-ages. Some of their names indeed denote some essential character, which distinguish them from all others; but these are but few. Many of them bear the names of the places where they were first known to grow, or did most abound, or of the persons who first brought them into *Italy*, and cultivated them; but, as they have now lost their names, there is but little knowledge can be gathered from most of them. And it is remarkable, that, even in *Italy* itself, where all these vines were cultivated in great abundance in our author's days, and where, no doubt, many of them still subsist, yet very few, if any, retain their antient names; so that the language of the *Romans* has not suffered a greater change in any part of it, than in the names of vines; so that it is not now easy to determine to which of the vines now growing the antient names belong. A few of them indeed are so exactly described by *Pliny* and this author, that one cannot mistake, though they are now called by different names.

It is probable, that those vines, which are not particularly described, were so well known, that it was sufficient only to name them, and nothing more was needful but to relate some of their particular qualities: and the chief design of *Columella* seems to have been to point out to the Husbandman, which of them were fittest for his purpose, and which not, and the manner of their cultivation; and such of them, as he has more accurately described, seem not to have been so generally well known, and were cultivated only in few places, where the soil was most agreeable to their nature.

From the elegant description he has given us of many, if not of all, the most commendable sorts, we have an opportunity to observe and admire the beautiful and surprising variety, that there is in this one small tree or shrub, whatever we please to call it; which is so great, that I know not if there be the like in any other tree or shrub whatsoever: for tho' all the various sorts agree in many essential things, which distinguish them from all other trees or shrubs whatsoever, and from which they all have the general appellation or name of *vines*, yet each of them has some remarkable character, which confines them to a certain sort, and distinguishes them from all others. Thus we see, that our author tells us, that some are exceeding fruitful; others produce tolerably well; others little or nothing; some are afraid of fogs, frosts, hoar-frosts, others not; some are early ripe, others ripen late; some lose all their fruit in the blossom, others cast their blossoms exceeding well; some are brittle, and easily broken by the winds; others of them are so strong and tough, that they suffer nothing from them; some of them dread rains, others are afraid of dry weather; some of them have frequent joints and knots, others but few, and distant from each other; some have long and thick branches and shoots, others have them small, and few of them; some of them have a large pith, others have it very small; some of them

sweetness of its fruit, but also for that facility, wherewith it answers the pains that mortals bestow upon it, almost in every country, and in every latitude of the world, except in the frozen or the torrid zones; and it grows as happily in plains as upon hills, and thrives as well in dense thick ground, as in that which is loose and open; and often also in land that is poor, as in that which is fat; and in a dry soil, as well as in that which is naturally moist; and it alone does best endure both the one and the other intemperature of weather, either under a cold, or under a scorching hot or stormy climate.

Nevertheless it is of great importance what kind, or what quality and habit the vine is of, which you resolve to cultivate, according to the state and condition of the country; for neither is the culture the same in every climate and soil, nor is this stem of one and the same kind; and which of them all is the chief, it is not easy to tell, since experience teaches, that every country has its own, which is more or less proper for it. Nevertheless a prudent Husbandman will easily find out, that that kind of vine is proper for a plain, which endures fogs and hoar-frosts, without receiving any hurt; and for a hill, that which can bear drought and winds. To a fat and fertile land, he will give a small slender vine, and which is not naturally too fruitful; to lean ground, he will give a vine that bears great plenty of fruit; to dense and thick land, one that shoots out vehemently, and puts forth abundance of hard wood and leaves; to a loose, open, and rich soil, one that is thin of sprays and twigs. He will know, that a vine of a tender fruit, and of a grape of a larger size, is not rightly committed to a moist place, but one of a callous, narrow, slender fruit, and full of grape-stones; and that, to a dry place also, plants of a different nature are rightly appropriated.

But, besides these things, the proprietor of the place will not be ignorant, that the quality of the climate, hot or cold, dry or dewy, subject to hail and wind, or calm, serene, or foggy, is of much greater influence than any other thing: and to a climate of a cold or foggy constitution he will adapt two sorts of vines, either such as are early ripe,

have their leaves cut very deep, others but very little cut, and in a different manner, and others of them are not cut at all, but intirely round; some bear white, some red, others black grapes, and the bunches and grains of different sizes and shapes; some have berries very callous, some soft, some hard; some of them have them very beautiful and bright, and others dark; some sweet, others acid; some produce durable wines, others that which soon corrupts: with many other varieties too tedious to relate.

Pliny, in his *natural history*, says, that the antients reckoned vines amongst trees; and that there was a statue of *Jupiter* in a town of *Tuscany* made of a vine. He mentions also a temple of *Juno*, supported by pillars made of vines; but he supposes they were wild vines; and that no wood is so durable.

whose

whose fruit comes to maturity before winter, or those of a firm and hard grape, whose clusters cast their blossoms in the midst of the fogs, and afterwards ripen and grow mellow with the hoar-frosts and frosts, as other grapes do with the heats. Also in a climate of a windy and tumultuous constitution, he will, with confidence, commit to the ground such as take firm hold of it, and bear hard grapes. Again, to a warm climate he will entrust such as are more tender, and abound in fruit. To a dry he will destinate such as rot with rains and continual dews; to a dewy, such as suffer by droughts; to a climate subject to hail, such as grow with hard and broad leaves, that they may protect the fruit the better; for there is no sort of vine that a calm and serene climate does not admit, but most commodiously that, whose bunches, or single grains, quickly fall off.

But if a place for vineyards, and the state of the climate, were to be chosen according to your wish, as *Celsus* judges very truly, that ground or soil is the best, which is neither too dense, nor too loose and open, nevertheless approaches more to that which is loose; neither poor nor exceeding rich, but which is next to that which is very fruitful; neither champain nor steep, nevertheless like to a rising high ground; neither dry nor naturally wet, nevertheless moderately moistened with dew; which does not flow with springs, either upon the surface, or deep below ground, but that it convey to, and supply the roots of the vines with the neighbouring moisture; and that that be neither bitter nor saltish, lest it corrupt the taste of the wine, and check the growth of every green thing with a certain rough scabby rust, as it were, if so be we believe *Virgil*, who says (5),

- ' A salt and bitter land in all its fruits
- ' Unhappy proves; nor can the lab'ring plough
- ' Its rugged nature tame, and make it mild.
- ' There *Bacchus*' favourite plant, the fruitful vine,
- ' Does lose its kind, and apple-trees their names.'

Moreover, as I said before, a vineyard neither requires a cold icy climate, nor, on the other hand, one that is scorching hot; nevertheless it rejoices and thrives better in a warm than in a cold climate, and is offended and suffers more hurt by rains, than by fair weather, and is more friendly to a dry soil, than to that which is too much exposed to rain. It rejoices in gentle and moderate passing gales, and is liable to suffer by

(5) *Virg. Georg. lib. ii. 238.*

tempestuous stormy weather. And this is the quality both of the climate and soil, which is the most to be approved.

C H A P. II.

What Vines must be planted for Food in Lands near the City.

THE vine is planted either for food to eat, or for a liquor to drink. It is not expedient to institute vineyards for food, unless when the land is so contiguous to the city, that it may turn to as good account to sell the fruit thereof to such as buy it before we bring it into our storehouse, as we do apples (1); and, when this is the case, the early ripe vines, and such as bear firm and hard grapes, with thick tough skins, and then the purple-coloured, and the *Bumast* (2) and date-like grapes (3), and the *Rhodian*, *Libyan* (4), and the *Ceraunian* (5) also, ought especially to be planted; and not only such as can be commended for their excellent taste, but also for their beautiful appearance, as the coronary (6), the three-foot-long (7), the uncial (8), and the

(1) *Velutipromum*. Some editions have *pomum*, and I have translated it accordingly; and the meaning is, that it is expedient to plant vineyards for food, if we can as easily sell our grapes to hucksters and others, as we do our apples, pears, &c. Other copies have *promum*. If this is the true reading, then the meaning of the author is, that it is not expedient, unless we can sell the fruit thereof as easily before we bring it into our storehouses, as we do our other fruits, when we bring them out of the same; and then *promus* is an adjective in this place, and *fructus promus* will signify fruit laid up in store, and afterwards brought forth for use, or to sell, &c.

(2) *Bumasti* are vines which produce clusters of grapes, like cows udders or dugs. *Varro*, lib. ii. c. 5. calls this sort of grape *uvam bumammam*. *Bz*, added to any word, increases the signification of it; and, as this author says, most part of great things are expressed by the addition of this word, which is owing to the great value they antiently put upon this useful animal: and this sort of vine was probably so called, from the clusters of grapes resembling a cow's udder and dugs, both in their bulk and shape. Some think, that the berries were round and swelling, and therefore so called.

(3) *Dactyli*, date-like grapes, shaped like a date, or small and long like the finger. The *French* call them *raisins au long grain*.

(4) *Rhodiæ & Libyæ vites*. These vines have their names from the countries whence they were brought into *Italy*.

(5) *Ceraunia*. *Isidorus* says they are so called from their fiery colour.

(6) *Stephanitæ*, from *στéφανος*, a crown. *Pliny* says they are so called, because they naturally grow somewhat like crowns or chaplets of flowers, the leaves running between the berries, as if they were artificially mixed, and made into coronets; so that they cannot be so called from the vine itself being twisted and formed into the figure of a crown. These grapes were also called *forenses*, market-grapes, because they come soon, are saleable for their beauty, and easy to be carried. The *French* call them *foirars*, which, as father *Harquin* says, seems to be the old name still retained.

(7) *Tripedaneæ vites*, three feet long, so called from the length of their stock, according to *Pliny*.

(8) *Unsiariæ*, by *Pliny* called *unciales*, from the weight of their berries.

quince-vines (9); as also those vines, whose grapes are put up in vessels, and are durable, and can be kept during the whole winter, as the *Venuculan* (10), as the *Numifian* (11), which have been lately found by experience to be exceeding proper for these uses.

But, when wine is what we have principally in view, we make choice of a vine, which is strong and mighty both in fruit and in firm wood, because the one contributes very much to the income of the Husbandman, and the other to the durableness of the stock; but then that is the chief and the choicest, if it neither promises too quickly, and casts its flower also very early in the beginning of the season, nor ripens and grows mellow too slowly, and also easily repels and stands out against hoar-frosts, fogs, and blasting, and neither rots with showers, nor shrivels and decays with droughts.

Let us make choice of such a vine as this, suppose it be but indifferently fruitful, provided the place has the reputation of producing wines of a noble and precious taste and flavour; for, if they be of a paltry and base taste, and little accounted of, it is an advantage to plant there every sort of vine, that bears the most fruit, that, by the vast increase and quantity of the fruit, our revenue and yearly income may be augmented. But whatever constitution or quality the lands may be of, commonly champain lands produce the greater quantity of wine; and such as are hilly, that which is more delicious. Nevertheless these places themselves, in a moderate state of the climate, bring a more plentiful vintage, when they decline towards the north; but the wines are more generous, when they lie towards the south.

Nor is there any doubt, but such is the nature of some vines, that, according to the situation of places, they either excel, or are excelled, in the goodness of their wine. *Aminean vines alone* (12), a too cold
state

(9) *Cydoniæ vites*, quince-vines, whose fruit had somewhat of the taste of quinces.

(10) *Venucula vitis*. *Pliny* calls it *venicula*. *Horace* makes mention of the grapes of this vine as proper to be put up in pots, *sat. ii. 4, 71*. Some think, that this word is formed of *ve*, *augendi particula*, and *nucleus*, as if it signified grapes with big kernels.

Pliny, *lib. xiv. 2*. gives no particular description of this vine; only says, that it is called by different names in different places. Those names signify very little to explain any quality peculiar to it. He adds, that they cast their blossoms very well, and are proper to be put up in jars. Some think, that they are what the *Venetians* call now *marzemina*. *Pliny* seems to say, that, at *Tarracina*, they took it for the *Numifian*, which follows here.

(11) *Numifianæ vites*. *Pliny* does not seem to make them to differ much from the *Venuculan*; says, that they have no peculiar strength in themselves, but derive all from the soil, according to the strength and goodness of which they change their qualities.

(12) *Amineæ vites*. Some write it only with one *m*. *Macrobius*, *sat. lib. ii. c. 16*. says, that they had their name from the country where they grew, which, he says, was where now *Falernum* is; but father *Hardouin* corrects this, and says, it ought to be *ubi nunc Salentum est*; viz. the *Salentine* land, where antiently was the *Regio Pencetia*, *Plin. hist.*

state of the climate excepted, are reported to surpass all others in flavour and taste, tho' they may degenerate, and, when compared with one another, yield wine of a more or less exquisite taste. These, tho' they all bear the same name, yet are not all of the same sort, nor have the same appearance. We have known two of them that are sisters, of which the lesser casts its blossom sooner and better, and is fit both for the tree and the frame. Upon the tree it requires fat ground, and, on the frame, middling: and it far surpasses the greater, because it endures rains and winds with greater fortitude; for the greater is quickly spoiled in the blossom, and more upon frames, than on trees. Therefore it is not fit for vineyards, and scarcely also for a place where it is supported by trees, unless it be in very fat and ousy ground; for neither does it thrive and enjoy good health in ordinary and indifferent ground, and much less in that which is poor. It is known by its great number of long branches of firm wood, and by the largeness of its leaves, clusters, and grapes. It is also thinner of joints; and the lesser excels it in the large quantity of its fruits; but this is not inferior to it in taste and flavour: and both these are indeed *Aminean* vines.

But there are two other vines, that resemble one another, which are called the *twin-Amineans*, because they put forth double clusters. They yield a rougher harsher wine, but equally lasting. The lesser of these is exceeding well known, because it covers the most famous hills of *Vesuvius* and *Sorrento* in *Campania*. It is chearful amongst the summer gales of the west wind; but is afflicted with south winds; therefore, in the other parts of *Italy*, it is not so fit for vineyards as for plantations of trees made for the support of vines; whereas, in the foresaid countries, the frame most commodiously supports its firm woody branches, and its fruit, which it produces not unlike that of the lesser *sister-Aminean*, except that its clusters are double, as the greater *twin-Aminean* produces also fruit like to the greater *sister-Aminean*; which lesser *twin-Aminean* is

nat. lib. iii. sect. 16. and a part of this country was called *Aminea*. It seems they were first brought from this country to other parts of *Italy*; but they were chiefly cultivated on mount *Vesuvius*, a famous hill near *Naples*, once very remarkable for its noble wines; but now, in a great measure, destroyed, and made unfit for cultivation, by the frequent eruptions of the volcano upon the top of it; as also about *Sorrento*, an antient city about 18 or 20 miles distant from *Naples*. The hills about it are much celebrated, both in former and later times, for the excellent wine they produce. There are several other reasons assigned, why these vines are so called; but seem to have very little foundation. *Pliny* mentions five different sorts of them. Our author, who gives a very distinct account of them, mentions a sixth sort, which he magnifies very much. *Servius* gives but a poor reason why they are called *Aminean*, viz. *quasi sine minio*, i. e. *rubore*, because their wine is white; which is true of many other vines besides these, and *Pliny* makes mention of a black *Aminean*.

better

better than the greater in this respect, that it is more fruitful in an indifferent soil; for we have already said, that that does not answer but in very fat ground.

Some approve most of the *woolly-Aminean* vine, which does not therefore assume this name, because it only, of all other *Aminean* vines, grows white or hoary, with a cotton or down upon it, but because this especially has more of it than the others. It yields indeed good wine; but lighter than those others above-mentioned. It puts forth also a great quantity of firm wood, and therefore casts its blossoms but very indifferently, because of the thickness of its branches and leaves; and the same quickly rots after the fruit is ripe.

Over and above the number we have mentioned, there is an *Aminean* vine, which is reckoned singular, not unlike to the greater *sister-Aminean*, but to be preferred to it; first, for the make and beautiful appearance of its stock, and shoots, and leaves; but somewhat inferior to it in the flavour and taste of its wine, tho' notwithstanding it is most generous. Next, it is preferable also upon the account of its own peculiar qualities; for it is both more fertile, and casts its blossom better, and bears thick, close, and whitish clusters, and of a plumper and more swelling grape. It does not degenerate in thin poor land, and therefore it is numbered among the most fruitful vines.

The *Nomentan* vines (13) follow next after the *Aminean* in the nobleness of their wine; but, in fruitfulness, they even come before, or have the precedency; because, as they have a numerous conception, so, what they have once brought forth, they preserve and maintain exceeding well. But of these also the lesser is the more fertile; and the leaf of it is more sparingly cut, and its wood is not so red as that of the *Aminean*, from which colour they are called *rubellian*. The same are also called *dreggy* vines, because they bring more dregs than other vines do. Nevertheless they make up this disadvantage by the multitude of clusters, which they produce even upon a frame, but better upon a tree. They suffer valiantly both winds and showers, and quickly cast their blossoms; and therefore ripen the sooner, bearing with every inconveniency, except heat; for, because they have clusters with small berries, and hard skins, they shrink with violent heats. They rejoice most in fat land, because it is able to give fruitfulness to vines that are naturally small and slender.

(13) *Nomentanæ vites*, vines growing about *Nomentum*, formerly a city belonging to the *Sabines*, now a village about ten miles from *Rome*, upon the river *Anien* or *Teverone*. *Pliny*, who ranks them next to the *Aminean*, says, that their firm hard wood was red; for which reason they were by some called *rubellæ*, red vines.

Eugenian vines (14) bear, without any inconveniency, with a cold and dewy soil and climate, seeing they grow on mount *Albano*; for they scarcely answer their name after they have changed their place. This is also the case with *Allobrogian* vines (15), the deliciousness of whose wine is changed with the country.

The three *Apian* (16) vines are commended also for their great and excellent qualities. They are all fertile, and fit enough for both the frame and the trees; yet the one with bare leaves is more generous; for the two that are woolly, tho' they are alike in the make and shape of their branches, leaves, and shoots, yet they are unlike and different in the quality of the liquor that flows from them; for one of them is slower in receiving the cariousness of antiquity. In a fat soil they are exceeding fertile, and in an indifferent also, they are fruitful, and their fruit is early ripe; therefore they are very proper for cold places. They yield a sweet wine; but they are not good for the head, nerves, and veins. Unless they be gathered in due time, they become a prey to the rains, winds, and bees; and, because the bees prey upon them, and plunder them, they are surnamed from them.

And these are the vines, which are most celebrated for their precious taste. Nevertheless vines of the second note may be commended also for their increase and fruitfulness, such as the *Bituric* (17) and the *Basilic* (18), the lesser of which the *Spaniards* call *cocolubis*. Both of them

(14) *Eugeniæ vites*, a *Greek* name, importing the nobleness and generousness of the wine they produce. When transplanted, they lose their quality, as is the case of many others, which leave their excellency behind them, and never carry it elsewhere. These vines flourished on mount *Albano*, near the antient city *Alba* in *Latium*, whither they were brought from the *Taorminan* hills in *Sicily*, as *Pliny* says.

(15) *Vites Allobrogicæ*. The *Allobrogians* were a people that inhabited the country that lies between the lake of *Geneva*, the *Rhone*, and the *Alps*, comprehending all *Savoy* on this side mount *Senis*, and a part of *Dauphiny*. *Pliny* says, that they thrive in cold places, ripened with the frosts, and were of a black colour.

(16) *Apianæ vites*, so called from the liking that bees have to them; for they feed greedily upon them. Our author mentions three sorts of them, of one of which, he says, *tardius recipit cariem antiquitatis*; which, I believe, is applicable not to the vine, but to the wine. By this *cariousness of antiquity*, the antients meant a certain agreeableness of taste and flavour, which certain wines contracted by long-keeping, *Pliny*, lib. xv. c. 2. *Blanda inveterati vini caries ad servandum invitat*. These wines were at first sweet, but contracted an agreeable roughness by long-keeping. *Hardouin* says, that this grape is now called *uva muscatella*, because the flies attack it with their darts.

(17) *Vitis Biturica*, so called from the country where they grow about *Bourges* in *Berry* in *France*. Father *Hardouin* thinks, that they comprehend also such as grow about *Bourdeaux*, and in *Gascony*.

(18) *Basilica vitis* seems to have its name from its stately appearance.

Our author makes two sorts of this vine, the lesser and the greater; and *Pliny* also says, that, in *Spain*, there are two sorts of them; that it is thin of clusters, and endures the violent heats, and the south winds; that one sort bears an oblong berry, the other a round

them are next to the very best of all; for their wine bears with long-keeping, and, by years, it arrives to some degree of goodness. Now, these indeed excel all the other vines I have before mentioned in fruitfulness, as also in their patience, because they endure most courageously both whirlwinds and showers, and flow very well; nor do they fail in lean ground. They bear the colds better than they do rains, and rains better than droughts; nevertheless they are not grieved and made sad with the heats.

Next to these the *Visula* and the lesser *Argitis* (19) thrive and rejoice in land that is but indifferent; for, in that which is fat, by their too great strength, they become luxuriant; and, in that which is lean, they come up small, and empty of fruit. They are more friendly to the frame, than to trees. But the *Argitis* is even fertile upon high trees, and over-abounds in a vast quantity of firm wood, and clusters of grapes. The *Visula* is fitter for the lowest stories of the frame. It puts forth but short hard wood, and a broad leaf, by the largeness of which it defends its fruits exceeding well against the hail; which nevertheless fall to the ground, if they be not gathered as soon as they are ripe. They rot also with too much moisture before they fall off.

There are also the *Helvolæ* (20), which some call various or parti-coloured. They are neither purple-coloured, nor black, and are so called (if I am not mistaken) from their carnation-colour. That which is more of the black is preferable for the abundance of its wine; but the other, that is nearer to a purple colour, is more precious and valuable for its taste. The colour of the berries does not appear equal to the eye neither in the one nor the other. Both of them yield more or less white must every other year by turns. They clothe a tree best, but a frame also

one; and that they gather them the last of all; the sweeter the wine of the lesser is, the better it is; that the sweet, with age, becomes rough, and the rough becomes sweet; that they produce fruit in great abundance; but are hurtful to the head, tho' of great benefit to the bladder. According to some authors, there is great plenty of this sort of vine in the kingdom of *Granada* in *Spain*.

(19) *Visula* and the lesser *Argitis*. *Pliny* gives us no reason why *vitis Visula* is so called; only says, that it is very humourfome and whimsical in chusing its soil, can neither bear continued heat nor cold; that it rots in a fat, and does not grow at all in a lean ground; but delicately seeks a middle temperature, and therefore is very familiar to the *Sabinian* hills. He says, that its grape is *indecora visu*, ugly to the eye, but pleasant to the taste. It would be stretching Etymology too far to say, it is so called, because it is ugly to look upon. *Argitis* seems to be so called from its white colour, and probably of its wood and leaves. I do not find it under this name in *Pliny*. *Hardouin* thinks, that the lesser *Visula* is by *Columella* called *Argitis*; but, according to the account he gives of it, he seems to mean a different vine, making two sorts of the *Argitis*, and not calling the lesser *Visula* *Argitis*, as he thinks. *Pliny* seems to make two sorts of the *Visula*, the lesser and the greater, as *Columella* does of the *Argitis*.

(20) *Helvolæ*, so called from their remarkable colour, as *Pliny* also says, which is a middle between purple and black, which, in *Latin*, is called *helvus*. They are also called *variana*, their berries seeming to change their colour.

tolerably well. They are also fruitful in an indifferent soil, as the *Precian vines* (21), the lesser and the greater; but these are more commended for the generousness of their wine; and they shoot out into much wood, and abound in boughs and leaves, and they soon ripen.

The *Albuelis* (22) (as *Celsus* says) is more profitable upon a hill, than upon a plain; upon a tree, than upon a frame; upon the top of a tree, than upon the lower part of it. It both bears plenty of grapes, and abounds in firm wood. For those small *Greek vines*, as the *Marcotic* (23), *Thasian* (24), *Psythian* (25), *Sophortian* (26), tho' they have a tolerable good taste, yet, in our climates, they yield but little wine, from the thinness of their clusters, and the smallness of their berries. Nevertheless the black *Inerticula* (the sluggish vine), which some *Greeks* call *Ame-thyston* (27), may be placed, as it were, in the second tribe, because it both yields a good wine, and is harmless; from which also it took its name, because it is reckoned dull, and not to have spirit enough to affect the nerves, tho' it is not dull and flat to the taste.

Celsus makes a third class of those that are commended for their fruitfulness only; as the three *Helvenacian vines* (28), of which the two larger

(21) *Pretia* or *precia vites*. *Columella* seems to insinuate, that they are so called from the preciousness of their wines. *Pliny* says, that their grapes are very proper to be put up and kept in jars; and that they have abundance of hard wood, and a leaf like parsley, *i. e.* their leaves are cut very deep. *Hardouin* says, they are like those the *Burgundians* call *raifins fendans*. *Servius* says, they were called *precia*, *quasi præcoqua*, because they ripen before others.

(22) *Albuelis vitis*. Neither *Pliny*, *Columella*, nor *Isidorus*, tell us why it is so called; whether from its colour or place, I know not.

(23) *Mareotides*, *Mareotis*, a country in *Egypt*. There is a lake there of the same name. These vines have their name from the place where they first grew, and probably were thence transported into *Greece*, and from *Greece* into *Italy*; which may be the reason why *Columella* ranks them among the small *Greek vines*.

(24) *Thasia vites*. These vines have their name from the island *Thasus*, by some called *Thassos* and *Thassus*. It lies in the *Ægean sea*, not far from *Lemnos*, of old, as *Pliny* says, called *Aeria* or *Æthria*, now *Thaso*.

(25) *Psythia vites*. I don't find in *Pliny*, or any other author I have looked into, why they were so called. *Virgil* mentions them, and says, that their grapes were best for drying in the sun, and afterwards making wine of them; which, I suppose, he means, when he says, *passo psythia utilior*. *Servius*, and other commentators I have seen, skip over it. *Jen-son's* edition of *Columella* has *Pythia vites*.

(26) *Sophortia vites*. It is doubtful whether it ought to be thus read, or *Sophrotia*. *Pliny* says nothing of them under this name. There is a small island in the *Ægean sea* they call *Sophonia*; so that perhaps it ought to be *Sophonie vites*.

(27) *Inerticula nigra*. The *Greeks* call it *ἀμίδυσος*, from the little effect that its wine has to make one drunk. *Pliny* says, that there is more reason to call it the *sober vine*; and that its wine is commendable when it is very old.

(28) *Helvenacæ vites*. *Pliny* calls them likewise *Helvicæ vites*, *ager Helviorum*, the *Vivarais* in *France*. The town is called *Viviers* upon the *Rhone*. *Pliny* speaks of *Alba Helvia*; and *Cæsar*, in his seventh book, says, that mount *Gebenna* separates the *Arverni* from the *Helvii*; so that the *Helvenian vines* were such as were originally of the country of the *Helvii*.

larger are, by no means, esteemed equal to the lesser, either in the goodness or abundance of their must. One of these, which the inhabitants of *Gaul* call *Emarcum*, yields an indifferent wine; the other, which they call the long, as also the greedy vine, yields a fordid paltry wine, and not in so great quantity, as from the number of its clusters of grapes our first hopes promise us. The least and best of the three is most easily known by its leaf; for, of all other vines whatsoever, it bears the roundest; and is commendable, because it patiently endures droughts far beyond any others, and bears colds, provided nevertheless they be without rains; and because, in some places also, its wine is poured into vessels, in order to be kept for years, till it be very old; and especially because it alone, by its fruitfulness, recommends and gives reputation also to the leanest ground.

But the *Spionian* vine (29) is very bountiful and liberal of its must, and is rather fertile in the largeness, than in the number of its clusters, as the *olive-like vine* (30), the *Murgentine* (31), which is the same with the *Pompeian*, the *Numisian*; as the *Venuculan* (32), which is the same with the *Scirpula* and *Sticula*; the black *Fregellan* (33), the *Merican* (34), the *Rhætian* (35), and the greater *Arcelacan*, which, of all

Helvii. Our author makes three sorts of them, one of which the inhabitants called *emarcium*, perhaps from its being apt to fade and wither. It is distinguished by the roundness of its leaf.

(29) *Spionia vitis*. *Pliny* says, some call it *spinea*, probably from its having leaves, or some other things, prickly, or like to thorns, about it. He says, that it thrives best in a moist, rainy, and foggy country; and for this reason it is peculiar to the country of *Ravenna*.

(30) *Oleaginea vitis*. *Pliny* says, that this vine is so called, from the resemblance it bears to the olive.

(31) *Murgentina vitis*, from the city *Murgentum* in *Sicily*. *Ager Murgentinus* is mentioned by *Tully*, in his oration against *Verres*. *Columella* seems to make it the same with the *vitis Pompeiana*, so called from *Pompeii*, a town in *Campania*, at the mouth of the river *Sarno*. It was once a municipal town, but now ruinous.

(32) *Vitis venucula*. Sometimes it is called *venuncula*; others read it *venicula*. It is so called, because its berries are distinguished and marked with veins and lines, and channelled, as it were. It is also called *sticula*, a *σίχος*, from the regular manner wherewith it is thus marked. It is by *Pliny* also called *scirpula*, *scirtula*, and *scribula*, all which cannot be true readings; but the name seems to import, that the grains or berries have something, as it were, written upon them.

(33) *Fregellana vitis*, from *Fregellæ*, once a famous town and colony in *Latium*. Some authors say, it is now called *Monte Corvo*.

(34) *Vitis merica*. In *Pliny* it is with a diphthongue. In some manuscripts it is *metica*. Why so called, is very uncertain. *Pliny* says, it is exceeding firm against rain, and all kind of weather. It bears black grapes, and its wine grows red, when it is long kept.

(35) *Rhætica vitis*, from the country where they originally grew. *Rhætia* comprehends the country of the *Grisons*, *Tyrol*, &c. They cultivated them much in the *Valtelline*, and upon the river *Addua*. *Pliny* says, that there was a vine of this name, which grew below the *Alps*, upon the sea-coasts, towards *Genoa*, which produced very bad wine; that the grapes had very thin skins, and but one kernel; that they were very different from the other *Rhætian* vines first-mentioned.

the vines we have known, abounds most in grapes. By many it is falsely thought to be the *Argitis*. For those others, which have lately come to my knowledge, I mean the *arbour* or *gallery-vine*, the *Irtiola* (36), and *Feriola* vines, I would not, for certain, affirm in what class they ought to be reckoned; because, tho' I know, that they are fruitful enough, nevertheless I have not been able, as yet, to judge of the goodness of the wine they produce.

We find also, that there is one early-ripe vine, which, before this time, we knew nothing of, and which, in the *Greek* language, we find, is usually called *Dracontion* (37), which, for its fruitfulness and deliciousness, may be compared to the *Arcelacan*, *Biturican*, and *Basilican* vines, and, for the generousness of its wine, to the *Aminean*. Moreover, there are many other sorts of vines, of which we can neither tell the number, nor the names, with any certainty to be depended upon; for, as the poet says (38),

- ‘ It serves no end their numbers to describe.
- ‘ The man, that’s fond of this laborious task,
- ‘ With equal ease, may learn how many sands;
- ‘ By western winds, are tofs’d in *Libyan* plains.’

Because all countries whatsoever, and almost all particular parts of countries, have their own peculiar kinds of vines, which they name according to their own custom and language. Some stocks also have changed their names with their places; some of them also, by changing their places, have departed from their peculiar quality; so that they cannot be known and discerned from one another. Therefore, in this *Italy* itself, not to say in the so widely extended globe of the whole earth, they vary their names. Neighbouring nations also disagree in their names, and give them different appellations; wherefore it is the part of a prudent master not to take up the student’s time with hawking after a nomenclature of this kind, which they can never make themselves masters of, but, upon the whole, to lay down that as a precept, which both *Celsus* says, and before him *Marcus Cato*, that no sort of vine ought to be planted, but that which is approved by fame; and none to be kept

(36) *Irtiola vitis*. *Pliny* says, that this vine abounds in *Umbria*, and about *Ancona*; but why it is so called, no reason is given by any of the rustic writers, which is the case with respect to several others here mentioned; and it signifies nothing to indulge one’s fancy, when it gives no light to the thing.

(37) *Dracontion*, probably so called from the twisting and winding of its branches, and the colour and appearance of its bark, resembling a dragon.

(38) *Virg. Georg. lib. ii. 103.*

for a long time, unless it be approved by experiment; and *Julius Græcinus* says, that, where many advantages of the country shall invite us to plant a noble vine, we will inquire and look out for one that is generous. Where there is nothing at all, or not much, that may encourage and allure us, we will rather pursue and search after fruitfulness, which, in the same proportion, is not so much excelled by the price, as it does excel by its abundance. But, concerning this opinion, tho' I myself, a little before, was of the same mind, nevertheless what my secret judgment is, upon closer consideration, I shall presently tell in its proper place; for I am resolved to teach after what manner vineyards may be constituted equally fruitful, and productive also at the same time of a precious liquor.

C H A P. III.

That there is nothing of greater Advantage, and more expedient for Husbandmen, than to cultivate Vineyards.

NOW, before I come to discourse of the planting of vines, I don't think it improper to lay, as a certain foundation for our future disputation, that we have before thoroughly weighed, and wisely considered, whether the culture of vineyards will enrich a master of a family; for it is almost to no purpose to give directions about planting them, while that which is the chief point, and first to be considered, is not yet granted; *viz.* whether or not we ought to have any vines at all? And this very many people are in so great doubt of, that many avoid it, and are much afraid of employing their land in this manner, and think, that an estate in meadows, pasturage, or copses, is more to be desired and wished for; for, as to lands planted with trees for supporting vines, there has been also no small dispute among authors, *Saserna* disliking and rejecting this kind of land, and *Tremellius* greatly approving of the same. But we shall take this opinion also into consideration in its own place.

In the mean time they, who study agriculture, must be taught this in the first place, that the income of vineyards is the most plentiful and abundant of any; and, that I may take no notice of the happy condition of lands in antient times, of which both *Marcus Cato* long ago, and afterwards

wards *Terentius Varro* (1), have given us an account, that each *jugerum* of vineyards did yield six hundred *urns* of wine (2); and *Varro* positively affirms this in his first book of Husbandry; and that this did not use to happen in one region only, but was the usual quantity, that both the *Faventine* land, and also that part of *Gallia Cisalpina*, now called *Picenum*, did produce: yes, marry, these things were for those times! But, at this present time, the *Nomentan* region (3) is very much celebrated by fame, and is in very great reputation, and especially that part of it, which *Seneca*, a person of an excellent genius and learning, does possess, upon whose estate it is certainly known, that each *jugerum* of his vineyards have, for the most part, yielded eight *cullei* (4): for the things that happened in our *Ceretanian* vineyards (5) seem somewhat strange and extraordinary, and have something of a prodigy, that, in your land, a certain vine should exceed the number of two thousand clusters of grapes; and, with me, eighty stocks, planted not two years before, should produce so much as seven *cullei*; and that the best vineyards should yield an hundred *amphoræ* (6) *per jugerum*, when mea-

(1) *Varro* says, *lib. i. c. 2.* that *Cato*, in his *libro originum*, gave this account of the vast produce of vineyards; and that this did not happen in one place only, but was common in the *Faventine* land, or the territory of *Faventia*, a town upon the *Æmilian* road, about 20 miles from *Ravenna*, now called *Faenza*; as also in *Picenum*, a part of *Gallia Cisalpina*, now called *Marca d'Ancona*, and subject to the Pope.

(2) Six hundred urns, which make 300 *amphoræ*, or 15 *cullei*, amount in *English* wine-measure to 2150 gallons, or 35 hogsheads eight gallons and a small fraction more. The

urn contained $3\ 4\frac{1}{2}\ 5,33$. Our author seems scarcely to believe this vast produce; and says, that it was only for those antient times, and so passes to what he knew himself.

(3) *Nomentana regio*, the territory of *Nomentum*, a town in *Sabina*, upon the river *Anien* or *Tiverone*, about 20 miles from *Rome*. It is now a village. Here *Seneca*, the famous moral philosopher, well known by his writings still extant, had an estate. He was tutor to the emperor *Nero*, who, for some time after his accession to the empire, was very fond of him, and bestowed great riches upon him; but, as tyrants cannot long endure good men, he added this wickedness to his other monstrous crimes, that he put him to death. It is probable our author wrote this book, before *Seneca* was entrusted with the education of *Nero*.

(4) *Culleus* or *culeus* was the greatest measure of liquid things among the *Romans*. It contained 20 *amphoræ*, or 40 urns, and, in *English* wine-measure, contained $143\ 3\ 11,095$ gall. pints. fol. inc. dec. so that 8 *cullei* make 1147 gallons, or 18 hogsheads and 13 gallons, and 7 *cullei* contained 1003 gallons $7\frac{1}{2}$ pints, or 15 hogsheads 58 gallons and $7\frac{1}{2}$ pints, or thereabout.

(5) *Ceretanian vineyards*. The *Ceretani* were a people of *Hispania Citerior*. The wine that grew in their country was in great request, and mentioned by several authors. *Columella* must here mean either the vineyards which he had in that country, or probably vineyards which he had planted in *Italy* with vines brought from thence, to which he gave the name of the country from whence he brought the vines.

(6) *Amphora*, from the Greek word *ἀμφορεύς*, or, by a syncope, *ἀμφορεύς*. It is so called from its two handles for carriage. It contained 2 urns or 8 *congi*, in *English* wine-measure $7\ 1\ 10.66$ gall. pint. fol. inc. dec. so that 100 *amphoræ* contained 717 gallons, or 11 hogsheads 24 gallons, or thereabouts.

dows,

dows, pasturages, and woods, seem to do mighty well for, and to turn to very good account to, the owner, if they bring him in a hundred *sestertii* (7) on each *jugerum*; for we can scarcely remember when corns, in the greatest part of *Italy* indeed, have answered with a fourth part of this.

Why then is this thing in so great disreputation? *Græcinus* says, that it is not from its own fault, but from mens; first, because nobody gives diligence in examining and trying the plants; and therefore most part of men plant vineyards of the worst kind. Then they don't cherish and nourish them, after they are planted, in such a manner, that they may grow strong, and shoot up, before they are parched and burnt up with the heat; but if peradventure they grow up, they cultivate them negligently. Now, from the very beginning, they think, that it is of no importance what place they plant; yea, they even pick out the very worst part of their lands, as if that ground, which can bear no other thing, were only the fittest for this stem; but they don't even so much as throughly understand the way of setting them, nor put it in practice when they do understand it: also they seldom prepare, and lay up beforehand, a portion or dowry, that is, the necessary furniture and implements for vineyards; whereas this thing, if neglected, exhausts many days labour, and always empties the master of the family's coffers.

Most people indeed are mighty intent upon having as much fruit for the present as is possible; and make no provision for the time to come; but, as if they lived altogether from hand to mouth, and only had regard for the present time, they so force the vines, and load them with so many fruit-bearing branches, that they have no regard for the interest of their posterity. After having been guilty of all, or at least of most, of these things, they will rather do any thing than confess their own fault; and they complain, that the vineyards don't answer their expectation, which they themselves have destroyed, either through covetousness, ignorance, or negligence. But if there be any, who, when they have added diligence to knowledge, cannot indeed (as I reckon) receive forty or thirty, yet, as *Græcinus* says, who makes the lowest computation,

(7) The Roman *sestertius* was a silver coin, equal in value to $2\frac{1}{2}$ *asses*, and is so called from *semisestertius*, i. e. 2 *asses* and the half of the third. It was equal to the fourth part of the *denarius*, as is clear from the best classical authors; which I need not mention. The *denarius*, which was the chief silver-coin among the *Romans*, weighed about 62 grains, and is, by the best judges, computed to be worth 7 d. $\frac{1}{4}$ *English*, allowing 8 *English* grains to the silver-penny; so that, according to this valuation, 100 *sestertii* amount to 16 s. 1 d. $\frac{3}{4}$, which was the common or ordinary yearly rent of a *jugerum* of pasture, meadow, or copse land.

if they shall receive twenty *amphoræ* (8) of each *jugerum*, they will easily, in the increase of their estate, surpass those who hug, and are mighty fond of their hay and their pot-herbs: nor is he mistaken in this, because, as a good reasoner, and a diligent accountant, after he had made his calculation, he saw, that this kind of Husbandry conduced most to improve his estate.

For let us suppose the largest expences that vineyards may require, nevertheless seven *jugera* (9) don't require above the labour of one Vine-dresser; which the vulgar indeed value at a very low price, and think, that even a malefactor, exposed to public sale, may be purchased for that purpose; but I, who dissent from the opinion of very many people, think, that an excellent Vine-dresser, purchased at an high price, is one of the first and principal things, and of the greatest advantage; and, suppose he be bought for six, or rather for eight thousand *sestertii* (10), when I reckon that the ground itself, consisting of seven *jugera*, is purchased for just so many thousand *sestertii*, viz. seven thousand (11); and that the vineyards, with their dowry, that is, with stakes or props, and willows, are planted for two thousand *sestertii per jugerum* (12); then

(8) 20 *amphoræ per jugerum* amount to

gall.	pints	roods, sq. poles	sq. feet dec.
143	3½	upon 2	18 250.05

English measure.

(9) 7 *jugera* make 4½ acres.

(10) 8000 *sestertii*, the price of an excellent Vine-dresser, make in *English* money 64 l. 11 s. 8 d.

(11) The price of the land proper for vineyards is computed by our author at 1000 *sestertii per jugerum*, which, for the whole seven *jugera*, amounted to 7000 *sestertii*, which, according to the value of the *sestertius* before-mentioned, make in *English* money 56 l. 10 s. 2½ d. so that a *jugerum* of such kind of land being worth 8 l. 1 s. 5½ d. an *English* acre, according to this rate, was worth about 13 l. 1 s. 1 d. the *Roman jugerum* being to the *English* acre near as 10 to 16. as has been often said. Here it may be proper to observe, that *totidem milibus*, in the text, do not refer to the 8000 *sestertii* paid for the Vine-dresser, but to the last-mentioned number, *septem jugerum*; and signify the same thing, as if the author had said, that he counted the land at 1000 *sestertii per jugerum*; so that, there being 7 *jugera* here mentioned, his meaning by *totidem milibus* is, that he computed the land at 7000 *sestertii*. This is manifest by adding the several sums together, which, the text says, amount to 29,000 *sestertii*; whereas, if these two words referred to the 8000 *sestertii* paid for the Vine-dresser, they would, with the 14,000 *sestertii* expended upon planting the 7 *jugera*, amount to 30,000 *sestertii*. The not adverting to this has been the occasion of a mistake made by a very worthy and learned gentleman, in his dissertations on ancient coins, weights, measures, &c. p. 155. chap. viii. Of the price of lands among the Romans; where, from this place of *Columella*, he makes a wrong calculation of the value of a *jugerum* of land at that time among the Romans, and of an *English* acre of land after the same rate. This mistake any person would easily fall into, who did not carefully attend to what follows after these two words, and omit to add the different sums there mentioned together.

(12) 2000 *sestertii*, i. e. 16 l. 2 s. 11 d. computed to be the expence of planting one *jugerum* of vineyard, which amount to 14,000 *sestertii* for the whole 7 *jugera*; add to this sum the price of the Vine-dresser, viz. 8000 *sestertii*, and the price of the 7 *jugera* of land, viz. 7000 *sestertii*, the whole amounts to 29,000 *sestertii* principal money laid out for

pur-

then the price of all these, added together, amounts to twenty-nine thousand *sestertii*: add to this sum the interest at six *per cent. per annum* for two years, when the vineyards, being, as it were, in their infancy, bear no fruit, which amounts to three thousand four hundred and eighty *sestertii*; the whole principal and interest amount to thirty-two thousand four hundred and eighty *sestertii*; which sum if a Husbandman would make his vineyards, as it were, debtors for, in the same manner as an usurer does with his debtors, so as the owner may have the foresaid interest of six *per cent. per annum*, he ought to receive yearly one thousand nine hundred and fifty *sestertii* (13). By which computation nevertheless the yearly income of the seven *jugera*, even according to the opinion of *Græcinus*, exceeds, or is much better than, the interest of thirty-two thousand four hundred and eighty *sestertii*; for, suppose the vineyards were of the very worst sort, yet, if they be cultivated, each *jugerum* will certainly produce a *culleus* of wine (14); and suppose the forty *urns* may be sold for three hundred *sestertii*, which is the lowest price wine can be supposed to be sold at, nevertheless the seven *cullei* make up the sum of two thousand and one hundred *sestertii* (15). Moreover, this sum exceeds the interest of six *per cent.* and this calculation, which we have made, comprehends *Græcinus's* computation. But we are of opinion, that those vineyards ought to be extirpated, which yield less than three *cullei* of wine the *jugerum* (16); and yet we have made our computation, so as if there were no quicksets to be taken up out of the pastinated ground, when that very article

purchasing and planting 7 *jugera* of vineyard. This, in *English* money, comes to 234 l. 2 s. 3½ d.

The interest of 29,000 *sestertii* for two years, at six *per cent.* is 3480 *sestertii*, which, added to the principal, make 32,480 *sestertii*, or, in *English* money, about 262 l. 3 s. 6 d. which is the whole charge of purchasing and planting the 7 *jugera* of land, and the two years interest before it is supposed to answer.

(13) The interest of 32,480 *sestertii* at 6 *per cent.* is 1948¾ *sestertii*; but the text, in the copies I have seen, has 1950. Probably the author was willing to express an even sum, without a fraction, or else there is an error in the copies. This interest amounts, in *English* money, to about 15 l. 14 s. 10 d.

(14) *Singula jugera*, &c. The author says, that vineyards of the worst kind, if cultivated, would produce *per jugerum* a *culleus* of wine, *i. e.* about ⅔ of an *English* acre would

produce 143 3 11.095, or 2 hogsheads 17 gallons and 3 pints, with the fraction, which, the author says, when sold at the lowest price, will bring 300 *sestertii*, or 2 l. 8 s. 5¼ d. At this rate a gallon comes to about 4 d. but this is supposed to be both of the worst vineyards, and of the worst wine, and consequently the lowest price that wine could then be supposed to be sold at.

(15) The 7 *cullei* make up the sum of 2100 *sestertii*, or 16 l. 19 s. 0¾ d.

(16) Three *cullei* of wine the *jugerum*, *i. e.* 430 gallons and 2 pints. Our author says, such vineyards, which did not yield this quantity, ought to be extirpated, *i. e.* which did not yield 10 hogsheads and 20 gallons an *English* acre.

alone may, by the price it bears, free the ground of all expences whatsoever, provided it be not provincial, but *Italian* land.

Nor ought this to remain a doubt with any person, after he has looked into, and considered, both our computation and that of *Julius Atticus*; for we, at this present time, set twenty thousand shoots or cuttings amongst the rows of vines upon one *jugerum* of vineyard; he plants four thousand less. But, suppose his way to be the best, yet there is no place, even tho' it be ever so bad, which will not yield a greater profit than the charges it has had bestowed upon it. But let us suppose, that, by the carelessness of the Vine-dresser, six thousand of the plants should perish, yet the remaining ten thousand any farmer of vineyards (17) will willingly purchase for three thousand *sestertii* (18), and gain by them: which sum exceeds, by its third part, the two thousand *sestertii*, which, we said before, was the charge that the planting of a *jugerum* of vineyard amounts to, altho' we, by our care, have now brought things to such an improvement, that the Rustics purchase of me quicksets very chearfully at six hundred *sestertii* a thousand. But another person will scarcely be able to come this length; for nobody will easily believe, that there is so great abundance of wine upon our small parcel of land, as you, *Silvinus*, very well know. I have therefore fixed the quicksets at an ordinary and common price, that they who, through ignorance, are afraid to meddle with this part of Husbandry, may be brought over to my opinion, without any one person dissenting from it; therefore either the advantage we shall make of our pastinated ground, or the hope we have of future vintages, ought to encourage us to plant vineyards: and, seeing we have proved, that it is consistent with reason to plant them, we shall now give precepts and directions for instituting them, and putting them into due order (20).

C H A P.

(17) *Redemptor*. This word is applied by authors to many different things. *Festus* says, that antiently *redemptores* were such as undertook to do or furnish any thing for the public, and, after performance, were to receive a sum of money. Afterwards the word came to be used for any person, who hired the use of any thing, and was obliged to pay a certain sum of money, or some other consideration, for the same. In this place it must signify a farmer of a vineyard, who commonly paid the half of the fruit thereof.

(18) 10,000 vine-plants sold for 3000 *sestertii*, in *English* money 24 *l.* 4 *s.* 4½ *d.*

(19) 600 *sestertii*, the price of 1000 quicksets or vine-plants, *i. e.* 4 *l.* 16 *s.* 10½ *d.* *English* money.

(20) At the end of this chapter it may not be amiss to observe, that *Columella* makes use of *numus*, *numus sestertius*, and *sestertius*, as equivalent terms denoting the same sum.

It may likewise be of some use to observe his manner of expressing the rate of the interest of money at the time he wrote; and, in order to understand his expression, we must know, that, among the *Romans*, the highest legal interest was one *per cent.* a month, or twelve *per cent.* a year; and that it was the custom to pay this one *per cent.* on the calends of every month, from which came the phrase *tristes calendæ*. And, as this one *per cent.*

C H A P. IV.

What Things he ought to observe, who plants Vineyards.

WHOEVER has the making of vineyards much at heart, let him beware, above all things, of chusing to entrust them rather to the care of another person, than to his own; nor let him purchase any quicksets, but let him plant at home shoots and cuttings of the most approved kind, and make a nursery of vines, out of which he may cloath his lands with vineyards; for such strange plants, as are transplanted from a different quarter, are not so familiar to our soil, as those that are natives of it, and brought up in it; therefore, as if they were of a foreign extraction, they greatly dread a change of climate and situation: but neither can they give us any certain evidence, that they are of the generous kind, seeing it is uncertain, whether he who planted them did set that sort of shoot, which had been carefully examined, tried and approved: wherefore the space of two years must not at all be thought long, within which time plants come such a length, as duly to answer our expectation, seeing, as I said, it will always turn to good account to have set a stem of an excellent kind.

Then, after these things, let him remember to be very exact in chusing a place for the vineyards, which when he is come to a final resolution about, let him know, that he must give the greatest diligence to pastinate it as it ought to be; which when he has thoroughly done, let

cent. was the hundredth part of the principal, it was therefore called *centesima usura*; and tho' it was not contrary to law to take so great interest, yet it was, for the most part, accounted oppression: so that it was common enough to take six or eight *per cent.* more or less, according as the borrower had credit, and could find a reasonable lender. However, the *usura centesima* was the integer, which authors had in view, when they mentioned the *quantum* of interest. It is also further necessary to know, that, in order to express any integer; they made use of the name of a brass coin they called *as*, which consisted of twelve ounces or divisions, each of which had a different appellation; so, to express any part of the integer, they gave it the name of that part or division of the *as*, which corresponded to it. Thus, to express the whole *centesima usura*, they said *asses usuræ*; and to express a part, they said *triens usuræ*, *quadrans usuræ*, &c. through all the divisions of it. Thus *Columella*, in this chapter, to express $\frac{1}{2}$ *per cent.* a month, and six *per cent.* a year, calls it *semissis usurarum*. And, that this is his meaning, we may easily see, by calculating the several sums mentioned in the text; so, according to this analogy, he would have said *triens usurarum* to express four *per cent.* a year, and $\frac{1}{3}$ *per cent.* a month; *quadrans usurarum*, three *per cent.* *per annum*, and $\frac{1}{4}$ *per cent.* a month; *odrans usurarum*, nine *per cent.* a year, and $\frac{3}{4}$ *per cent.* a month; and so of all the rest of the divisions of the *as*, corresponding to the *centesima usura*. Some authors indeed have expressed this matter differently; but they must mean the same thing.

him, with no less care, plant the vine; and, after he has planted it, let him apply himself to the culture of it with the greatest sedulity; for this is the chief and principal point, as it were, in all expences, because it consists in this, whether a master of a family has acted better or worse in committing his money to the earth, than if he should finger it in idleness, and not employ it at all. Therefore I shall now prosecute, in their order, each of these things I have proposed.

C H A P. V.

In what sort of Ground, and after what manner, a Nursery of Vines must be made.

A Nursery of vines must not be made either in hungry ground, nor in that which is oily; nevertheless the land must be juicy, and rather middling than fat, altho' all authors almost have destinated the richest and fruitfulest place for this purpose, which I don't at all think is for the Husbandman's advantage; for the stems being set in a strong ground, tho' they quickly strike root, and shoot up, yet, when they are become quicksets, if they be transplanted into a worse soil, they shrink and wither, and cannot grow up to their full stature; for it is the part of a prudent Husbandman to transplant rather from a worse to a better, than from a better to a worse soil: for which reason, in the choice of a place, *mediocrity* is most approved, because it is placed in the confines of, or in the middle between, good and bad; for whether necessity shall afterwards require us to commit these plants, when they are fit to be removed, to a hungry soil, they will not feel any great difference when they are transplanted from indifferent ground to that which is poor; or whether it be a richer land, which is to be planted therewith, they will improve and grow up much faster with plenty and abundance of *nourishment*.

Moreover, it is not at all for our interest, or agreeable to reason, to make a nursery of vines in a very thin poor soil, because the greater part of the shoots or cuttings perishes, and what remains becomes slowly fit for transplanting: therefore a middling and moderately dry land is fittest for a nursery of vines; and it ought first to be broken up and subdued with the double-hoe or trenching-spade, which is the depth of the pastination,

nation, when the ground is turned up to two feet and an half (1). Then, having left spaces of three feet, by which the plants may be cultivated, you must plant six hundred shoots or cuttings in each row, consisting of two hundred and forty feet. This number makes up all together twenty-four thousand plants upon the whole *jugerum*. But the careful examination and choice of the shoots or cuttings precedes this care; for, as I have now often told you, it is the foundation, as it were, of the fore-said affair, to set the most approved kind of them.

C H A P. VI.

What Sort of Shoot or Cutting must be chosen, and from what Parts of the Vine it must be gathered.

BUT the choice must be made with a twofold regard; for it is not enough, that the mother, from which the plants are sought, be fruitful; but greater subtilty of reason must be used, that they may be taken from those parts of her body, which are both genital, and the most fertile: for a vine, whose offspring we are desirous to set apart for bearing fruit, ought not to be esteemed for this reason only, because it produces very many clusters of grapes; for this may happen from the vastness of its trunk, and the great number of its fruit-bearing branches (1): nevertheless I would not call that a fertile vine, where single clusters are seen upon each spray or twig, but if, upon every young twig of the present year, a greater number of bunches hangs down; if, from each eye upon its very many firm branches, it germinates with fruit; if, lastly, it puts forth from its hard part also a twig with some clusters upon it; if also it is pregnant with the fruit of the nephews,

(1) *Bipalium*, a tool they made use of for trenching ground. *Pliny* calls it *bidens ternos pedes bipalio alto*, which must signify, that the iron part of it was 3 feet deep. *Father Hardouin* says, that *bipalium* was the iron part of the *bidens*, wherewith the earth was digged. *Columella*, I reckon, means a *bipalium* of 2 feet, or $2\frac{1}{2}$. The first was called *bipalium non altum*; the second *bipalium altum*, which may signify a trenching-spade or mattock 2 or $2\frac{1}{2}$ feet deep.

(1) *Palmites* are the young branches or sprays of vines, which shoot forth from the vine, like fingers from the hand; and, as has been already said, they are called *palmites*, from their resembling the human hand. There are two sorts of them, one which grows out of the firm hard wood of the vine, and, for the most part, bears only leaves the first year, and is called *pampinarius*; the other is that which springs out of a branch of one year old, and, because it presently brings forth fruit, is called *fructuarius*.

or secondary shoots (2). This vine, without doubt, being fruitful, ought to be destinated for shoots to be gathered from it.

But a *malleolus* (3) or *mallet-shoot* is a young vine-branch or tendril growing out of a rod of the former year, taking its surname from its likeness to the thing by which it is called, because, in that part which is cut off from the old branch, it is prominent on each side, and has the appearance of, or resembles a mallet. We are of opinion, that this should be gathered from the fruitfullest stem every time the vineyards are pruned, and be carefully covered over with earth in a place moderately moist, but not oufy, leaving three or four eyes standing out above-ground; provided nevertheless, that this be always a principal point with us, to examine and take due care, that the vine, from which it is taken, be not liable to uncertainty, with respect to the event of its blossom; that its berry does not with difficulty grow big; that it neither brings early ripe fruit, nor that which is too late in coming to maturity; for the former is infested by the fowls of the air, and the latter by stormy weather.

Moreover, we cannot have any certain proof of such a kind of vine by one vintage; for even a vine that is naturally unfruitful may, for

(2) *Nepotes* are twigs or small sprays growing out of a spray or twig of the same year. I call them secondary shoots. *Columella, lib. iv. cap. 24.* says, *ipfos palmites quos vindemia præparamus, claviculis ac nepotibus privandos cenfeo*; he ordered the fruit-bearing branches, which were prepared for the vintage, to be bereaved of their tendrils and nephews, or secondary shoots, and *quicquid a tenero processit sicut nepos parcius detondetur*; so that *nepos* signifies a twig, that grows out of a twig of the same year, which, with respect to the branch of which it is the issue, is, as it were, the grandchild; for there is in the vine what our author calls *durum, i. e.* the firm hard wood, become so by time; and there is the *tenerum*, which is a twig or young branch, which is, as yet, but soft and spongy, and has not had time to harden; so that, I think, the learned father *Hardouin* mistakes *Pliny, lib. xvii. cap. 21.* when he says, that *nepotes* are *virgæ quas vitis ciet e radicibus aut caudicis lateribus*, rods which the vine putteth forth out of her roots, and the sides of her trunk; for these, I think, are always called *stolones*.

(3) *Malleolus*. Our writers upon gardening, I see, retain this word, as they do many other original words, both *Greek* and *Latin*, which may be necessary perhaps in the names of trees, plants, &c. where their own language furnishes them no words; but, when this is carried too far, very few people can read their books with that pleasure, which otherwise they would have; so that it is to be wished, that these ingenious gentlemen would sometimes make use of circumlocutions in expressing things, that so more people might profit by their learned writings. It would be easy to draw up a catalogue of words, which they use, which frighten *English* readers, who understand neither *Greek* nor *Latin*. The ingenious Mr. *Millar* has indeed, in a great measure, remedied this inconveniency in his most useful dictionary, by an alphabetical catalogue of those hard words, with their explanations, which, in time, may make them as familiar to the reader, as other *English* words; and the learned Dr. *Martin* has followed the same method in his first lecture of his course of botany.

I have translated *malleolus* a mallet-shoot or cutting, as our author explains it. It is a cutting taken off the branch, with a bit of the old wood on each side of it, which makes it resemble a mallet; but cuttings, which were not of this form, and had nothing of the old wood adhering to them, notwithstanding still retained the old name.

once,

once, bring forth abundantly, either from the great plenty of the year, or from some other causes; but, when a vine has once established its reputation, so as to be depended upon by the merit, as it were, of the service of a great many years, there is no further doubt to be made of its fruitfulness. Nevertheless such an inquiry is not to be extended above the term of four years; for that time commonly, wherein the sun returns to the same part of the Zodiac through the same numbers by which it began its course, discovers the generous qualities of all green things whatsoever; which periodical course of one thousand four hundred and sixty-one whole days they, who apply themselves to the study of celestial things, call ἀποκατάστασις, or the restitution of things to their former state (4).

C H A P. VII.

How you may know and discover the Fruitfulness of a Vine.

BUT I am persuaded, *Publius Silvinus*, that you are long ago tacitly inquiring what kind this fruitful vine, which we so accurately describe, may be of, and whether or not one of those, which are not commonly esteemed the most fertile, is not pointed at; for very many people extol and praise the *Bituric*; many the *Spionian*; some the *Basilic*; and some the *Arcelacan* or *arbour-vine*. We also do not unjustly deprive these sorts of vines of our commendation; for they yield a vast quantity of wine: but we have resolved to teach you to plant such vineyards, as may bring no less plenty of fruit, than those sorts already mentioned, and of as precious a taste as that of the *Aminean*, or, at least, not far from that taste.

I know, that almost all Husbandmen differ from us in their opinion upon this point, which, with respect to *Aminean* vines, is become inveterate, and now has prevailed a long time, as if they laboured under a

(4) Ἀποκατάστασις signifies the restitution of any thing into its former state or form. *Columella*, no doubt, means, by this word, the *Julian* year of 365 days and six hours, four times repeated, which make 1461 days. This word is also applied to the annual revolution or return of a heavenly body to the same sign; as for example, from *Aries* through the 12 signs to *Aries* again. It is also made use of to signify what they call the *Dionysian period*, which is; by multiplying the cycle of the sun of 28 years with the cycle of the moon of 19, which produces 532 years; which being finished, it was believed, that the new-moons and full-moons returned to the same day of the year, and of the week; and this was called *conversio anni magni*. But what influence the revolution of four years can have upon trees, plants, and other green things, our author does not explain.

natural and innate sterility ; for which reason, it is more necessary, that the method, which we have recalled, and brought back from long disuse and neglect, and which, being condemned by the slothfulness, and no less by the imprudence of Husbandmen, and, as it were, kept in obscurity by the darkness of ignorance, has not been fairly represented, nor set in a true light, should be supported and established by very many examples : wherefore it is not improper to turn our thoughts first towards those things, which seem proper to correct this public error.

C H A P. VIII.

What Quality you are principally to have regard to, in Ground that you destinate for Vineyards.

THEREFORE, *Publius Silvinus*, if, with the eyes of our mind, as it were, we would more intently contemplate *Nature*, the former of all things, we should find, that she has established the like law of fecundity for every green thing, as for men, and other living creatures ; and that she has not bestowed peculiar gifts and advantages upon some nations and countries, so as wholly to deny the like endowments to others. To some nations she has given the advantage of propagating a numerous offspring, as to the *Egyptians* and *Africans*, with whom it is a very common and ordinary thing almost every year to have two children at a birth ; and of *Italian* extraction also, she has been pleased to endow with exceeding great fruitfulness some *Albanian* ladies of the *Curatian* family (1), who were mothers of three children at a birth. She has graced *Germany* with armies of exceeding tall men ; but has not wholly deprived other nations of men of excellent stature ; for both *Marcus Tullius Cicero* is a witness, that *Nævius Pollio* (2), a *Roman* citizen, was a foot taller than the tallest man whatsoever, and lately we ourselves might have seen, in the apparatus for the pompous celebration of the *Circensian* games, a man of the *Jewish* nation, who was taller than the tallest *German*.

(1) *Albanas Curatiæ familie*. *Dionysius Halicarnassæus* gives an account of two daughters of an *Albanian* gentleman being married, one into the family of the *Curatii* of *Albano*, the other into the family of the *Horatii* at *Rome* ; and that they both had three children at one birth. The *Egyptians*, *Pliny* says, are also thus fruitful, which he attributes to their drinking of the water of the *Nile*, which he calls *fetifer Nilus* ; of which *Solinus* says, *cap. I.* that it not only makes the land fruitful, but also the woman's womb.

(2) *Nævius Pollio*. *Tully* wrote a book *de admirandis*, which *Pliny* mentions in his thirty-first book of *natural history*. It is probable he mentioned this giant in that book.

I pass now to cattle: *Mevania* (3) is famous and remarkable for herds of tall cattle, and *Liguria* (4) for small; but, in *Mevania*, sometimes there is seen a low ox, and in *Liguria* a bull of an eminent stature. *India* is reported to be wonderful for the vast bulk of its wild beasts; nevertheless who will deny, that, in this land, there are bred terrible beasts of equal hugeness? since we may observe, that there are elephants brought forth within our walls.

I return to the fruits of the earth of several kinds: they say, that *Mysia* (5) and *Libya* abound in large crops of corn; nor are the lands of *Apulia* and *Campania* (6) inferior to them in plentiful crops; that *Tmolus* (7) and *Corycus* (8) are reckoned famous for the saffron-flower, and *Judæa* and *Arabia* for their precious odours. But neither is our city destitute of the foresaid stems, forasmuch as we see at one time cassia putting forth its leaves, and thriving in many parts of the town; at another time the frankincense-plant, and the gardens blossoming with myrrh and saffron. Certainly, by these examples, we are given to understand, that *Italy* is most obsequious to the industry of mortals, it having learned to bear whatever grows in any other part almost of the whole earth, when Husbandmen have applied due diligence and care: for which reason we are in less doubt about that fruit, which, being, as it were, originally a native of the country, is natural, familiar, and peculiarly adapted to this soil; for there is no doubt, but the vines of the *Massican*, *Surrentinian*, *Albanian*, and *Cæcuban* lands are, for the nobleness of their wine, the chief and the most excellent of all those that the earth sustains.

(3) *Mevania*, now called *Bevagna*, a city in *Umbria* in *Italy*. It was the country of *Propertius* the poet, who celebrates the *tauriferi campi Mevania*.

(4) *Liguria* comprehended all that country now called *La Riviera di Genoa*, which extends a great many miles upon that part of the *Mediterranean* sea called *Mare Ligusticum*. It comprehended also a great part of *Gallia Cisalpina*, between the *Apennines* to the south and east, the *Cottian Alps* to the west, and the river *Po* to the north, comprehending *Montferrat*, a great part of *Piedmont*, and a part of the duchy of *Milan*.

(5) *Mysia*, a country of the *Lesser Asia*, now called *Natolia*, subject to the *Turks*.

(6) *Campania*, a most beautiful and fruitful country in the kingdom of *Naples*, now called *Terra di Lavoro*.

Apulia, now called *Puglia*, a province in the kingdom of *Naples*.

(7) *Tmolus*, a mountain in *Phrygia* in *Lesser Asia*, upon the confines of *Lydia*, famous for saffron, of which both *Virgil* and *Ovid* make mention.

(8) *Corycus*, a city of *Cilicia*, by some called *Corcur* and *Curcho*; as also a mountain in that country famous for saffron. Some say, that the saffron has its name from the mountain; others from the city. It is much celebrated by *Dioscorides*, *Galen*, *Pliny*, and others.

C H A P. IX.

How you may make Aminean Vines fruitful.

I N these perhaps *fruitfulness* is wanting; but this may be promoted by the industry of him that cultivates them: for if, as I said a little before, *Nature*, the most bountiful parent of all things, has enriched every particular nation and country with peculiar gifts, yet so as not wholly to deprive others of the like endowments, why should we doubt, that she has observed the foresaid law also in vines? That altho' she has thought fit, that some kind of them should be particularly fruitful above all others, as the *Bituric* and the *Basilic*, yet she has not made the *Aminean* kind so barren, that, of many thousands of them, there should not be found a very few fruitful ones, as these *Albanian* sisters among the *Italian* ladies.

But as this is very likely, so also experience has taught us, that it is true; forasmuch as in the *Ardeatine* land (1), which we ourselves have had in our possession for these many years, as also in the *Carseolian* (2) and *Albanian* lands, we have had *Aminean* vines of this character; very few indeed, but so fertile, that, upon a frame, each of them yielded three urns (3); and, in arbours, they amounted to ten *amphoræ* of wine each (4). Nor ought this fruitfulness in *Aminean* vines to seem incredible; for how could *Terentius Varro*, and, before his time, *Marcus Cato*, affirm, that each *jugerum* of vineyards yielded to the antient Husbandmen six hundred urns of wine, if *Aminean* vines were deficient in fruitfulness, they being, for the most part, the only vines, which the antients were acquainted with? unless we think, that the vines which they cultivated were of the *Bituric* or *Basilic* kind, which, being lately brought from very distant countries, are just now come to our knowledge; whereas, at this present time, we reckon the *Aminean* vineyards to be the most antient.

(1) *Ardea*, formerly a famous town of *Latium*, between *Ostia* and *Antium*, now intirely ruinous. It was more antient than *Rome*, and the metropolis of the *Rutili*.

(2) *Carseoli* and *Carseola*, a colony and town in *Latium*, near to the *Lacus Fucinus* in the Pope's dominions. It was antiently a town of the *Æqui*, now called *Arsoi*.

(3) Three urns, *i. e.* 10 gallons 6 pints.

(4) Ten *amphoræ*, *i. e.* 71 gallons 3 pints. This seems to be too great a quantity; for it is not probable, that a vine's growing in the form of an arbour, and its branches expanded, and extended to a great length, should make it so much more fruitful than that which grows upon the *jugum* or frame; so that it is probable, as the learned *Gesnerus* says, that there is an error in the text; and that it was, at first, *senas* or *binas*, and not *denas*, as we have it now. Errors, in numbers, easily creep into books.

If any man therefore would, for several vintages, observe and mark such *Aminean* vines, as I told you I had in my possession a little while ago, that, from them, he might chuse the most fertile cuttings, he might raise vineyards equally generous and abundant in fruit; for there is no manner of doubt, but it was the will and pleasure of Nature itself, that the offspring should be like to the mother. Hence it is, that the shepherd also, in the *bucolics*, says (5);

- ‘ I’ve known the puppy, and the wanton kid,
 ‘ Each like its dam grow up.’

And hence it is, that they, who are fond of contending for the mastery in the sacred games, keep, with great diligence and care, the breed of the swiftest horses, and conceive hopes of future victories from the offspring, which has been propagated of a generous stud. Let us also, for the like reason as they in chusing the breed of the *Olympian* mares, found all our hopes of future vintages in chusing the seeds of the most fruitful *Aminean* vines.

Nor is there any reason, that the tediousness of the time should deter any person; for, whatever delay there is, it is taken up in examining and making a trial of the shoot or cyon. But, when once the fruitfulness of the vine has been sufficiently proved, it is very quickly raised to a very great number by engraftments. Of this thing, you, *Publius Silvius*, can give evidence for us, seeing you will very well remember, that I completely finished the planting of two *jugera* of vineyard in less than two years time, by making engraftments from one early ripe vine belonging to you in your *Ceretanian* estate. What number of vines therefore do you think might be planted within the like space of time from the cuttings and shoots of two *jugera*, when these two *jugera* themselves are the offspring of one vine?

Wherefore, if, as I said, we would bestow labour and care, we shall easily, by the foresaid method, form as fruitful vineyards of the *Aminean*, as of the *Bituric* and *Basilic* kinds: only it will be of great importance, that, in transplanting the plants, we observe and keep the like state and constitution of the climate, and also the quality, situation, and disposition of the place, and of the vine itself; because, for the most part, a cutting or cyon degenerates, if either the situation, or the quality of the land, or of the air, be repugnant to it; or also, if it be brought from a tree, and put upon a frame.

(5) *Virg. ecl. i. 23.*

Therefore we must transplant from cold to cold, from hot to the like state, and from vineyards into vineyards. Nevertheless an *Aminean* stem, when removed from a cold state, can better bear that which is hot, than from a warm situation, that which is cold; because every kind of vine, but especially that before-mentioned, is naturally more delighted with warmth, than with cold.

But the quality of the soil also helps very much, that it be removed from that which is lean or indifferent, to that which is better; for that which has been accustomed to a fat soil can by no means endure a lean ground, unless you dung it often: and these are the precepts we have given you in general concerning the care that is to be taken in the choice of mallet-shoots or cuttings. Now we come to give you particular directions, that they may be chosen, not only from the fruitfullest vine, but also from that part of the vine, which bears the greatest plenty of fruit.

C H A P. X.

From what Part of the Vine the Plants must be chosen.

BUT the most fertil plants are not, as antient authors have taught us, the extreme part of it, which they call the head of the vine, that is, the utmost, and the most produced or longest rod of it; for in this also Husbandmen are deceived: but the cause of this error is the first beautiful appearance and number of the clusters, which, for the most part, is seen upon the longest and most produced branch; which thing ought not to deceive us, for it happens not from the natural, innate fertility of the fruit-bearing branch, but from the conveniency and advantage of the place, because all the moisture and nourishment, which the ground dispenses, passes quickly through the other parts of the trunk, till it comes to the last; for the whole nourishment of any green thing, as if it were a certain soul, is, by its natural spirit, drawn to the top, through the marrow of the trunk, as through a siphon, which mechanics call a *diabetes* (1); to which place when it is come, it stops there, and is consumed: and hence it is, that, either in the head

(1) *Diabetes* is a Greek word, which comes from a Greek verb, which signifies to *pass through*. It is an incurvated instrument, or crooked glass tube, for drawing liquor out of a vessel, and is so called from the liquor passing quickly through it. In allusion to this, that disease of the body, wherein whatever one drinks does suddenly flow through the vessels, and pass by urine, is called by this name; because the moisture of the body does not stop any-where, but passes from place to place, just as water does through a siphon.

of the vine, or in the shank, next to the roots, are found the firm wood-branches, that shoot forth the most vehemently; but those shoots, which are produced out of the hard part of the vine, are approved by them for two reasons, because they are without any offspring, or are empty of fruit, and also because they are nourished by the fresh, pure, and unmixed juice next to the earth; and those others are reckoned fertile and firm, because they creep forth out of the tender part of the vine, and whatever nourishment, as I said above, comes to them, is not divided, and dispersed to other parts. The shoots that sprout out of the middle of the vine are the leanest, because the moisture passes quickly by them, and is partly intercepted on this side of them, and drawn from them on the other: therefore neither the uppermost or highest rod, nor the lowest, ought to be reckoned fruitful, altho' it may bring forth much fruit; forasmuch as it is forced to bear much fruit, by the exceeding fruitfulness of the place it grows upon: but that branch ought to be reckoned fruitful, which, being situated in the middle of the vine, even tho' it be in an inconvenient place, yet does not fail to bear, but shews its benignity by a numerous offspring. When this branch is transplanted, it very rarely degenerates, when, from a worse state and condition, it passes to, and obtains a better; for whether it be set in pastinated ground, or grafted upon a stock, it is satiated with more plentiful nourishment than formerly, when it was in a poor and needy state.

Therefore we will carefully observe to chuse and gather our plants from the fore-mentioned places, which Rustics call the *shoulder-parts* of the vine, nevertheless such as we shall have observed to have brought forth some fruit before; for, if they be intirely destitute of fruit, we are of opinion, that the most commendable part of the vine will contribute nothing to the fruitfulness of the cutting.

Wherefore the opinion of those Husbandmen is exceeding erroneous, who believe, that it is of very little moment and importance what number of clusters a spray may have, provided it be gathered from a fruitful vine, and is not sprung out of the hard stock, which they call a *stock-branch*. But this opinion, which has its rise from their ignorance, or their not knowing the plants that ought to be chosen, does first make such vineyards as are but indifferently fruitful, and afterwards also such as are too barren: for who is it now, that, in so long a course of years, has ever given the Husbandman, when he was gathering his cuttings, such precepts as I have mentioned a little before? yea, who is it, that does not pick out for this business the most imprudent servant he has, and one that is not able to do any other thing? Therefore, from this custom,

custom, such as are the most unskilful and imprudent, and the most infirm also, come to undertake a business the most necessary of any; for, as I said before, every fellow that is the most useles, and who cannot endure any other labour, is put to this business. Moreover, this person also, if he has any knowledge or skill to chuse the cuttings, yet, because of his infirmities, either dissembles or conceals it, or lays it aside, and does not make use of it; and, that he may complete the number, which the Bailiff has enjoined him, manages nothing with due care, does nothing conscientiously: and there is only one thing that he has in view, and proposes to himself; *viz.* to finish the task that has been set him, when, notwithstanding that he may both know, and also execute what he knows, this one precept only has he received from his masters, *viz.* that he take care not to pull off and displant the stock-shoot; but all the rest he may throw into his number of plants.

But we, having at first followed reason as our guide, and now also a long time's experience, make choice of no other plant, nor look upon any as fruitful, but that which has brought forth fruit in the genital part of the vine; for that indeed which has come forth in a thriving condition, and is grown up, and become strong, in a barren place, without any fruit, makes a deceitful shew and appearance of fruitfulness, but possesses no generative power. Reason teaches us, that this is undoubtedly true, if so be that, as in our bodies every member has its peculiar offices, so all the parts of fruit-bearing stems have their proper offices also. We see, that men have a soul breathed into them, which, like a Charioteer or a Pilot, conducts and directs their members; and they have senses implanted in them, in order to discern those things, which are discernable and found out by feeling, by the taste, by the nostrils, by the ears, and by the eyes; that the feet are adapted for walking, the arms for embracing: and, that our discourse may not, in an unusual manner, wander over all the various vicissitudes and changes of ministrations our senses are employed in, the ears are able to do nothing which properly belongs to the eyes; nor the eyes what belongs to the ears: nor indeed is the power of procreation bestowed upon the hands or the feet; but the *Father of the universe* has covered and hid in the belly, that which it was his will and pleasure should be unknown to men, that the *eternal Former of all things*, who is endued with divine reason, might, as it were, in certain secret recesses of the body, hiddenly and in secret, mingle those sacred elements of spirit with terrestrial principles, and curiously make and fashion this species of a living and animated machine. By this law he procreated cattle, young trees, and sprigs; by
this

this law he formed and fashioned the several kinds of vines, for which this self-same mother and parent did first lay their roots, as certain foundations upon which they might stand, as it were, upon feet : then, upon these, he placed the trunk, as a certain stature and size of body and habit : afterwards he diffused them, or made them to spread with branches, as it were with arms ; and then he drew forth their shoots and twigs, as it were hands : and upon some of them he bestowed fruit, and others he cloathed with leaves only, to protect and defend their offspring. If from these therefore, as I have already said, we shall chuse not the very genital members themselves, which are pregnant and great with young, but, as it were, their coverings, and little shadows for sheltering them, which are intirely destitute of fruit, we shall certainly labour for a shadow, and not for a vintage.

What is it therefore that we would be at, *may you say* ? Why is a young branch or shoot, tho' sprung, not out of the hard, but out of the tender part of the vine, condemned nevertheless by us, if it be destitute of offspring, as if it would be barren also in time to come ? for just now our reasoning inferred, that every part of the body had its peculiar office assigned to it ; *viz.* that which is suitable and agreeable to it ; so that the power of fecundity may be inherent in a shoot also, which is sprung out of an opportune place, tho' in the mean time it may cease from producing any fruit. I would not deny, that I warmly insisted to argue from this very thing ; but this I chiefly insist upon, and maintain, that a branch, tho' it be sprung out of the fruit-bearing part of the vine, has by no means the power of fecundity, if it has not itself already brought forth fruit. Nor is this contrary to that opinion ; for it is manifest, that there are some men, who cannot procreate, tho' the number of all their members be complete and perfect ; so that it need not seem incredible, if a rod, which, growing in a genital place, wants fruit, will also produce no offspring in time to come.

Therefore, that I may return to the usual way of speaking among Husbandmen, those shoots or twigs, which produce nothing at all, they call *Eunuchs* ; which they would not do, unless they suspected them incapable of producing fruit : which very appellation itself suggested a reason to me for not chusing mallet-shoots or cuttings, tho' sprung out of an approved or commendable part of the vine, if they had not produced any fruit, altho' I know, that even these are not intirely affected with barrenness ; for I confess, that stock-shoots also, tho' they have crept forth out of the hard part of the vine, acquire fecundity during the following year ; and therefore they are reserved and set apart for
short

short cuts (2), that they may bring forth fruit. But we find, that this kind of fruit is not owing so much to the short cut itself, as to the bounty of the mother-vine; for, because it sticks to and abides in its own stock, which is naturally fertile, and partaking as yet of the maternal nourishment, in conjunction with the other fruitful plants, which she has brought forth, and being brought up, and nourished, as it were, at its nurse's breasts, it learns, by little and little with them, to bring forth fruit. But that plant, which is forcibly snatched from its stock before its due time, and while under-age, not having attained to that maturity which nature has determined, and is either set in the ground, or ingrafted into a stock cut for that purpose, just like puerile age, which is indeed neither fit for coition nor conception, it either loses intirely its generative power, or certainly diminishes and lessens it.

Wherefore I judge it absolutely necessary, that, in chusing of plants, we take care to gather, from the fruitfullest part of the vine, those fruit-bearing shoots, which, by bearing plenty of fruit already, promise fecundity for the time to come: nor let us content ourselves with single clusters, but let us approve those most, which, we see, have the most numerous offspring. Shall we not commend that shepherd, who propagates an offspring from that mother, which brought forth twins? and a goat-herd, who preserves and sets apart for breeding the young of those cattle, which are commended for bringing three at a birth? for it is certainly true, that the offspring will almost constantly answer to the fecundity of their parents. And let us follow this very method in vines, so much the rather, because we may find by experience, that plants or feeds, tho' carefully tried and approved, yet sometimes, from a certain natural malignity, degenerate; and this the poet inculcates upon us, as if we were deaf to the truth, by saying,

- ' (3) I've seen some plants, in chusing which, much time
' And labour were bestow'd, which ne'ertheless
' Did soon degenerate, unless, with care,
' Man's skilful hand did yearly cull the best:
' Thus all things quickly, by a fatal doom,
' Decay, and, backward forc'd, to ruin tend.'

(2) *Refex*, from *refecare*, to pare or cut, is a young branch or shoot sprung out of the hard part of the vine, cut off very short, and near to the hard wood, with one or two eyes left upon it, in order to shoot up and recruit the vine. I have called it a *short cut*, which expresses the thing, tho' not a term of art perhaps.

(3) *Virg. georg. lib. i. 192.*

Which must be understood to be said, not only of the seeds of all sorts of pulse, but of every thing that is the subject of agriculture.

If now we have found, by long observation, as certainly we have, that that cutting or mallet-shoot, which had brought forth four clusters, did so degenerate when it was cut off from the vine, and set in the earth, that sometimes it brought one, and sometimes also two clusters less than before: but how much do we think those will come short, which, upon the mother-vine, have brought two, or oftener one cluster, when even those, which are the most fertile, often dread transplantation? Therefore I willingly confess, that I rather demonstrate the reasonableness of this method, than pretend that I am the inventor of it, lest any body should think, that our ancestors are unjustly deprived of their deserved praise; for there is no doubt but they were of this very opinion, altho' we have no account of it in any other writing, except these verses of *Virgil*, which we have quoted: and yet here there may be only directions given relating to the seeds of pulse; for why did they reject either the rod, which sprung out of the hard part of the vine, or the small end or arrow-part (4) cut off from the fruitful mallet-shoot, which they had approved, if they looked upon it as a matter of no moment or importance, from what place the plants were gathered? Now, because they did not doubt, but the power of fecundity was inherent in some particular members, as it were, therefore they very wisely condemned the shoot that springs out of the stock, and the small end, or arrow-part of a shoot, as useless, and unfit to be set in the ground. But, if it be so, there is not the least doubt but they also disapproved much more of that young branch, which, tho' sprung out of a fruit-bearing part, had not itself brought forth any fruit; for, if they were of opinion, that the arrow, that is to say, the uppermost part of a cutting or mallet-shoot ought to be found fault with and rejected, when the same was a part of a fruit-bearing shoot, does not reason itself declare, how much more they would have disapproved of a rod, if it were barren, tho' it sprung out of the best part of the vine? unless they did believe, (which is absurd) that that which had been naught when growing upon the mother, would become fruitful when it was transplanted, and cut off from its stock, and deprived of the maternal nourishment. Perhaps more has been said upon these things, than the

(4) *Sagitta*. The pointed, or sharp taper end, or uppermost part of a shoot, by our author, *Pliny*, and others, is called the *Arrow*; the reason of which, our author says, is either because it has, as it were, mounted, or sprung up, or started out further from its mother; or, because, being small, and pointed at the top, it has the resemblance of the foresaid weapon. *Vide lib. 4. cap. 17.*

cause of truth required, yet not so much as the perversely mistaken and inveterate opinion of Rustics made necessary.

C H A P. XI.

*What Qualities you must have Regard to in that Ground,
which you destinate for Vineyards.*

NOW I return to what remains of the plan I laid down for my discourse. The business of pastinating the ground follows the care of chusing the cuttings, if nevertheless you are first fully satisfied as to the quality of the soil; for there is no doubt, but this contributes very much both to the goodness and the quantity of the fruit. And, before we take this into consideration, we think, that it is a thing, which has been long agreed upon, and admits of no dispute, that that land, which has never been tilled, if we have any such, ought rather to be chosen, than that where there has been corn, or where trees have been planted; for, as to old vineyards, which have lain long waste and out of use, it is agreed by all authors, that they are the worst of any, if we would replant them, because both the lower ground is embarrassed and intangled with roots, which are wrought into it like net-work, and has not as yet lost that poison, and that cariousness of antiquity or old-age, whereby the earth being blunted and weakened, as it were with certain poisons, grows faint and benumbed. For which reason, woodland ought chiefly to be chosen, which, tho' it be embarrassed with nurseries, or plots of shrubs, and with trees, yet is easily cleared; because whatever things grow up naturally of their own accord, do not strike their roots exactly downwards, nor yet very deep in the earth; but they spread and extend themselves upon its surface, which being cut with an ax, and extirpated, the little that remains in the lower ground, may be digged out with spades or mattocks, and gathered together, and built up in piles, in order to ferment and rot.

If, nevertheless, you have no rough untilled land, the next to it is ploughed land, void of trees: but if this also be wanting, they destinate for Vineyards land that has trees planted very thin upon it; or land where olive-trees have been planted, which have never been matched with Vines.

The last shift of all is, the repairing and restoring of an old worn-out decay'd Vineyard; for, if necessity forces us to do this, whatever remainders

remainders of a Vine there may be in it, ought to be rooted out in the first place : then all the ground ought to be dunged with dry dung ; or, if this is not to be had, with the freshest of another kind ; and so to be turned up, and all the roots most carefully dug up, and laid upon the surface, and burnt. Then the pastinated ground must be covered, either with plenty of old dung, because it does not breed weeds, or with earth brought from the briar-hedges and thickets. But where the pure lay-lands, which have never been tilled, are free from trees, before we pastinate the ground, we must consider, whether it be proper for shoots and cuttings : and this is very easily known, by the stems that come up of their own accord : nor is there any ground so long destitute of numbers of young sprigs, as not to produce some shoots or cuttings, such as wild pear-trees and plum-trees, or at least bramble-bushes ; for, though these are kinds of thorns, nevertheless they are wont to rise up strong, and in a thriving condition, and pregnant and full of fruit. Therefore, if we don't see, that they are shrivelled and parched, nor rough and scabby ; but smooth, sleek, and fair, tall and fruitful ; then we shall understand, that the ground is naturally proper for cuttings, or young shoots.

But this, in general, with respect to that soil which is chiefly proper for Vineyards : but, as I told you before, we must particularly consider, if the ground is easy, and tolerably loose, which we said was commonly called *Black Earth* ; not because this is the only ground for Vineyards, but because it is the fittest of any other for that purpose : for, what Husbandman, of tolerable capacity, does not know, that even the hardest sand-or gravel-stone, or black slate, as soon as they are broken and thrown into a heap upon the surface of the ground, will rot, open, and grow soft by stormy weather, or frost, and likewise by the summer-heats ; and that, during the summer, they refresh and cool the roots of the Vines exceedingly, and retain their juice ? Which things are exceeding proper for nourishing the cutting, or young plant : and that, for the very same reason, loose gravel, and land that is full of small pebbles, and moveable stones, is approved ; provided, nevertheless, these things be mixed with fat mould ; for the same are very much disapproved in that which is poor and hungry.

The flint-stone also (according to my opinion) upon which a moderate quantity of earth is placed, is very friendly to Vineyards ; because, being cold, and very retentive of moisture, it does not suffer the roots to be thirsty, during the rising of the Dog-star. *Hyginus*, indeed, who followed *Tremellius*, asserts, that the bottoms of mountains, especially such as receive the earth which is washed down from their tops ; or even valleys and lands which have been formed, or have had consider-

able additions made to them, by the continual current, or inundations of rivers, are very proper for Vineyards ; and I do not dissent from him. Chalky ground is reckoned very good for a Vine ; for chalk by itself, which potters make use of, and which some call *Potters Earth*, or white Clay, is exceeding unfriendly to it : hungry coarse sand is no less hurtful to it, and, as *Julius Atticus* says, whatever parches and dries up the cutting or sprig ; but that soil is either oufy, or salt, or bitter also, or thirsty and exceeding dry.

Nevertheless, the antients approved of black and reddish shining sand, which is mixed with moist earth : for they said, that land which is full of black slates, unless you assisted it with dung, makes the Vines poor and lean. Ruddle also, as the same *Atticus* says, is very hurtful to them, and is very unfavourable to the roots, which have difficulty to take hold of it. But the same nourishes the Vine, when it has once taken hold of it ; but it is more difficult when you work it, because you cannot dig it either when it is wet, because it is exceeding glutinous ; nor when it is exceeding dry, because it is stiff and hard beyond all measure.

C H A P. XII.

Of such things as Julius Græcinus delivered to us, concerning Land proper for Vineyards.

BUT that we may not now wander over the several sorts of land, which are infinite, it will not be unseasonable to mention, and put you in mind of, that written *Formula*, as it were, of *Julius Græcinus* ; to which is annexed the definition or description of land proper for Vineyards. For thus saith this same *Græcinus*, That any land whatsoever is either hot or cold, moist or dry, thin and rare, or dense ; light, or heavy ; fat, or lean : but that a Vine can neither endure a hot soil, because it burns it up ; nor a very cold one, because it does not suffer the astoned roots, as it were, benumbed and frozen with the excessive cold, to move and extend themselves ; nor can it endure that which is moist, because when the Vines disclose and shew themselves, they, by a moderate heat, attract from the earth a greater quantity of moisture than is proper for them, which putrefies and rots the plants that are set in it. On the other hand, *he says*, that too great driness deprives the plants of their natural nourishment, and either kills them intirely, or makes them scabby, and parches and burns them up : that very
thick

thick and dense ground does not sip up the rains, that the wind cannot easily blow through it; and that it is very easily broken through, and affords chinks, by which the sun penetrates to the roots of the stems; and that the same also compresses and strangles the plants, which are, as it were, straightened and shut up within too narrow bounds; that that which is rare or thin gives passage to the showers, beyond all measure, which pass into it as through a tunnel; and that it is intirely dried up and withered with the sun and wind: that heavy earth can scarcely be subdued and brought under by any culture; and that that which is light can scarcely be kept in heart by any: that the fattest and richest ground labours under a very great disadvantage from its luxuriancy; and that which is lean and poor, is distressed with hunger and fasting.

There is need, says he, of great temperament among so very different inequalities, which is also very requisite in our own bodies, the good health of which consists in a certain steady regular adjustment, by weight and measure, as it were, of hot and cold, moist and dry, thick and thin. Nevertheless, says he, this temperament in the ground destinated for Vineyards ought not to be weighed in a perfectly even balance; but it ought to lean somewhat toward the one side, that so the earth may be rather hotter than colder, drier than moister, thinner than thicker; and if there be any other things like to these, to which he who plants Vineyards may turn his contemplations. All which things are of greater advantage, when the constitution of the climate also concurs with them. And what quarter of the heavens Vineyards ought to look to, is a very old dispute, *Saserna* approving most of the rising of the sun, next to that the south, and then the west; *Tremellius Scrofa* being of opinion, that a southerly position is the best of any; *Virgil* expressly rejecting the west thus:

- (1) ' Nor let thy Vineyards bend towards the sun,
' When setting.'

Democritus and *Mago* commending the northern quarter of the heaven, because they think that Vineyards exposed to it become the most fruitful, which nevertheless may be inferior to others in the goodness of their wine. It seems best to us to give directions in general, that, in cold places, Vineyards be exposed to the south quarter; and, in warm, that they be turned to the east; provided nevertheless, that they be not infested with the south and east winds, as the maritime coasts of *Bætica*:

(1) *Virg. Georg. lib. 2. 298.*

are. But, if the countries be liable to the foresaid winds, it will be better to expose them to the north or west winds. For, in exceeding hot provinces, as in *Egypt* and *Numidia*, it will be better to expose them directly to the north. Having carefully examined and considered all these things, we shall then, at length, undertake the business of pastinating the ground.

C H A P. XIII.

After what manner the Earth ought to be pastinated.

BUT the method of doing this must be delivered and described both to future Husbandmen of *Italian* extraction, and also to those who are born in the Provinces; because, in very distant and remote countries, this way of turning up, manuring, and subduing the earth, is not at all practised; but, for the most part, vines are planted, either in trenches, or in furrows. Vines are placed in trenches in this manner: they whose custom it is to set their vines in trenches, after they have digged out the earth, and made a hollow for almost three feet in length, and two in depth, as much as the breadth of the iron tool allows, lay the cuttings flat on each side, along the sides of the trenches; and, having bended them, they raise them up at the opposite ends of the trenches; and, allowing them to appear with two eyes above the ground, they replace the earth, and make all level: this they continue to do in the same line, leaving intervals or baulks of the same number of feet, till they finish the row: then leaving a space, according as every one is accustomed to cultivate his vineyard, either with the plough, or with the spade or mattock, they advance and carry on another row. And if the earth is only turned up by a digger, the least distance between each row is five feet, and seven the greatest; but if they turn it up with oxen and the plough, the least distance is seven feet, and ten is large enough.

Nevertheless, some dispose and set every vine at the distance of ten feet, in the form of a *Quincunx* (1), that so they may till the ground with transverse and adverse furrows, in the manner of lay land, or fallow

(1) *In Quincuncem.* Trees were said to be planted in form of the *Quincunx*, when they were so placed, as to represent the figure used among the *Romans* for the number five, viz. V. This disposition of trees, in a triangular manner, was in great esteem among the *Romans*,

low ground. This kind of vineyard is not for the advantage of the Husbandman, unless where, in very rich ground, the vine rises up to a great height, and is of a large growth. But they who dread the expences of pastinating the ground, and yet study in some measure to imitate Pastination, and make trenches, omitting equal spaces by turns, draw straight furrows, of the breadth of six feet, and dig them, and make trenches three feet deep, and so place the vine or the cutting in due order, by the sides of the trenches.

Some, with more covetousness, make a furrow two feet and nine digits deep, and five feet broad; then they leave thrice as much ground unmoved, and so dig the following furrow; which when they have done throughout the whole place designed for the vineyards, in the sides of the furrows they erect quicksets, or young vine-branches, cut off from the vine, as fresh as possibly they can, planting at the same time, among the regular plants, that compose the row, very many cuttings, which, after they shall have taken root, and are grown strong, they may propagate in transverse trenches in the crude ground, which they before passed over without moving it, and so regularly form their vineyards into rows at equal distances from one another. But these different ways of planting vineyards must either be admitted or rejected, according to the nature and goodness of every country.

Now I propose to describe and teach you the method of Pastinating or Trenching the land. And first of all, out of every place we shall have destinated for vineyards, whether it be planted with trees for supporting the vines, or be woodland, every shrub and tree must be rooted up, and taken out of the way, that they may be no hindrance after-

mans, and much recommended by their rustic writers. It is well enough represented by the position of the cinque upon a die, and are placed in the following manner:



As there is frequent mention, in this and the following chapters, of the *Roman foot*, it may be necessary to tell the reader, that it is computed by Dr. *Arbutnot* to amount only

Inch. Dec.
to 11,604; or, which is the same thing, the *Roman foot*, compared with the *English foot* by Mr. *Greaves*, is reckoned to contain 967 of such parts as the *English foot* contains 1000; which is to be understood of that on the monument of *Coffutius* in *Rome*, which, for very good reasons, is, by these learned gentlemen, reckoned to be the true, antient, *Roman foot*.

wards

wards to the digger, and that the ground that is already pastinated may not be pressed down by the weights that lie upon it, and be trodden down by the going in of those who carry out the trunks and branches of the trees. Nor is it, indeed, of small importance, that the pastinated ground be kept very loose and suspended, and, if it can be done, preserved from the print of a foot upon it; that so the ground, being equally moved, may gently yield, and give way, to the roots of the young plant, whatever part they shall creep and extend themselves to; and that it may not by its hardness reverberate, and oppose their growth, but receive them, as it were, into its tender and nursing bosom, and give admittance to the celestial showers, and dispense them for nourishing the plants, and conspire with all its parts to educate the new offspring.

A champain even place must be digged two feet and a half deep, and a rising ground three; but a hill somewhat steeper must be turned up at least four feet; because when the ground is drawn down from an higher part to a lower, there is scarcely such a quantity of earth thrown up to be of such a depth as is necessary in Pastination, unless you raise the bank much higher than you would do upon a plain. Moreover, I am not pleased with planting a vine in low valleys less than two feet deep; for it is better not to plant it, than to suspend it upon the surface of the ground; except, nevertheless, when a spring, which forms a marsh, comes in your way (as in the land about *Ravenna*), and hinders you from digging deeper than a foot and a half.

But you must at first begin the foresaid work, not, as most part of Husbandmen do, at this present time, by deepening the furrow by little and little, and so by a second and third gradation, to come at length to the depth you designed the pastinated ground should be of; but at the very first, having placed your line equally, you must carry on a continued trench, without any break or interruption, with its sides exactly perpendicular, and place the earth you have moved, in due order behind your back, and carry it down so far, till it exactly answer to the measure of the depth given: then the line must be equally moved throughout the whole space of the gradation: and you must so order matters, that it be made of the same breadth at the bottom, as it was begun at the top.

But there is need of a skilful and vigilant overseer of the work, who may command the bank to be raised, and the furrow to be emptied, and the whole space of crude ground, that is not yet moved, to be thrown up, and joined with that which is already thrown out of the trench, as I directed in the preceding book, when I described the way of tilling the ground, by giving this caution, that no baulks should be
omitted,

omitted, or left any-where, nor any hard part of the ground covered or hid with the uppermost clods thrown upon it.

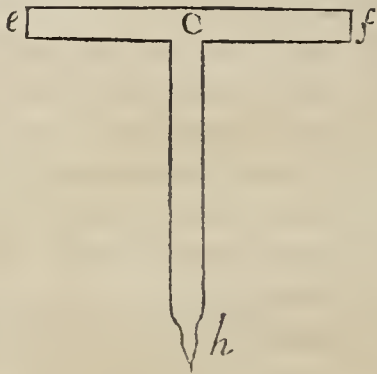
But, in order to exact the doing of this work as it ought to be done, our ancestors devised a certain machine, as it were; they contrived and formed a rule or square, or strait piece of wood, from the middle of which a small rod jutted out, commensurate to that depth to which it was necessary the furrow should be depressed, reaching from the bottom to the uppermost part of the bank. This kind of measure rustics call *Ciconia* (a Stork) (2): But this also is liable to fraud, because there is a great difference which way you place it, whether inclining, or perpendicular. We have therefore added some parts to this machine, which may be effectual to put an end to all strife and dispute between contending parties. For we have joined together, crosswise, in the form of the *Greek* letter X, two rules, of such a width as the trencher designs to make his furrows; and so have fastened that antient *Ciconia* to the middle part where the rules are joined, that so, being made, and fixed exactly perpendicular, it might rest upon it, as upon a base, to support it. Then upon the small rod, which is in the middle of the transverse rule, we have planted a carpenter's plummet. The instrument thus framed, when put down into the trench, puts an end to all dispute between the master and the undertaker of the work, without injury to either party. For the star, which we said resembled the *Greek* letter, does at the same time measure the ground of the bottom of the trench, and likewise exactly try its level; because, whether it slopes, or whether it is exactly upon a level, it is found out by the position of this machine: for the plummet that is placed upon the fore-mentioned small rod, shews both the one and the other, and does not suffer the overseer of the work to be deceived. The work being thus exactly measured, and reduced to a level, proceeds always, and is carried on in such a manner, as to bring it to the similitude of ground that is fallowed: and as much space is taken up by the line formed by the earth which is thrown out of the trench, as the said trench, out of which it is dug,

has

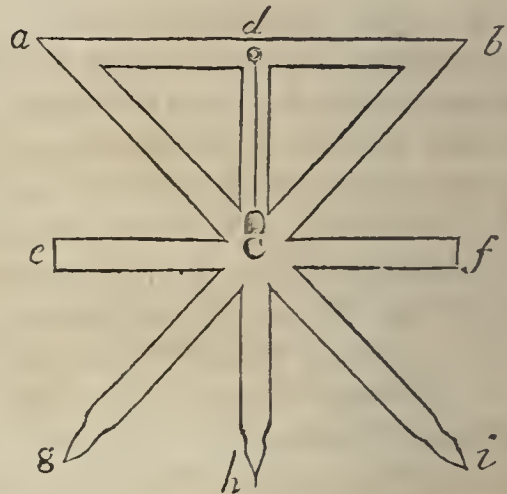
(2) *Ciconia*, an instrument contrived for measuring the depth and width of the trenches, when they trenched the ground. They called it by this name, probably, because one part of it represented the bill of a stork. They called a certain machine, wherewith they drew water, by this name also, tho' sometimes authors call it *tollenonem*. It is thus described by *Vegetius de re militari*, lib. 4. 21. *Trabes in terram præalte defixa, cui in summo vertice a'ia transversa trabes longior, dimensa medietate connectitur, i. e.* a piece of timber fastened deep in the ground, upon the top of which another transverse piece, longer than it, is joined with it, and exactly poised in the middle. It is called a Swipe *Isidorus* says, that this machine was called *Ciconia*, because it imitates a stork raising and falling her bill when she

has length and breadth ; and this way and method of preparing the ground is most approved.

crunks. The figure of this machine for measuring the trenches, as it was made at first, and also with the improvement made by *Columella*, you have here below. There is in some old editions an imperfect delineation of it ; but whether originally by the author, is uncertain : but he describes it so exactly, that one cannot mistake it.



e f h, the antient *Ciconia*.
e f, the transverse rule.
c h, the small rod joined to it.



a i, and *b g*, the two rules decussated, or joined together in the form of the Greek letter X.

g i, the breadth of the furrow.

$\left. \begin{array}{l} c g, \\ c h, \\ f i, \end{array} \right\}$ the depth of the same.

c, the middle part, where the two rules are joined and fixed to each other.

d c, the carpenter's plummet.

g h i, the rays of the star, which equally measure the bottom of the trench.

C H A P. XIV.

How many ways a Vine may be planted, either in Italy, or in the Provinces.

NOW follows the business of planting the vine, which is seasonably set in the ground, either in the spring, or in autumn; better in the spring, if the constitution of the climate be either rainy or cold, or the land either fat, or a champain and oufy plain: on the other hand, it is best to plant it in autumn, if the quality of the air be dry, or hot; if it be a poor and dry plain; or if it be a lean and steep hill. There are almost forty days proper for planting in the spring, from the 13th of *February* till the Equinox; and in autumn, from the 15th of *October*, to the first of *December*.

But there are two different ways of planting, either with the cutting, or with the quickset, both which are in use with Husbandmen; and, in the provinces, they rather make use of the cutting; for they neither care for, nor apply themselves to make nurseries; nor are they acquainted with the way of making quicksets. This way of planting with cuttings, the most part of the vine-dressers in *Italy* have, with very good reason, disapproved and rejected; because the quickset is far preferable to it, and excels it in many qualities. For it is less liable to perish, inasmuch as by reason of its firmness and soundness it more easily supports both heat and cold, and other sorts of weather; and then it grows up, and comes to perfection sooner; from which it comes to pass, that it is more quickly in a condition to bring forth fruit; as also, there is no doubt but, being often transplanted* (1), nevertheless, in loose and yielding easy ground, a cutting can be immediately planted in the room of a quickset. But that which is thick, close, and heavy, does certainly require a vine.

* (1) There is a blank here in all the old editions: there seems only to be one or two words wanting, to shew the benefit a quickset receives, by being transplanted; but, without the assistance of some manuscript, I cannot see how they can be supplied.

C H A P. XV.

That it is better to plant in pastinated Ground, than in Trenches or Furrows made in fallow Ground, or in that which is newly broken up.

A Vine, therefore, is planted with greatest advantage in pastinated ground, that has been well cleansed, harrowed, and levelled, omitting five feet between the rows, in ground that is lean; but six feet in that which is middling: but in that which is fat, there must be spaces of seven feet allowed, that so larger intervals may be vacant, all along which the frequent and prolix firm boughs may be diffused.

This disposition and laying out the dimensions of vineyards in the form of the *Quincunx* is performed in a most expeditious manner: for you stretch to a line a bit of purple cloth, or any other conspicuous colour, at the distance of so many feet, as you design the rows of the vines should be distant from one another; which line, marked after this manner, you stretch along the pastinated ground, and hard by each bit of purple cloth you fasten a reed in the ground, and so the rows are directed and laid out at equal distances from one another. And, after this is done, the digger follows, and, leaving spaces by turns all along the row, from one reed to another, digs a trench, no less than two feet and a half deep, in such places as are level and plain; in rising ground, two feet and three fourths of a foot; but, in such places as are very steep, even three feet. The trenches being depressed to this depth, the quicksets are set into them in such a manner, that every one of them may be laid flat the contrary way to one another from the middle of the trench, and their tops erected just by the reeds at the opposite ends of the trench.

But the first thing incumbent upon the planter to do is, to remove his plant carefully out of the nursery, both sound and intire, and transplant it as fresh as possible, and, if it can be done, the very moment when he has a mind to plant it; and then to prune it all over as a veteran vine, and reduce it to one very strong firm-wood branch, and smooth its knots and scars; and also, if any of its roots have received any injury, (which he ought, above all things, carefully to avoid, when he takes them out of the ground) to cut them off; and then, bending it, to set it in such a manner, as the roots of two vines may not interweave with one another. For this may be easily avoided by regularly placing a
few

few stones all along the bottom, hard by the different sides of the trenches, which may not exceed five pounds weight each : these, as *Mago* informs us, keep off the waters in winter, and the heats in summer, from the roots of the vines. *Virgil* is of the same mind with him, and directs us thus to defend and fortify the young plants :

- ‘ (1) The spongy pumice-stone, and rugged shells,
- ‘ Hide with them under ground.’

And, a little after :

- ‘ ——— Now some there are,
- ‘ Who press them down with stones, or with the weight
- ‘ Of bulky shells ; these, from th’ o’erflowing rains,
- ‘ A sure defence, and, from the scorching heat,
- ‘ When flaming Dog-star cleaves the parched ground ;
- ‘ Which, spent with thirst, gapes for refreshing rain.’

And the same *Carthaginian* author proves, that the husks of grapes and grape-stones, mixed with dung, put into the trench with the plants, quicken and strengthen them ; and that they call forth, and draw out, their new little roots ; and that this, during the cold and moist winter, communicates a seasonable warmth to the trenches, and, in summer, ministers nourishment and moisture to the green plants. But, if the ground, to which you have committed the vine, appears to be poor, he is of opinion, that fat mould should be brought from a greater distance, and put into the trenches. Whether this be [expedient, or not, the increase or yearly produce of the country, the price that the fruits of it yield, and the wages of labourers, will teach us.

(1) *Virg. Georg. lib. ii. 333.*

C H A P. XVI.

What Measure or Quantity of pastinated Ground may be sufficient for Vineyards (1).

THE pastinated ground is proper for planting, when it is a little moist; nevertheless, it is better to commit the plant to it when it is dry, than when it is miry and dirty; and, when the plant is so long as to stand several joints above the brim or uppermost part of the trench, that part of the top, which rises above the trench, is cut off, only two eyes of it being left above-ground, and the trench filled up, by throwing the earth into it. Then, after the pastinated ground is levelled, the cutting must be planted among the vines that grow in the rows; and it will be sufficient to set it all along one line, in the middle space which is vacant between the vines. For thus both the shoot itself will grow and gather strength the better, and there will be left a moderate space of free and open ground for dressing the regular plants as they stand in their several rows. Then, in the same line wherein the quickset shall occupy and stand in its own rank, some cuttings also must be planted, as præsidaries for the regular vines, out of whose number one may be propagated and brought into the place of a vine that is dead. Five cuttings must be set upon the space of one foot (2), and

(1) This paragraph is not so clear and distinct as most others, and great attention is requisite in reading the original, where some words seem to be wanting, to make the sense complete. The author says, that the pastinated ground being laid out into several rows, the quicksets must be planted upon the said rows, at such and such distances from each other. The vines, being thus set in their several rows, are called *Vites ordinariæ*: between the several rows of regular vines, he directs a certain number of cuttings to be planted, exactly in the middle between the rows; and says, that even in the same line wherein the quicksets are planted, and occupy their own rank, must some cuttings be set as præsidaries to the regular vines, *i. e.* when the regular vines perish, these may be commodiously brought to supply their places; this is what is meant by *præsidii causa*; and in other places, they are called *malleoli præsidarii*. *Lib. iv. c. 15.*

(2) *Quinq; malleoli pangendi sunt per spatium pedis, isq; pes, &c.* The author, contrary to his usual method, seems in these words to have expressed his meaning very concisely, leaving it to the reader to find it out from what he had said before. In the preceding chapter he had said, that in middling land there must be six feet between the rows. Now, in a *jugerum* of ground there are 240 feet in length, and 120 in breadth: so there will be 40 intervals lengthwise, and 20 in the breadth; which, multiplied into one another, make 800 intervals, or vacant spaces. To each interval allow five feet to plant cuttings upon, and half a foot distance from each vine, there will be twenty-five cuttings in every interval; which, multiplied by 800, make 20000; and this is the number of cuttings *Columella* directs to plant on each *jugerum* of pastinated ground.

this foot is taken from the very middle of the space between the rows, that they may be equally distant from the vines on both sides. *Julius Atticus* thinks, that sixteen thousand cuttings are abundantly sufficient for this kind of planting. Nevertheless, we plant more by four thousand; because a great part of them perishes thro' the negligence of the vine-dressers; and the rest, that thrive, grow thin by the death of the regular plants, whose places they are taken to supply.

C H A P. XVII.

After what Manner, and at what Time, a Vine is to be planted.

THERE has been no very small dispute among authors about the planting of shoots. Some were of opinion, that the whole rod, as it was pulled off from the mother, was proper for planting; and, having divided it into parts of five, or even six eyes each, they committed the several cuttings to the earth: which I don't at all approve; and I rather agree with those authors, who denied, that the upper firmwood branch is fit for bearing fruit, and only approved of that part which is joined with the old spray. But they intirely rejected the arrow. Rustics call the utmost or last part of the shoot, *the Arrow*, either because it has removed itself, and departed to a greater distance from its mother, and has, as it were, started or leapt out from her; or because, being attenuated and pointed at the top, it bears the resemblance of the foresaid weapon. Therefore the wisest Husbandmen have denied, that that part should be planted. Nevertheless, they have not given us any reason of their opinion, which they, who had great understanding in Husbandry, could have readily done, it being almost obvious and manifest before their eyes. For every fruitful branch of a vine is exuberant, or abounds most in fruit, below the fifth or sixth eye; and in the remaining part, tho' exceeding long, it either bears no fruit at all, or shews us some very small clusters. For which reason, the top of the shoot was, by the antients, very justly blamed for its barrenness: and they so planted the mallet-shoot, that some part of the old branch did stick to the young one. But experience has condemned the planting of it in this manner. For, whatever part of the old wood was left, did quickly rot with the moisture, after it was set and covered with earth, and, by its own distemper killed the tender roots that were next to it, and scarcely as yet creeping out; and, when this happened, the upper part
of

of the plant dried up and decayed : afterwards *Julius Atticus*, and *Cornelius Celsus*, the most celebrated authors of our age, following the example and directions of the *Saferna's*, father and son, did cut off whatever remained of the old branch exactly by the joint where the young shoot grows out of it, and so set into the ground the spray with its own small head.

C H A P. XVIII.

What things one ought to observe, who plants a Vine.

BUT *Julius Atticus* set the foresaid plant in the earth, with its head twisted and bended, that it might not fly off from the dibble. Husbandmen call the forked iron tool wherewith they set their plants *Pastinum* (a Dibble) ; and hence it was, that old vineyards, which were digged a second time, were said to be *repastinated*. For this was the proper appellation of a vineyard, that was restored or trenched, and replanted a second time (1). Now, custom, unacquainted with antiquity, calls all ground whatsoever, that is moved and prepared for vineyards, *Repastinated*. But let us return to what we proposed.

Julius Atticus's way of planting, which allows of twisting and writhing the head of the shoot, is, in my opinion, intirely wrong ; and there are more reasons than one for avoiding this practice : first, because there is no stem whatsoever, which, being vexed and broken before it is planted, comes up and thrives better, than that which is set in the ground sound and intire, without suffering any injury. Moreover, whatever thing is put into the earth crooked, bended, and looking upwards, when at a proper season it is taken out of the ground, it resists the efforts of the digger, as if it were a hook ; and, like a crook fastened in the ground, breaks, before it can be pulled out. For the wood is brittle in that part which contracted a blemish when it was

(1) *Restibilis vinea, restibile vinetum*, is a vineyard trenched a-new, and replanted, or the vines that were decayed, restored by cutting them, or laying them in order to recover them ; *restibilis, a restituendo*, by the Greeks called *παλιμυρίς*. But *restibilis ager* was land that was sown every year without intermission, or at least two years immediately following, with bearded or husked wheat, which they who let their farms provided against, because it impoverished the land : on the contrary, land that rested every other year, in order to recover its strength, was called *novalis, a novando*, tho', properly, *ager novalis* signifies land that was never tilled nor cultivated before. And *Pliny* himself calls land, from off which old wood was cut, *ager novalis*.

twisted and bended at the time it was planted. For which reason it loses the greatest part of its roots, which are broken off it.

But, to pass over these inconveniencies, I cannot, indeed, dissemble that which is exceeding hurtful; for, a little before, when I was speaking of the uppermost part of the shoot, which I said was called the *arrow*, I observed, that the greatest part of the fruit commonly grows within the fifth and sixth eye, which are next to the old branch. Therefore he who twists the shoot, destroys this fruitful part; because both that part which is doubled contains three or four eyes, and the remaining two or three eyes, that would produce fruit, are intirely put under-ground, and those that are hid under-ground don't produce branches, but roots. So it comes to pass, that what we would have avoided, in planting nurseries of willows, we put in practice in planting this kind of cutting, which it is necessary to make the longer, if we will plant it twisted. Nor is it to be doubted, but the eyes next to the top, which are unfruitful, are left in it; from which sprout sprigs which are either barren, or certainly such as bear less fruit, which Rustics call *Twigs with single clusters*. What! Is it not of great importance, that a cutting, which is set in the ground, should quickly close up, and form a scar in that part where it was cut off from its mother? For, if this is not done, too much moisture is drawn thro' the open pith of the vine, as it were thro' a pipe, and the same makes the stock hollow: and hence it is, that ants, and other animals, which consume the legs of vines, are provided with places to lurk in. But this is what happens to plants that are twisted: for, when their lower parts are broken, by taking them out of the ground, they are replanted with their pith open and exposed; and when the waters, and the foresaid animals, creep into them, they quickly decay, and grow old. Wherefore it is the best way to plant the cutting straight, the head of which, when it is put into the fork of the dibble, is easily kept fast in the narrow jaws of the iron tool, and thrust down into the earth; and that cutting which is set after this manner, will sooner take root, and grow up: for it equally sends forth roots from its head, where it was cut off from the mother; which, when they grow out of it, form a scar upon it: and besides that, the wound itself, looking downwards, does not receive so much moisture as that, which, being bowed back, and turned upwards, transmits thro' its pith, as it were thro' a tunnel, all the rain that falls upon it.

C H A P. XIX.

How long the Cutting ought to be.

WHAT length a cutting ought to be of, is not very certain ; for, if either it have frequent eyes, it must be made the shorter ; or, if it have them but thin, it must be made the longer. Nevertheless, it ought not to be more than a foot, nor less than three fourths of a foot long, lest this, being just upon the surface of the earth, should suffer by drought in the time of summer ; and lest that, being set deeper, should, after it is grown up, be with great difficulty pulled out of the ground. But these things with respect to the length of a cutting in even flat ground. But in sloping hilly grounds, where the earth tumbles down, a cutting may be set one foot and a palm, or four digits long. In low-situated and oufy plains, we plant a cutting also with three eyes, which is a little less than nine fingers, but certainly longer than half a foot. And this is not called a cutting with three gems or buds, merely because it has three eyes, seeing commonly it is full of eyes about the wound, where it was cut off from its mother ; but because, besides these, of which it has many in the head itself, it has moreover three joints, and the like number of buds.

Of this also, above all other things, I would forewarn him that plants either cuttings or quicksets, *viz.* that he avoid immoderate wind and sun, lest the plants wither, and dry up ; both which are very easily avoided, by throwing a garment, or any sort of thick covering, over them. Nevertheless, it is better to choose for our planting a perfectly calm-day, or at least when it only breathes a gentle breeze. For the sun is easily kept off by any thing that affords a shade. But, before we put an end to our discourse, we must say something upon a point we have not as yet touched upon ; *viz.* whether we ought to have vines of several kinds, and these separate and distinct from one another under their several sorts, or confused and huddled together, one with another. We shall discourse first of that which we first proposed.

C H A P. XX.

How many kinds of Vines are to be planted.

Therefore it is the part of a prudent Husbandman, to plant that vine which he has chiefly approved ; and always to increase the number as much as he possibly can, no other stem of any other character intervening. But a provident man ought also to set different sorts. For the year is never so mild and temperate, as not to annoy, with some inconveniency, some kind of vine or other. For, if either it be dry, that kind which thrives best with moisture, is grieved and disheartened ; or, if it be rainy, then that which delights in drought ; or, if it be cold and frosty, then that which cannot endure blasting cold : or, if it be exceeding hot, then that which does not endure heat, languishes. But, not to insist now upon a thousand injuries of different sorts of weather, there is always something which may offend and hurt vineyards. Therefore, if we plant but one kind, when that happens which is hurtful to it, we shall be deprived of the whole vintage. For he will have no reserve, no relief, who has not stems of divers sorts. But if we make vineyards of various kinds, some of them will escape without receiving injury, which may bring forth fruit. Nevertheless, this reason ought not to force us to seek after many varieties of vines ; but what we shall have discovered to be an excellent kind, let us make that as numerous as we are able ; then that which is next to the first, and afterwards that which is of the third, and even that which is of the fourth note also. So far let us be content with a certain *Quaternion*, as it were, of chosen vines. For it is sufficient with the experiment of four, or, at most, five, kinds of vines, to wait the fortune of the vintage.

As to the second thing, which I just now proposed, I am in no manner of doubt, but vines ought to be sorted and disposed into their particular places and divisions, according to their kinds ; and distinguished by foot-paths, and lines and boundaries, from one quarter to another : not that I myself have been able to obtain of my own servants, or intimate friends and acquaintance, that any of them should put this in execution ; before I did it myself, how much soever they might approve of the thing. For, of all rural business, this is the most difficult, because it requires the greatest diligence both in chusing and gathering the plants, and discriminating them, and discerning the

smallest difference in them ; in which there is need, for the most part, of the greatest dexterity, prudence, and discretion. But sometimes (as that divine author *Plato* says) the beauty and comeliness of the thing attracts us, and engages us to pursue even after those things, which, because of the infirmity and frailty of our common mortal nature, we cannot obtain. This thing, nevertheless, with no great difficulty, we shall be able to accomplish, if we are not too far advanced in years, and if our knowledge and estate correspond with our desire ; altho' it is necessary to persevere for no small part of our life, in order to judge of, discern the difference, and make a trial for some years of any considerable number. For every time of the year does not allow us to pass a judgment upon this matter. For vines which, because of the similitude of their colour, stock, or shoots, cannot be known from one another, are very distinctly known and discovered by their ripe fruit, and by their leaves. That any other person, besides the master of the family, can use this diligence and application, I will not affirm. For it is acting the part of a careless, slothful person, to commit it to the care of the bailiff, or even of the vine-dresser, seeing very few Husbandmen have as yet been able to attain to what is infinitely more easy, *viz.* to be intirely free from stems that produce black wine, tho' the colour of the grapes may be discerned by every the most stupid and imprudent person whatsoever.

C H A P. XXI.

Whether the several kinds of Vines are to be planted in distinct Divisions, separately by themselves.

Nevertheless, there is one method of effectuating very quickly what we proposed, which presents itself to me ; that, if the vineyards are of an old standing, we should engraft each division thereof with grafts that are distinguished and separated into their several kinds, each sort having its proper division allotted to it. Thus I don't in the least doubt but in a few years we shall gather many thousand cuttings from the vines we shall have engrafted, and shall plant in several quarters and divisions the plants thus distinguished from one another.

Moreover, the advantage of doing this thing may engage us upon many accounts : and that I may begin with those of less importance, in the first place, in every transaction and employment of life, not only

only in Husbandry, but in every art and science whatsoever, a prudent man is much more delighted with such things as are distinguished and ranged into their several kinds, than with such as are thrown down, as it were, at random here-and-there, and confounded in one common heap.

And, in the next place, that if any one having even the greatest aversion to a rural life, and the most disaffected to Husbandry, should come into your grounds when planted regularly, and in due season, he may with the greatest pleasure admire the bounty of nature, when on that side the *Bituric* vines richly laden with fruit, and on this side the *Helvolæ*, that are equal to these, answer to one another; when on that hand the *Arcelacan*, and on the other the *Spionian* or *Basilican* vines meet together, and suit with one another, whereby the kind and nursing earth, rejoicing and glad at the return of the season of the year, (as at a certain everlasting child-bearing) stretches out her breasts distended with new wine. In the midst of all which, whilst *Bacchus* cherishes the pregnant vine-branches, either of the white or yellow, or of the bright ruddy kind, or of that which glitters with the brightness of the purple, *Autumnus* appears every-where in great lustre, loaden with party-colour'd apples.

But tho' these things yield very great delight; nevertheless, the advantage is greater than the pleasure. For, the more beautiful appearance any master of a family's estate makes, the more willingly does he come down to take a view of it; and what the poet says of a sacred Deity (1),

'Where-e'er the God turn'd his majestic head,'

may be truly said of him; for, where-ever the master is frequently present, and casts his eyes, there the fruit abounds to a greater degree. But I omit what may accidentally happen to vines that are not ranked according to their several kinds. I shall prosecute those things which are the most remarkable.

Stems of a different character neither cast their blossom alike, nor come to maturity at the same time. For which reason, he who has not his vineyards made into several divisions, according to the several sorts of vines, must of necessity suffer one of these inconveniencies; either he must gather his late fruit with that which is early ripe, which thing presently is the cause of acidity; or, if he wait till his late fruit comes to maturity, he may lose his early-ripe vintage, which, being

(1) *Virg. Georg. lib. ii. 377.*

for the most part, exposed to the pillage of the fowls of the air, and harassed by the winds and rains, decays, and comes to nothing : but, if he desires to gather the fruit of each kind at different intervals of time, in the first place he is under a necessity of undergoing the hazard of the grape-gatherers discretion ; for he cannot assign an overseer to each of them, to have his eye upon them, and to give them orders, that the bitter unripe grapes be not gathered with the ripe. Moreover, of such vines also as are come to maturity, they being of a different character, the taste of the better is spoiled by that which is worse, and, the taste of many being confounded into one, the wine will not bear keeping till it be old : and therefore necessity forces the Husbandman presently to sell his wine when it is new ; whereas, if the selling of it could be deferred, either for a year, or at least till the summer, it would make a great addition to the price of it.

Now this separating the several sorts of vines into divisions by themselves, has a very great conveniency, that the vine-dresser can more easily give to each particular sort the pruning which is most suitable to it, inasmuch as he knows what character the division which he is pruning bears : and this is a thing very difficult to be observed in vineyards, which are planted promiscuously with vines of different sorts ; because the greatest part of the business of pruning is done at that time when vines bear no leaves whereby they can be distinguished. But it is of much importance, whether the vine-dresser preserves and sets apart for fruit more or fewer firm branches, according to the nature of every stem, or whether he encourages and puts a vine forward by leaving long verges upon it, or curbs and restrains it by pruning it very near : yea, it is of great importance also what quarter of the heavens every kind of vineyard looks to. For every sort of vine does not delight and rejoice in a hot situation ; nor, on the contrary, in one that is cold : but young vines have their peculiar property, so that some of them thrive mightily towards the south pole, because they are destroyed by extreme cold ; others of them love the north, because they lose heart, when they are exposed to the heat : some of them rejoice in a middle state, in the temperament of the east or west.

He who separates the several sorts into divisions by themselves, has a due regard to these differences, according to the situation and position of places. He also obtains this further advantage, which is not inconsiderable, that thereby he lessens both the labour and expences of the vintage : for, both such grapes as begin to grow ripe, are gathered in due time, and such as are not yet fully ripe, are deferred to another time without any loss. Nor does the early and late fruit, gathered at
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the same time, hurry the vintage, and force him to hire labourers at any rate. Now this also is of very great advantage, to be able to preserve the true and genuine taste of each kind, whether it be the *Basilican*, *Biturican*, or *Spionian*, without any mixture, and lay it up separately by itself: which kinds, when they are thus managed, and put up into vessels, because nothing of a different nature, which may be repugnant to them, is intermixed with them, are ennobled by being kept till they are old (1); for, after fifteen years, or a few more, nothing ignoble can be perceived in their taste, because almost all wines whatsoever, after that time, obtain this quality, that they acquire goodness by their oldness: wherefore, as we proposed to shew, the disposing and separating the vines according to their kinds, is of the greatest advantage; which, nevertheless, if you cannot accomplish, the next method to be taken is, that you don't plant any other vines of a different character, but such as resemble one another in taste, and yield fruit which comes to maturity at the same time. Now (if you have any care or desire for the apple-kind) you may set the tops of fig-trees, pear-trees, and apple-trees, at the ends of the several rows, in that part of the vineyard which lies towards the north, that so, when they grow up, they may not overshadow it; and, after the space of two years is past, you may engraft them; or, if they are of a generous kind, you may transplant them when they are full-grown. These are the things I had to say, concerning the planting of vineyards. The chief and principal part is still behind, that we give directions concerning cultivating them, of which we shall discourse at large in the following Book.

(1) *Per potus tamen nobiles antur.* It is plain, that either these words are erroneous, or some words are wanting; and *Ursinus* has probably hit upon them, at least his amendment makes the sentence uniform and intelligible. *Per vetustatem nobiles antur*, or, *perpetuitate nobiles antur*, and makes them agreeable to what the author says, *lib. iii. 2. Ad bonitatem aliquam per annos venit*; and *lib. iv. 20. Non solum ad speciem plurimum refert, sed ad firmitatem perpetuitatemque.*

L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

B O O K F O U R T H.

 C H A P. I.

That Trenches of two Feet are not deep enough for Vine-plants, contrary to the Opinion of Atticus and Celsus.

YOU say, *Publius Silvinus*, that, after you had read over to several persons, that delight in husbandry, the book which I have written about planting of vineyards, there were found some of them, who, tho' they commended the rest of my precepts, yet found fault with two of them, because I had given my opinion for making too deep trenches for vine-plants, by adding three-fourths of a foot over and above the depth of two feet, which *Celsus* and *Atticus* had determined; and that I had not done very prudently in assigning one quickset to each pole, when these same authors allowed them, with less charge, to cloathe two props next to one another upon the same row, with two boughs of the same vine, divided and parted from each other: both which objections are founded rather upon an uncertain supposition, than upon any true judgment.

But, (that I may refute first that which I first proposed) if we will content ourselves with a trench of two feet, why are we of such an opinion as to pastinate the ground deeper than two feet, since we are resolved to plant the vine so shallow? Somebody will say, We do it, that the lower ground, which lies under the vine, may be soft and yielding, that it may not, by its hardness, stop and repel the young small roots, that gradually creep into it. Indeed this point may be

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gained

gained also, if the ground be moved with the two foot mattock or spade, and the plants be depressed into the trenched ground, which is fermented, more than two feet and an half (1); for always, upon a plain, the earth, that is thrown up loosely out of the trench, is more bulky and swelled, than the same gradation, quantity or extent of crude earth answering to it, that has not been moved: nor indeed do plants, when they are set, require a deep bed of earth to be made under them; but it is sufficient to put half a foot of loose earth under the vines when they are planted, which may receive the gradual growth of the green plants, as it were, into its hospitable, and even maternal bosom.

Let us take an instance of this matter from ground where trees are planted for supporting vines, where, when we have digged the trenches, we lay a very little quantity of dust under the quickset: therefore the truer reason for our pastinating the ground deeper is, because in vineyards, where the vines are laid upon frames, they grow up the better, the deeper the trenches are they are planted in: for, trenches two feet deep can scarcely be approved even by Husbandmen that live in the provinces, where the vine, being of a low stature, is, for the most part, checked, and kept near to the earth; whereas that, which is destined for a frame, must be established upon a deeper foundation; and if so be it climbs up higher, it requires more earth, and more assistance; and therefore, when they are to be wedded to trees, nobody prepares a trench less than two feet deep for the vines.

But those principal advantages of shallow planting, *viz.* that those plants, which are not wearied by being pressed down by a great weight of earth, do both grow up quickly to their full stature, and become strong, and such as are gently suspended become more fruitful, contribute very little to what the Husbandman desires and aims at; for both these reasons of *Julius Atticus* are confuted by the example of the method of planting vines, in order to couple them with trees, which makes the vine both stronger and fruitfuller; which it would not do, if the plants suffered any injury by being sunk deeper into the earth. What! does not pastinated ground, when it is loose, and newly thrown

(1) Our author directed vines to be planted in trenches made two feet and an half deep in trenched ground. To this it was objected, That the vine was set too deep. *Columella* asks, Why we trench the ground so deep, if we set the vines so shallow, and do not plant them as deep as we trench? They who made this objection, and blamed him, answered, That this was done, that the earth below them might be soft, and that the small roots might creep gently into it. *Columella* answers, That this may also happen, if the earth be moved with the two foot spade, and the plants be set in trenches more than two feet and an half deep; because the earth, when trenched, and thrown up to a certain height, does ferment and swell, so that there is place enough for the roots to extend themselves in.

up, swell as if leaven were put into it? and then, before any considerable time passes, it is condensed, and subsides, and forsakes the roots of the vines, leaving them swimming, as it were, upon the surface of the ground? But this does not happen so readily to our way of planting, which sets the vine deeper into the earth. As to their saying, That the plants suffer by cold, when they are deep in the ground, this also we don't deny; but it is not the depth of two feet and three-fourths of a foot that can produce this effect, especially considering, that, as I said a little before, notwithstanding vines, which are to be coupled with trees, are set deeper in the earth, yet they escape the foresaid inconveniency.

C H A P. II.

That the Branches of one Quickset ought not to cloathe two Props; but every single Plant must have its own Prop assigned to it.

THAT other pretence, *viz.* their being of opinion, that two props are, with less expence, married to the young shoots of one plant, is false; for, if either the head itself should die, two props are reduced to a state of widowhood, and presently as many quicksets must be substituted in the room of that which is dead, which, by their number, bring a further charge and burden upon the Husbandman; or, suppose it lives, and, as it often happens, should either turn out to be of the black kind, or to be not very fruitful, then the fruit fails, or is naught, not in one prop only, but in more also. And even they who have more skill than ordinary in Husbandry, think, that a vine, tho' it be of the generous kind, when it is divided in this manner into two props, will become less fruitful, because the roots will interweave under ground, and form a hurdle; and therefore the self-same *Atticus* directs us to propagate and renew old vineyards rather by layers, than by laying the whole vines flat in the ground; because layers easily strike root presently, so that each vine leans upon, and is, as it were, supported by, its own foundation: but that, which has its whole body laid flat, when it has, with its roots running cross every way, wrought the lower part of the ground like a lettuce or net-work, forms a hurdle, and it is vexed and tormented by its many roots being watled into one another; and fails and decays in the very same manner as if it had been overburdened with branches:

branches : wherefore, on all accounts, I would rather chuse to run the hazard of putting two plants into the earth, than one only ; and not to pursue that as an advantage, which, every way considered, may bring a much greater loss. But now the argument of the preceding book calls upon us to perform what we promised we would begin the following book with.

C H A P. III.

That a Vineyard, newly planted, will speedily decay and perish, if it is not supported by great and assiduous Culture.

IN all expensive undertakings whatsoever, as *Græcinus* says, most men begin new works with greater courage and resolution, than they maintain and support them with, after they have finished them ; for some men, as he says, build houses from the very foundation, and, after they have finished the building, don't provide proper furniture for them. Some are exceedingly active in building of ships, and, after they have built them, they neither rig nor man them as they ought to do. Some men are constantly employed in buying of cattle, others in purchasing slaves ; but they are under no manner of concern about keeping and preserving them. Many also, by their levity, undo and destroy the favours they have bestowed upon their friends. And, that we may not, *Silvinus*, wonder at these things, there are some men, who, with great covetousness and parsimony, educate their children, which, by marriage, prayers, and vows, they earnestly sought for ; nor do they cultivate either their mind, or their body, with any kind of discipline, exercise, or any improvement whatsoever.

What is to be inferred from these things ? It is this, that, for the most part, Husbandmen also are guilty of the same kind of fault, who, upon various pretences, abandon vineyards, which they have beautifully planted, before ever they grow up to any perfection. Some avoid a yearly expence, and think, that this is the first and the surest income, to be at no expences at all ; as if they were under an absolute necessity to make vineyards, which they might presently, through covetousness, throw up and abandon. Some think it a fine thing to have rather spacious than well-cultivated vineyards in their possession. I have even known many who are fully persuaded, that land ought still to be cultivated, whether it be by good or bad methods.

But my opinion is, that as no kind of land whatsoever can be fruitful, unless it be diligently, carefully, and skilfully manured, so more especially vineyards. For a vine is a delicate, tender, and weak thing, and can by no means bear with hard usage; and, for the most part, it is consumed by too much labour, and bearing too great plenty of fruit; and, if you don't restrain it within due bounds, it perishes by its own fruitfulness. But when it has, in some measure, strengthened and hardened itself, and attained, as it were, to the strength of youth-hood, it can bear up under neglect. But a young vineyard, while it is growing up, unless it receive all due care and attendance, is reduced into the poorest and most starving condition, and pines and wastes away in such a manner, that it can never afterwards, by any expences whatsoever, be recovered and restored. Therefore the foundations, as it were, must be laid with the greatest care, and from the first day of planting it, it must be formed with the same care as the members of infants are; which unless we do, all our expences will be laid out to no purpose; nor can the proper season of any thing be recalled, when once we let it pass. Believe me, *Silvinus*, upon my own experience, that a vineyard well planted, and of a good kind, and under the care of a good Husbandman, did never fail to requite, with usury, all the expences and pains bestowed upon it.

And this the same *Græcinus* makes clear to us, not only by reason, but by an example also, in that book which he wrote of vineyards; where he tells, that he used frequently to hear from his own father, that one *Pavidius Veterensis*, his own neighbour, had two daughters, and a piece of land planted with vines; of which he gave a third part as a portion to his daughter when she married; and, this notwithstanding, he used to gather an equal quantity of fruit out of the two thirds of the same land; and that afterwards he gave his second daughter in marriage, with the half of the land that remained; nor did he thereby suffer any diminution of his former income. What inference does he draw from this? It must certainly be this, that that third part of his farm was afterwards better cultivated, than the whole of it had been formerly.

C H A P. IV.

That the Vine ought to be laid flat in the Trench ; and, after bending it back from the Bottom of the same, and raising it up straight, it ought to be applied to a Reed.

WHerefore, *Publius Silvinus*, let us plant vineyards with great courage and resolution, and cultivate them with greater application ; of the planting of which, that is the most commodious method which we have delivered in the preceding book ; *viz.* that a trench being made in the pastinated ground, the vine be laid flat from the middle part of the furrow almost, and that the firm-woody part of it be raised up straight from the bottom, and applied to a reed. For this, especially, must be observed, that the trench be not like a conduit, or trough ; but that the fronts, or ends of it, be raised, as it were, exactly perpendicular, and with distinct regular angles. For a vine that is laid down flat, and then set in a leaning posture, in a trough, as it were, is afterwards liable to be wounded when it is ablaqueated : for, while the digger is intent upon digging, strengthening, and raising the circumference of the ablaqueation, for the most part, he wounds the vine that grows obliquely, and sometimes cuts it quite thro'.

Therefore we must remember to raise the sprig straight up from the bottom of the trench, and apply it to its prop, and so bring it to the uppermost part or top of it. Then we are to proceed in the other things as we directed in the preceding book : and then, after leaving two eyes standing above ground, to level the trench. Then, having planted cuttings between the rows, we must, by frequently digging it, loosen the pastinated ground, and reduce it into dust. For thus the cuttings, quicksets, and other plants which we have set in it, will take root, thrive, and grow strong, if the soft and tender ground convey moisture to them, and no weeds creep in among them, nor the hardness of the ground press and squeeze the plants while they are young and tender, as if they were bound fast with fetters.

C H A P. V.

After the Vines are planted, we must dig the ground every Month, and take care, that Weeds don't spring up in it ; and the Quicksets must be reduced to one single Branch of Firm-wood.

BUT, to confess the truth, the number of times that the ground ought to be turned up with hoes, is not to be determined, seeing it is agreed, that the oftener it is digged, the more benefit it will receive. But, because it is proper to set due bounds to expences, most people think it sufficient to dig new vineyards every thirtieth day from the first of *March* to the first of *October* ; and to extirpate all sorts of herbs, especially grass, which, unless they be picked out by hand, and thrown upon the surface of the earth, if the least part of them be covered with earth, they revive, and so burn up the vine-plants, that they become scabby, shrivelled, and rusty.

C H A P. VI.

That superfluous Leaves and Twigs ought to be cut off from Quicksets and Cuttings.

MOREOVER, whether we have planted our vineyards with cuttings, or with quicksets, it is best to form them in such a manner from the beginning, that all superfluities may be plucked off them, by frequent pampination ; and that we suffer them not to communicate their strength, and all their nourishment, to more than one firm-wood branch. Nevertheless, at first, two young branches are set apart for growth, that one of them may be for a reserve, if, peradventure, the other should decay and fail. Then when the rods are a little hardened, all that are of an inferior quality are pulled off : and that those which are left may not be shaken off by stormy winds, it will be proper to follow them, as they grow up, with a soft, slack band, till they take fast hold of their props with their tendrils, as it were with hands.

But, if want of labourers hinder us to bestow so much labour upon the cutting, which, we are of opinion, ought itself to be freed from all its luxuriant twigs and leaves ; yet, certainly, it ought to be done to vines that are regularly planted in rows, that they may not be emaciated by too many rods upon them, unless we are making a provision of layers for the time to come, in order to propagate the vine : but that they may minister nourishment only to one firm-wood branch each, whose growth we ought to encourage, by applying a longer prop to them, by which they may creep up to such a height, as to mount above the frame you make for the following year, and be bended, in order to bear fruit. When they are grown up to this height, their tops must be broken, that so they may rather grow in thickness and strength, than be attenuated, by shooting out into a superfluous length.

Nevertheless, we will pull off all the superfluous leaves and twigs from this very branch, which we set apart for firm-wood, as far as three feet and a half from the bottom, and we will often pull off all the nephews, or secondary shoots, that spring out of it within that space. Then, whatever shall sprout out of it above that, must be left untouched : for it is more proper, that the upper part be lopped off the next autumn with the pruning-knife, than be pampinated in the summer-time ; because from that place from whence you have taken away the nephew, or secondary twig, it presently pours forth another ; and, after this is sprung out, there is no eye left in the firm branch itself, which may sprout out with fruit the following year.

C H A P. VII.

That then is the due Season for Pampinating, when the Twigs can be struck off with the Finger.

BUT that is the proper season for cutting off superfluous twigs and leaves, when the young shoots are so tender, that they may be struck off with a slight touch of the finger ; for, if they are hardened to a greater degree, they must either be pulled off with greater effort, or lopped with the pruning-knife, both which are to be avoided ; the one because it tears the mother (if you endeavour to pull it off by force) ; and the other, because it wounds her, which is very hurtful to be done in a green stem, as yet not grown up to maturity. For the gash does not stop exactly in the very place where the edge of the knife made
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the impressiion, and left its mark ; but, in the summer heats, a wound deeply impressed with the knife, spreads to a greater breadth, and withers, and dries up, so that it kills no small part of the mother's body itself ; and therefore, if it be absolutely necessary to apply the knife to young branches which are already grown hard, they must be cut off at a little distance from the mother, and left as stumps or short-cut branches, which may receive the injury of the heat, so far as the place where the young twigs sprout out of her side ; for the violence of the heat does not creep further.

The same method must be observed in pulling the superfluous leaves and twigs off the cuttings, and in humouring and assisting the firm-wood to grow out in length, if we have a mind to use it when it is one year old, which I have often done. But if we are certainly resolved to cut it, that we may use it rather when it is two years old, after you have reduced it to one young branch, and the cutting itself exceeds a foot in length, it will be proper to lop off the top of it, that it may grow more firm towards the neck, and become the stronger. And this is the first culture of plants, after they are set.

C H A P. VIII.

That a Vineyard must be ablaqueated in the Autumn.

THEN the time following (as *Celsus* and *Atticus*, whom our age has most approved, with respect to Husbandry, have declared) requires a more extensive care. For, after the fifteenth of *October*, before the colds come upon us, the vine must be ablaqueated (1) ; which work lays open and shews the hidden small roots, which it put forth last summer, and the prudent Husbandman cuts them off with the knife. For, if

(1) *Ablaqueatio, ablaqueare*. This original word is retained by some, and if it was commonly understood, would be more commodious than a long circumlocution. It signifies, to dig round the root of a vine, or any other tree, in order to lay their roots bare, and expose them to the air and wind, and with the earth to make, all round the vine, a kind of repository, or basin, for the water ; and to take away the uppermost superfluous roots, and thereby the earth is provoked to imbibe the sun and the showers. It contributes very much to their growth, and is otherwise of very great benefit to them ; so that the oftener the tree is ablaqueated, the better does it thrive, if the nature of the place, and other circumstances, permit. Authors do not agree about the Etymology of the word : the most probable opinion is, that it is formed from *lacus*, the pool, or pond, made round the tree, by digging out the earth, and discovering the roots.

he suffer them to grow strong, the roots that lie lower will decay ; and the event is, that the vine stretches out her roots upon the surface of the ground, which are both infested with the cold, and scorched to a greater degree with the heats, and so force their mother to suffer a vehement thirst at the rising of the Dog-star. Wherefore, when you have ablaqueated the vine, whatever has sprouted out of it within a foot and an half must be cut away.

But the method of amputation in this is not the same as was directed with the upper part of the vine : for the wound must not be smoothed, and the knife must by no means be applied to the mother herself ; because if you cut off the root hard by the stock, either more roots will spring out of the scar, or the winter rain, which stagnates and forms a pool in the small hollows that are made round the tree, when it is ablaqueated, will, by its freezing in the middle of winter, chill and gall the new wounds, and penetrate to the very pith. To prevent this, it will be proper to keep at the distance of about one finger's-breadth from the trunk, and so cut away all the small roots ; which, being taken away after this manner, sprout out no more, and defend the trunk from further injury.

This work being finished, if the winter be mild in that region, the vine must be left open ; but, if a harder winter forbids to do this, the foresaid cavities, or little ponds, must be filled up, and levelled, before the thirteenth of *December*. But also, if you have any suspicion, that the colds of that country will be excessive, before you cover the vine with earth, you must lay some quantity of dung to its roots, or, if it be more convenient, pigeons dung ; or you must pour upon them six *sextarii* of old urine, prepared for that purpose : but you must ablaqueate the vine, every autumn, for the first five years, till it grow strong. But, when the stock is full-grown, the labour of this work must be intermitted almost for three years : for the legs of the vines are less hurt with the iron, and the young small roots don't spring out of it so quickly, now the stock is become old.

C H A P. IX.

After what manner an ablaqueated Vine is to be pruned.

THEN, after the ablaqueation, follows the pruning, which is to be performed in such a manner, that, according to the direction of antient authors, the vine may be reduced to one small rod, and that it be cut so as to leave two eyes next to the earth; which pruning must not be performed just by the joint, lest the eye be put in fear; but the wound is made with the knife obliquely, almost in the middle of the space between the knots, lest the scar, if it were made exactly crossways, should contain the rain that falls upon it; but neither must it decline towards that part where the bud is, but towards the back part, that so the cut being made sloping, it may let its tears fall rather upon the ground than upon the bud: for the moisture that flows down blinds the eye, and suffers it not to put forth its buds.

C H A P. X.

Of the best Time for pruning.

THERE are two seasons for pruning; but that of the spring (as *Mago* says) is the best, before the cutting begins to sprout, and put forth its buds; because, being full of juice, it does not resist the pruning-knife, but receives an easy, smooth, and equal wound. *Celsus* and *Atticus* were of the same mind with him. But we are of opinion, that plants ought neither to be kept too much under, by pruning them too near, unless they be very weak; nor be cut by any means in the spring of the year. But, indeed, the first year they are planted, they must be assisted by frequent diggings, every month, while they have leaves upon them; and by frequently pulling off their superfluous leaves and twigs, that they may gather strength, and not minister nourishment to more than one firm-wood branch. And, after they have educated this, we are of opinion, that, either in the autumn, or in the spring, if it be more convenient, every thing that is superfluous upon them should be pared away; and that they be freed from the nephews, or secondary twigs, which the vine-dresser had omitted in their upper part, and so be placed upon the frame. For that vine is smooth and straight, with-

out a scar, which, with the rod of the first year, has raised itself above the frame, which happens but very seldom, and with few Husbandmen. Therefore the foresaid authors gave it as their judgment, to cut off the first fruits of the vine. But neither, indeed, is pruning in the spring of the year best in all countries. But where places are exposed to the sun, and the winters are mild, pruning in autumn is best, and most natural; at which time, trees, by a certain divine and eternal law, drop both their fruit and their leaves.

C H A P. XI.

How a Cutting ought to be cut and lopped.

IT is my opinion you should do this, whether you have planted a quickset, or a cutting: for experience has condemned that antient opinion, that cuttings of one year old ought not to be touched with the knife, because they dread an edge-tool; which *Virgil* (1) and *Saserna*, the *Stolos* and the *Catos* (2), were afraid of without any foundation; who not only erred in this, that they suffered the first year's capillaments of plants to remain untouched; but that after the space of three years, when the quickset was to be cut, they cut away all the upper part of it to the very ground, just by the joint itself, that so it might pullulate out of the hard wood. But use, the master of arts, has taught us to form and regulate the growth of cuttings of the first year, and not to suffer the vine, growing luxuriant with superfluous leaves and twigs, to wax wild; nor, on the other hand, to restrain and curb it so much as the antients directed, so as to cut off all the upper part of it; for this is exceeding hurtful to it: first, because most of the plants, after you have cut them as low as the ground, (having received, as it were, an intolerable wound) perish, and some of them also, which have been so stubborn as to live, put forth wood-branches, that are not so fruitful as otherwise they would have been; seeing it is allowed by every-body, that shoots which sprout out of the hard part of the vine, are very often destitute of fruit: a middle way therefore must be followed, *viz* that we neither cut the cutting close to the ground, nor, on the other hand, provoke or encourage it to shoot out into firm-wood,

(1) *Virg. Georg. lib. ii. 362, 369.*(2) *Cato de re rustica, lib. xxxiii. 2.*

to a greater length than is requisite; but, having remarked the thumb (3) of the former year, we may leave, above the very place where the old spray was joined to it, one or two eyes from which it may germinate.

C H A P. XII.

After what manner a Vineyard must be propped, and of the single Frame for Vines.

NOW, after the pruning, follows the care of propping a vineyard; but this year does not as yet require a very strong prop or stake. For I have observed, that, for the most part, a tender young vine rests better upon a small prop, than upon a very high strong pole. Therefore we will either apply two old reeds (lest young ones strike root) to each vine; or, if the condition of the country permits it, set old spear-staves into the ground, to which may be fastened single transverse poles toward the lower part of the row; which kind of rail or frame Rustics call *Canterius* (a Horse): it is of very great advantage, that there be something which the tendril, creeping forth, may presently take hold of, a little below the bending of the vine; and rather spread itself on each hand on the transverse poles, than grow upwards towards the higher part of a frame; and that, leaning upon the rail, it may more easily bear up against the winds. It will be proper, that this frame be not raised so high as four feet, till such time as the vine strengthens itself.

C H A P. XIII.

After what manner a Vine is to be tied.

NEXT after the propping follows the binder, whose business is to raise the vine straight up to the frame; and, whether it be set just by the prop, as some authors would have it; he that binds it ought

(3) *Pollex*. The antient Husbandmen, when they cut off any spray growing out of the side of a branch of a vine, and left a small stump remaining, not cutting it close to the branch, called that stump a *Thumb*, from the resemblance it bore to the thumb of one's hand.

to beware of thinking, that he should follow the bending of the stake in binding the firm-wood branch to it (if, peradventure, it be crooked); for this makes the vine crooked; or, whether there be a space left between the vine and the prop, (as seemed best to *Atticus*, and some other Husbandmen, and which I am not ill pleased with) the reed must be joined straight to the plant, and so by several bindings it must be brought up to the frame. It is of great importance what kind of bindings the plants are bound with: for, while the vine is young and tender, it must be bound with the softest that can be found; for, if you bind them with wickers, either of willow or elm, as the vine grows thicker, it cuts itself. Therefore broom is best for this purpose, or bulrushes cut in marshes, or long grass that grows in pools of standing water. Nevertheless, the leaves of reeds also, dried in the shade, are not at all bad for this use.

C H A P. XIV.

Cuttings must be put upon a Frame, and how high the single Frame, or Rail, must be raised.

BUT the like care must be taken of cuttings also, that they be put upon the frame, after they are pruned to one or two eyes, either in autumn, or in the spring, before they put forth their buds. The rail, or horse, as I said, must not be raised so high above the earth, as it is for vines that grow in rows: nor ought it to be more than one foot high, that so there may be something to which the yet tender and young branches may bind themselves with their tendrils, that they may not be rooted up by the winds. Then follows the digger, who is frequently to turn up with hoes the surface of the ground equally, and by little and little at a time.

We approve most of this even plain digging; for that which in *Spain* they call the *winter-digging*, when the earth is drawn from the vines, and brought into the middle spaces between the rows, seems superfluous to us, because the autumnal ablaqueation has immediately preceded, which has laid bare the uppermost small roots, and reached to those that are undermost, and transmitted the winter-showers. But the number of diggings ought either to be the same with that of the first year, or less by one; for certainly the ground must be frequently stirred,

till

till such time as the vines, by their growth, overshadow it, and don't suffer the weeds to grow under them.

This year, the superfluous twigs and leaves must be pulled off, in the very same manner as they were the first year. For the puerile age, as it were, of the plants, must as yet be kept under due restraint, and not more than one rod of the plant be set apart for bearing fruit; and so much the more indeed, because its tender age cannot endure to be burdened both with offspring, or fruit, and with firm-wood branches.

C H A P. XV.

After what manner a Vineyard must be recruited, and how Layers are to be made.

BUT when the vineyard, of one year and an half old, is brought the length of the vintage, after the fruit is taken away, it must be supplied and filled up with new plants (1); and the presidiary cuttings (2), which were set for that purpose, must be propagated: or, if we have none of these, a layer must be drawn from a vine growing in the row, to another stake. For it is of very great importance, that every prop be cloathed by still planting a new vine in the room of that which is dead; and not to be afterwards recruiting our vineyard, when we ought to be reaping the fruit thereof.

There is a kind of layer (3) when the vine is bended above the earth hard by the prop, and, being put under-ground, is, by a deep trench, carried to the prop; then from the arch which it forms, it puts forth vehemently a firm-wood branch (4), which, being presently applied to
its

(1) *Vinea frequentanda*. The meaning of this phrase is, that when any of the regular vines of a vineyard, *i.e.* such of them as grow in the rows, happen to die, their places must be supplied with other vines from other places; for this purpose, the author directs to plant cuttings between the vines, in order to have a supply always ready at hand, when they are wanted.

(2) *Malleolus presidiarius* is a cutting set between the vines that grow in rows in a vineyard, in order to supply their place, if they should happen to die.

(3) *Mergus*, a layer. This has its name from fowls, that dive into the water. The vine is bended into the earth, and carried under-ground a little way, and then raised up again; and so resembles those fowls which dive under water, and rise up again at some distance from the place where they first plunged into it.

(4) *Tum ex arcu vehementer citat materiam*. *Citare*, a word frequently used by our author, to express a vine's putting forth its buds, leaves, fruit, or roots, as it were summoning them

its own prop, is called up to the frame. Then the following year an incision is made upon the upper part of the curvature, as far as the pith, left the rod, which is propagated, attract the whole strength of its mother; and that it may learn, by little and little, to be nourished by its own roots. Then, when it is two years old, it is chopped off hard by the young branch, which, from the bow or arch, is set apart for growth; and that which is newly cut off from its mother, is presently digged deep all round; and, a small trench being made, you must cut it close by the very bottom of the trench, and cover it over with earth, that it may strike its roots downwards, and not sprout out towards the surface of the earth, after it has been negligently cut too near the same. But there is no time fitter for making the amputation of this layer, than from the fifteenth of *October* to the thirteenth of *November*, that so it may confirm and fix its roots in the winter-months. For, if we do this in the spring, when the vine-branches begin to put forth their buds, being suddenly deprived of maternal nourishment, it falls into a languishing condition.

C H A P. XVI.

At what time a Quickset must be transplanted.

THE same method must be observed in transplanting a cutting: for, in the second autumn, if the quality of the climate, and of the place, allows it, it is most conveniently taken out of the ground after the fifteenth of *October*, and planted. But if some hurtful quality, either of the earth, or of the air, be repugnant, then the time for removing it is delayed till next spring. Nor must it be left longer in the vineyards, lest it consume the strength of the ground, and annoy the plants that grow in the rows, which, the sooner they are freed from the company and partnership of the quicksets, so much the more easily do they grow, and gather strength. But, in a nursery, you may keep a vine very safely three, yea, four years, when you have cut or pruned it very near, because the vintage is not what you have in view.

to shew themselves. The meaning of this sentence is, that whenever a vine is bended, and laid in the ground, it vigorously putteth forth a shoot at the bow, or arched part, which will grow up to be a firm-wood branch; for, in the language of rustic writers, *materia* signifies, when they are speaking of vines, the woody part, or a shoot, which in time will grow up, and become firm-wood.

When

When a vineyard has been planted above thirty months, that is, in the third autumn, it must presently be supported with stronger and higher props : and this must not be done just as you list, or at random ; for, whether you fix the prop near to the stock, yet you must keep at the distance of one foot from it, lest it either press upon, or wound the root, and that the digger may dig round the plants on every side. And this prop must be so placed, that it may receive the violence, both of the colds, and of the north winds, and protect the vine ; or, whether you fix it in the middle of the space between two rows, you must either dig a hole for it, and so sink it into the ground, or you must first bore the ground with a small stake, and then drive the prop deeper into the earth, that it may more easily support both the frame, and the fruit. For, the nearer the pale is placed to the stock of the vine, the more firm and steady it will be, suppose it be but slightly fastened in the ground ; for, being near to the vine, it mutually supports, and is supported.

Then, upon the supporting props, you must bind very firm and strong frames ; and these must be made either with willow-poles, or with reeds put, as it were, into bundles, to give them sufficient stiffness, so that they may not yield, nor sink down with the weight of the fruit. For now two firm-wood branches must be preserved upon each plant, and set apart for bearing fruit ; unless, notwithstanding, the slenderness of any vine shall require a closer pruning, of which only one fruit-bearing branch must be left, with very few eyes upon the same.

C H A P. XVII.

After what manner a Frame must be made with Reeds.

A Frame made of poles is the firmest, and requires less labour. Reeds require more labourers to put them together, because they are both tied in more places ; and they must be bound with their tops turned to one another, that the whole frame may be equally thick ; for, if the tops are laid all one way, the weakness of that part, being pressed down with the weight, lets the fruit fall to the ground, when it is just ripe, and exposes it to dogs and wild beasts. But, when a frame is orderly made of reeds put into bundles, with their tops turned alternately to each other, it will be fit for use almost for the space of five years.

Nor

Nor is the method of pruning, or of any other part of Culture, different from what it was the first two years; for, in autumn, the roots of the vines must be carefully laid open, and no less care taken to apply new vines by layers to the vacant props; for this work must never be intermitted, but let it be renewed every year: for indeed such things as are planted by us cannot be immortal; nevertheless we thus use our endeavours to make them eternal, by substituting new plants in the room of such as are dead; nor do we suffer the whole generation to be reduced to utter destruction by the neglect of many years. Moreover, we must bestow frequent diggings upon them, tho' we may withhold one digging from the Culture we bestowed upon them the first year. The superfluous leaves and twigs must be often plucked off; nor is it enough to do this to the vine once and again the whole summer: but especially all those things, which sprout out below the head of the stock, must be shaken off. Also, if each eye upon the frame should send forth two young shoots, tho' they shew us great plenty of fruit, yet one of the small fruit-bearing branches must be pulled off, that the firm-wood branch, which remains, may thrive the better, have the better heart, rear itself the more chearfully, and educate the fruit that remains the better.

After the one-and-fortieth month, when the vintage is finished, the pruning must be so managed, that the vine may be spread and divided into the form of a star, by setting apart several rods or long shoots for bearing fruit. But it is the business of the Pruner to restrain and keep in the vine almost within the space of one foot round the frame, that whatever tender thing is sent forth from the head of the vine all along its arms, may be encouraged and helped forward, and, after bending it over the frame, be precipitated to such a degree, as not to touch the earth.

But a due measure must be observed, in proportion to the strength of the stock, lest more fruit-bearing branches be set apart for bearing fruit, than the vine is able to minister sufficient nourishment to. But ordinarily the foresaid age, in a rich ground, where the stock thrives very well, requires and allows of three firm-wood branches, seldom four, which the Binder ought to separate and divide into as many different parts; for it is to no purpose that the frame be decussated and made into the form of a star, and be spread wide and divided, unless the fruit-bearing branches of the vine be spread and joined to it in the like manner: which form nevertheless all Husbandmen have not approved of; for many have contented themselves with extending the vine in one line. But a vine is more stable, and abler to bear the burden both

of the young branches and sprays, and of the fruit, which, being bound on both sides to the frame, is, by an equal counterpoise, kept fast as with so many anchors; as also a vine, that is supported on every side, diffuses and spreads abroad firm-wood branches by more arms, and opens and displays them more easily, than that which, upon a single rail, is crowded with very many fruit-bearing branches.

Nevertheless, if a vine is not spread out to a great breadth, and does not bear very much fruit, and has neither a foggy nor a stormy climate, it may be satisfied with one single frame; for, where rains and storms come with great force and violence, where the vine is weakened by frequent rains, and where it hangs, as it were, upon exceeding steep hills, and requires very many defences and safeguards, there it must be fortified and supported all round, as it were, with a square battalion. But, in warm and drier places, the frame must be stretched out on every side, that so the shoots, creeping forth on all sides, may be joined, and, being laid close, and compacted together, in the manner of an arched roof, may overshadow the thirsty earth. On the contrary, in cold and frosty countries, the vines must be ranged in single rows in one line; for thus both the ground is more easily warmed by the sun, and the fruit is thoroughly ripened, and wholesome air will have the more easy access to it, and pass through it the more freely. The Diggers also handle and move their hoes and spades more freely and easily; and the Keepers have a better and more thorough view of the fruit; and the Vintager gathers it more commodiously.

C H A P. XVIII.

Of dividing a Vineyard into small Orchards.

BUT, when you shall think it proper to put your vineyard into regular divisions, let one hundred vines be distinguished by foot-paths into orchards apart by themselves; or (as some persons think proper) let the whole compass or extent of your vineyard be divided into divisions of half a *jugerum* each; which distinction, besides that conveniency, that it affords more sun and wind to the vines, it also gives more easy admittance both to the eyes and feet of the Proprietor, things extremely salutary to vineyards, and affords us a certain rule to go by in estimating and exacting that proportion of labour we expect from

from our labourers and servants; for we cannot be deceived, when the *jugera* are thrown into equal divisions and intervals.

Moreover, this very distribution into small orchards, the smaller the modules or proportions are, into which it is cut, the more it lessens, as it were, the fatigue; and at the same time encourages such as are doing the work to dispatch it quickly; for commonly the *vastness* of the pressing work incumbent upon them disheartens them, and weakens their courage. It is also some advantage to know the strength of your vineyards, and how much fruit every part produces, that we may rightly judge which parts we must bestow more or less culture upon. Also these paths will give convenient room to the Grape-gatherers, and to those who repair the frames and props, by which also either the fruits, or materials for supporting the vines, may be carried.

C H A P. XIX.

Of the Position of a Frame, and how far it must be raised above the Ground.

AS to the position of a frame (1), how far it must be raised from the ground, it is sufficient to say this, that the lowest must be four feet high, and the highest seven; which last nevertheless is to be avoided in young plants: for vineyards ought not to be constituted after this manner at first; but the vine must be gradually carried to this height after a long succession of years. But the moister the soil and the climate are, and the calmer the winds, so much the higher must the

(1) *Jugum*. As most vines have not stiffness enough to stand upright of themselves, therefore they must be supported by props, which, being fixed in the ground, and the vines fastened to them, not only keep them from falling, but preserve them from being broken by stormy winds. When the vine, after it is grown up to a certain height, begins to extend its arms, and spread itself, then they make frames or yokes (*juga*) to lay them upon, and support them. These they make by fixing two poles or stakes in the ground, at a certain distance from each other, and also from the vine, according to the length of its boughs. To the top of the two erect poles they apply a transverse one, which they fasten to them at each end. This they call a *jugum*, which is commonly made higher than the head of the vine (They call the *head of the vine* that part, from which the arms or boughs issue and extend themselves). Upon this frame they place the *arms*; and, when the vine is strong, and puts forth boughs in abundance, they divide it into four quarters, to each of which they apply a frame, forming it like a star, or the letter X; and this they call *decussating the vine*, *decussare*, *vel in formam decussis redigere*. They might add one frame after another, if they had a mind to extend the vine farther; but this was not usually done.

frame be raised; for the thriving condition of vines allows them to ramble, and spread, and stretch themselves to a greater height; and the fruit, which is removed to a good distance from the earth, is less liable to rot; and by this method only the winds blow freely through them, and quickly dry up the fogs, and pestilentious dew, and contribute much to their casting their blossoms duly, and to the goodness of the wine. On the other hand, poor land, that lies on the side of a hill, and is parched with the scorching heat, or that which is obnoxious to vehement storms, requires a lower frame. But, if all things fall out according to your wish, and are agreeable to your desire, the true and right height of a vine is five feet; nevertheless there is no doubt, but the higher the frames are, which the vines rise up to, of so much the better taste is the must which they yield.

C H A P. XX.

Of the Business of binding Vines.

AFTER the vineyard is propped, and put upon frames, follows the work of the Binder, whose principal concern ought to be, to keep the stock of the vine straight, and not to make it follow the bending of the stake, lest the crookedness of the prop should form the vine after its own similitude. This contributes very much not only to its beautiful appearance, but also to its fruitfulness, firmness, and perpetuity; for a straight stock contains a pith like to itself, through which, as by a certain way or passage, without winding or impediment, the nourishment, which the mother *earth* supplies it with, passes the more easily, and reaches to the very top; but such as are crooked and distorted are not equally accessible to the terrestrial moisture (1), the knots hindering, and the bending itself, as so many rugged uneven places, retarding its incursion; wherefore, when the vine is drawn up straight to the very top of the stake, it is bound fast to it with a band, that so, when it is burdened with fruit, it may not sink down, and be bended and crooked. Then, from that place, where that which is next to the frame is tied to it, its arms are disposed and distributed

(1) *Vineæ curvæ & distortæ non æqualiter alliduntur.* Our author, who borrows words and phrases from a vast many different things, and applies them to the subject he is speaking of, had, no doubt, in his view here the motion of waters towards the shore, and their dashing upon them; and thereby expresses the motion of the juice of the vine towards its branches, which, he says, cannot have equal access to them when the vine is distorted.

into different parts, and the small fruit-bearing branches, which are placed upon the frame, are, with a band, bended downward: therefore that, which hangs down from the frame, is replenished with fruit. Moreover, the bending or curvature puts forth a firm-wood branch hard by the band.

Some spread out upon the frame that part which we precipitate, and, by tying it in several places with willows, keep it within bounds; which I don't at all think are to be approved: for neither rains, nor hoar-frosts, nor hail, do so much hurt to the dependent fruit-bearing branches, as to those that are bound, and exposed and laid open, as it were, to the stormy weather. Nevertheless the same fruit-bearing branches ought to be tied fast, before their fruits become mellow, while the grapes are yet of different colours, and bitter, that they may be less exposed to rot with the dews, and to be destroyed by the winds and wild beasts. All along the main broad way, that runs cross the vineyard from east to west, and also the smaller paths, the fruit-bearing branches of the vines must be bended inwards, that they may not be hurt by the incursions of those, that pass by. And this is certainly the way to bring a vine to the frame, when it is of sufficient age and growth for the same; for that, which is either infirm or short, must be cut to two eyes, that so it may, with more speed, put forth firm-wood branches in abundance, which may quickly mount up to the frame.

C H A P. XXI.

Of the Way and Manner of pruning a young Vineyard.

THERE is no other pruning requisite for a vineyard of five years old, but that it be formed and reduced to a right shape, in the manner we have already directed, and that it may not spread and extend itself overmuch; but that the head of the stock be almost the space of a foot lower than the frame, and that, with its four arms, which some call its old hardened wood, it be divided into as many parts. It will be enough, that one single fruit-bearing branch upon each of these arms be set apart for bearing fruit, till the vines are of a sufficient strength. Then, some years afterward, when they have attained, as it were, to their juvenile age, it is uncertain how many fruit-bearing branches ought to be left upon them; for a rich fertile soil requires more, and that which is poor and lean fewer: for certain it is, that a luxuriant
vine,

vine, unless it be restrained and checked with fruit, casts its blossoms very indifferently, and exhausts and wastes itself in wood and leaves. On the other hand, that which is weak, when it is burdened with fruit, is afflicted thereby. Therefore, in fat earth, you may, if you will, join two rods to each arm; nevertheless you must not burden it with a greater number, than that one vine may serve or convey nourishment to eight fruit-bearing branches, unless its too great fruitfulness shall require more; for a vine, extended with firm-wood branches beyond this measure and proportion, has rather the appearance of a long-extended arbour, than of a vine.

Nor ought we ever to suffer the arms to become fuller or larger than the stock; but, whenever we have it in our power to set apart for growth young rods or shoots growing out of their sides, we must constantly cut away the uppermost old hardened boughs, lest they exceed the frame: but let the vine be always renewed with young fruit-bearing branches, which, if they are grown out to a sufficient length, may be put upon the frame. But, if any one of them be either broken to shivers, or not of a due length, and it occupy a proper place, from whence the vine ought to be renewed the following year, let it be clipped into a *thumb*, which some call a *keeper*, others a *short-cut* or *stump*, and some the *presidiary branch*, or the *branch of defence*, or *reserve* (1); that is, a sprig of two or three eyes, from which, whenever fructiferous firm-wood branches are come forth, whatever part of the old arm is above them, is lopped off; and so the vine begins to pullulate, and springs up again out of the young branch. And this way of managing well-instituted vineyards must be perpetually observed.

C H A P. XXII.

After what manner old Vineyards are to be restored.

BUT, if we shall come to the possession of vineyards formed after a different manner; and if, by being neglected for many years, they are come up above the frame; it must be considered what length

(1) *Custos, reflex, præfidiarius*, are names given to the young branches of vines when cut, and they are taken either from the figure or appearance they made upon the bough after they were cut, or from the use they were applied to; as for example, a young branch cut pretty near, and standing out a little from the bough, resembling the thumb, was called a *thumb* (*pollex*); another set apart to supply the place of that which was next to it, in case it should die, was called *custos*, or *præfidiarius*; or it was cherished and put forward, in order to become an arm or bough of the vine, when the old one was taken away.

the old hardened boughs are of, which exceed the foresaid measure; for, if they be two feet long, or a little more, the whole vineyard may yet be reduced into due bounds, and put under the frame, provided the stake or prop, which supports it, is adjoining to the stock of the vine; for the stake is removed to a greater distance from the vine, and fixed exactly in the middle space between the two old hardened boughs; then the vine is brought across to the prop, and so brought under the frame. But, if its old hardened boughs have grown to a greater length, and have crept forth as far as the fourth, or even the fifth prop, they may be restored at a greater expence by layers; for a vineyard, renewed and propagated by these, comes forward very quickly; and this is what pleased us most.

Nevertheless, if the outside of the stock is grown old and consumed, it requires greater labour and pains; but, if it be strong and sound, it requires less: for, being ablaqueated in the winter-time, it is satiated with dung, and pruned very near; and it is wounded with the sharp point of an iron tool in the greenest part of the bark, between the third and fourth foot from the ground. Then the earth is thoroughly mixed by frequent diggings, that the vine may be incited and put forward to pour forth young shoots or branches in abundance, and especially from that part where it is wounded. But, for the most part, a bud comes forth out of the scar, which, if it starts out to a greater length, is preserved and set apart for a rod; but, if it is shorter, it is set apart to be cut into a thumb; but, if it be very small, it is left for a *knob* (1). This may be made of any, even the very least capillament; for when a small shoot, with one or two leaves, has crept forth out of the hard part of the vine, provided it comes to maturity the following spring, if it be neither close pruned, nor pared away, it puts forth firm-wood branches with great vehemence; which, after it is grown strong, and has made, as it were, an arm of the vine, you may then, if you please, cut away that part of the old hardened bough, which has extended itself, and wandered beyond its bounds, and so bring the remaining part of it under the frame or yoke.

Many, from a desire to save time, chop off all the stocks of such vines above the fourth foot, fearing no manner of inconveniency from cutting them in this manner; because commonly the nature of most part of stems does so accommodate itself to us, that they repullulate, and

(1) *Furunculus*, a knob or knur. It is a small swelling of that part of the vine which has been wounded; or it is a bump or *bossé*, which a vine forms in that part where it is to put forth a bud. The name is taken from a pimple, small swelling, or bump in the body.

sprout out again, hard by the scar, with new shoots and leaves. But indeed this method does not at all please us; for certain it is, that a larger wound, unless it have strong, thriving, hard wood placed above it, by which it may close and grow up again, is parched by the hot steams and vapours, and heat of the sun; then, presently afterwards, it rots with the dews and rains.

Nevertheless, when a vine must certainly be cut down, it is proper first to ablaqueate it, and then to make the amputation a little below the ground, that the earth, being thrown upon it, may defend it from the violence of the sun, and give free passage to the young stems, that break forth from the roots, which may either be married to their own props, that properly belong to them; or, if there are any props in their neighbourhood that are widowers, they may, by means of layers, cloathe them again. But these things must be done in this manner, if the vines are planted deep, and have not their roots lying loose, and decaying upon the surface of the ground, and if they be of a good kind; for otherwise all labour is bestowed upon them in vain, because such as are base and ignoble will retain their former disposition, even when they are repaired and renewed. But such as can scarcely adhere to the surface of the earth, will utterly decay, before they recover strength: therefore the first sort of vineyard must be ingrafted with fruitful grafts; but the other must be intirely extirpated, and replanted, provided the goodness of the soil gives you encouragement; but if, thro' the badness of the soil, the vineyard is decayed, and grown old, we are of opinion, that it must by no means be restored.

Moreover, the faults and bad qualities of a place, which bring vineyards to the very brink of destruction, are *leanness* and *barrenness*, *salt* and *bitter earth*, *ousiness*, *a steep-hanging rugged high situation*, one that is too gloomy and dark, and not exposed to the sun, *sandy valleys*, also *sandy gravel-stones*, and *gravel that is over-much hungry*, and also gravel that is bare and naked, and destitute of earth, and if there be any other like property, which does not nourish a vine: but, if the place be free from all these inconveniencies, and others like to them, an old vineyard may be restored and repaired in the manner we directed in the preceding book. Again, those vineyards, that are of a bad kind, which, altho' they are very strong, are, through barrenness, destitute of fruit, are, as we have said, corrected and mended by making ingraftments, of which we shall discourse in its proper place, when we come to handle that part of our subject.

C H A P. XXIII.

After what manner Vineyards must be pruned.

NOW, because we seem to have said very little of the pruning of vineyards, we shall the more carefully prosecute the most necessary part of the work we have proposed. We are of opinion therefore, if the mildness, temperateness, and clemency of the weather, in that country where they dwell, will allow it, to begin the pruning after the vintage is finished, about the fifteenth of *October*; provided nevertheless, that the rains, which fall about the time of the *Equinox*, are over, and the sprays, that are to be cut off, are come to their due maturity; for a drought makes the pruning later.

But, if the cold and frosty state of the weather gives us notice of, and presages, a rough boisterous winter, we will defer this business till the thirteenth of *February*; and we are at liberty to do this, if we have a small extent of ground in our possession; but where the vast extent of our lands does not allow us to chuse our time, it will be proper to prune the strongest and most thriving part of our vineyard during the colds, and the poorest and leanest in the spring, or in autumn; and even when the days are shortest, we may prune such vines as are opposite to the south pole; but those that are exposed to the north, in the spring, and in autumn: nor is it to be doubted, but the nature of these little trees is such, that the more early they are lopped, so much the more wood, and the later, so much the more fruit they produce.

C H A P. XXIV.

Of such Things as a good Vine-dresser ought to avoid or pursue in a well-constituted Vineyard.

Whensoever therefore a Vine-dresser shall go about this work, let him principally observe three things: first, to contribute all he can towards plenty of fruit. Next, let him chuse the most thriving firm-wood branches from among the rest for the ensuing year. As also, let him order matters so, as to procure as long a duration for the stock as possibly he can; for which soever of these is neglected, it occasions great loss to the owner.

But the vine, when it is divided into four parts, looks towards as many different regions of the heavens; which quarters, inasmuch as they have qualities contrary to one another, require a different method of ordering and disposing of the vine, according to the nature of their several constitutions: therefore those arms of the vine, that are exposed to the north, ought to receive very few wounds, especially if they be pruned when the colds are now coming on, whereby the places, where they have been cut, will be chilled, and much hurt: therefore one firm-wood branch only next to the frame, and one keeper below it, must be set apart for growth, which may afterwards renew the vine for one year. But, on the contrary, towards the south, let more fruit-bearing branches be preserved and set apart for growth, which may cover and shade their mother, labouring with the scorching summer-heats, and not suffer the fruit to parch and wither before it comes to maturity. There is scarcely indeed any great difference in pruning with respect to the east and west, because the vine receives the sun an equal number of hours towards both quarters. The measure therefore, with respect to firm-wood branches, shall be that which the richness and goodness of the ground, and the thriving condition of the stem itself, shall prescribe.

These things must be observed in general; but those which follow, require particular consideration, and must be particularly observed. For, that I may begin at the lower part of the vine, as at certain foundations, as it were, the earth round the leg of the vine must always be removed from it with the hatchet; and if any offspring, which Rustics call *Suckers*, adhere to the roots of it, they must be carefully pulled up, and it must be smoothed with the knife, that it may refuse admittance to the winter-rains: for it is better to pull out the offspring, that repullulates out of the wound, than to leave a knotty and rugged cut. For, by that way, it soon closes and forms a scar; and by this it is made hollow, and rots.

Then having taken a thorough care of the feet, as it were, of the vines, the legs themselves, and trunks, must be carefully viewed all round, and examined, that neither any young branch sprung out of the stock, or any knob like a wart, be left upon them; unless it happens, that a vine cast upon a frame shall require to be repaired and renewed from the lower part. But, if that part of the stock which is cut, be withered with the heat of the sun; or if the vine be hollowed by the rains, or by hurtful animals, which creep into it thro' the pith; it will be proper to take intirely away, with the hatchet, whatever part of it is dead: and then, that it be pared to the very quick with the
pruning-

pruning-knife, that it may form a scar from the green part of the stock. Nor is it a difficult thing, soon after you have smoothed the wounds, to daub them over with earth, which you have first moistened with lees of oil. For this sort of daubing hinders the worms, that gnaw the wood, and the ants, to enter; and also keeps off the sun, and the rains. These things make it close its wounds the sooner, and preserve the fruit green (1). Also the dry bark, which is cloven, and hangs down all along the uppermost parts of the trunk, must be pulled off as far as its body; because the vine, when it is freed, as it were, from all filth and nastiness, thrives the better, and grows strong, and brings less dregs with its wine.

Moreover, the moss also, which, like fetters, compresses the legs of the vines that are bound therewith, and macerates them with its mouldiness and nastiness, occasioned by the moisture which rests in it, must be scraped and pared off with the iron. And these are the things which must be carefully observed with respect to the lower part of the vine. Let us next give such directions also, as must be observed with respect to its head.

The wounds which the vine receives in its hard wood, ought to be made oblique and round; for they recover their health, and grow strong the sooner; and as long as they have not formed a scar, they pour off the water more commodiously: transverse wounds both receive, and contain more moisture. Let the Vine-dresser especially avoid this fault. Let him cut off all sprays that are broad (2), old, ill-shaped, crooked, and that look downward; and preserve, and set apart for growth, and for bearing fruit, the young, fruitful, and straight ones; let him preserve the tender and green arms, and cut away, with the pruning-hook, such as are dry and old: let him pare, or cut off, the one-year old nails (3) of the *keepers*. When he has raised his vine almost four feet above the earth, let him divide and dispose it regularly

(1) *Coalescit celerius, & fructum viridem conservat.* Some think, that *truncum* ought to be put instead of *fructum*, because the author is only speaking of the trunk of the vine: but all the editions have *fructum*. Perhaps the author was of opinion, that the things mentioned in the text contribute to keep the fruit green, and hinder it from drying up and withering.

(2) *Sarmenta lata.* It is not easy to determine what the author means by *broad sprays*, if not such as rather spread into thickness, than grow out tapering. Some from their own conjecture, and not from any good authority, read *lata* instead of *lata*.

(3) *Ungues custodum annotinos.* It has been already explained what our author means by *custodes* (*keepers*). Here he speaks of *ungues custodum*, the nails of the *keepers*. To understand this expression, it must be remembered, that a sprig or young branch cut off from a branch within a small distance from the place out of which it grows, resembles a thumb; and is so

larly into four arms, and let each of them look towards, and correspond to a part of, the frame, which is decussated, or made in the form of the letter X: then let him leave, upon each arm, one rod for growth, and bearing fruit, if the vine be more slender and lean; or two, if it be fuller grown; and having placed them upon the frame, let him precipitate them (4). But we must remember, never to suffer two or more firm-wood branches to be upon one line, and in one side of the arm: for that annoys the vine very much, when every part of the arm does not equally partake of the labour and pain in its turn, and dispense an equal portion of juice to its offspring; but is sucked and drained of its moisture on one side only: whereby it comes to pass, that that vein, whose intire moisture is taken away from it, dries up and withers, as if it were struck with lightning.

Also there is what is called the *Chop-branch* (5), which uses to creep out exactly in the middle of a forked bough; and therefore Rustics call it by the aforesaid name; because, springing out between two arms, where the vine divides itself, it blocks up its chops, as it were, and bereaves both the old hardened boughs of their nourishment; therefore they cut it off carefully as a rival, and fnd it, before it becomes strong. If, nevertheless, it has prevailed to such a degree, as to have weakened one of the arms, the weakest must be taken away, and the *chop-branch* itself left to grow in its room. For, when the arm is cut off, the mother conveys strength to both parts equally. Therefore let him constitute and fix the head of the vine one foot below the frame, from whence the four arms, as I said, may spread themselves, by which the vine may be renewed yearly, by cutting off the old fruit-bearing branches, and leaving the young ones to grow and bear fruit in their stead, of which the choice must be made very skilfully. For, where there is great plenty of firm-wood branches, the Pruner ought to observe carefully, that he neither leave those that are next to the hard-wood, that is, from the stock, and the head of the vine; nor, on the other hand,

called by our author. He directs it to be cut obliquely, or slanting, which gives the extremity of it the shape of the nail of the thumb; and, as this cut is made above the bud, when this shoots forth, that part which is called the *nail*, withers, and grows dry: therefore the author orders all such as are of a year old, to be pared away. A cut exactly cross the wood is called *plaga transversa*; and one that is slanting, is called *obliqua*.

(4) *Præcipitare vitis flagellum*, to precipitate a rod, signifies, to hang it down over the frame; which position contributes more to the plenty and goodness of the fruit, than laying it wholly upon, and binding it to, the frame.

(5) *Palmes focaneus*. The author explains this very distinctly himself: I have translated it, the *Chops Branch*. It grows in the middle, between the two arms of the vine, as *Palla* likewise says in *Feb.* 12. 2.

those towards the extremities. For those contribute very little to the vintage, as they yield but little fruit, being, indeed, like branches, that grow out of the stock: and these exhaust the vine, because they load her with too much fruit, and extend themselves as far as the second or third stake, which we have already said is intirely wrong. Wherefore it will be most convenient to set apart for fruit those branches that grow out of the middle of the arms, which may neither frustrate our hopes of a vintage, nor emaciate their own stem.

Some men with more greediness force as much fruit as possible, by setting apart for fruit both the middle and the extreme rods; and also by cutting the sprig, that grows next to the hard part of the vine, into a *keeper*; which I don't at all think ought to be done, unless the strength of the soil, and the stock, will allow of it. For they array themselves so with grapes; that they can never ripen, unless the ground be exceeding good, and the stock itself in a thriving condition. The subsidiary branch, or *Branch of Reserve*, which is the same with the *keeper*, ought not to be cut into a *thumb*, when the branches, from which the next fruits are expected, are situated in a proper and fit place. For, when you have bound them, and bended them so as to make them look downward towards the earth, you will make them put forth firm-wood branches below the bindings. But if the vine has started out from the head, to a greater length than the custom of Husbandmen allows, and has crept with its arms over to the penthouses formed by the vines upon the other frames, we will leave a strong *keeper*, and the greatest we can find, hard by the stock, of two or three joints, from which, as from a *thumb*, a firm-wood branch springing up, may be formed into an arm the next year, that the vine, being thus cut and renewed, may be contained within the frame.

But, in setting apart a *keeper*, and putting it forward for growth, these following things must be chiefly observed. First, that the cut or wound don't look upward to the heavens, but rather downward to the earth: for thus it both protects itself from the frosts, and is shaded from the sun. Secondly, that the cut be not made pointed, like to a dart, but like to the small nail of one's finger; for that dies more quickly, and the dead part spreads farther: but this is only put in fear, and that but slowly, and to no great extent (6). There is also a thing, which I observe

(6) *Reformidat tarde & angustius.* The meaning of these two lines is this: The author directs the Pruner to cut the *keeper*, or presidiary branch, like the nail of one's finger, and not pointed like a dart; because, when the cut is sharp, pointed, and long, a great part of it dies, and death spreads itself further; whereas, when the cut is made in the form of the nail

observe is practised, and is exceedingly wrong, which ought especially to be avoided ; for, while they have great regard to the graceful appearance of the vine, they cut the spray hard by the joint, that the *keeper* may be the shorter, and like to the *thumb* of one's hand. But this is very hurtful, because the gem, being placed hard by the wound, labours or suffers by the frosts and colds, and afterwards by the heat also. It is best, therefore, to clip the subsidiary branch, or branch of reserve, almost in the middle of the space between the two joints, and to make the cut shelving downwards behind the gem, lest it let its tears fall upon it, (as we have already said) and so blind the eye when it is budding. But, if we are not provided with a *short-cut branch*, we must look about for a knob, which, though it be not extremely near, and resemble a wart, may put forth a wood-branch the next spring, which we may appropriate either for an arm, or for a fruit-bearing branch. If even this cannot be found, the vine must be wounded with the iron, and exulcerated in that part where we are desirous to make a young branch to come forth.

Now I am, indeed, very much of the opinion, that the fruit-bearing branches themselves ought to be freed from tendrils and nephews. But, in cutting these away, a different method must be observed from that which we observe with respect to those which grow out of the stock : for, whatever it is that jutteth out of the hard part of the vine, must be sned off, and scraped away, by applying the pruning-knife more strongly and closer to it, that it may the more speedily form a scar. On the contrary, whatever sprouts out of the tender part, as the *nephew* does, is cut off more sparingly ; because, for the most part, it has a gem hard by its side, joined with it, of which very great care must be taken, lest it be struck off with the pruning-knife. For, if you sned it very near, with the pruning-knife applied very close to it, it is either wholly taken away, or is sore wounded : for which reason, the *fruit-bearing branch*, which afterwards it will put forth when it germinates, is weak, and will bear less fruit ; as also it is more liable to be hurt by the winds : doubtless, because it creeps out of the scar in a weak condition.

But it is difficult to determine exactly the length of the *firm-wood branch* itself, which we are to set apart for growth. Nevertheless, most people cherish and call it forth to such a length, that when

of a finger, the part does not die, but is only put in fear : and this reaches no great way, and but slowly ; *i. e.* it languishes a little, but recovers itself again. These are beautiful expressions in the original, but, I fear, will have but little grace in an *English* translation.

it is bended, and precipitated all along the frame, it may not touch the earth. We are of opinion, that these following things ought to be considered with greater attention : First, the habit and constitution of the vine ; for, if it be strong, it will sustain larger *firm-wood branches*. Next, we must consider the fatness of the soil also ; for, unless it have this quality, we shall quickly kill even the strongest and most thriving vine whatsoever, when it is emaciated by longer rods than is proper. But long fruit-bearing branches are valued and esteemed, not for their length, but for the number of eyes which they have. For, where the spaces between the joints are greater, we may, if we please, lengthen out the firm-wood branch so far, till it almost touch the ground ; for it will put forth but few young twigs and leaves : but where the joints are thick, and stand near to one another, and the eyes are frequent, tho' the spray be but short, yet it will flourish, and grow strong, with many fruit-bearing twigs, and produce a most numerous offspring. Wherefore it is necessary to set bounds to a vine of this kind especially, that it may not be burdened with fruit-bearing branches of too great a length ; and that the Vine-dresser consider, whether the last year's vintage was great, or small ; for the vines must be spared after great plenty of fruit, and therefore must be pruned very near ; but, after producing but a small quantity, they must be put upon exerting themselves.

Over-and-above what has been said, we also give this direction, that this work be done with hard iron tools, and the thinnest and sharpest that can be found ; for a blunt, dull, and soft pruning-knife is a hindrance to the Pruner, and therefore does less work, and occasions more labour to the Vine-dresser. For, whether the edge be laid, which happens to a soft iron tool ; or whether it penetrates more slowly, as is the case with one that is blunt and thick ; he is obliged to put to more strength : as also rugged and uneven wounds tear the vine ; and the business is transacted not by one blow, but by often repeated strokes, whereby, for the most part, it comes to pass, that that which ought to have been cut, is broken, and so the vine, being thus butchered and made rugged, rots with the rains, and its wounds are not healed up. Wherefore, the Vine-dresser must be earnestly admonished to lengthen the edge of his iron tool, and make it as like a razor as he possibly can. Neither let him be ignorant what part of the bill he must use, in every thing : for I have known very many, who have laid vineyards waste, through their want of knowledge in this particular.

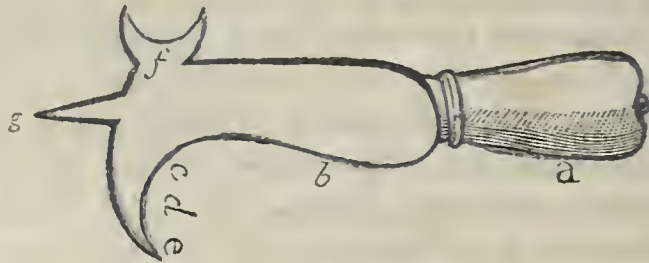
C H A P. XXV.

Of the Figure of the Bill, or Pruning-knife (1).

BUT the shape of the bill, or pruning-hook for vines, is so contrived, that the part next to the haft, which bears a straight edge, is called the *Knife*, because of its likeness to it. That part which is bended is called the *Sinus*, or Hollow ; and that part which runs out from the bending, is called the Paring- or Scraping-edge ; then that part which is crooked is called the Beak, or Bill. The figure of an half-moon, which is placed above this, is called the Ax, or Hatchet ; and its crest, as it were, which jetteth or sticketh out from it, is called its Point, or Spike.

Every one of these parts performs its own peculiar office, provided the Vine-dresser be skilful : for, when he wants to cut any thing over-against him with a gentle touch of his hand, he uses the knife ; but when he is obliged to draw it back, he makes use of the hollow part. When he is to smooth any thing, he uses the scraping- or paring-edge : or, to hollow it, he uses the beak. When he must cut it with a stroke, he does it with the hatchet ; or, when he wants to clear and remove any dirt out of any strait and narrow place, he uses the point.

But the greatest part of the work in a vineyard must be done, not with hacking and chopping, but by drawing the pruning-knife leisurely and gently towards you. For that wound which is thus made, is smoothed all at once with one impression. For the Pruner first applies the iron, and so cuts what he designed and marked out. But he who falls upon the vine by fetching his strokes, if he misses his aim, (which often happens) he wounds the tree with several strokes. Therefore, that pruning is safer, and more profitable, which, as I said before, is performed by



(1) a, the haft. b, the knife. c, the *sinus*. d, the *scraper*. e, the beak, or bill. f, the hatchet. g, the point, or spike.

gently

gently drawing the pruning-knife towards you, and not by striking with it.

C H A P. XXVI.

Of the Care of propping a Vineyard, and putting it upon Frames.

AFTER these things are finished, follows (as we have already said) the care of propping the vineyard, and putting it upon frames; for establishing of which, the broad lath or stake is better than the round pole, and that must not be of any sort, that comes first to hand; for the chief and best for this purpose is the olive-tree, the oak, or the cork-tree, cloven with wedges, or any other strong wood like to these. The round prop obtains the next place; and that which is made of juniper, laurel, and the cypress-tree, is most approved. Also wild or forest pine-trees are very proper for this purpose; and the use of the elder-tree is also approved. Nevertheless, these or the like props must be mended and adjusted afresh, after the pruning; and such parts of them as are rotten, must be cut away; and others of them, which have any soundness in them, must be turned: others of them, which are either carious, or shorter than they ought to be, must be removed, and such as are fit for the purpose put in their room. Those that are lying upon the ground must be set up, and such of them as stoop must be set upright. If the frame does not stand in need of any new reparation, let fresh bindings be put upon it. But if it shall seem to want repairing, before ever the vine be applied to the prop, let it be fastened together with poles or reeds; and then afterwards (as we directed with respect to the new vineyard) let us bind the vine with the stake that supports it, just by its head, and below its arms; and this must not be done every year in the same place, lest the band cut it, and strangle the stock.

Then we will place the arms into four divisions, in form of a star, and bind the tender fruit-bearing twigs or branches upon the frame, not forcing them contrary to their nature; but each of them must be gently bended, according as it will yield and obey, lest it be broken by bending it, or lest the gems or eyes, that are now swelling, be rubbed off. And where two firm-wood branches are extended over one part of the frame, let a middle stake intervene; and let the branches run directly out from them straight along the shelvings or pents of the frames,

frames, and with their tops look towards the earth, as if they were layers : and, that this may be done skilfully, let the binder remember not to twist the young vine-branch, but only to bend it gently, and tie it ; and that every firm-wood branch which can be presently precipitated, be placed upon the frame, that it may rather hang down leaning upon the pole, than hang down from the binding. For I have often remarked, that Rustics, thro' imprudence, put a fruit-bearing branch under the frame, and bind it to it in such a manner, that it hangs under it only by the willow ; which vine breaks and falls down, when it receives the weight of the shoots, and of the grapes.

C H A P. XXVII.

What Things a good Vine-dresser ought to avoid or pursue in a Vineyard already constituted, and put into good Order.

OUR vineyards being thus put into good order, we will then make haste to cleanse them, and free them from sprays, and broken pieces of reeds ; which nevertheless must be gathered when the ground is dry, lest the earth, being trodden upon when it is miry, should occasion greater labour to the Digger, who must presently be brought in, and set to work, while the vines are yet silent ; for, if you send in the Digger when the branches of the vines begin to sprout, and put forth their buds, you will shake off a great part of your vintage : therefore vineyards must be digged as deep as may be during the interval between the winter and the spring, before they begin to put forth their buds, that they may pullulate the more joyfully and chearfully ; and, when these have arrayed themselves with leaves, and clusters of grapes, bounds must be set to the tender shoots, before they grow to their full length. And the same Vine-dresser, who before made use of the iron tool, shall now shake them off with his hand, and check and keep the shadows within due bounds, and beat off the superfluous twigs and leaves ; for it is of very great importance not to do this unskilfully, seeing shredding off the superfluous shoots and leaves is of greater advantage to vines, than pruning them ; for, tho' this is a great help to them, yet it wounds and mangles them ; *that* cures them more gently, and without a wound, and contributes to make the next year's pruning more expeditious : as also it saves the vine from a vast many scars, which it would otherwise have, because that, out of which any tender or green thing has been pulled,

pulled, does quickly close and heal up. Moreover, the firm-wood branches, which have fruit, thrive better, and grow strong; and the grapes, being more commodiously basked, are thoroughly ripened.

Wherefore it is the business of a prudent and very skilful Vine-dresser to consider, and carefully to look, in what places he ought to set apart firm-wood branches for the year, and not only to pull off the vine such branches as have no eyes or buds, but also those that are fertile, if they shoot forth in number beyond all bounds; forasmuch as it happens, that certain eyes bud out with, and put forth, three fruit-bearing twigs, of which two must be pulled away, that they may the more commodiously educate one single pupil each: for it is the part of a wise Husbandman to consider and discern, whether a vine has not arrayed herself with a greater quantity of fruit, than she is able to bear and go through with the full time. Therefore he ought to pluck off not only the superfluous leaves and twigs, which indeed must always be done, but sometimes to beat off her some part of her offspring, that so he may lighten and ease the vine, overburdened with her own fruitfulness. And this an industrious careful person, employed to pull off the superfluous twigs and leaves, will do for several reasons, altho' there should be no more fruit than what may be in a condition to come to maturity; for, if the vine has been wearied with an abundant product for several preceding years without intermission, it will be equal and just, that it should rest, and refresh and recover itself; and so the good and advantage of the future firm-wood branches must be consulted: for it is a business proper for any person whatsoever, even suppose he were a boy, to break off the tops of the rods, in order to check their luxuriancy; or to take out of the way the shoots, that rise out of the hard part, or out of the stock of the vine, unless it be necessary to preserve one or two of them for restoring and repairing her; as also to pluck off every green thing, that sprouts out of her head between her arms, and to cut off all those barren branches, which spring out of the arms themselves, and seize upon the mother's nourishment, and employ and weary her to no purpose.

C H A P. XXVIII.

How a Vineyard ought to be pampinated; and how many Diggings are necessary for sufficiently cultivating it.

BUT the time for pampinating or pulling off the superfluous twigs and leaves (1) must especially be chosen, before the vine shews her flower; but afterwards you may resume and return to the same work again: therefore, in the intermediate days, during that space of time wherein the berries are formed, they deny us access into vineyards, because it is not expedient to move the fruit while it is in the blossom; but, when it is past its puerile state, and grown up to its juvenile age, as it were, or come to its full growth, it is proper to rebind it, and to strip it of all its leaves, and also to plump it by frequent diggings; for, by frequent pulverations (2), it becomes more plentiful, and grows into better plight.

Nor do I deny, that most masters of Husbandry before me were content with three diggings; of whom *Græcinus* is one, who expresses himself thus: *It may seem sufficient to dig a constituted vineyard thrice.* *Celsus* also and *Atticus* agree, that there are three natural motions in a vine, or rather in every tree or sprig whatsoever; one, whereby it may germinate; another, whereby it may blossom; and a third, whereby it may ripen: therefore they think, that these motions are excited by diggings; for nature does not sufficiently effectuate what she desires, unless you assist her with labour and study. And this is the care that is to be taken in cultivating vineyards, which the vintage puts an end to.

(1) *Pampination* is pulling off the superfluous shoots and leaves of vines, a word not used by our gardeners, so far as I have observed, tho' they have adopted several other *Latin* words not so difficult as this to be expressed by an *English* word; for this cannot be fully expressed without using several words. *Pampinus* is a young shoot, that groweth out of the branch of a vine, and from it is formed *pampinare*. This is a work mightily recommended by all rustic writers, as very beneficial to vines.

(2) *Pulveratio* is digging the ground all round the vine when it is dry, and raising the dust so as to cover the grapes with it. This, our author says in his book of trees, *cap. 12.* is of great benefit to them, because it defends and preserves them from the sun, and from fogs.

C H A P. XXIX.

Of ingrafting Vines, and preserving the Ingraftments.

I Return now to that part of my argument, where I engaged to give directions about ingrafting of vines, and preserving the ingraftments. *Julius Atticus* has told us, that the time of ingrafting is from the first of *November* to the first of *June*, till which time, he affirms, that a cyon may be kept without germinating; and by this we ought to understand, that no time of the year is to be excepted, if we can be masters of a spray or graft, that is silent (1). I might grant indeed, that that might be done in other kinds of trees, which have a firmer and more juicy bark. But, with respect to vines, it is contrary to my honest and faithful way of acting to dissemble, that it is too rash and unadvised to allow Husbandmen to ingraft them during so many months; not that I am ignorant, that sometimes a vine, ingrafted about the middle of winter, takes hold. But we ought to teach learners, not what may accidentally happen in one or two experiments, but what, in a certain regular way, under certain circumstances, may, for the most part, succeed; for, if the experiment is to be made only upon a small number, in which greater care is a cure for their rashness, so far I can give my consent. But when the vastness of the work does also extend and enlarge the care of the most diligent Husbandmen, we ought to remove all manner of scruple.

For there is a contradiction in what *Atticus* directs: for he denies, that it is right to prune a vineyard in the middle of winter, which, tho' it does less hurt to the vine, nevertheless, for very good reasons, is forbidden to be done, because, in great colds, all sorts of shoots whatsoever are chilled and benumbed with the cold; nor, by reason of the cold, give they any motion to the bark, so that it may close and heal up with the wound: and the same *Atticus* does not forbid to ingraft at the very same time, which he then directs to be done, both by chopping off the head of the whole vine, and making a cleft in the very same part where the cut is made. Therefore the truer way of ingrafting is after the winter is past, now when the days are warm, when the vines naturally move both their buds and their bark; and when there is no cold wea-

(1) *Sarmentum silens*. This a phrase commonly used by our author, *Pliny*, and other rustic writers, to denote a branch or spray of a tree, or of any plant, that has not as yet begun to put forth its buds.

ther approaching which may chill and dry up, either the cyon that is ingrafted, or the wound that is made by the cleft. Nevertheless, I would allow such as are in great haste, to ingraft a vine in autumn; because the quality of the air at that time is not unlike to that of the spring.

But what time soever any person shall fix upon to ingraft in, let him know, that there is no other care to be taken in trying and examining the cyons, than what is delivered in the preceding book, where we gave directions about choosing of cuttings. After he has pulled off the vine such cyons as are generous and fruitful, and the ripest that he can find; let him also choose a warm day, calm and free from wind: then let him look out for a cyon that is round, and of a firm body, but not of a spongy pith, with frequent eyes or gems also, and short joints or distances between the knots. For it is of great importance, that the cyon, which is ingrafted, be not long; and also, that there be many eyes in it, from which it may put forth its buds. Therefore, if the distances between the knots be long, it is necessary to cut the cyon to one, or at most to two eyes, lest we make it of a greater length than to be able to endure both storms, and winds, and showers, without being moved. But a vine is ingrafted, either when it is cut, or when it is bored through with an augre, without cutting it. But *that* ingrafting is more frequently practised, and is known almost to all Husbandmen; *this* is rarer, and practised but by few. I shall therefore discourse of that first, which is more in use.

For the most part, the vine is cut above the earth; sometimes, nevertheless, below it also, in the place where it is most solid, and most without knots. When it is ingrafted even with the earth, the graft is covered with earth to the very top: but when it is higher above the earth, the cleft is carefully daubed over with well-wrought clay, and bound up after it has had moss placed upon it, which may defend it both from the heats and the rains. The cyon is so shaped, that, being not unlike to a pen made of a reed, it may exactly answer to, and fill up the cleft, under which it is requisite there should be a knot in the vine, which may, as it were, bind up that cleft, and not suffer the chink to proceed further. Tho' this knot be four digits distant from the place where the cut is made; yet it will be proper to bind it fast, before the vine be cloven, lest when a way is made with the knife for the graft, the wound should gape more than is fitting. But the graft ought not to be smoothed more than three digits, and that it may be equally smooth on that side where it is pared. And this paring is carried so far, that it may touch the pith on one side, and be scraped a little

further than the bark on the other side, and the cyon formed into the shape of a wedge; so that it may be sharp on the lower part; and be thinner on the one side, and thicker on the other; and that, being put into the cleft by the thinner side, it may be closely fastened on that side where it is thickest, and may touch the cleft on both sides. For, unless the bark of the one be applied so close to the bark of the other, that the light cannot shine thro' it in any place, it cannot coalesce.

There are more kinds of bands for grafting than one: some bind it fast with willows; some wrap the cleft round with the rind of a tree; very many bind it with a bulrush, which is the fittest for this purpose. For the willow, when it is dried, penetrates and cuts the bark. For which reason, we approve more of softer bindings, which, after they are bound round the stock, are made straiter and closer, by driving in small wedges made of reeds. But the principal thing to be observed is, that, before all this, the vine be ablaqueated, and the uppermost roots and suckers cut away; and that, after all, the stock be covered over with earth; and, after it has taken hold of the graff, it again requires another care. For it must be very often pampinated, when it puts forth its buds; and the suckers, which creep out of the roots and sides of it, must be frequently pulled off. Also that which shoots out of the place where the ingraftment was made, must be carefully bound up, lest the cyon, being moved with the wind, should be weakened, or the tender shoot be pulled away by the root; which, when it is grown to any considerable length, must be bereaved of all its nephews, unless, by reason of the penury and baldness of the place, it be set apart and reserved for layers. Then autumn applies the pruning-knife to the young branches that are come to maturity, and fit for it. But this method of pruning is carefully observed in vines that are grafted, that where there is no occasion for reserving a layer, one shoot be called up to the frame; and the other be so cut, that the wound be made even with the stock; nevertheless, that it be so made, that nothing be pared off from the hard wood. The superfluous leaves and twigs must be pulled off it no otherwise than you do off a young quickset: and we must so prune it, as to be very sparing in commanding it (2), and putting it upon exerting itself till the fourth year, till such time as the wound of the stock closes up, and forms a scar. And this is the order and method to be observed in Cleft-grafting.

(2) *Imperare viti*, commanding the vine, *i. e.* setting apart many fruit-bearing branches, and putting it forward to produce much wood and fruit; the contrary to which is pruning it very near, and hindering it to exhaust itself.

But, in that which is performed by terebration, you must first mark out the fruitfullest vine in the neighbourhood ; from which you may draw to you a young branch (as a twig still adhering to the mother) and put it thro' the hole. For this is the safer and surer way of ingrafting, because, tho' it does not take hold the next spring, yet, certainly, the following spring, when it is grown bigger, it is forced to unite with the other ; and presently afterwards you cut it off from its mother, and so chop off the upper part of the vine, that is ingrafted, hard by the place where it received the cyon. But if you have not the conveniency of this sort of cyon growing upon its mother, then you make choice of a spray or shoot, plucked as fresh from off the vine as possible ; and, after you have pared it all round so gently, that the bark only may be pulled off it, you fit it to the hole, and so you daub the vine, *whose top* you have cut off, all round with clay, that the intire stock may serve, or *minister nourishment* to, a vine of a different kind ; which, indeed, is not done in a graff, which still adheres to its mother, and is nourished by the mother's breast till it grows into the other vine.

But the iron tool, wherewith our ancestors perforated the vine, is intirely different from that, which I myself have found by experience to be fitter for that purpose. For the old augre, which antient Husbandmen were only acquainted with, did make a kind of saw-duft, or filings, and it galled and burned that part which it perforated. Moreover, the burnt part did seldom revive, and recover itself, and coalesce with the former ; nor did the cyon, that was ingrafted upon it, take hold of it : as also the saw-duft, or filings, was never taken out so intirely, that some of it did not remain in the hole. Moreover, this by its intervention hindered the body of the cyon to be applied close to the body of the vine. We, having contrived what we call the *Gallic Gimlet*, for this kind of ingraftment, find it much more proper and useful ; for it makes a hollow in the stock, so as not to burn the hole ; because it does not make, as it were, a saw-duft, or filings, but shavings ; which being taken out, a smooth wound is left, which may more easily touch, on every side, the cyon which is seated in it, when nothing of that flock, which the antient augre raised, intervenes. Therefore take care to have your ingraftment of vines finished about the vernal Æquinox. In barren and dry places, graff the black vine ; in such as are moist, the white : neither is there any necessity of propagating, if so be that the stock is of so middling a thickness, that the growth of the cyon, which is ingrafted into it, can cover the wound or cut that is made in it ; except, nevertheless, that the vacant place of the head of a vine that is dead, requires another vine. When this is the case, one
of

of the cyons is turned down for a layer, the other is carried up to the frame, and set apart for bearing fruit. Nor will it be usefefs to educate fuch shoots as grow out of the arched part of the vine, which you have put down for a layer; which shoots you may afterwards either make layers of, if it be proper, or leave them for fruit (3).

C H A P. XXX.

Of Directions relating to Props for Vines, and to Osiers, and Willow-groves.

FOrasmuch as we have already discoursed of fuch things as we thought might be usefully delivered as precepts and directions for constituting and cultivating vineyards; a method must *now* be laid down, for making provision of props, frames, and osiers: for these things are provided beforehand, as certain dowries or portions for vineyards. Which things if the Husbandman be destitute of, he has no motive or encouragement to make vineyards, seeing all the things that are necessary, must be sought for at a distance from his own ground: and not only the price that he pays when he purchases them, (as *Atticus* says) is a burden in the accounts of the charges of his vineyard; but also the procuring fuch things is exceeding troublesome. For they must be carried and brought together in winter, which is a very inconvenient time for it. Wherefore provision must be first made of willow-roots, and grounds planted with reeds, common woods, or woods planted on purpose with chesnut-trees. One single *jugerum* of willow-ground (as *Atticus* thinks) may suffice for binding twenty-five *jugera* of vineyard: a single *jugerum* of ground, planted with reeds, is sufficient for furnishing frames for twenty *jugera*: and a *jugerum* planted

(3) It is evident, as *Gesnerus* observes, that this last paragraph is imperfect, and things not so clearly expressed as is usual with this author. But his meaning seems very obvious: his design is to teach when it is necessary to insert two cyons into the cleft of a vine. He says, it is not necessary when the stock is of fuch a moderate thicknes, that, by the growth of one graft, it may fill up, and soon coalesce. On the other hand, he says, it is necessary to ingraft two cyons into one stock, when it is larger than to be able to coalesce with one cyon only; or when, in its neighbourhood, the head of some vine is dead, and it is necessary to supply it with a layer. It is obvious to any who considers it, that this must be the sense of the author, tho' the first part of the sentence, *neque est ulla propagandi necessitas*, be very ambiguous; and perhaps he means, that, when a vine can be rightly ingrafted, there is no necessity of propagating by layers, which requires more labour.

with chefnut-trees is enough for propping as many *jugera*, as a *jugerum* planted with reeds can furnish frames for.

Land that is either well watered, or oufy, nourishes the willow exceedingly well; nevertheless, that which is level and fat, is not at all improper for it. And it ought to be turned up with the spade two feet and a half deep (for so the antients direct); nor is it of any importance what kind of willow you plant, provided it be exceeding tough and flexible. Nevertheless they think, that there are three principal kinds of the *Willow*; the *Greek*, the *Gallic*, and the *Sabinian*, which most people call the *Amerine*. The *Greek* is of a yellow colour; the *Gallic* of a rusty purple colour, and of a very small with or rod; the *Amerine* willow bears a slender, bright, reddish-coloured rod: and of these you either plant the tops, or set them in cuttings. The topmost rods of a moderate thickness, which nevertheless don't exceed the thickness of a hoop for a vessel of two feet circumference, are very proper for setting, if they be put down so deep into the ground, as to be even with it. Cuttings a foot and a half long, being immersed into the ground, are covered over therewith but a very little: a place that is well watered requires wider spaces between them, and those of six feet, in the quincunx order, do very well: a place that is naturally dry requires smaller distances between each, but so, that they who cultivate them, may have easy access to them. It is sufficient, that the distances between the rows be five feet; but that, nevertheless, in the very line where they are planted, there be empty spaces of two feet left between each plant, the vacant spaces and the plants succeeding each other alternately. The proper time for setting them is before they bud, while the rods are silent, which it is proper to pull off the trees when they are dry: for, if you cut them off when the dew is upon them, they thrive and come forward but very indifferently. Therefore, in pruning the willow, we avoid rainy days. The first three years, willow-grounds must be frequently digged, as you do new vineyards: afterwards, when they are grown strong, they are content with three diggings; when they are cultivated in a different manner, they quickly decay. For, tho' great care be taken, yet very many willows perish. In the place of which others ought to be propagated by layers from those that grow near at hand, by bending their tops, and putting them under-ground, whereby whatever is perished may be replaced. Then let the layer, when it is a year old, be cut off from its stock, that it may be nourished by its own roots.

C H A P. XXXI.

Of Broom.

VERY dry places, which don't admit of that kind of sprig-nurseries, require broom. As a band made of this is strong enough, so also it is exceeding tough. You sow the seed of it, which, when it is grown up, you either transplant it when a quickset of two years old; or, being left to *grow where it was sown*, after it is past that age, it may be cut down every year hard-by the ground, after the manner of corn. Other sorts of bindings, such as those made of bramble, require more pains; but nevertheless very necessary, when there is a scarcity of them. The willow, for poles, requires almost the same land as that for withs. Nevertheless it comes up, and thrives better, in land, that is well watered; and it is set in cuttings; and, when it has germinated, it is so formed as to grow up into one pole. You must frequently dig round it, and root out the weeds, and pull off its superfluous leaves and twigs, no less than you do those of a vine, that it may be called forth, and made to shoot forth, rather into length of branches, than into breadth. When thus cultivated, you cut it at farthest the fourth year; for that, which is prepared for bands, may be cut, when it is one year old, about two feet and a half from the ground, that it may sprout out of the trunk, and be divided into arms or boughs, like a low vine. Nevertheless, if the land be drier than ordinary, it must be cut when it is two years old.

C H A P. XXXII.

Of Ground planted with Reeds.

THE reed does not require ground that is pastinated so deep; nevertheless it thrives better when it is set in ground that is turned up with the spade two feet deep: and, forasmuch as it is exceeding lively, it does not refuse any place whatsoever. It thrives better when it is set in loose ground, than in that which is thick; in moist, than in that which is dry; in valleys, than upon hills or rising grounds; and it is planted more commodiously upon the banks of rivers, in borders and thickets, than in the middle of lands. The bulb of the root of it

is planted ; they also set cuttings of the cane ; and it is as common to lay the whole body of it flat in the ground. The bulb, being put underground, with vacant spaces of three feet between each, yields a full-grown pole in less time than a year. The cutting, and the whole reed laid flat, comes later to maturity than the foresaid time ; but whether you set it in cuttings of two feet and a half, or the whole reeds be laid flat, their tops must appear above-ground ; for, if they be wholly put under-ground, they rot intirely. But the culture of grounds, planted with reeds, is not different the first three years from that of other grounds before-mentioned. When it is become old, it must be trenched again : and this is its old age ; when either it becomes dry and withered, and is overgrown with moss and nastiness, by being neglected for many years ; or when it is so crouded with reeds, and they grow so close together, that they grow up slender, and like small canes. But *that* ought to be dugged again anew, and *this* may be cut down here-and-there, and thinned ; which work Husbandmen call *castrating* : which way of cutting nevertheless of a reed-plot is acting at random, and in the dark, because it does not appear by the ground, what ought either to be taken away, or left. Nevertheless it can better bear with being castrated before the reed is cut down ; inasmuch as the small canes point out, as it were, and shew what ought to be rooted out. The time of repastinating, and of setting them, is, before the eyes of the reeds shoot forth. Then the time for cutting them is after the middle of winter is past ; for it always continues to grow till that time, and then it receives a check, when it grows stiff with the winter-cold. A reed-plot must be dugged as often as a vineyard ; but its leanness may be relieved with ashes, or other dung : for which reason most people set it on fire after it is cut down.

C H A P. XXXIII.

Of Chestnut-trees, and Chestnut-groves.

THE chestnut-tree is next to the oaks called *robor* (1), and therefore very proper for establishing and firmly supporting vineyards ; for its nut, being planted in pastinated ground, starts up, and shews itself

(1) *Robur*, an oak. There are several sorts of oaks, differing from one another either in their growth and stature, figure of their leaves, bigness and shape, hardness and colour of their fruit, and several other qualities, which I need not mention. Authors differ very much

itself quickly, and, after the space of five years, being cut down, it recovers itself, and grows up again in the manner of a willow-grove, and, being made into a stake, it lasts almost till another cutting. It requires a black and loose earth; it does not dislike a moist coarse sand, nor the broken, crumbling, sandy gravel-stone; it rejoices, and thrives exceeding well, upon a hill or rising ground, sheltered from the sun, and exposed to the north; it is afraid of a close thick soil, and of that which is full of red-okre. It is planted, from the month of *November* during the whole winter, in dry ground, and which has been trenched two feet and a half deep. The nuts are set in a row, and at the distance of half a foot; but the rows are separated by spaces of five feet from each other. The chestnut is committed to furrows sunk three-fourths of a foot deep; and, when the same are set with nuts, before they are filled up with earth, and levelled, short reeds are set up at the side of the chestnuts, that, by these marks and indications of the place where they are planted, they may be digged and weeded with the greater caution. As soon as the plants are grown up to have a stem (2), they must be

much about their several kinds and names. *Pliny* says, that, in *Germany*, there were vast woods of the *robur*; and seems to think, that it is the same with what the *Greeks* call *δρῦς*, from which, he says, the *druids*, a kind of *magi* among the *Gauls*, took their name, they taking great delight in groves of this kind of tree, and performing no religious ceremony without the leaves thereof. *Pliny*, who, no doubt, was well acquainted with this tree, says, that it bears a small acorn; besides which, it produces several other things, *viz.* both black and white galls, and a fruit resembling mulberries, excepting that they are dry and hard, in which there is inclosed a fruit like the kernel of an olive. Likewise it produces small balls or pills, which have a kind of flax within them very fit for lamps; as also another sort of pill or ball, with hair upon it, which, in the spring, yields a juice, which tastes like honey; as also that it breeds, in the hollows between the boughs and the trunk, certain small pills, which stick close to the wood, without any pedicles; which, toward their navel, are whitish; but, over the other parts, are speckled with black spots, only in the middle they are of a scarlet red colour. These, and several other peculiarities, which he mentions at large, *lib. xvi. cap. 8.* are sufficient to distinguish this from other sorts of oaks. Father *Hardouin* is very positive, that the *robur* is the *δρῦς ἀγρία* of *Theophrastus*; and that it has no name in the *French* language.

Quercus is another sort of oak frequently mentioned by our author. *Pliny* says, that it bears both the best and the largest acorns; that of the female is softer and sweeter than that of the male, which is thicker and closer; that it has the strongest and most durable wood, not being so subject to rot, full of boughs, and has a taller and thicker trunk, than the other sorts of oaks. It seems, that even of the *quercus* itself there are different sorts. *Pliny* mentions the *quercus latifolia*, the broad-leav'd oak; which, father *Hardouin* says, is always green in the country of *Anjou* in *France*; and they call it *le grand chesne*, the great oak. He is very positive, that the *quercus* is the *κρυός* of *Theophrastus*.

(2) *Simulatq; semina stillaverint.* It is not easy to determine what the author means by this sentence. *Gesnerus* says, that there is some reason to think it ought to be *stilaverint*, from *stilus* a stem or stalk, as *gemmare* from *gemma*, and *germinare* from *germen*, &c. *i. e.* as soon as the seeds are sprung up, and have formed a stile or stalk, they may be pulled up, and transplanted. But as all manuscripts and editions have *stillaverint*, perhaps the

be plucked up here-and-there; also they may be transplanted when they are two years old; and there must be two feet of empty ground left between each, without any of the little trees upon it, lest their being too thick and close upon one another emaciate the plants. But the seed is planted thicker, because of various accidents; for sometimes the nut, before ever it springs out of the earth, either withers or dries up intirely with droughts, or rots with too much water. Sometimes it is infested by subterraneous animals, such as mice and moles: for which reasons young chesnut-groves often grow bald, and wax thin; and, when they are to be replaced, and made thicker, it is better, if it can be done conveniently, that a pole, growing hard-by, be bended in the manner of a layer, and propagated, than to take it out of the ground, and replant it; for *that* germinates vehemently, and shoots forth vigorously, as having never been moved out of its own seat; but *this*, which is taken up by the root, and planted again, is in terror for two years afterward: for which reason it is found to be more convenient to raise woods of this sort from nuts, than from quicksets.

The spaces of ground above-mentioned of this kind of planting will receive two thousand eight hundred and eighty heads of chesnut-trees; according to which number, (as *Atticus* says) every single *jugerum* will easily yield twelve thousand props or stakes; for the cuttings, that are cut off nearest the stem, will, when cloven, for the most part, furnish us with four stakes; and then the second cuttings of the same tree will yield two; which kind of cleft prop lasts longer than the round pole. The culture of digging and setting is the same as that of the vineyard. It ought to be pruned when it is two years old, and also when three years; for, in the beginning of the spring, it must twice feel the edge of the knife, that it may be incited and put forward to shoot forth in length.

The oak-tree also may be planted in the same manner; but it is cut down two years later than the chesnut-tree; and, because of this, reason requires, that we should rather gain time, unless mountains, that are gravelly, and full of thickets, and those kinds of earth, which we have already mentioned, shall require the acorn, rather than the chesnut. These things concerning *Italian* vineyards, and the furniture and implements of vineyards in general; have I, at full length, and not unprofitably, so far as I can judge, discoursed of. I shall by-and-by give an account how the provincial Husbandmen cultivate their vineyards, and of the culture and management of trees planted for supporting vines, both in our own country, and in *Gaul*.

author means, that, as soon as the seeds have put forth their stalks or stems, and that the young shoots sprout out from them, so that the rain drops from them, then they are fit for transplanting.

L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

B O O K F I F T H.

C H A P. I.

YOU said, *Silvinus*, that, in the former books, which I had written to you concerning constituting and cultivating vineyards, there were some things wanting, which they, who applied themselves to the study of rural affairs, did mightily wish for; nor do I deny, that I have passed over some things, tho' I have carefully inquired and examined what both the Husbandmen of our own age, and also the antients, have delivered to the records of learning. But, when I undertook to teach publicly the precepts of Husbandry, if I mistake not, I did not confidently say, that I would treat of all, but of the most part of those things, which the vast extent of that science comprehended; for that could never fall within the compass of one man's knowledge and skill: neither is there any discipline or art whatsoever, that has been consummated, or brought to perfection, by the genius and capacity of one single man. Wherefore, as one that traces and searches for wild beasts in a great wood, shews himself to be a good hunter, if he catches very many of them, nor was it ever charged as a fault upon any man, that he did not catch them all; so it is abundantly enough for us to have treated of most things belonging to so diffuse a subject as we have undertaken; forasmuch as the things, which are wanting, and are required, as if they were omitted by us, do not properly belong to our profession, as very lately, when our friend

M. Trebellius required of me a method for measuring of lands, he gave it as his opinion, that it had so near a relation to, and was so connected with one's subject, who demonstrated after what manner we should pasture land, that we ought to give directions also how to measure it; which, I said, was not the business of an Husbandman, but of a surveyor or measurer, especially when architects, who must needs know the way and method of measuring, don't indeed vouchsafe to comprehend the dimension of buildings when they are finished, and which they themselves have disposed, and put into due order; but they think, that one thing belongs to, and is suitable to their profession, and another to theirs, who measure things already built, and who, by making a calculation, compute the amount of the work, that is completely finished: whereby I am of opinion, that our art ought the more to be excused, if it proceeds only so far, as to tell after what method every thing must be performed, but not the *quantum* of what it has done.

But because you also, *Silvinus*, in a familiar manner, desire, that we should give you rules and directions for measuring, I'll comply with your desire, upon this condition, that you make no doubt, that this is rather the business of Geometers, than of Husbandmen; and that you will pardon any error or mistake I may fall into in a thing I don't pretend to have a perfect knowledge of. But to return to my subject: The quantity or extent of every area is known by a foot-measure, which consists of XVI digits (1); a foot multiplied proceeds to *paces*, and *actus* or furlongs, and *clima's*, and *jugera*, and *stadia*, and *centuriæ*; afterwards also into greater spaces. A *pace* (*passus*) contains V feet (2). The smallest *actus* (as *M. Varro* says) has IV feet in breadth, and in length CXX (3). A *clima* is LX feet every way (4). A square *actus* is termi-

(1) The smallest measure of length mentioned by our author is *digitus latus*, or *transversus*, a digit or finger's breadth, which is properly $\frac{1}{4}$ of an inch, and is equal to four grains of barley laid breadthwise, so as to touch one another. This, he says, was the sixteenth part of a foot; and the *Roman* foot, as has been said before, according to the

inch dec.

English standard, is 11,604; and of this foot-measure they compounded several others here mentioned by our author, to all which they gave their peculiar names, which, when mentioned, raised in the mind the idea of a certain number of feet, as *passus*, *actus*, *clima*, *jugerum*, &c. to which, I believe, very few nations at present have, in their own language, names of measures, that exactly correspond. The foot was the smallest land-measure.

(2) The *passus*, a pace, contained five feet; and we are told, that it was so called a *passis pedibus*, from the feet extended in walking.

(3) *Actus*, as *Pliny* tells us, *lib. xviii. c. 3.* is the length of a furrow, as far as a plough goes before it turns; and is properly translated, in *English*, a furlong; and, as a determinate measure, is 120 feet. They had their *actus minimus*, and their *actus quadratus*. Our author, from *Varro*, tells us, that the *actus minimus* had 120 feet in length, and four in breadth (which words are not in the copies of *Varro* which we now have; and he makes

terminated by *cxx* feet on every side (5). This *square-actus* doubled makes a *jugerum*; and from the two *square-actus* joined the one to the other, it took the name of *jugerum* (6). But the Rustics of the province of *Bætica* call this *square-actus*, *Acnua* (7); and these same call a breadth of *xxx* feet, and a length of *clxxx*, *porca* (8). But the *Gauls* call a space of *c* feet in *areas* in a city, and a space of *cl* feet in *areas* in the open fields, *candetum*; which the plowers call *cadetum* (9): they call also half a *jugerum* *Arpennis* (10). Therefore (as I said) two *actus* make a *jugerum* of *ccxl* feet in length, and *cxx* in breadth; both which sums, multiplied into one another, make twenty-eight thousand and eight hundred square feet. Then a *stadium* (11) contains *cxxv* paces, that

no mention of this *actus* in the 10th chap. of his first book, where he treats of the measures of land). The square feet in this *actus minimus* are only 480; so that some late authors must be mistaken, who make it the sixth part of the *jugerum*, (*jugeri sextans*) viz. 4800 square feet.

(4) The *clima* had 60 feet every way, i. e. 3600 square feet, and was the *sestuncia* of the *jugerum*, i. e. $\frac{1}{12}$ parts of it, and $\frac{1}{24}$, or, with respect to the number of scruples in the *jugerum*, is $\frac{3}{88}$ parts of it.

(5) The *actus quadratus*, or square furlong, being 120 feet every way, was equal to the half of the *jugerum*, and contained 14400 square feet.

(6) Two *actus quadrati*, joined together, made a *jugerum*, which, as our author says, from this junction, took the name of *jugerum*. This shews, that it is a mistake to say, that this measure was called *jugerum*, because it contained as much land as a yoke of oxen can plow in one day; for we learn from *Varro*, *lib. i. cap. 2.* that such a quantity as this was called *jugum*, which was a certain measure they used in some parts of *Spain*; in *Hispania ulteriore metiuntur jugis, jugum vocant; quod juncti boves uno die exarare possunt.* A wrong reading in *Pliny's nat. hist. lib. xviii. cap. 3.* gave occasion to this notion; and father *Hardouin* has, from this place of *Varro*, very judiciously corrected it, and changed *jugerum* into *jugum*; and the place itself shews the correction to be just, because *Pliny* afterwards tells us what constitutes the *jugerum*, and speaks of it as a thing he had not mentioned before. The two *actus quadrati*, joined, make 240 feet in length, and 120 in breadth, the square of which is 28800, the number of square feet in a *jugerum*.

(7) *Acnua*. Our author says, that the Husbandmen in *Bætica* called the *actus quadratus* by this name; so that he seems to make it a *Spanish* word; but *Varro* makes it a *Latin* word. It has so many different readings, that it is difficult to say which is the true one. Probably it might have been in *Spain* a corruption of the word *actus*.

(8) *Porca*, a certain measure used in *Bætica*, consisting of 180 feet in length, and 30 in breadth. *Porca* commonly signifies the ridge or raised part of plowed land, as *lira* signifies the furrow, or depressed part. Probably in plowing that delightful country they threw the land into ridges of that dimension.

(9) *Candetum*. *Isidorus* seems to think, that this is only a corruption of the word *centetum*, a measure of 100 feet.

(10) *Arpennis* or *arepennis*. This, our author says, is a *Gallic* word; and probably from it comes the *French* word *arpent*: but the number of feet in it does not answer either to those of the *jugerum*, or of the half of the *jugerum*.

(11) The *stadium* is originally a *Greek* measure. Some say it was the length of the race-ground at *Pisa* in *Elis*, where the *Olympic* games were celebrated, and was 600 feet long. It came to be in use among the *Romans*. But both *Columella* and *Pliny* say, that a *stadium* was 625 *Roman* feet; so that either the *Greek* foot was longer than the *Roman*, or it may

that is, DCXXV feet, which, multiplied by eight, make a thousand paces, which amount to five thousand feet. We now call (as the same *Varro* says) an extent of two hundred *jugera* a *centuria* (12); but formerly it was called a *century*, from one hundred *jugera*; but afterwards, being doubled, it retained the name, as the tribes (*tribus*) were at first so called from the people's being divided into three parts, which, being now multiplied, nevertheless retain their antient name. These things it was proper briefly to premise, as not foreign to our purpose, nor remote from the calculation we are going to deliver.

Now let us come to the purpose. We have not laid down all the parts of a *jugerum*, but only those that fall into the estimation of work done. For it was needless to insist upon the smaller parts, for which no consideration or reward is paid down: therefore (as we said) a *jugerum* (13) contains twenty-eight thousand and eight hundred square feet; which feet make, or answer to, CCLXXXVIII scruples. But, that I may begin with the least part; that is, with half a scruple. The five hundred seventy-and-sixth part of a *jugerum* makes fifty feet; that is,
half

be true what some authors say, that the *stadium* was marked out by *Hercules* himself, and measured by the length of his own foot, which, in proportion to his stature, was longer than that in common use. It was the eighth part of the *Roman* mile which consisted of 5000 feet.

(12) *Centuria*. This is the largest measure of land mentioned by *Columella*, which, at first, was so called, because it consisted of 100 *jugera*. When *Romulus* distributed two *jugera* a man to the people, it seems, for distinction-sake, they threw an hundred of these small parcels of land together, and called them *Centuria*, every man having his own particular portion assigned him, which was called *Heredium*, because it went to his Heir; so that 100 of these small inheritances made 200 *jugera*.

(13) In order to understand the account *Columella* gives of the divisions of the *jugerum*, it is necessary to know, that the *Romans* used to call any integer, which came under consideration, by the name of *as*, which was a great brass coin, which at first weighed 12 ounces; and, to express any part of the integer, they called it by the name of the division of the *as*, which corresponded to it: thus, to express a man's inheriting the whole estate, they said he was *Heres ex asse*; or the half of it, *Heres ex semisse*, and so forth, thro' all the divisions of the *as*, which, consisting of 12 ounces, was divided into 12 parts, each of which had its own particular name; thus $\frac{1}{12}$ was called *uncia*; $\frac{1}{6}$ *sextans*, or two ounces; $\frac{1}{3}$ was called *triens*, or four ounces; $\frac{1}{4}$ *quadrans*, or three ounces; and $\frac{1}{2}$ they called *quincunx*, or five ounces; the half of the *as* they called *semis*, or six ounces; $\frac{2}{3}$ they called *septunx*, or seven ounces; $\frac{3}{4}$ they called *bes*, or eight ounces; $\frac{4}{5}$ they called *dracans*, or nine ounces; $\frac{1}{2}$ they called *dextans*; and $\frac{1}{12}$ they called *deunx*.

And when they had occasion to mention any smaller divisions of an integer, they gave it the name of a division of the *uncia*, of which there were several divisions. I shall only mention such of them as *Columella* makes use of. And first they divided it into two *semuncia's*; so that, with respect to the *as*, or integer, the *semuncia* was $\frac{1}{24}$. The next division was into four *scilici*, or quarters of an ounce, so called, from its cutting the half ounce, which was $\frac{1}{48}$ of the integer. Another division of the *uncia* was into six *sextulae*, each *sextula* being $\frac{1}{6}$ of the *uncia*, and $\frac{1}{2}$ of the *as*, or integer. The last division of the *uncia*,
which

half a scruple of a *jugerum*. The two hundred eighty-and-eighth part of a *jugerum* makes a hundred feet; that is, a scruple of a *jugerum*. The hundred forty-and-fourth part makes cc feet; that is, two scruples. The two-and-seventieth part makes cccc feet; that is, the sixth part of the ounce, wherein there are four scruples. The forty-eighth part of a *jugerum* makes dc feet; that is, the fourth part of an ounce, wherein are six scruples. The twenty-fourth part makes one thousand two hundred feet; that is, half an ounce, in which are xii scruples. The twelfth part makes two thousand four hundred feet; that is, one ounce, in which are xxiii scruples. The sixth part makes four thousand and eight hundred feet; that is, two ounces, in which are xlviii scruples. The fourth part makes seven thousand and two hundred feet; that is, three ounces, in which are lxxii scruples. The third part makes nine thousand and six hundred feet; that is, four ounces, in which are xcvi scruples. The third part, and one twelfth part of a *jugerum*, make twelve thousand feet; that is, five ounces, in which are cxx scruples. The half of a *jugerum* makes fourteen thousand and four hundred feet; that is, six ounces, in which are cxliiii scruples. The half, and one twelfth part, make sixteen thousand and eight hundred feet; that is, seven ounces, in which are clxviii scruples. Two third parts make nineteen thousand and two hundred feet; that is, eight ounces, in which are cxcii scruples. Three fourth parts make twenty-one thousand and six hundred feet; that is, nine ounces, in which are ccxvi scruples. The half, and one third, of a *jugerum* make twenty-four thousand feet; that is, ten ounces, in which are ccxl scruples. Two thirds, and one fourth part, make twenty-six thousand and four hundred

which our author takes notice of, is into 24 *scripula*, or *scriptula*, which the Greeks call *γερμύσα*. According to this division of the *uncia*, a scruple is $\frac{1}{288}$ of the *as*, or integer. *Columella*, in his divisions of the *jugerum*, goes as low as the half of the scruple, which he calls *dimidium scrupulum*, and is $\frac{1}{576}$ of the *as* or *jugerum*.

I know there are other divisions of the *uncia* mentioned by other authors, viz. into 8 drachms, each of which contained 3 scruples; and into 3 *duellæ*, each of which contained 8 *scripula*; and into 7 *denarii*. Our author once only speaks of a thing being of the weight of the *denarius*, but does not tell what proportion it bore to the *uncia*. But *Plin. Nat. Hist. lib. xxxiii. cap. 9.* says, that their just weight was 84 in a pound, which is 7 in the ounce.

From what is said, one may easily understand all that our author says of the *jugerum*, considered as an integer divided into a certain number of parts, to each of which he gives the name of the division of the *as* corresponding to it, as half a scruple, a scruple, *sciliculus*, *sextula*, *uncia*, *semuncia*, &c.; and this gives light to any other Roman author using the same method of expressing the part of any integer.

What has been said is more distinctly exposed to the eye in the following table, which begins with the smallest or lowest divisions of the *jugerum* considered as an integer, exactly

hundred feet ; that is, eleven *ounces*, in which are CCLXIII *scruples*. A *jugerum* makes twenty-eight thousand and eight hundred feet : this is the *as*, or the integer, in which there are CCLXXXVIII *scruples*. But if the compass of a *jugerum* did always so quadrate, and had, in taking the measure of it, CCXL feet in length, and CXX in breadth, the calculation of it would be very expeditious. But, because different forms of lands come under consideration, we shall subjoin examples or figures of every kind, which we may use as formula's for our direction.

in the same manner as *Columella* himself considered it, who begins with half a scruple, and rises gradually till he comes to the integer.

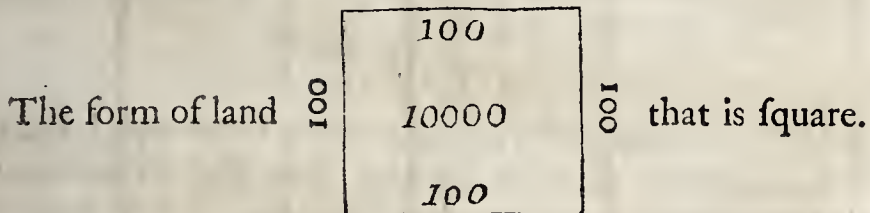
The several Parts and Divisions of the Jugerum mentioned by Columella, with the Number of Roman and English square Feet each Part and Division contained.

The Roman Names of the Divisions of the Jugerum.	Scruples	Parts.	Roman square feet	English square Feet Decimals.
Dimidium Scrupulum, }	$\frac{1}{2}$	$\frac{1}{76}$	50	48,35
Scrupulum, }	1	$\frac{1}{38}$	100	96,70
Duo Scrupula, }	2	$\frac{1}{19}$	200	193,40
Sextula,	4	$\frac{1}{9}$	400	386,80
Sicilicus,	6	$\frac{1}{6}$	600	580,20
Semuncia,	12	$\frac{1}{3}$	1200	1160,40
Uncia,	24	$\frac{1}{2}$	2400	2320,80
Sextans,	48	$\frac{1}{6}$	4800	4641,60
Quadrans,	72	$\frac{1}{4}$	7200	6962,40
Triens,	96	$\frac{1}{3}$	9600	9283,20
Quincunx,	120	$\frac{1}{2}$	12000	11604.
Semis,	144	$\frac{1}{2}$	14400	13924,80
Septunx,	168	$\frac{2}{3}$	16800	16245,60
Bes,	192	$\frac{2}{3}$	19200	18566,40
Dodrans,	216	$\frac{3}{4}$	21600	20887,20
Dextans,	240	$\frac{5}{6}$	24000	23208.
Deunx,	264	$\frac{11}{12}$	26400	25528,80
Jugerum,	288		28800	27849,60

CHAP. II.

Of the several Forms of Lands, and of their Dimensions (I).

ALL land is either square, or long, or shaped like a wedge, or triangular, or round, or exhibits the form of a semicircle, or of an arch of a circle, and sometimes also of several angles. The measuring of a square is very easy; for, seeing it is of the like number of feet on all sides, two sides are multiplied into one another; and what sum arises from the multiplication, that we call the number of square feet contained in it. As, if a place were an hundred feet every way, we multiply one hundred into a hundred, and they make ten thousand: therefore we will say, that that place has ten thousand square feet, which make a third part, and a two-and-seventieth part of a *jugerum*; according to which proportion, we must make the computation and payment of any work done.

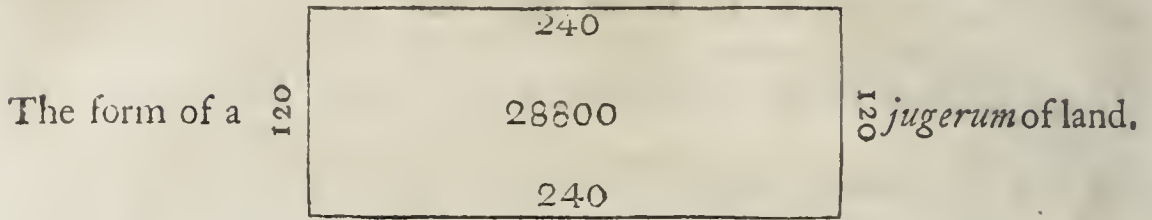


But if it be longer than it is broad, as for example, let the form of the *jugerum* have CCXL feet in length, and CXX in breadth, as I said a little before; you shall multiply the feet in breadth with the feet in length thus: one hundred and twenty times two hundred and forty amount to twenty-eight thousand and eight hundred. We shall say, that a *jugerum* of land contains so many feet square. You shall pro-

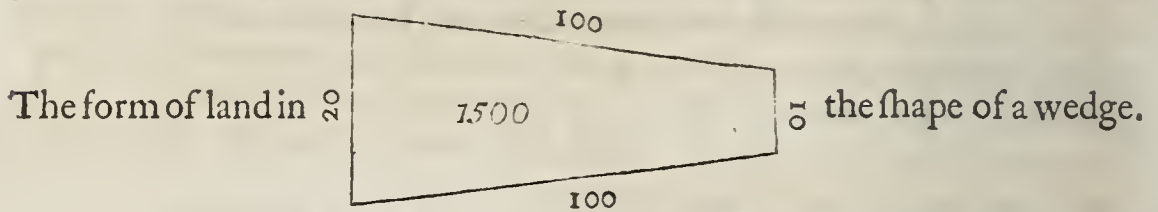
(1) In the old editions of this author, these different figures of land, as here placed, are not to be found; only the *Roman* numeral letters, corresponding to each, are so placed, as in some measure to represent each figure immediately treated of, and they are printed as a part of the text: but whether the author designed any figures at first, is very uncertain; yet it seems probable, because the letters answering to the same were found in the manuscripts, according to which the first editions were exactly printed.

The last figures, which represent the different distances to be observed in planting trees, signify very little, because, for want of room, they cannot be made to answer in number to the several distances mentioned by the author: notwithstanding I have added a few of them, because they are printed in some of the best editions; and they serve to illustrate the thing a little, if any one will observe the proportions of the numbers.

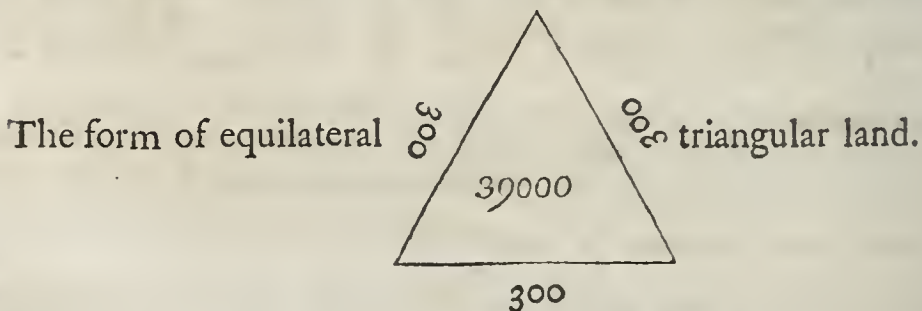
ceed in like manner with all lands whose length is greater than their breadth.



But if the land be in the form of a wedge, suppose it be one hundred feet long, and twenty feet broad on one part; and on the other, ten feet: then we will add together the two breadths, and both sums will make thirty feet. The half of this sum is fifteen, by multiplying which with the length, we will make one thousand five hundred feet. We shall therefore say, that in this wedge, these are the square feet which will make one half ounce and three scruples, that is, $\frac{1}{24}$ part, and $\frac{3}{288}$ parts of a *jugerum*.



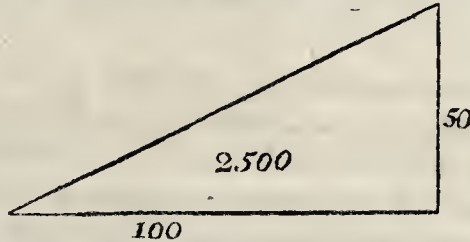
But if you are to measure a triangle with three equal sides, you shall follow this method. Let the land be triangular, of three hundred feet every way: multiply this number into itself, it will make ninety thousand feet: take the third part of this sum, *viz.* thirty thousand. Take also the tenth part, *viz.* nine thousand. Add both sums together, they make thirty-nine thousand. We'll say, that this is the sum of the square feet in this triangle; which measure makes one *jugerum*, and one third of a *jugerum*, and the forty-eighth part of a *jugerum*.



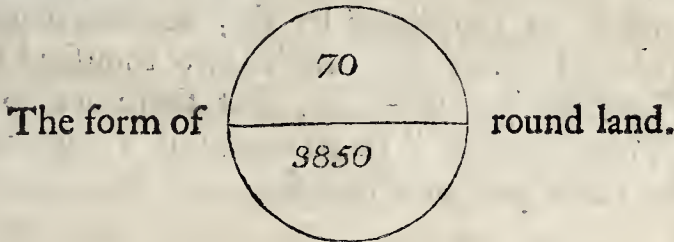
But if the triangular land have unequal sides, as in the figure subjoined, which has a right angle, the computation shall be ordered and made in a different manner. Let the line of the one side, which makes the right angle, be fifty feet; and of the other, one hundred feet. Multiply these

these two fums into one another. Fifty times one hundred make five thousand ; the half of these make two thousand five hundred, which part makes an ounce and a scruple, or $\frac{1}{12}$ part, and $\frac{1}{288}$ part of a *jugerum*.

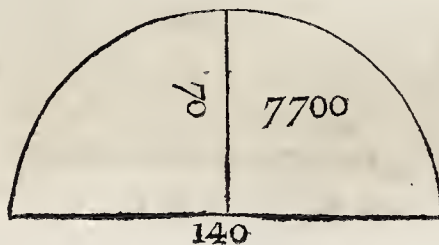
The figure of a triangular field, with one right angle.



If the land shall be round, so as to have the appearance of a circle, take the feet thus : Let there be a round area, whose diameter contains LXX feet. Multiply this into itself ; seventy times seventy make four thousand nine hundred : multiply this sum by eleven, they make fifty-three thousand nine hundred feet. I subtract the fourteenth part of this sum, *viz.* three thousand eight hundred and fifty feet. These, I say, are the square feet in this circle, which make an ounce and an half, and $2 \frac{1}{2}$ scruples of a *jugerum*.

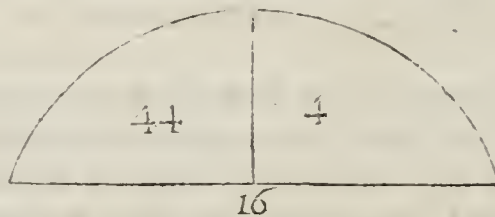


If the land be semicircular, whose basis has cXL feet, and the breadth of the curvature LXX feet, you must multiply the breadth with the basis : seventy times one hundred and forty make nine thousand and eight hundred : these multiplied by eleven make one hundred and seven thousand and eight hundred. The fourteenth part of this sum makes seven thousand and seven hundred. We shall say, that these are the number of feet in this semicircle, which make three ounces and five scruples, *i. e.* $\frac{1}{4}$ part, and $\frac{5}{288}$ parts of a *jugerum*.

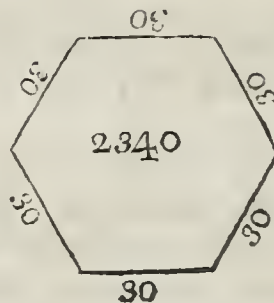


But,

But, if it be less than a semicircle, we will measure the arch after this manner : Let there be an arch; whose basis contains XVI feet, and the breadth VIII feet. I add the breadth to the base : both make XX feet. These I multiply by four, and they make LXXX feet : the half of these is XL. Also the half of sixteen feet, which make the basis, is VIII : these VIII, multiplied into themselves, make LXIV : from these I take a fourteenth part, which makes IIII feet, and a little more. This you shall add to forty : both sums make XLIIII. I say, that these are the square feet in that arch, which make half a scruple, *i. e.* $\frac{1}{576}$ part of a *jugerum*, less a twenty-fifth part of a scruple.



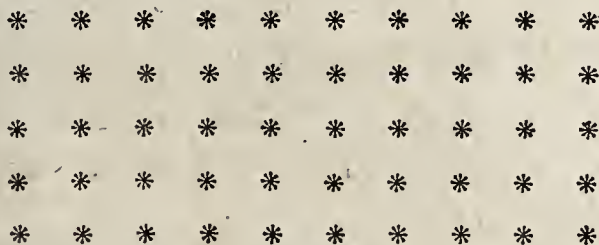
If the land has six angles, it is reduced into square feet thus : Let there be an hexagon, with lines of xxx feet every way. I multiply one side into itself ; thirty times thirty make DCCCC. Of this sum I take a third part, CCC, and a tenth part of the same, xc, which make CCCXC. This must be multiplied by six, because there are six sides, which, being reduced to one sum, make two thousand three hundred and forty. Therefore we shall say, that there are so many square feet therein. Therefore it will be an ounce of a *jugerum*, less half a scruple, and the tenth part of a scruple.



C H A P. III.

How many Plants a Jugerum of Land may receive, when they are set at the Distance of Three Feet, and from that to the Distance of Ten Feet from each other.

HAVING therefore attained to a right perception of these first principles, as it were, of such-like computation, we shall, without any difficulty, enter upon the measuring of lands, of which it is both tedious and difficult to prosecute and treat of all the different sorts. I shall also now add to these I have already proposed two different formulas or methods, which Husbandmen frequently make use of in the disposition and setting of their plants. Let there be a field one thousand two hundred feet long, and one hundred and twenty feet broad: in it the vines must be so disposed, that five feet be left between the rows. I ask, how many plants there shall be occasion for, when spaces of five feet are required between the plants? I take a fifth part of the length, which makes CCXL, and a fifth part of the breadth, which makes XXIII. To both these sums I always add one, which make the outmost rows, which they call the angular rows: therefore one sum is two hundred and forty-one, and the other twenty-five. Multiply these sums thus: Twenty-five times two hundred and forty-one make six thousand and twenty-five. You shall say, that just so many plants will be wanted.



Likewise, if you have a mind to set them at the distance of six feet the one from the other; you shall subtract the sixth part of the length of one thousand two hundred, which make CC; and the sixth part of CXX, the breadth, which makes XX. To each of these sums you shall add one, which I called the angular rows; they make CCI and XXI. You shall multiply these sums into one another, viz. twenty-one times two hundred and one; and so you shall make four thousand two hundred

dred and twenty-one. You shall say, that there will be occasion for the like number of plants.

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In like manner, if you would plant them at the distance of seven feet, you shall take the seventh part of the length and breadth, and add one for the angular rows, in the same manner, and in the same order, you shall complete and make up the full number of plants. Lastly, at how many feet distance soever you shall judge proper to make the rows, you shall take such a part of the length and breadth, and add the foresaid units for the corner ranks.

Seeing these things are so, it follows, that a *jugerum* of land, which has CCXL feet in length, and CXX in breadth, may receive, at the distance of three feet, (for we think, that this is the least distance that we ought to make in planting vines) in length LXXXI, and in breadth, at the distance of five feet, xxv plants; which numbers, being multiplied into one another, make two thousand and twenty-five plants.

Or, if the vineyard be planted at the distance of four feet every way between each plant, the row will have LXI plants in length, and xxxi in breadth; which numbers make one thousand eight hundred and ninety-one vines in a *jugerum*.

Or, if the vineyard be so laid out, as to have the distance of four feet between the vines in the length, and of five feet in the breadth, the row will have LXI plants in length, and xxv in breadth. But, if they be planted at the distance of five feet the one from the other, the row will contain XLIX plants lengthways, and xxv plants in breadth; which two numbers, multiplied into one another, make one thousand two hundred and twenty-five.

But, if you shall think fit to lay out the same place in rows of vines at the distance of six feet, there is no doubt but xli vines must be assigned to the length, and xxi to the breadth; which, being multiplied into one another, make dccclxi. But, if the vineyard must be laid out into distances of seven feet, the row in length will receive thirty-five heads, and in breadth xviii; which numbers, multiplied into one another, make dcxxx. We shall say, that just so many plants must be prepared. But, if the vineyard should be planted at the distance of eight feet, the row in length will receive xxxi plants, and
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in breadth xvi; which numbers, multiplied into one another, make ccccxcvi. But, if at the distance of nine feet, the row in length will receive twenty-seven plants, and in breadth fourteen: these numbers, multiplied into one another, make ccclxxviii. But, if at the distance of ten feet, the row in length will receive xxv plants, and in breadth xiii: these numbers, multiplied into one another, make cccxxv.

And, that our discourse on this subject may not proceed *in infinitum*, we may set our plants in the same proportion, according as every one shall be pleased with wider spaces. Let what we have said of the measures of lands, and of the numbers of plants, suffice. Now I return to the order I proposed.

C H A P. IV.

Of the Culture of provincial Vineyards.

I Have found, that there are several kinds of provincial vines; but of those that I myself have known, such as stand by themselves, with a shorter leg or stock, like little trees, without any prop to support them, are most approved. Next are those, which, leaning upon props, are placed upon single frames. These the Peasants call *under-propped* or *horsed vines* (1). And then such as, being fenced all round with reeds fixed in the ground, and their firm-wood branches tied to the several reeds that support them, are bended all round into an orbicular form. These some call *palisaded vines*. Vines, that lie flat upon the ground, are in least esteem, which, being, as it were, presently projected from the stem when it springs out of the earth, are spread and stretched out at their full length upon the ground.

The way and method of planting all these is almost the same; for the plants are set either in a trench, or in a furrow, because the Husbandmen in foreign nations are unacquainted with pastinating the ground; which indeed is almost superfluous, and of no use, in those places,

(1) *Canteriatas vites*. Vines, supported by single frames or yokes, were so called by the Peasants. *Canterius* or *cantberius* signifies a gelding; and the word was frequently made use of by the Romans to signify any thing that supported another, as the word *horse* in English is applied to several things in the same sense. Our author says, *lib. iv. c. 12.* that, to each vine, he applied two reeds, or fastened old spear-staves hard by them, to which he applied one transverse pole towards the lower part of the row, upon which the vine might spread itself rather in breadth than in length and height; and these kinds of single frames they called *canterii* (*horses*), to distinguish them from the *juga* or double frames.

where the foil is loofe and open, and crumbles into duft of itfelf: *for this we imitate in plowing*, as *Virgil* (2) fays, which we do alfo in pafinating the ground. Therefore the people of *Campania*, tho' they might take example from us, who live very near them, don't follow this method of working the ground, becaufe the eafinefs of that foil requires lefs labour; but where-ever a clofer and thicker land in the provinces obliges the Husbandman to a greater expence, what we effectuate by pafinating, he obtains by making a furrow, that he may fet his plants in ground that is more loofened and opened.

C H A P. V.

A Repetition of thofe Things, which have been mentioned by their feveral Kinds.

BUT, that I may difcourfe particularly of each of thofe kinds of vines I have propofed, I fhall refume the order before-mentioned. The vine, which ftands by its own ftrength, without a prop, where the earth is more loofe and open, muft be planted in a fofs or trench; but, when it is denfer and clofer, in a furrow. But it will be a very great advantage, if, in temperate places, where the fummer is not exceeding hot, both the trenches and the furrows be made a year before the vineyards are planted. Neverthelefs the goodnefs of the foil muft be carefully inquired into; for, if the plants be fet in hungry and poor land, the trench or furrow muft be made about the very time of planting them. If they are made a year before, it is abundantly enough if the trench be digged three feet both in length and in depth; neverthelefs it muft be two feet in breadth. Or, if we defign to leave fpaces of four feet between the rows, we reckon it more convenient to allow the fame meafure to the trenches on every fide; neverthelefs not to fink them more than three feet deep. But the plants muft be applied to the four corners, after fmall earth has been put under them, and fo the trenches muft be filled up.

But, as to the fpaces between the rows, we have only this direction to give, that Husbandmen fhould underftand, that, if they defign to cultivate their vineyards with the plough, they muft leave wider fpaces between the rows; or, if they defign to cultivate them with hoes or

(2) *Virg. georg.* ii. 184.

spades, they must leave them narrower: but they must neither be wider than ten feet, nor narrower than four. Nevertheless many lay out the rows so as to leave all along the straight line two feet, or, as is commonly done, three feet between the plants. But, on the other hand, they make the transverse spaces wider, through which either the Digger or the Plower may freely pass.

But the care of planting ought not to be different from what I directed in the third book. Nevertheless *Mago the Carthaginian* adds one thing to this sort of planting, *viz.* that the plants be so set, that the whole trench may not be immediately filled up with earth; but that the following two years almost the one half of it be gradually filled up; for thus, he thinks, the vine will be forced to strike its roots downward. I shall not deny, but this may be done with advantage in dry places; but where either the country is oufy and wet, or the constitution of the climate is rainy, I am of opinion it ought not at all to be done; for too much moisture, remaining in the trenches, that are half filled up, kills the plants, before they recover strength: wherefore I think it more advantageous, that the trenches be filled up again after the plants are set in them; but that, after they have taken root, they ought to be carefully ablaqueated to a considerable depth presently after the autumnal Equinox; and, after cutting away the small roots, if they have put forth any towards the surface of the ground, to be filled up again after a few days; for thus both those inconveniencies will be avoided, that neither their roots will be drawn up to the upper part, nor the plants, which are not very strong, be vexed with immoderate rains. But, where they are already grown strong, there is no doubt but they receive great benefit from rain-water: therefore, in places where the clemency of the winter allows it, it will be proper to leave the vines uncovered, and to keep them ablaqueated the whole winter.

But, concerning the quality of vine-plants, authors are not agreed among themselves. Some of them think it best, that a vineyard be planted at the very first with cuttings; others, with quicksets. Concerning which thing, I have already declared what I think, in the preceding books. Nevertheless I now add this farther, that there are some lands, in which plants, that are transplanted, do not answer equally well as those, which have not been moved; but that that happens very rarely. Therefore we must observe, and diligently endeavour to find out,

‘ What ev’ry soil will bear, and what refuse (1).’

(1) *Virg. georg. i. 53.*

Therefore

Therefore it is proper, when the plant is set in the ground, whether it be a cutting or a quickset, to form it in such a manner, that the vine may stand without a prop. But this cannot be done presently; for, unless you apply a support to the vine while it is tender and infirm, the young branch, creeping forth, will bend towards, and lean upon, the earth. Therefore a reed is tied to the plant when it is first set, which may defend, as it were, its infancy, and educate it, and carry it up to such a stature as the Husbandman allows. Moreover, that ought not to be very high; for you must check it, and keep it under, even so far as one foot and an half. Afterwards, when it gets strength, and is now able to stand without help, it grows up to its perfect state, by the growth either of its head, or of its arms; for of this culture also there are two sorts: some approve more of vines cut close to the head; others of those that have arms.

It is proper, that they, who take pleasure to trim and form the vine into arms, should preserve whatever sprouts forth hard by the scar, where the young vine has had its upper part cut off, and divide it into four arms of the length of one foot, so that each of them may look to a different quarter of the heavens. But these arms are not presently to be put upon shooting forth in length the first year, lest the vine be burdened during its weak and slender condition; but they are drawn out to the foresaid length by a great many prunings. Then there must be left, as it were, certain horns sticking out of the arms, and so the whole vine be diffused into a circular form on every side. But the method of pruning is the same as in vines that grow upon frames; nevertheless it differs in one thing, that, instead of longer firm-wood branches, there are left thumbs of four or five eyes: but for keepers there are made short-cut branches of two eyes.

Then, in that sort of vine, which, we said, was formed into a head, the spray is pulled off close by the body of its mother, one or two eyes only being left, which adhere to the stock itself; and this can be safely done in places that are well watered, or that are very fat, when the strength of the earth is able to afford both fruit and firm-wood. But they, who have their vineyards formed after this manner, cultivate them chiefly with ploughs; and they follow this method of pulling off the arms from the vines, because the heads themselves, having nothing sticking out of them, are neither obnoxious to the plough, nor to the oxen; for, in such vines as have arms, it happens, for the most part, that their small branches are broken either with the legs or horns of the oxen, and often also with the tail of the plough, while the diligent plowman endeavours lightly to touch or graze upon the rows with
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the plough-share, and to cultivate that very part, which lies next to the vines. And this indeed is the culture that is bestowed either upon vines with arms, or upon those that are cut close to the head, before they put forth their buds. Then, after they have put forth their buds, the Digger follows the Ploughman, and, with hoes, breaks up and manures those parts, which he could not reach.

Presently after the vine has put forth its firm-wood branches, follows the person who lops off all the luxuriant parts, and clears it of all the superfluous young branches, and sets apart for growth such as are fruitful, which, after they are hardened and become firm, are bound up in the manner of a crown. This is done for two reasons; one, lest the young branches, being left at liberty to run out in length, should creep and shoot out, so as to become luxuriant, and consume all the nourishment of the vine; the other is, that the vine, being bound up, may give free access again to the Ploughman and the Digger, when they cultivate it. But this shall be the manner of pampinating or pulling off its superfluous leaves and twigs, that, in places not exposed to the sun, and that are moist and cold, the vine be stripped naked in summer, and that the leaves be plucked off its branches, that the fruit may come to maturity, and that it may not rot, by becoming mouldy with too much moisture; but, in places that are dry and warm, and exposed to the sun, that, on the contrary, the clusters of grapes be covered with the shoots and leaves; and, if the vine be but thin of shoots and leaves, that the fruit be secured and defended with branches and leaves brought to them from other places for that purpose, and sometimes with straw. Indeed *M. Columella*, my uncle, a man learned in all the illustrious arts and sciences, and the most diligent Husbandman in the province of *Bætica*, did, about the rising of the Dog-star, make shades for his vines with palm-mats, because, for the most part, during the time of the said star, certain parts of that country are so infested with the east wind, which the inhabitants call *Vulturinus* (2), that, unless the vines be overshadowed with coverings, the fruit will be burnt up, as it were, with a fiery vapour.

And this is the culture both of the vine that is cut close to the head, and of that which has arms; for that, which is placed upon one single frame, or which is reduced into a circular form, by having its firm-wood branches, which are set apart for growth and for fruit, bound to props of reeds set round it, requires almost the same care, as that upon

(2) *Vulturinus*. The south-east wind was so called by the *Romans*, as some say, from a mountain of that name in *Apulia*, or from a town of the same name, which lay east from *Rome*.

the double frame. Nevertheless I have observed, that some persons have taken long fruit-bearing branches of such vines as are palisaded, or surrounded and supported with reeds, especially of the *Elvenacian* kind, and put them under ground near the surface, as if they were layers; and then raised them up again, and fixed them to the reeds, and set them apart for bearing fruit. These our Husbandmen call *mergos* (divers or offsets) (3). The *Gauls* call them *candofoccos* (4); and they put them under-ground for one single reason, because they think, that the earth gives more nourishment to the fruit-bearing rods: therefore, after the vintage, they cut them off, and remove them from the stem as useless sprays. But we direct, that these very rods, when they are cut off from the mother-vine, be planted for quicksets, if there be vacant places any-where in the rows, by the death of any of the vines, or if any person have a mind to institute a new vineyard; because the parts of the branches, which were put under-ground, have certainly a sufficient number of roots, which, being set in trenches, will presently take hold.

That other culture of the vine, that lies flat upon the ground, remains yet to be spoken to, which ought not to be put in practice, but where the constitution of the climate is exceeding stormy and boisterous; for it both occasions hard and difficult labour to the Husbandman, nor does it ever yield wine of a generous taste. But where the condition of the country admits only of this culture, the cutting is set in trenches two feet deep, which, after it shoots, and has put forth its buds, is reduced to one firm-wood branch; and this is kept under and restrained to two eyes the first year. Then, the following year, when it has put forth young fruit-bearing branches in abundance, one of them is set apart for bearing fruit, and the rest are struck off; but that which is set

(3) *Mergus* is a name given to some sea-birds, which dive into the water, and rise up again at some distance from the place where they plunged; for which reason, branches of vines, which are bended downwards from the mother-vine, and set into the ground, and their tops raised up again at some distance, are called *mergi*, or *divers*. There is a difference between this and what they call *propago*, which properly signifies a *layer*, and is bended downwards from the mother in the same manner; for *this* is in order to propagate the vine; but *that* is put under-ground to contribute to the increase of the fruit, and is of no further use, as we learn from the text.

(4) *Candofoccos*. Whether this word is composed of *candidus* and *succus*, is not certain. Perhaps the juice of the grapes of this sort of vine was whiter than that of others. It seems to be a provincial word, not pure *Latin*. The branches of these very low vines were bended, and put under-ground, and then the tops of them were erected, and joined to the reed, in order to produce fruit. The vine-dressers thought, that the curvature drew nourishment from the earth, and so had a double portion of nourishment, both from its own stock, and also from the earth; and then, after it had produced its fruit, they cut it off as an useless spray.

apart for fruit, after it has brought forth its fruit, is pruned to such a length, that, when lying upon the ground, it may not reach beyond the vacant space between the rows. Nor is there any great difference in the pruning of a vine that lies upon the ground, and of that which stands upright, except that the firm-wood branches of the vine, which lies upon the ground, which are reserved and set apart for growth, and bearing of fruit, ought to be shorter; and the short cuts also ought to be left shorter, in the manner of knobs. But, after pruning, which indeed must always be done in autumn in a vineyard of this sort, let the whole vine be turned over into the other vacant middle space between the rows; and so that part, which it took up before, is either delved or plowed; and, after it is completely cultivated, it receives the same vine, that the other part may be cultivated also. Authors are little agreed about pampinating or pulling off the superfluous twigs and leaves of such a vineyard. Some deny that the vine ought to be made bare, that it may hide and protect its fruit the better against the injury of the winds and wild beasts. Others are of opinion, that it ought to be pampinated more sparingly, that both the vine may not be wholly burdened with superfluous leaves, and yet may be able to cover and protect its fruit: which method appears more proper and commodious to me also.

C H A P. VI.

Of making Groves and Plantations of Elms.

BUT we have said enough of vineyards at present. Now we must give directions concerning trees. Whoever shall have a mind to have a thick and profitable plantation of trees for supporting vines (1),
regularly

(1) *Arbustum*. It was formerly, and is still the custom in many parts of *Italy* to plant trees in the fields for supporting vines; and, by this means, the vines are carried up to a great height, and so produce a vast quantity of fruit. This kind of plantation the rustic writers call *arbustum*, which cannot be rendered by any one *English* word I know, so as to raise in the mind the whole idea they intended to express by it. There was the *arbustum Italicum*, which consisted of tall trees; and the *arbustum Gallicum*, of low or dwarf trees; both which our author describes with great elegance, and gives directions how to manage both the tree, and the vine which is married to it; and, in most of his descriptions, makes use of so many figures of speech, varying his expressions so frequently, and embellishing the whole with borrowed words and phrases, that it would appear strange to express always literally what he says in any modern language; so that it is not very easy, without using more words than one would chuse, to express his meaning fully and distinctly. Both in this chapter, and in many other places, he makes use of a variety of words, which properly
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regularly disposed at equal distances the one tree from the other, must take care, that it don't grow thin by the trees decaying and dying; and let him remove the very first that is afflicted either with old age or boisterous weather, and substitute a new plant in its room; and this he may easily obtain, if he have a nursery of elms ready at hand. How, and in what manner, and of what kind of trees, it must be made, I shall not grudge the trouble to give directions each in its order.

It is agreed, that there are two sorts of elms, the *Gallic*, and that which is a native of our own country; that is called the *Atinian* (2), and this our own *Italian elm*. *Tremellius Scrofa* was mistaken, when he thought, that the *Atinian* elm did not bear seed; for, without doubt, it produces it but very thin, and in a very small quantity, and therefore seems barren to most people, the seeds lurking among the leaves, which it puts forth at its first budding: therefore nobody now plants it from the seed, but from the shoots, which sprout out of the root or stock of the tree. But this elm thrives much better, and is much taller, than our *Italian elm*; and yields a sweeter leaf, and more agreeable to oxen; which if you feed cattle constantly with, and afterwards begin to give them leaves of that other kind, it makes the oxen nauseate their food. Therefore, if it can be done, we will plant all our land with this one kind of the *Atinian* elm; but, if this cannot be done, we will take care, in laying out our rows, to plant an equal number of our own

belong to other things, as *pes vitis*, the foot or root of the vine; *crus vitis*, the leg or trunk; *brachia*, the arms or boughs; *caput vitis*, the head of the vine: so he calls that part where it begins first to spread and extend itself. The Vine-dressers commonly form it as they please; for, when the top of a young vine is amputated, it sends forth several shoots, two or more of which the Vine-dresser chuses, and sets apart for growth, in order to produce fruit. The larger branches or boughs are called the *arms* of the vine. Out of these spring other branches, which, because of the several small twigs which shoot out of their sides, resembling so many fingers of a man's hand, are called *palmites*. These I call *fruit-bearing branches*, because on these more immediately the fruit of the vine grows; for out of them spring the twigs, or young shoots, upon which the grapes grow. These *palmites* are cut longer or shorter, as the Vine-dresser pleases, reserving more or fewer eyes upon them, according to the strength of the vine. We must observe, that, at pruning, the wood or spray, upon which the last year's fruit grew, is always cut away; for the twig, which immediately bears the fruit, is still of the same year's growth. The branches (*palmites*) of the vine, as also the shoots that grow out of the different parts of it, have different appellations, according to their figure, or the use they are applied to, or the place of the vine where they grow. Sometimes they are called *custodes*, keepers; sometimes *præsidarii* or *subsidiarii*, branches of reserve, or subsidiary branches; sometimes *pollices*, from the figure they make when they are cut not too close, but at a certain distance from the part out of which they grow, resembling the thumb of one's hand; sometimes they are called *refeces*, which may be translated short-cut shoots, as has been observed in another place.

(2) *Atinia ulmus*, the *Atinian* elm, so called from *Atina*, a town in *Gallia Cispadana*, that part of *Gaul* which lay on the south side of the *Po*, of which *Pliny* speaks, *nat. hist.* lib. iii. c. 19.

Italian,

Italian, and of *Atinian* elms alternately: so we shall always make use of mixt leaves; and the cattle, being allured by this seasoning, as it were, will more eagerly eat up that due quantity of food, which is allotted them.

But the poplar-tree seems to nourish the vine most of any; next to that, the elm; and, after that, the ash-tree also. The poplar-tree (3) is rejected by most people, because it yields a thin leaf, and not proper for cattle. The ash-tree, which is most acceptable to goats and sheep, and not uselefs for oxen, is rightly planted in rough, rugged, and mountainous places, where the elm thrives but indifferently. The elm is preferred by most people, because it both suffers the vine without any inconveniency to it, and yields a most agreeable fodder for oxen, and comes up and thrives very well in various kinds of soils. Therefore let him, who has a mind to plant a great number of trees for supporting vines, prepare nurseries of elms and ashes in that manner I have hereafter described; for poplars are better planted at first in tops, in the ground you design they should grow in: therefore we will pastinate the earth with the hoe or trenching-spade, which is two feet deep, where the soil is fat, and moderately moist; and, after it has been carefully harrowed, and all the clods broken, form it into even beds or divisions in the spring-time. Then we will throw the seed upon the beds, which will now be of a reddish colour, and shall have lain exposed to the sun for several days, yet so as still to retain some moisture and clamminess in it; and we will cover the beds thick all over with the seeds, and so, with a sieve, sift loose crumbling earth two inches deep upon them, and water them moderately, and cover the beds with straw, lest the fowls gnaw the tops of the plants when they are coming forth, and appearing above-ground. Then, after the plants have crept forth, we will gather up the straw, and pluck up the weeds with our hands; and this must be done gently and carefully, lest the small roots of the elms, which are as yet tender and short, be plucked up with them.

As for the beds themselves, we must, by all means, make them so narrow, that they, who are about to weed them, may easily reach to

(3) *Opulus*. Authors cannot agree about this tree, some doubting whether there is any such tree at present as the author here means; and they cannot fix upon a modern name for it. But as *Pliny* several times mentions the *populus* as proper, among other trees, for supporting vines, without mentioning the *opulus*, I think it more reasonable to transfer *populus* from *Pliny* to *Columella*, than to pretend to correct *Pliny* by *Columella*, especially considering, that, at present, the poplar-tree is used about *Bologna*, and many other places on the south of the *Po*, for supporting vines. Accordingly I have taken the liberty always to translate it a poplar-tree, tho' the text has always *opulus*. A single letter might easily be cut off from the beginning of the word, and the other word become the common reading.

the middle of them with their hand; for, if they be broader, such of the plants themselves, as shall be trodden down, will suffer damage. Then, in the summer, before the sun rises, or towards the evening, the nurseries ought rather to be sprinkled than watered; and, when the plants are about three feet high, they ought to be transplanted into another nursery; and, that they may not strike their roots too deep, (which afterwards occasions great labour in taking them out of the ground again, when we have a mind to transplant them into another nursery) we must dig the trenches, not of the largest size, at the distance of one foot and an half the one from the other. Then the roots must be twisted into a knot, if they be short, or, if they be longer, into a circle, in the manner of a crown; and, after they are smeared over with cow's dung, be set into the little trenches, and the ground carefully trodden down all round them. The plants also, that are gathered and taken from the roots and stocks of the tree, may be set in the same manner; which must of necessity be done in the *Atinian* elm, which is not raised from the seed. But this elm is better planted in autumn than in the spring: and its small branches must be wreathed or twisted by little and little with the hand, because the first two years it greatly dreads the stroke of an iron tool. At length, the third year, it must be lopped bare with a sharp pruning-knife. And now, when it is fit for being transplanted, the proper season for planting it is from that time of autumn, when the earth shall have been thoroughly moistened with showers, till the spring of the year, before the root of the elm be in danger of having its bark pulled off in taking it out of the ground. Therefore, in loose earth, the trenches must be made three feet every way; but, in that which is dense, furrows of the same depth must be prepared for receiving the trees. But then, in a dewy and foggy soil, the elms must be so planted, that their branches may be directed towards the east and the west, that the middle of the trees, to which the vine is applied and fastened, and upon which it leans, may receive the more sun.

But, if we have corn also in our view, and provide for it accordingly, let the trees be disposed and set within forty feet of each other, in a fertile and rich soil; and, in that which is poor and lean, within twenty feet. Then afterwards, when they begin to grow up to their full stature, they must be formed with the pruning-knife, and laid out into *stories* or *divisions*; for by this name Husbandmen call the prominent branches and trunks, and they either lop them closer, and restrain them within narrower bounds, with the knife, or let them shoot out to a greater length, that the vines may be spread the wider, and lie more diffuse upon them. *This* is best in a fat soil, and *that* in a slender and poor one. Let not the stories be less than three feet distant from each

other, and let them be so formed, that the upper branch be not in the same line with the lower; for the lower branch will rub against, and bruise the fruit-bearing vine-branch, which is let down from that, when it is budding, and will strike off its fruit.

But, whatever tree you shall plant, you must not prune it the next two years. Then afterwards, if the elm receives but very little growth, the top of it must be lopped off in the spring-time, before it lets fall or casts its bark, hard by the small branch, which shall appear to be the fairest; but this nevertheless must be so done, that you may leave above it a stump upon the trunk three-fourths of a foot long, to which the said branch may be bended, applied, and bound fast, and so, being turned upwards, may afford a top to the tree. Then, after one year, the stump must be cut off, and the place smoothed. But, if the tree have no small branch fit for this purpose, it will be enough, that nine feet from the earth be left of it, and that the upper part be lopped off, that so the young rods which it shall put forth, may be secure from the injury of the cattle. But, if it can be done, the tree must be cut thro' with one stroke; but, if that cannot be done, it must be cut off with a saw, and the wound smoothed with a pruning-knife; and this wound must be covered with clay mixt with straw, that it may not be annoyed by the sun or rains. After one or two years, when the small branches, which are sprung out of it, shall have got strength, and thrive as they ought to do, it will be proper, that those which are superfluous be lopped off, and that those, that are fit for your purpose, be put upon growing in a regular manner in the row.

Whatever elm shall have thriven and come well forward from the time it was set, its uppermost branches ought to be freed from knots with a pruning-knife; but, if the small branches be strong, let them be so lopped off with the iron tool, that you may leave a small stump sticking out from the stock. Then, after the tree is waxen strong, whatever can be touched with the pruning-hook, must be lopped off, and smoothed so far, as that the wound or cut may not be applied to the body of the mother. But it will be proper to shape a young elm in this manner: In a fat place, eight feet from the earth must be left of it without a branch, or, in meagre land, seven feet. Then, above the said space, the tree must be divided into three parts in its whole circumference; and let the small branches, which must be set apart for growth on the three sides, one to each side, be assigned to the first story. Then, three feet above that, other branches must be taken, and set apart for growth; but so, that they may not be placed in the same line with those of the former story: and in the same manner must the tree be regularly adjusted to the very top. And, in lopping the tree, care
must

must be taken, that neither the thumbs, which are left of the rods which are lopped off, be made longer than they ought to be, nor, on the other hand, that they be so smoothed, as that the trunk itself be hurt, or have its bark peeled off; for that elm rejoices but very little, which is stripped bare to the very body: and we must avoid making two wounds into one, seeing the bark will not easily close upon, and grow over, such a scar. But this tree requires perpetual culture, not only carefully to dispose and put into due order the things before-mentioned, but also to dig round the stock, and every other year either to cut off with the knife, or bind fast up, and restrain, every twig or leaf, that shall sprout out of it, lest its shadow, vying with that of the vine, should hurt it. Then, when the tree is arrived at a considerable age, it must be wounded near where a branch grows out of it, so that there may be a hole made in it to the very pith, whereby there may be an outlet to the water, which it has gathered in the upper part.

It is proper also to plant the vine, before the tree prevails and grows altogether too strong for it; but, if you marry a tender young elm, it will endure a young vine; but, if you apply an old vine to it, it will kill its husband: so it is proper, that the trees and vines be equal to each other in age and strength. But, in order to marry or couple the tree and the vine together, there ought to be a trench made for the quickset two feet broad, and as many feet deep, in light earth; but, in heavy ground, two feet and three-fourths of a foot, and six, or at least five feet long: but let this be no less than the space of one foot and an half distant from the tree; for, if you join it to the roots of the elm, the vine will strike root but very indifferently, and, when it has taken hold, it will be oppressed by the growth of the tree. Make this trench in the autumn, if your business will permit, that it may be macerated with the rains and frosts. Then, about the vernal Equinox, two vines must be set in the trenches at the distance of one foot from each other, that they may cloathe the elm the more quickly; and you must take care, that they be not planted either when the north winds blow, or when they are wet with dew, but when they are dry.

I order this particularly to be observed, not only in planting vines, but elms also, and other trees; and that, when they are taken out of the nursery, one part of them be marked with ruddle: which may put us in mind not to place the trees otherwise, than in the manner they stood in the nurseries; for it is of very great importance, that they look to that part of the heavens, to which they have been accustomed from their infancy. But, in places exposed to the sun, where the state of the climate is neither very cold, nor too rainy, both trees
and

and vines are better planted in autumn, after the Equinox ; but these must be so planted, that we may lay under them, to the depth of half a foot, the uppermost earth, which has been well broken and subdued with the plough, and spread and open all their roots, and dung them after they are set, as I am of opinion. If not so, let us cover them with well-wrought earth, and tread it down round the stock of the plant. The vines must be set in the farthest part of the trench, and their firm-wood (4) stretched along the trench, and erected to the tree, and fenced with rails against the injuries of cattle. But, in very hot places, the plants must be applied to the tree upon the north side of it ; in cold places, upon the south side ; in a temperate state of the climate, either upon the east or west side, that they may not endure the sun, or the shade, the whole day.

Then *Celsus* is of opinion, that, the next pruning-time, it is better to forbear to make use of the pruning-knife ; but that the young branches or shoots themselves be twisted and wrapped round the tree, in the manner of a crown, that the part, that is bended, may put forth firm-wood branches, of which, the following year, we may make the strongest the head of the vine. But long experience has taught me, that it is much better to apply the pruning-knife to vines the very first season for pruning, and not to suffer them to grow bushy and wild with superfluous sprays. But I am also of opinion, that that firm-wood branch, which shall be set apart for growth, be curbed with the pruning-knife as far as the second or third eye, that so it may put forth the stronger fruit-bearing branches, which, as soon as they have reached to, and taken hold of the first story of the tree, shall, the next pruning, be regularly distributed among all the branches of it : otherwise they shall be raised up to the uppermost story, always leaving one firm-wood branch, which, being applied to the trunk, may look towards the top of the tree.

And now a certain law is imposed by Husbandmen upon the vine, when it is constituted and set in its place : most of them crowd the lower stories of the tree with firm-wood branches, having only in view a greater plenty of fruit, and a more easy way of cultivating it. But they, who have the goodness of the wine chiefly at heart, advance and raise

(4) *Materia*. The hard firm-woody part of the vine is so called. Sometimes it signifies any shoot reserved and set apart for growth, in order to form either an arm, or any lesser hard branch, of the vine ; and it is opposed to those tender shoots, which are cut away in pruning, and are but of a short duration. The *materia* is commonly the arm, bough, or hardened part of the vine, which puts forth the smaller branches they call *palmites*. The author orders all the old small branches, on which the fruit of the last year did hang, to be cut off, and young ones to be substituted in their place.

the vine to the uppermost parts of the tree. As every firm-wood branch shall offer itself, so they extend it to every branch of the tree that is highest, that the uppermost part of the vine may follow the uppermost part of the tree; that is, that the two extreme fruit-bearing branches be applied to the trunk of the tree, which may look towards the top thereof; and, according as every branch of it has gathered strength, it may take the burden of the vine upon itself. Upon branches of the tree, that are fuller and thicker, let more fruit-bearing branches of the vine be imposed, the one separate from the other, and fewer upon those that are slenderer; and let the young tender vine be tied to the tree with three different bindings; with one in the leg of the vine towards the lower part of the tree, at the distance of four feet from the earth; with a second, which takes hold of the vine by its uppermost part; and a third, which embraces the middle of the vine. The lowermost binding must not be put upon it, when it impairs the strength of the vine; nevertheless sometimes it is reckoned necessary (5), when either the tree has all its branches lopped off, or when the vine, growing too strong, spreads itself beyond its bounds, and is growing luxuriant.

What is further necessary with respect to pruning, is as follows; that the old fruit-bearing branches, upon which the last year's fruit did hang, be all cut off, and taken away, and new ones set apart for bearing fruit in the room of those that are lopped off, after you have pared away every-where round them the tendrils and nephews that have sprung out of them; and, if the vine be in a very thriving condition, let the utmost fruit-bearing branches rather be precipitated (6) over the tops of the branches of the elm; if the vine be slender, those that are next to the stock; if it be middling, then let those that are in the middle be precipitated; because the uppermost branch of the vine brings most fruit; that which is next to the stock, does least exhaust and extenuate the vine.

(5) *Torus imus necessarius*. There is a great variety in the readings of this sentence, which it is needless to repeat. The correction made by *Gesnerus* seems the most probable, *viz. torum imum imponi non oportet, quoniam vires viti adimit, interdum tamen necessarius*; but the meaning of the author is so evident, that there needs no alteration of his words, except warranted by good authority. His meaning is, that the lowermost binding is to be put upon it, when it is in order to lessen the strength of the vine; which is necessary when it grows too luxuriant, or when the tree is so lopped, that it has no branches to support the vine.

(6) *Præcipitare palmitem*. To precipitate a young fruit-bearing branch, signifies to twist or writhe it gently, and turn it downwards, and bind it to the hard part of the vine. This *Cato* advises against, *cap. 32. caveto ne vitem præcipites*; but our author advises to do it, when the vine is grown higher than the tree that supports it, and only in the extreme branches; and says, that, when it is precipitated, tho' it draws less nourishment from the vine, yet it superabounds in fruit. Sometimes these precipitated branches were tied to the tree in the hard part, and then they must almost wholly hang down; sometimes they were tied in the tender part, and then they did hang down but a very little.

But

But it is of great advantage to the vines to unbind them every year; for they are both more conveniently freed from knots, and they are refreshed when they are bound in another place, and they are the less hurt, and grow and recover strength the better. And it is proper, that the fruit-bearing branches themselves be so placed upon the several stories of the tree, that they may hang down tied from the third or fourth eye, and that they be not bound too hard, lest the spray be cut with the willow. But, if the story or division of the tree be at so great a distance, that the firm-wood branch cannot be very conveniently brought up to it, having bound the fruit-bearing branch itself fast to the vine, we will bind it again above the third eye. We direct this to be done for this reason, because that part of the fruit-bearing branch, which is precipitated, is cloathed with fruit; but that which, being tied with a band to the vine, tends upward, affords firm-wood branches the year following.

But of the young fruit-bearing branches themselves there are two sorts; one which comes forth out of the hard part of the vine, which they call a *leaf-bearing shoot*, because the first year, for the most part, it brings a leaf without fruit. The other is that which is procreated of a fruit-bearing branch of one year old, which they call a *fructuary shoot*, because it forthwith produces fruit; of which sort that we may always have plenty in our vineyard, the parts of the fruit-bearing branch must be bound as far as three eyes, that whatever is below the band may put forth firm-wood branches. Then afterwards, when the vine is grown up, and advanced in years and strength, the long rods, or young branches, must be conveyed to every tree that is next to them; and, after two years, it is proper to cut them all off together, and to transmit or carry over others that are younger; for, when they grow old, they weary the vine. Sometimes also, when a vine cannot compass and take up the whole tree, it has been usual to bend a part of it downwards, and immerge it into the earth, and to raise up two or three layers again to the same tree, that, being surrounded with several vines, it may be the more speedily cloathed.

A *leaf-bearing shoot*, growing out of the hard part of a young vine, must not be preserved and left upon it, unless it is sprung out of a necessary place, that it may marry a branch that is a widower. Leaf-bearing shoots, that spring out of old vines, and in a proper place, are useful, and most of them, when they are cut to the third eye, are preserved, and set apart for bearing fruit with very good success; for the ensuing year they put forth firm-wood in abundance. But whatever leaf-bearing shoot, growing out of a good place of the vine, is broken,

either in the pruning or bending, ought not to be taken clean away, provided it have any eyes, because the next year it will produce even a stronger firm-wood branch from one eye. Those are called precipitated fruit-bearing branches, which, being sprung out of rods of one year old, are made fast with a band in the hard part of the vine. These bring very much fruit; but they hurt the mother very much: therefore a fruit-bearing branch must not be precipitated, except from the extreme branches, or if the vine has surmounted the top of the tree. But if, nevertheless, any person has a mind to set apart for growth this kind of shoot for the benefit of its fruit, let him writhe or twist the fruit-bearing branch; then let him bind it fast, and precipitate it; for both behind the place which you have twisted will it put forth thriving firm-wood, and, when it is precipitated, it will attract less strength to itself, altho' it may bear fruit in great abundance: but a branch that is precipitated must not be suffered to continue above one year.

There is another sort of a young fruit-bearing branch, which springs out of the tender part of the vine, and, being made fast with a band in the tender part of the vine, hangs down from it (we call it a firm-wood branch). It produces both very good fruit, and new shoots. And now, if, out of one head, two rods be preserved, and set apart for fruit, nevertheless both of them are termed *young firm-wood*; for I have above taught you what strength a leaf-bearing shoot growing out of the stock of the vine has. The *chops-shoot* (7) is that which springs out of the middle, between two arms of the vine, as it were, in a fork. I have found by experience, that this is the very worst shoot of all, because it does not bear fruit, and weakens both the arms of the vine, between which it is sprung up; therefore it must be taken away.

Most people have falsely believed, that a strong and luxuriant vine would become more fertile, if it were loaded with many young branches, set apart for growth, and bearing of fruit; for the more rods it has, the more leaf-bearing shoots it produces; and, when it has covered itself with many leaves, it casts its blossoms the worse, and contains both the fogs and the dews the longer, and loses all its grapes. Therefore my opinion is to separate and divide a strong vine into boughs, and to irradiate and spread it, by carrying its young branches to other trees, that

(7) *Palmes focaneus* is a young branch, that grows out in the middle between two arms of the vine, as it were, in a fork. This branch the author advises to cut away immediately, because it weakens the vine; but, if it has already weakened one of the arms, he advises to preserve it, and to substitute it in the room of that which is decayed. You may see why it is so called, *lib. iv. cap. 24.*

grow next to it (8), and to precipitate the rest of the fruit-bearing shoots; and, if it becomes too luxuriant, to leave the firm-wood branches loose, and, by that method, make the vine more fertile. But as a thick, close plantation of trees, with vines upon them, is commendable, both for its fruit, and for its beautiful appearance, so when, with old age, it grows thin, it is equally unprofitable, and disagreeable to the eye. To prevent this, it is the business of a diligent Master of a family to remove the very first tree, that is decayed with old age, and to plant a young one in its place, and supply and fill up the vacancies of the vines, not so much with quicksets, (tho' he may have wherewithal to do it) as with layers from the neighbourhood, which is far better; the manner and method of both which is very like to that we have already delivered and taught you. And these directions concerning *Italian* plantations of trees for supporting vines, which we have given, are sufficient.

C H A P. VII.

Of Gallic Plantations of Trees for supporting Vines.

THERE is another sort of plantation of trees used in *Gaul* for supporting vines, which is called *rumpotinum*, that requires a low tree, which does not produce many leaves; for which business the poplar-tree seems the fittest. This tree is very like the cornel-tree; yea, the cornel-tree also, the horn-beam, and the mountain-ash, and sometimes also the willow, is planted by most people for this very purpose; but the willow must not be planted, except in watery places, where other trees with difficulty take root, because it hurts the taste of the wine. The elm-tree also may be so ordered, that it may have its top cut off while it is yet tender and young, that it may not exceed the

(8) *Tradux* is a rod of a vine, carried from the tree which supports it, to another at some distance from it, and is either tied to that tree, or to a branch of the vine, which grows upon the same. This is done when a tree cannot support all the branches of its own vine. These branches, as *Varro* says, *lib. I. cap. 8.* were by some called *rumpi*, perhaps because they were broken, as it were, or bended from the vine and tree on which they grew, and carried to another tree. They may be called *plashed vines*. A plantation of low trees for supporting such vines was called *rumpotinum*, probably because they made use of them for those plashed vines, which they called *rumpi*; yet, from the account our author gives of this *rumpotinum*, there is reason to think, that this sort of plantation was so called from their breaking off the tops of the young trees, in order to prevent their growing too high.

height of fifteen feet ; for I have observed the *rumpotinum*, or a plantation of dwarf-trees for supporting of vines, commonly so ordered, that the stories were contrived, in dry and hilly places, about eight feet, and, in flat and ousy lands, about twelve feet *from the ground*. But, for the most part, that tree is divided into three boughs, upon each of which, from both sides, several arms are set apart for growth. Then almost all the rods are pared off them at the time when the vine is pruned, that they may not form a shade.

If there is no corn sown among those dwarf trees, they leave spaces of twenty feet between them on both sides ; but, if people are fond of having a crop of corn, they leave forty feet on one side, and twenty on the other. As to all other things, they are managed and carried on here in the same manner, as in *Italian* plantations of trees for supporting vines ; *viz.* the vines are set in long trenches ; they are taken care of, and dressed with the same diligence, and divided into boughs ; and new vine-branches are brought over every year from the neighbouring trees, and tied together, and the old ones are cut off. If a young branch of a vine, that is extended and carried from one tree, does not reach to that which is brought from another, let them be tied with a rod put between them. Then, when the fruit shall press them downwards with its weight, let props be put under them to support them. But this kind of plantation for supporting vines, and all other trees whatsoever, the deeper the ground is plowed and digged round them, the greater abundance of fruit they produce ; but, whether it may be expedient for a Master of a family to make them, the culture of them teaches him.

C H A P. VIII.

Of the several Kinds of Olive-trees (1).

NEvertheless the culture of every kind of tree is more simple than that of vines ; and, of all stems, the olive-tree, which is the chief of all trees, requires the least expence by far : for, altho' it does not bring

(1) *Pliny* tells us, that the culture of the olive-tree was not introduced very early into *Italy* ; and that *Fenestella* affirmed, that, in the reign of *Tarquinius Priscus*, in the year of the city 183. there was not an olive-tree either in *Italy*, *Spain*, or *Africa* ; but that, in his time, the way of cultivating it was so well known, that it had passed the *Alps*, and got into

bring fruit constantly every year, but almost every other year, nevertheless there is very great account to be made of it, because it is supported with very slight culture; and, when it does not array itself either with blossoms or fruit, it scarcely requires any expence; but, if any charges are bestowed upon it, it thereupon multiplies its fruit. When neglected for several years, it does not decay, as the vine; and, even in that very time also, it yields something, notwithstanding, to the Master of the family; and, when culture is bestowed upon it, in one year it is recovered. Wherefore also we have thought it proper to give directions carefully concerning the culture of this kind of tree.

I believe there are many kinds of olive-trees, as there are of vines; but only ten of them have come to my knowledge, the *Paufian* (2), the *Algian* (3), the *Licinian* (4), the *Sergian* (5), the *Nevian*, the *Culminian* (6), the *Orchis* (7), the *royal olive-tree* (8), the *circites* (9), and the

into *Gaul*, and the middle of *Spain*; and that they planted it in nurseries; and, the year after they transplanted it, they received fruit of it.

Columella mentions ten different sorts of olive-trees. *Virgil* mentions only three sorts; the *orchitis*, the *radius*, and the *pausia*. *Pliny* mentions some sorts, which our author takes no notice of. None of the rustic writers give us any exact description of the different characters of all these trees, so as to enable one to distinguish them. They do little more than mention them by their names, as being then very well known; and their chief business was to teach how to cultivate them.

The olives, as many other fruit-trees, took their names, sometimes from the country where they first were known to grow, and from which they were brought into *Italy*; or from the person, who first brought them out of *Asia* or *Greece*, and first cultivated and improved them; and these names give little or no knowledge of the tree. Others of them have their names from some distinguishing quality of the fruit, shape, or colour; as may be seen in those different sorts mentioned by our author, of which there are several, whose distinguishing characters we know nothing of.

(2) *Pausia*. *Virgil* seems to insinuate, that the berry of this is bitterer than that of other sorts of olive-trees; and *Pliny* says, that they have most flesh upon them, and, being very tender, fall soonest to the ground; as do also those of the *orchitis* and *radius*. *Isidorus* says, that it is very proper for green and sweet oil. But I suppose the reason he assigns why it is called *pausia* will not give any great satisfaction, *quod paviatur*, i. e. *tundatur*; for they were all bruised, in order to express the oil out of them.

(3) *Algiana*. Whether this is so called because it ripens with the cold weather, and does not suffer by it, or from the name of some person or place, I know not.

(4) *Licinian*. This olive has its name from the person who first brought it into *Italy*, and cultivated it. It is a callous fruit, of a small size, late in ripening, resists moisture, and yields an excellent oil, and the best both for eating and ointments.

(5) *Sergian*. This probably has its name from *Sergius Orata*. Our author, *lib. viii. c. 16.* makes mention of two famous Romans, *Sergius Orata*, and *Licinius Murena*. Perhaps they introduced these two olive-trees last-mentioned.

(6) *Culminea*, by *Pliny* called *colminiana*, by *Cato*, *colminiana*, and by *Varro*, *colminia*. These three above-mentioned are all callous and small, and therefore the moisture makes no impression upon them. They begin to grow black in the month of *February*, when the western winds begin to blow. *Pliny* says, that these callous olives yield the most oil; and that it is a common error to think, that the largest olives yield the most; for they easily admit the moisture, which makes them swell, and fills them with lees.

(7) *Orchis*,

the *myrtle olive* (10); of all which the berry of the *Pausian* is the sweetest, and that of the royal the most beautiful, which is rather fit for food, than for oil. Nevertheless the oil of the *Pausian* is of an excellent taste while it is green; but it spoils when it is long kept. The *Orchis* also, and the *Radius*, are better gathered for food, than for liquor. The *Licinian* gives the best oil, and the *Sergian* the most; and, for the most part, all the larger olives are fitter for eating, and the lesser for oil. None of these kinds endures either an excessive hot, or a cold constitution of the climate: therefore, in very hot places, it rejoices in the north side of a hill; and, in hot, on the south side. But it neither loves low places, nor such as very high; but rather small hills, such as we see those of the *Sabines* in *Italy*, or in the whole province of *Bætica*.

Most people think, that this tree either does not live, or at least is not fertile, beyond sixty miles from the sea; but, in some places, it thrives very well. The *Pausian* bears the heats best, the *Sergian* the cold. The fittest kind of earth for olives is that which has gravel under it, if chalk, mixed with coarse sand, be placed above it. The soil, where there is fat coarse sand, is not less esteemed; but a denser earth also, if it be moist and rich, receives and entertains this tree very commodiously. That, which is wholly chalk, must be rejected, and much more that also, which is full of springs of water, and wherein an osteness always remains. Land, that is lean, with coarse sand, and bare gravel, is unfriendly to it; for, tho' it does not intirely die in this kind of soil, nevertheless it never recovers strength: yet it may be planted in corn-land, where either the arbuté or strawberry-tree, or the evergreen oak-tree, have stood; for the common oak, even when it is cut down, leaves roots that are hurtful to the olive-yard, the poison of which kills the olive. But these things I had to say to you in general

(7) *Orchis*, *Orchita*, *Orchitis*. In some editions of *Virgil*, and in *Isidorus*, it is called *Orchades*. The first termination comes nearest to the *Greek* word from which it has its name, as *Servius*, and some other authors say, ὄρχις, *testiculus*, from the resemblance they bear to the testicles, perhaps both in their shape, and hanging in pairs upon their pedicle. *Pliny* says, *lib. xv. c. 3.* that it yields the most oil.

(8) *Regia*, the royal olive, so called from its excellent qualities, or rather from its size, from which, by some, these olives were called *majorinæ*. They were the largest of all, and had the most flesh; but yielded the least juice.

(9) *Circites* is the same with *Radius*, and by *Isidorus* these are called *radiolæ*, as he says, *eo quod oblongæ sunt in modum radiorum*. It is probable, that they were so called, because they were somewhat like a weaver's shuttle, small at each end, and thick in the middle. *Servius* also says, that they were so called from their long shape, *Vir. georg. ii. 85. ῥαδις, radius textorius*.

(10) *Murtea olea*, the myrtle olive, so called from the resemblance it bears to the myrtle-tree, or some likeness in their berries.

concerning this tree of every kind. Now I shall particularly describe its culture.

C H A P. IX.

Of making Nurseries for Olive-yards.

LET a nursery for an olive-yard be prepared in a free air, in land indifferently strong, but juicy; in a soil neither dense nor loose, yet rather in that which is open. This kind of earth is almost black, which when you have pastinated three feet deep, and surrounded with a deep ditch, that cattle may have no access to it, give it leave to ferment. Then take off from the trees the young, tall, and fair branches, and such as are the most fertile, and which your hand can span, when it takes hold of them (that is, about the thickness of the handle of any thing); and from these cut off the very freshest cuttings, so as you may not hurt either the bark, nor any other part, except where the saw shall have cut through: and this is easily done, if you first make a forked piece of wood to saw them upon, and cover with hay or straw that part, which you are going to cut the branch upon, that the cuttings, which are placed upon it, may lie softly, and be cut without hurting the bark. Then let the cuttings be cut off with the saw a foot and an half long, and let their wounds be smoothed at both ends with a pruning-knife, and let them be marked with red lead, that so they may be set into the ground, after the same manner as the branch stood upon the tree, looking with its lower part to the earth, and with its top to the heavens; for, if it be put under-ground inverted, it will with difficulty strike root, and, when it has recovered itself, and got strength, it will be barren for ever. But you must daub the heads and the lower parts of the cuttings with dung mixt with ashes, and so immerge them wholly, that so the rotten or loose crumbling earth may come over them four fingers deep. But they are put under-ground with two marks or indexes on each side of them. These may be taken from any tree, and placed at a small distance hard by them, and tied together with a string in the uppermost part, that they may not, when standing by themselves, be easily thrown down. It is good to do this, because of the ignorance of the Diggers, that, when you shall direct your nursery to be cultivated, either with spades, hoes, or farcles, the cuttings, which you have set, may not be hurt.

Some think it better to form their nursery with eyes, and to dispose or set them in like manner regularly upon a line marked out with a cord; but both the one and the other ought to be planted after the vernal Equinox, and the nursery ought to be very frequently hoed the first year. The next and following years, now when the small roots of the plants have gathered strength, it ought to be cultivated with spades; but it will be proper to abstain from pruning for two years, and that the third year two small branches be left upon each plant, and the nursery frequently hoed. The fourth year the weakest of the two branches must be cut off. The little trees, being thus cultivated, are fit, the fifth year, to be transplanted. But, in lands that are dry, and not at all ousy, the plants are best set in the olive-yards in autumn; but, in such lands as are rich and moist, in the spring-time, a little before they bud. And trenches of four feet are prepared for them a year before: or, if so much time is not allowed them, let straw be burnt in the trenches, that the fire may make them loose and crumbling, which the sun and the hoar-frost ought to have done.

In ground that is fat, and fit for corn, the least space between the rows ought to be sixty feet on one side, and forty on the other; but in that which is lean, and not fit for corn, twenty-five feet. But it is proper, that the rows be directed and turned towards the west, that they may be refreshed with the summer breezes blowing freely through them. But the little trees themselves may be transplanted in this manner: Before you pull up the little tree, mark with vermilion that part of it, which looks to the south, that it may be set in the same manner it was in the nursery; then that the space of one foot be left to the little tree all round it, and so the plant be digged up with its own turf; and, that the said turf may not fall into pieces in taking it out, you must weave small twigs of rods, and join them to one another, and apply them to the lump of earth that is taken out, and bind it so with the twigs, that the earth, being pressed fast together, may be kept, as it were, shut up close within them. Then, having digged up the lower part, you must move the lump gently, and bind it with the rods, which you have put under it, and so carry the plant from the one place to the other. And, before you set it, you must dig the bottom of the trench with hoes: then put earth into it, which has been well wrought and broken with the plough, (provided nevertheless, that the upper ground be fat) and so strew seeds of barley under it; and, if there be water standing in the trenches, it must be all drawn out before the trees be put down into them. Then you must throw small stones into them, or gravel mixt with fat earth; and, after the plants are set, the
sides

sides of the trench must be pared all round, and some dung put in between them. But if it does not suit to remove the plant with its own earth, then it is best to strip the stock of all its twigs and leaves, and, having smoothed its wounds, and daubed them with dung and ashes, to set it in the trench or furrow.

But a trunk or stock, which is as thick as one's arm, is fitter for transplanting; also that which is of a much larger and stronger growth, may be transplanted, which it is proper should be so set, that if it be in no danger from the cattle, very little may appear above the trench; for it thrives the better, and puts forth its leaves more joyfully. Nevertheless, if the incursion of cattle cannot be otherwise prevented, the stock must be placed higher, that it may be secure from the injury of the cattle. Also the plants must be watered, when droughts come on, and they must not be touched with a knife till two years are expired. And they ought to be so lopped at first, that the single stalk or stem may exceed the depth of the greatest trench (1), that afterwards, in ploughing, the ox may not hurt his haunches, or any other part of his body.

It is also best to fence the plants all round with pales, when they are first planted, and then to divide the olive-yard, now it is constituted and finished, into two parts, which may be cloathed with fruit every other year by turns. For the olive-tree does not produce fruit in great plenty, two years successively. When the land that lies under it is not sown, the tree puts forth small shoots; when it is replenished with seeds, it brings forth fruit: so the olive-yard, being thus divided, brings an equal income every year. But it ought to be plowed twice every year at least, and digged deep all round with hoes. For, after the Solstice, when the earth gapes with the fervent heats, care must be taken, that the sun may not penetrate thro' the chinks to the roots of the trees. After the autumnal Equinox, the trees must be so ablaqueated, that, if the olive-tree be upon a declivity, furrows may be drawn from the higher part, which may convey the muddy water to the stock of the tree. Then all the young shoots, sprung out of the lower part of the tree, must be extirpated yearly, and every third year the olive-trees must be nourished with dung (2); and the olive-yard must

(1) *Simplex stilus altitudinem maximi scrobis excedat.* Gesnerus is of opinion, that it ought to be *bovis* instead of *scrobis*, which is not improbable; and then the meaning of the author is, that the stem ought to be higher than the highest ox, that he may not hurt his haunch in plowing.

(2) *Ac tertio quoque fimo vel.* This sentence seems to be imperfect; something or other, wherewith the olive-tree was nourished, is wanting; probably, it is *amurca*, the

must be dunged in the same manner I proposed in the second book. Nevertheless, care must be taken of the corns.

But if you have only the doing service to the trees themselves, which you have planted, in view, six pounds of goats dung, and a single *modius* of dry dung (3), or one *congius* of lees of oil, ought to be thrown into the roots of each of them in autumn, that the dung being thoroughly mixed with it, it may warm the roots of the olive-tree in winter. Lees of oil must be poured into them when they are strong, and in a thriving condition; for if worms, or other animals, have got into them, during winter, they are killed by this medicament. Also for the most part, both in dry and moist places, trees are infested with moss; and, unless you cut it off with an iron tool, the olive-tree will neither produce fruit nor leaves in abundance. Moreover, the olive-yard must be pruned also, after several years intermission: for it is proper to remember the old proverb, *That he who plows his olive-yard, asks fruit; he that dungs it, begs and intreats it; but he who lops it, forces it.* Nevertheless, it will be sufficient to do this every eighth year, lest the fruit-bearing branches be cut off from time to time.

It often happens also, that, tho' the trees thrive mighty well, yet they produce no fruit. It is proper, that these be bored with a *Gallic* augre, and so a green graft, or slip of a wild olive-tree be put into the hole; thus the tree, being as it were impregnated with fruitful seed, becomes more fertile. But also, without laying open the roots, it must be assisted with lees of oil, wherein there is no salt, and with hogs-stale: or our own old urine, of both which a certain quantity is observed. For one urn of it will be abundantly enough for the greatest tree, if it be mixed with water. Also, thro' the badness of the soil, olive-trees use to deny their fruit; which thing we may thus remedy: We must ablaqueate them very deep all round; then we must put more or less lime round them, according to the bigness of the tree; but the least tree requires a *modius* of it. If this remedy has no effect, we must have recourse to ingrafting as the only refuge. But after what manner the olive-tree must be ingrafted, we shall afterwards declare. Sometimes also, in an olive-tree, one branch thrives somewhat better than the rest; and, unless you cut this off, the whole tree will languish. What has been thus far said concerning olive-yards, is sufficient. It remains

lees of oil; which, in other places, our author, as also *Varro* and *Palladius*, recommend, as of very great benefit to olive-trees.

(3) *Palladius*, who borrows most things from *Columella*, when speaking of this article, instead of *stercoris feci*, as in *Columella*, has *cineris modii singuli*, a *modius* of ashes to each of them.

to give some account of the way of managing pomiferous trees, concerning which we shall give directions in what follows.

C H A P. X.

Of pomiferous Trees.

YOU must inclose and fence all round the place for an orchard, before you set the plants, either with walls, or an hedge, or with a steep ditch, that it may refuse a passage not only to cattle, but also to men: because if their tops be often handled by men, or gnawn and browsed by the cattle, the plants can never arrive at their due growth. But it is necessary to range the trees according to their several kinds; and especially that the weak be not oppressed by the stronger, because it is neither equal to it in strength nor bigness, and it grows up in an unequal space of time. Earth that is fit for vines, is also proper for trees. Dig the trench one year before you resolve to set your plants; so it will be macerated with the sun and the rains; and what you set in it will soon take root. But if you have a mind both to make the trench, and plant the trees, the same year, dig the trenches two months before at least, and afterwards warm them by burning straw in them; and the broader and more open you shall make them, the better and the greater plenty of fruit you shall gather. But let the trench be made like an oven or furnace, the bottom of which is wider than the upper part, that the roots may be at more liberty to extend themselves on every side, and that less cold in winter, and less heat in summer, may penetrate thro' its narrow mouth; and also, that in sloping places the earth, which is gathered into it, may not be washed away by the rains.

Plant the trees thin, and at a considerable distance, that when they grow, they may have space wherein they may extend their branches: for, if you plant them thick, you can neither sow any thing below them, neither will they themselves be fruitful, unless you pull up some of them here-and-there, and thin them. Therefore it is proper to leave forty, or at least thirty feet between the rows. Chuse and gather the plants as thick at least as the handle of a prong, straight, smooth, tall, without blotches or gashes, and with the bark sound and intire. These will take root well and speedily. If you take them off from old branches, chuse them of those also which bring

good fruit, and in great plenty, every year ; and rather those which are exposed to the sun, than those which are inclosed, and surrounded with shades, branches, and other plants. But, before you transplant the little trees, observe what winds they were before exposed to, and afterwards put to your hands, that you may transplant them from a sloping and dry land to that which is moist. Plant that which is three-forked preferably to any other : let it stand three feet above-ground at least. If you have a mind to place two or three little trees together in the same trench, take care that they touch not one another ; because by mutual contact they will either rot together, or perish by the worms. When you set the plants, put down into the bottom of the trench, both on the right and left, bundles of sprays, of the thickness of one's arm, so as they may appear a little above the ground ; by which you may with little labour administer and convey water to their roots in summer.

Plant trees and plants of trees with roots in autumn, that is, about the first and fifteenth of *October* : in the beginning of the spring set them before the trees put forth their buds (1). And, that the moth-worm may not be troublesome to fig-tree-plants, put down into the bottom of the ditch a cutting of the mastich-tree, with its top inverted. Plant not the fig-tree during the colds : it loves places exposed to the sun, that are full of small stones, and gravelly, and sometimes it loves rocky places. This kind of tree soon grows strong, if you make the trenches large, open, and wide. The several kinds of fig-trees, tho' they differ, and are unlike, in their taste, habit, form, and make, are planted after one manner, but with due regard to the difference of land. In cold and watery places, plant the early-ripe fig-trees in autumn, that you may gather the fruit off them before the rains come on. Plant winter fig-trees in warm places : but if you shall have a mind to make a fig-tree late in ripening, tho' it is not so naturally, then shake off its unripe figs, or the fruit which it first produces, it will again produce a second fruit, which it will defer ripening till winter. Sometimes also it is an advantage to cut off with a knife the uppermost tops of the fig-tree, after they have begun to put forth their leaves : so the

(1) *Arbores ac semina cum radicibus autumnno serito ; primo vere, antequam germinent arbores, deponito.* Pontedera thinks that this sentence is imperfect, and that it is not to be understood, that trees should be planted in the spring, but cuttings and branches, as appears by the author's book *de arboribus* ; and therefore *taleas* and *ramos* ought to be put before *vere*. Others are for putting *alteras* before *vere* ; and, as *Gesnerus* says, it is very likely, that the author, in the last period of the sentence, speaks of some other kind of plants without roots.

trees become firmer, and more fertile; and it will always be proper, as soon as the fig-trees shall have begun to put forth leaves, to dilute and dissolve okre in lees of oil, and pour it with human dung about their roots. This makes the fruit more plentiful, and the stuffing and pulp of the fig fuller and better. But we must chiefly plant the *Livian* (2), *African*, *Chalcidian* (3), *Lydian* (4), *Callistruthian* (5), *Topian* (6), *Rhodian*, *Libyan* (7), and winter fig-trees; also all those that bear a floret twice or thrice in a year (8).

(2) *Ficus Liviana*. Fig-trees, as several other fruit-trees mentioned by *Columella*, have for the most part their names from the places from which they were first brought, or from the persons who first brought them into *Italy*, and cultivated them, or were mighty fond of them. Thus the *Livian* fig-tree, they say, had its name from *Livia*, wife of the Emperor *Augustus*: she made but a bad use of her favourite figs, if it be true, as she is charged, that she poisoned her husband with them.

(3) *Chalcidia*, from *Chalcis*, a city in *Eubœa*, now called *Negroponte*, of which *Pliny* says there were two sorts, one black, the other white.

(4) *Lydia*. The *Lydian* fig was of a purple colour, as *Pliny* says. *Columella* in his tenth book says, that it had a painted back, & *picto Lydia tergo*.

(5) *Callistruthia*, called *passaria*, or rather *passeraria*, probably because sparrows fed greedily upon them. *Pliny* says, that they were of an excellent taste, but the coldest of all figs. *Columella*, in his tenth book, mentions this fig, & *callistruthis roseo quæ semine ridet*. When it was laid open, it seemed to smile with its bright, reddish, rose-coloured seeds.

(6) *Sulcæ*, *Topiæ*. These two kinds of fig-trees are mentioned neither by *Pliny*, nor *Varro*, nor *Athenæus*; nor does our author mention them in his tenth book, where he mentions most of the other sorts. *Pontedera* thinks, that *Topiæ* ought to be read *Chia*, which were a sort of fig-trees first brought from the island of *Chios*. The *Chian* fig was in great esteem, as several authors testify. *Martial* says, it was of a pungent taste, and pleased him much. *Columella* mentions it in his tenth book, which makes it probable he would not have omitted it here, where he enumerates the several sorts of fig-trees. Whether *Sulcæ* be a corruption of *Mariscæ*, is very uncertain. Both *Cato* and *Pliny* mention the *Mariscan* fig, as also our author, in his tenth book. It was a large fat fig, not agreeable to the taste, rather fit to be preserved, than to be eaten green. As the *Chian* and *Mariscan* figs were so well known, and so often mentioned, and the *Topiæ* and *Sulcæ* are obscure and uncertain, it is probable, that *Columella* intended the first, and that the last are corrupt readings, of which no account can be given.

(7) *Libyæ*. *Columella* here mentions these as different from the *African*; so that father *Hardouin* seems to be mistaken, when he says, *illas vocat Columella Africanas*. Perhaps *Pliny*, who does not mention them under this name, looked upon them as the same with the *Alexandrian*, which he says were black, and had a white chanel or cleft, *candicante rima*; by which it is probable he meant a hollow or chanel that ran lengthwise round the fig, and is what *Columella* means, when he calls it *scissa Libyssa*; for when, thro' over-ripeness, figs begin to open, the cleft or opening at first will appear whitish in them all; so that the *candicans rima*, probably, was a mark upon the outside appearing like a cut, which distinguished this from other sorts. Father *Hardouin* explains it of its being white when it opens; *cum hiat, albet*.

(8) *Biferæ*, *triferæ*, *flosculi*. *Pliny*, in his *Nat. Hist. lib. xv. cap. 18.* says, that some of the *Chalcidian* fig-trees bear fruit thrice a year; and *lib. xvi. cap. 25.* says, that fig-trees have no flower or blossom, as some others also assert. So that by *flosculus* here, probably, the author means, the first breaking out or appearance of the young fruit.

About the first of *February* plant the almond-tree, which begins to bud the first of any : it requires hard, warm, dry land. For, if you plant the almond in places of different qualities, for the most part it rots. Before you put the nut into the ground, steep it in honey-water, not too sweet : so, when it is grown up, it will yield fruit of a more agreeable taste, and, in the mean time, it will put forth its leaves the better, and the more speedily. Place three nuts in a triangle, that a nut may be at least four fingers breadth distant from a nut, and that two of them look towards the west (9) : but each nut puts forth one root, and creeps forth with a single stalk. When the root reaches to the bottom of the trench, it is *checked* by the hardness of the ground, and bended back again ; and, from the summit or top of the two branches the root forms, it sends out other roots (10).

You may make an almond, and a filberd, become a *Tarentinian* (11) nut-tree in this manner. Into the trench, wherein you design to plant your nuts, put small earth about half a foot deep, and there set a plant of fennel-giant. When the fennel-giant is sprung up, cleave it, and in its pith hide an almond or filberd-nut without a shell, and so put it under-ground. Do this before the first of *March*, or also between the seventh and fifteenth days of the said month. At the same time you must plant the walnut, the pine, and the chesnut-trees.

It is right to plant the pomegranate from the same time to the first of *April*, which, if it produces acid, or not so sweet fruit as you desire, may be corrected in this manner. Water the roots of it with stale urine mixed with human and hogs dung. This will both make the tree fertile, and the first years it makes the fruit of a winy taste, and, after five years, makes it sweet, and without any woody substance. We have dissolved a very little laserwort-juice in wine, and so have

(9) *Et anceps in favonium spectet.* The three nuts were to be placed in a triangle, not equilateral, as *Gesnerus* thinks, and that the top of the triangle is what the author means by *anceps* ; but it is more probable, that *Columella's* meaning is, that the three nuts were to be so placed, as that two of them might incline towards the west.

(10) *Et ex summo duum ramorum ambas radices emittit.* In his book *de arboribus*, it is *extensa in modum ramorum alias radices emittit* ; and not *ambas*, which, as *Pontedera* thinks, is probably the true reading here. *Gesnerus* thinks it ought to be read *& ex se in modum ramorum amplas radices emittit.* Perhaps the two branches the root forms after its bending may be properly enough expressed by *ambas*, i. e. it forms both its roots from the bending it made of the first root ; but it is more probable, that *alias* is the true reading, seeing the bending of a root will naturally put forth other roots, as, in vines, any bending will put forth young shoots.

(11) *Tarentina nux.* A *Tarentinian* nut was so soft, that it could scarcely be handled without breaking, as *Macrobius* says. *Pliny* says, that there were two sorts of them ; one with a brittle shell, and the other harder. They were common about *Tarentum*.

anointed the uppermost tops of the tree. This did correct the acidity of the apples. If, when you plant the tree, you place three stones at the very root of it, they will remedy and prevent the bursting of pomegranates upon the tree. But, if you have a tree already planted, sow squills hard by the root of the tree. This may be prevented by another method also: when the apples are almost ripe, before they burst, twist the small branches upon which they hang. In the same manner they will keep even a whole year without spoiling.

Plant the pear-tree (12) in autumn, so that there may be at least twenty-five days to come before winter. And that it may be fruitful, when it shall come to its full growth, lay its roots open to a considerable depth, and cleave the stock hard by the very root, and drive into the cleft a wedge of torch-pine-tree, and there leave it: then, after you have covered the roots of the tree, by replacing the earth, throw ashes upon the earth. But we must take care to plant our orchards with the most generous pears that can be found. These are, the *Crustumian* (13), the *Royal* (14), the *Signinian* (15), the *Tarentinian* (16), which are called *Syrian*, the *Purple-coloured*, the *Superb* (17), the *Barley-pear* (18), the *Anician* (19), the *Nævian*, the

(12) The same thing may be said of pear-trees and apple-trees, as was said of vines and olives, that the ancient rustic writers give us but very little insight into their different characters. It is probable, that most of them were so well known, that they thought it needless to describe them; and that their business was chiefly to teach how to cultivate them. The greatest part of them had their names from men who either brought them into *Italy*, or took great delight in them, and cultivated and improved them; who, as *Pliny* says, by so small a matter, have rendered their memory immortal, as if they had done something very notable in life. Others of them have their names from the countries and places from whence they were brought; and some of them from some quality or character peculiar to themselves.

(13) *Crustumina pira*, so called from *Crustumium*, a town in *Hetruria*, where they were best, and in greatest plenty. *Pliny* commends them for their most agreeable taste. *Servius* says, that they were partly red, and they were of a small size.

(14) *Regia*, the royal pear. *Pliny* says, that it has a very short pedicle or stalk, and grows close to the branch; it is somewhat round. Father *Hardouin* says, it was what is now called a Bergamot-pear, from *Bergamo* in the State of *Venice*.

(15) *Signina pira*, from *Signia* a town in *Italy*. *Pliny* says, that by some they were called *testacea*; perhaps, because they were fit for being preserved and kept in earthen pots; but he says, they are so called from their colour.

(16) *Tarentina, quæ Syria dicuntur*. Both *Pliny* and *Servius* say, they were of a black colour; and they are commended by *Martial*, and other authors.

(17) *Superba*. *Pliny* says, they are so called, because they come the first of any, and ripen very quickly; and they are of a small size. Father *Hardouin* calls them *poires muscates* or *muscadelles*, muscadelle-pears.

(18) *Ordeacea*, barley-pears. *Pliny* says, they are so called, from the season, or time when they are ripe, in the time of barley-harvest. Father *Hardouin* calls them *St. John's* pears.

(19) *Aniciana*, so called, from some person probably who first introduced them. *Pliny* says, they are gathered after autumn, and that they are agreeable from their somewhat acid taste.

Favonian (20), the *Lateritan* (21), the *Dolabellian* (22), the *Turranean* (23), the *Warden* (24), the *Honey-pears*, and the *Early-ripe*, and the *Venus-pears* (25), and some others, which it would be tedious now to enumerate.

Moreover, those kinds of apples must be chiefly sought after ; the *Scandian* (26), the *Matian* (27), the *Orbicular* (28), the *Sextian* (29), the *Pelusian* (30), the *Amerinian*, the *Syrian*, or *red-coloured* (31), the *Honey-apples*, and *Quinces* (32), of which there are three sorts, the *Struthian*, the *Orange* or *Gold-quinces*, and the *Must quinces* : all which not only yield pleasure, but health also. The service-apple, the apricot (33), and the peach (34) also, are not the least beautiful and lovely.

(20) *Favoniana*, from one *Favonius*. *Pliny* says, that they were red, and larger than the *Superb* before-mentioned. *Father Hardouin* says, it is the great muscadelle-pear.

(21) *Lateritana*, *Lateritiana*, *Laterana*, one and the same pear thus differently written. Probably it is so called, from its brick-colour.

(22) *Dolabelliana*. They have their name from *Dolabella*, a *Roman* citizen. *Pliny* says, that they had a very long stalk.

(23) *Turranean*. This has its name from one *Niger Turranius*, mentioned by *Varro*, *lib. ii.* and commended as a great lover of cattle, &c.

(24) *Volema*. They were so called, because they filled the hand. They were also called *libralia*, from their weight, *pound-pears*.

(25) *Veneræa*, so called from their beauty. *Pliny* says, they were also called *colorata*, from their being as it were painted with several beautiful colours.

(26) *Mala Scandiana*, from one *Scandius*, as *Pliny* says.

(27) *Matiana*, from *Caius Matius*, a *Roman* knight, and a great favourite of the Emperor *Augustus* : he is probably the same whom *Columella* mentions in his twelfth book as author of three books of cookery, &c.

(28) *Orbiculata*, so called, from their round figure, as *Pliny* says ; and adds, that they were originally of *Epirus*, and that the *Greeks* called them *Epirotica*.

(29) *Sextiana*, or rather *Sestiana*, as *lib. xii. 45.* They are not mentioned by *Pliny* by this name. He says, there is a sort which have their name from one *Gestius*, which *Father Hardouin* is inclined to change into *Sestius*.

(30) *Pelusiana*, *Amerina*, from *Pelusium* in *Egypt*, and *Ameria* a town in *Umbria* in *Italy*.

(31) *Syricea*. *Pliny* says, they were so called, from their colour, being a bright red. *Isidorus* says, that *Syricum* is a certain red colour or paint, which the *Syrophœnicians* gathered upon the shore of the *Red Sea*. *Pliny* says, that it is also a made colour, by mixing *sinoper*, or *ruddle*, and *sandyx* together. This last, he says, was also a made colour of *sandarac* and *ruddle* an equal quantity, and toasted in a furnace.

(32) *Cydonia*, *κυδώνια μήλα*, from a town in *Crete*, called *Cydon*. The *Romans* called them *mala cotonea*. Our author mentions three sorts of them. The *struthia*, *Pliny* says, were of a smaller sort : they were covered with much down, and had a stronger smell than the other sorts, and were late in ripening. Why they were called *struthia*, seems not so certain, whether from their size, or from *sparrows* delighting in them. The second sort were called *chrysomela*, golden apples, and were distinguished with incisures, and of a colour inclining to gold. The third sort were called *mustea*, probably from their having the taste of *must*, or new wine : they were early ripe. *Pliny* mentions a sort of apples that were called *mustea a celeritate mitescendi*, because they grew soon mellow, and that they afterwards were called *Honey-apples*.

(33) *Armeniaca*. Our author seems to rank these among apples : they are commonly supposed

lovely. Plant apples, sorbs, and plums, after the middle of autumn, till the thirteenth of *February*. The season for planting mulberry-trees is from the thirteenth of *February* till the vernal *Æquinox*. Set the *Carob-tree* (35), which some call *κεράτιον*, and the peach-tree, during autumn, before winter. If the almond-tree bear but little fruit, after you have made a hole in the tree, drive a stone into it, and leave it there, that the bark may grow over it.

But, of all these kinds, it is proper to set the branches regularly in orchards, about the beginning of *March*, upon beds raised in the several divisions thereof, and made of earth that has been well manured and dunged. Care must be taken, that when their small branches are young and tender, they be, as it were, pampinated, or freed from superfluous twigs and leaves, as you do vines; and that the plants be reduced the first year to one stem: and when autumn approaches, before the colds pinch them, and dry up their tops, it is proper to pull off all the leaves, and so cover them with thick reeds, which have their knots intire at one end, as it were with caps, and so to defend the yet tender rods from the cold and the frosts: then, after twenty-four months, whether you have a mind to transplant them, and range them in rows, or to ingraft them, you may safely enough do either the one or the other.

supposed to be what we call *Apricocks*; but *Pliny* seems to rank them among the plums, and says, they have their name from *Armenia*, their native country, and are commended for their agreeable smell.

(34) *Persica*, *peaches*. *Pliny* says, they were foreign both to *Asia* and *Europe*, being brought out of *Persia*, and have their name from their country; that it was with difficulty they succeeded when transplanted, for which reason it was late before they came into *Italy*; and that it was false, that they were of a poisonous quality in *Persia*, as was commonly believed, as *Columella* says expressly in his tenth book. But this was a vulgar opinion, and our author says nothing of it here.

(35) *Siliqua Græca*, which some call *κεράτιον*, the *carob-tree*: it grows in great plenty in *Greece* and *Syria*, and in many parts of *Italy*. Its fruit is shaped like the husk, or pods, of some sorts of pulse. In *Syria*, it seems, the poorer sort of people, and cattle, feed upon it, as we see in *St. Luke* xv. 16. where the prodigal son is said to have desired to fill his belly, ἀπὸ τῶν κεράτιων, which is rendered *husks* by our translators of the New Testament.

C H A P. XI.

Of ingrafting of Trees.

EVERY kind of shoot or cyon can be grafted upon every kind of tree, if in its bark it is not unlike to that upon which it is grafted; but if it produces also like fruit, and at the same time, it may be grafted upon it perfectly well, without any scruple. Moreover, the antients have given us an account of three kinds of ingrafting, one, whereby a tree that is cut and cloven, receives cyons that are cut off *from some other tree*: a second, whereby a tree, after it is cut, admits the plants or cyons between its bark and wood, both which kinds are proper for the spring-time; the third kind, whereby the tree receives the buds themselves, with a little bark, into a part of itself, from which the bark is taken away, which Husbandmen call *Emplastration* (1), or, as some call it, *Inoculation*. This kind of ingrafting is best put in practice in the summer-time. When we shall have described the way and method of these ingraftings, we shall also teach you that which we have invented.

Graff all trees in the increase of the moon, as soon as they shall begin to put forth their buds, but the olive-tree about the vernal Æquinox, till the thirteenth of *April*. From whatever tree you shall have a mind to chuse grafts, and are going to take cyons, see that it be young and fertile, and with frequent knots or joints; and as soon as the buds shall swell, chuse them of the thickness of your little finger, from the small branches of one year old, which look to the rising of the sun, and are perfectly found. Let the cyons be two or three-forked. Cut the tree which you have a mind to graff upon, carefully with a saw, in that part where it is fairest and in best condition, and without any scar; and you must be very careful not to hurt the bark. Then after you have cut the trunk through, smooth the wound with a sharp iron tool. Then put down a small iron or bone-wedge between the bark and the wood, not less than three fingers breadth; but do it very considerately, that you may not hurt or break the bark. Afterwards pare, with a sharp pruning-knife, the cyons you have a mind to ingraft, on one side only, as far as the wedge which you have put down will

(1) *Emplastration*, so called, from the plaister of clay or wax used in this sort of grafting. It is also called inoculation, or ineying, from the taking an eye or bud off a tree, and setting it into another, with a bit of the bark of its own tree.

give them space, and do it so as you may not hurt the pith, nor the bark of the other side. When you have prepared your cyons, pull out the wedge, and immediately put down the cyons into the holes which you shall have made with the wedge driven in between the bark and the wood; but insert the cyons by that end which you have pared, in such a manner, that they may stand out from the tree half a foot, and no more. You may very well graff two grafts into one tree; or, if the trunk be larger, you may graff more. Let there be a space of four fingers breadth between them: do these things according to the bigness of the tree, and the goodness of the bark. When you have thrust down all the grafts which that tree will suffer, bind the tree fast with elm-tree inward bark, or with a bulrush, or a willow. Then daub the wound all over with well-wrought clay, mixed with straw, and the space which is between the grafts, so far, as that the grafts may appear and stand out at least four fingers breadth above it; then put moss upon it, and bind it so, that the rain may not sink into it.

Nevertheless, some are better pleased with making a place for the grafts with a saw in the stock of the tree, and to smooth the parts which are cut, with a small penknife, and so to fit the grafts to them. If you have a mind to ingraft a very small tree, cut it off very low, so that it may stand only one foot and an half above the ground; and then when you have cut it through, smooth the wound carefully, and, with a sharp penknife, cleave the middle of the stock a very little way, so that there may be a cleft in it of three fingers breadth; and then insert a wedge into it, whereby it may be kept open; and put down into it grafts pared on both sides, so that you may make the rind, or inward bark of the graft, equal to the rind of the tree. When you have carefully fitted the grafts, take out the wedge, and bind up the tree, as I said above: then heap up the earth about the tree to the very place where the ingraftment is made; this will defend it most of any thing from the wind and heat.

The third kind of ingraftment, inasmuch as it is exceeding nice and delicate, is not fit for all sorts of trees; but, for the most part, such as have a moist, juicy, and strong bark, admit of such an ingraftment; as the fig-tree; for it yields great abundance of milk, and has a very strong bark. Therefore it is exceeding proper to be graffed upon after this manner: Chuse young and fair branches from off that tree from which you have a mind to take your grafts; and in them take particular notice of the eye, which shall make a fair appearance, and afford a certain hope of a bud: mark it all round, about two fingers square, so that the eye may be in the middle; and so cut it all round

with a sharp penknife, and take off the bark carefully, that you may not hurt the gem. After this, chuse also the fairest branch of the tree which you are about to inoculate, and cut all round the same quantity of its bark, and take it off the wood: then fit the scutcheon, which you have prepared, into that part which you have stripped of its bark, so that it may agree exactly to the part from which the bark is taken. When you have done these things thus, bind it well round the gem, and beware, that you do not hurt the bud itself: then daub the joinings and bindings with clay, leaving a space, that the gem may be at liberty, and not be pressed with the binding: but chop off all the under shoots and upper branches of the tree which you have grafted upon, that there may be nothing whereby the juice may be diverted, and to which it may minister nourishment rather than to the graft. After the twenty-first day, unbind the scutcheon, and with this kind of grafting the olive-tree also is grafted upon with exceeding good effect.

We have already taught you that fourth kind of grafting, when we treated of vines: therefore it is needless to repeat, in this place, the way and method of terebration, which we have already described. But, forasmuch as the antients denied, that every kind of graft might be grafted into every kind of tree, and established, as a certain law, that limitation, as it were, which a little before we made use of, *viz.* that only those grafts could coalesce, which, in their bark, and rind, and fruit, were consimilar to those trees upon which they are ingrafted; we thought it proper, that this erroneous opinion should be confuted, and a method delivered to posterity, whereby every kind of graft might be grafted upon every kind of tree. But that we may not weary the reader, by drawing out this book to too great a length, we shall subjoin, as it were, one example, whereby all sorts of grafts may be grafted upon all sorts of trees.

Dig a trench four feet every way, at such a distance from an olive-tree, that the extreme branches of the olive may reach to it: then plant in the trench a small fig-tree, and take great care, that it become fair, sound, and strong. After the space of three years, when it has had a large-enough growth, bend downwards the branch of the olive-tree, which seems to be the fairest and the goodliest, and tie it to the stock of the fig-tree; and so, having cut off all the other small branches, leave only those tops which you shall have a mind to ingraft: then chop off the fig-tree by the trunk; and smooth the wound, and cleave it down the middle with a wedge: then pare the tops of the olive-tree on both sides, as they stick to their mother, and so insert them into the cleft of the fig-tree, and take out the wedge, and bind

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the small branches carefully together, that they may not, by any force, be pulled away. Thus, in the space of three years; the fig-tree grows up together, and takes with the olive-tree; and then, at length, the fourth year, when they are well co-united, you shall cut off the branches of the olive from their mother, as if they were layers. In this manner you shall graff every kind of tree on every kind of tree. But, before we make an end of this book, since we have in the former books treated almost of all the different sorts of grafts, it is now a proper time to speak of the *Cytisus*, or Shrub-trefoil.

C H A P. XII.

Of the Cytisus, or Shrub-trefoil.

IT is of great importance, that there be great abundance of the *Cytisus*, or shrub-trefoil, in your land, because it is most useful for hens, bees, goats, oxen also, and for all kind of cattle; because they soon grow fat thereby, and it gives the ewes plenty of milk; as also, because you may use it eight months for green fodder, and afterwards you may make use of it dry. Moreover, it quickly takes in any land whatsoever, altho' exceeding lean: it bears all kind of ill usage without receiving any hurt. Yea, if women labour under scarcity of milk, the *Cytisus*, or dry shrub-trefoil, must be steeped in water; and, when it has soaked throughly the whole night, the next day the juice of it must be squeezed out, and three *heminae* of it mixed with a little wine, and so given them to drink: thus, both they themselves shall enjoy good health, and their children shall be strengthened with abundance of milk.

The *Cytisus*, or shrub-trefoil, may be sown either in autumn, about the fifteenth of *October*; or in the spring. After you have well manured the earth, make it into small beds, and there sow the seed of the shrub-trefoil, as you do that of common basil. Then set the plants regularly in the spring, so that there may be spaces of four feet every way between them. If you have no seed, set the tops of the shrub-trefoil in the spring, and heap up well-dunged earth all round them. If rain does not come on presently after, water them the next fifteen days; and hoe them as soon as they begin to put forth new leaves; and, after three years, cut it down, and give it to the cattle. Fifteen pounds weight of it green is enough for an horse, and twenty pounds
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for oxen, and for other cattle in proportion to their strength. Also Shrub-trefoil may be conveniently enough planted in branches before the month of *September*, because it easily takes hold, and bears with ill usage. If you give it dry, give it more sparingly, because it hath greater strength; steep it first in water, and, after it is taken out, mix it with chaff, or straw. When you have a mind to dry the *Cytisus*, cut it down when its seed shall begin to grow big, and keep it a few hours in the sun, till it fade; then dry it thoroughly in the shade, and so lay it up. It is enough for me thus far to have given precepts and directions concerning trees: now I am going, in the following book, to give an account of the care and management of cattle, and of the remedies proper for them.

 L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

B O O K S I X T H.

I Know, *Publius Silvinus*, that some prudent Husbandmen have refused to take upon themselves the care and management, either of greater or smaller cattle ; and have most constantly slighted and rejected that art and occupation, as hurtful and contrary to their profession : nor do I deny, that they did this with some reason, as if the purpose and aim of the Grazier were contrary to that of the Husbandman, inasmuch as the latter rejoiced most in ground that is exceedingly well manured, and perfectly clean and free from weeds ; the former delights in that which is unplowed, and produces plenty of grass ; the one hopes for fruit from the earth, the other from his cattle. So it comes to pass, that what the plower abominates, the Grazier, on the contrary, wishes for, *viz.* great plenty of grass and herbs.

Nevertheless, in these so discordant desires, there is a certain society, or fellowship, or communion ; because it is customary to eat up the fodder which the ground produces, for the most part rather with domestic cattle, than with those belonging to strangers. And by plentiful dunging, which is owing to flocks and herds of cattle, the earth produces her fruits in great abundance : nor yet is there any country, provided there is corn produced in it, which does not receive great benefit and advantage from the help and assistance of all sorts of great cattle, as well as of men. Hence labouring cattle also derived their name from the thing, being called *jumenta*, (helps) because they eased and helped us in our labour, either by carrying loads, or by plowing. Therefore, as the antient *Romans* commanded, I myself also am of opinion, that we should thoroughly understand the management of cattle, as well as the culture of lands. For, in a rural life, the business and

Occupation of Grazing is certainly most antient (1), and the same is also exceeding gainful: for which reason, the *Latin* words for *money* and *goods* seem to be derived from the word which signifies *cattle*, because the antients possessed nothing else; and at this time, with some nations, this one kind of riches only is in use and esteem; and now, with our farmers, there is no other thing whatsoever, that turns to better account, or yields a greater increase; as *M. Cato* also believed, who, when one asked his advice, What part of Husbandry he should follow, whereby he might quickly be enriched? answered, If he would apply himself diligently to the business of a Grazier. And when he asked him again, What he should do next, in order to receive a plentiful enough income? affirmed, If he would apply himself to the business of Grazing but indifferently. But I am loth to tell (2) of so wise a man, what some authors relate; that when the same man asked, What was the third gainful thing in Husbandry? he asserted, If one would follow the business of Grazing, even but negligently; especially considering, that the loss which follows a slothful and ignorant Grazier, is greater than the advantage which redounds to one that is prudent and diligent. Nevertheless, as to the second answer, there is no doubt but the produce of the cattle may do more than make an amends for the tolerable negligence of the owner. For which reason, we also, *Silvinus*, have committed this part of Husbandry to posterity, having followed the precepts of our ancestors, with all the industry we have been capable of.

(1) *Fumenta*. Horses and oxen are so called, because they help and assist men in their labour. It seems to be an abbreviation of *juvamenta*, helps.

In all the antient poets, both *Greek* and *Latin*, the breeding and feeding of cattle is always honourably mentioned, as a business to which persons of the greatest character applied themselves; and *πολύμηλον*, *πολύαρον*, *πολυβούτης*, rich in sheep and oxen, &c. were common epithets of the greatest Captains, Leaders, and Governors. And the Poets, from the great riches that great plenty of wool produced, invented their fable of the Golden Fleece, &c. And *Varro*, who was a very great antiquarian, and with very good reason gathers the nature and origin of things from the names by which they were called, says, that the story of the golden apples, so much celebrated by the antient Poets, signified only sheep and goats, which *Hercules* brought out of *Africa* into *Greece*, which the *Greeks* called in their own tongue *μήλα*: and he is of the same opinion with our author, that *pecunia*, and *peculium*, money, and all kinds of goods whatsoever, were so called from *pecus*, which signifies *cattle*.

(2) *Piget dicere*. Here *Columella* blames *Cato* for asserting, that even bad feeding of cattle would not fail to bring some gain to a Grazier. But *Cato's* answer signifies only the great esteem he had of cattle, and how great gain might be made by breeding them. *Plin. Nat. Hist. lib. xviii. cap. 5.* mentions the two first questions and answers, but takes no notice of the third. *Tully*, in his *Offices, lib. ii. 25.* takes notice of all the three, and adds a fourth way of being rich, *viz.* that of Tillage.

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Therefore there are two kinds of four-footed beasts, with one kind of which we furnish ourselves in order to take them into a copartnership of our labours, as the ox, the mule, the horse, the ass; the other we provide ourselves with for our pleasure, for our guard and protection, and for the sake of the yearly profit they bring us; as the sheep, the goat, the hog, the dog. We shall first speak of that kind, which we make use of as copartners in our labour; nor is there any doubt but (as *Varro* (2) says), the ox ought to be honoured and respected above all other cattle, but especially in *Italy*, which is supposed to have derived its name from this animal, because, of old, the *Greeks* called bulls *Ἰαλός*; and in that city, where a male and a female of this kind of cattle marked out the bounds with a plough, when they were going to build the walls: also, because at *Athens* the ox is said to be the minister of *Ceres* and *Triptolemus* (3): and because he has obtained a place in the heavens amongst the brightest stars: moreover, because he is still man's most laborious companion in Husbandry, and for whom they had so great a veneration among the antients, that it was as capital a crime to have killed an ox, as a citizen. With him, therefore, let us begin the work we have promised.

C H A P. I.

Of buying Oxen, and of their Shape and Make.

IT is not an easy matter for me to tell, what things are to be observed, and what to be avoided, in buying of oxen; seeing cattle derive both the habit of their body, and the disposition of their mind,

(2) *Varro*, in his second book of Husbandry, says, that if the antients had not had a great esteem for cattle, their astronomers would not, in describing the heavens, have called some signs by their names; so that some of them began the twelve signs with the two chief names of cattle, *Aries* and *Taurus*, the Ram and the Bull, preferring them to *Apollo* and *Hercules*, which some thought were intended by *Gemini*, tho' commonly it is thought, that *Castor* and *Pollux* were signified thereby; and, not content with the sixth part of the signs being called by their names, they added *Capricornus*, in order to have the fourth part; and, that several places, both by sea and land, retain their names, as the *Bosphorus* and *Ægean seas*; the mountain *Taurus*, &c. and, that several eminent men had their names from different sorts of cattle, as *Porcius*, *Ovinus*, *Caprinus*, *Taurus*, *Vitulus*, &c. all which, and many other things, shew the great regard they had for cattle.

(3) *Ceres* & *Triptolemi minister*. *Ceres*, the goddess of corn and tillage: she nursed *Triptolemus* the son of *Celeus* King of *Athens*, and taught him Husbandry. The poets feign, that he travelled over the whole earth, in order to teach men Husbandry. Probably, he wrote of Husbandry, and published his books to the world, which gave occasion to the fable.

and the colour of their hair, from the condition of the country, and the constitution of the climate. The *Asiatic* have one form, the *Gallican* another, and those of *Epirus* a third. Nor is there only a diversity in those of the Provinces, but, in *Italy* itself also, they differ in its several parts. *Campania*, for the most part, breeds white and slender oxen; nevertheless, they are not unfit for labour, and for cultivating their native soil. *Umbria* produces such as are huge, and of a white colour; the same produces also such as are red, and they are no less to be approved for their temper and disposition, than for their bodies. *Hetruria* and *Latium* produce such as are compact, but strong for labour: the *Apennine* mountains, such as are exceeding hardy and sturdy, and which endure any kind of hardship, but not comely nor beautiful to look upon. Since in these there is so great diversity and variety, the Plower, in buying bullocks, ought to observe some common and certain precepts as it were: and these *Mago* the *Carthaginian* has transmitted and delivered to us, so as we shall hereafter relate them.

Such oxen are to be purchased as are young, square, with huge members, lofty horns, and somewhat blackish and robust, with a broad and curled forehead, hairy rough ears, black eyes and lips, wide nostrils, a camoys nose, a long and brawny neck, large dewlaps, and almost hanging down to their knees, a great breast, vast shoulders, a capacious belly, and, as it were, great with young, extended sides, broad loins, a straight and even back, or even somewhat subsiding, round buttocks, with compact, well-set, and straight legs, but rather shorter than longer, and not with big and ill-shaped knees, with great hoofs, and exceeding long bristly tails, and the hair of their whole body thick and short (1), of a red or dark colour, and exceeding soft to the touch.

(1) *Pilosisque, corpore denso brevique.* In this last paragraph I have followed the correction of *Pontedera*, the errors of the text being very manifest, as *Gesnerus* and others have observed; for oxen with thick and short bodies are not at all approved. *Varro*, lib. ii. 5. says, *Let these cattle be well made, with sound, oblong; and large members.* *Palladius*, lib. iv. 11. *Let oxen have square and huge limbs, and a firm and solid body.* And *Columella*, in this very chapter, directs us to purchase *young oxen that are square, and have huge limbs.* So that it is very probable the true reading is, *caudis longissimis & setosis, pilo totius corporis denso ac brevi.*

C H A P. II.

Of breaking of Oxen.

CALVES of such a character you must accustom, while they are yet young, to be handled and tied to their mangers, that there may be very little labour, and less danger, in breaking of them. But I am of opinion, that steers ought not to be broken, either before their third, or after their fifth year, because that age is, as yet, too tender and young, and this is now exceeding stiff and sturdy. But it is proper, that those, which are caught, and taken wild out of the herd, should be tamed and broken in this manner :

First of all, let a spacious stable be prepared, where the person, that breaks them, may easily go about his business, and from whence he may retire without danger. Let there be no narrow strait places before the stable, but either a field, or a wide open way, that, when the bullocks are brought out, they may have a free excursion, that so, when they are timorous and skittish, they may not intangle themselves with trees, or any other thing lying in their way, and receive hurt. Let there be large cribs in the stable, and above them transverse planks, fastened in the manner of yokes, seven feet high from the ground, to which the steers may be tied. Then make choice of the morning of a day, which is free from storms and religious ceremonies, when you may begin the breaking of your cattle, and bind the horns of the bullocks with hempen ropes ; but let the ropes, wherewith they are at first caught, be wrapt about with wooly skins, that their tender foreheads under their horns may not be hurt. Then, after you have seized the young steers, bring them to the stable, and tie them to the stakes, so that they may be at their ease, and have a little room to move in ; and let them be a little space distant from each other, that, in struggling, the one may not hurt the other. If they are too fierce, suffer them to give vent to their fury for one day and a night ; and, as soon as they have asswaged and repressed their anger, let them be led out in one's hand, so that there may be both somebody before them, and several behind them, who may follow them, and keep them in with ropes ; and let one go before with a willow cudgel, and, with gentle blows, from time to time restrain and stop their sudden sallies and efforts. But, if the oxen are gentle and quiet, you may lead them forth before the evening, even the very same day you tied them to the stake, and teach them to walk a thousand

paces quietly and without fear. After you have led them home, tie them again close to the stakes, so that they may not be able to move their head. Then afterwards come up to the oxen, when they are tied, neither behind them, nor sideways, but right before them, gently, and with a soothing and fawning voice, that they may accustom themselves to look to you when you come up to them. Then rub their nostrils, that they may learn to smell a man. Afterwards also it is proper to handle all their skin, and to sprinkle it all over with pure wine, that they may become more familiar with him that tends them, or labours with them; and to put your hand also under their belly, and upon their thighs, that afterwards they may not be frightened, when they are touched in this manner, and that the tikes, which commonly stick to their thighs, may be taken away. Therefore, when the person that breaks them is doing this, he ought to stand at a side, that he may be out of the reach of their heels. After these things, having opened their jaws, draw out their tongue, and rub their palate all over with salt, and put down their throat with a slice a pound of sops dipped in very salt melted fat; and pour into their jaws, thro' an horn, a *sextarius* of wine each; for, by these blandishments, they grow tame almost in three days time, and receive the yoke the fourth day, to which a bough of a tree is tied, and drawn instead of the beam of the plough; and sometimes something of weight is joined to it, that, by their greater effort, their patience of labour may be tried.

After experiments of this sort, they must be yoked to an empty cart, and gradually led out to a greater distance with their loads. Being thus thoroughly broken, let them be presently instructed and bred up to the plough, but in manured land, that they may not presently dread the difficulty of the work, nor bruise their necks, that are but tender as yet, with breaking up unplowed land, which is very hard and difficult. But I gave directions in the first book, after what manner a Ploughman may train up an ox in plowing. You must take care, that the ox, during the time you are breaking him, may not touch any person either with his horn, or his heel; for, unless these things are prevented, he can never be freed from these vices, even tho' he be thoroughly broken.

But we direct, that these things be done thus, in case you have no veteran cattle at hand; for, if there are any at hand, there is a safer and more expeditious way of breaking them, which we follow in our own lands: for, when we accustom a bullock to the cart, or the plough, we yoke one of the strongest and gentlest of our broken oxen with one that is not broken, who may both pull him back when he makes too great haste, and lead him on when he lingers or stops. But, if we do

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not grudge the being at the trouble to make a yoke, wherein three oxen may be yoked, we shall, by this contrivance, gain our end so far, that even stubborn headstrong oxen will not refuse the heaviest loads; for, where a slow or restiff bullock is yoked in the middle between two veteran oxen, and, being put into the plough, is forced to till the ground; he is no more left at liberty to refuse and disobey what is commanded; for, whether he falls into a fury and rage, and leaps out on one side, he is kept in his place at the pleasure of the other two; or whether he stands still, when the other two go on, he also obeys; or, if he endeavours to lie down, he is held up and drawn along by the stronger; by which means, he is forced on every side to lay down his stubbornness, and, with very few strokes, is brought to endure labour.

There is also an ox of a softer kind after breaking, who lies down in the furrow. I am of opinion, that he must be cured, not by cruelty; but by reason; for they who judge, that this vice is best removed with goads, or fire, and other torments, are ignorant of true reason, because their obstinate stubbornness, for the most part, wearies the person that is enraged against them, and that uses them cruelly; for which reason, it is better to cure an ox, that lies down, with hunger and thirst, without tormenting his body; for his natural desires affect him more vehemently than blows. Therefore, if an ox has lain down, the most effectual way is to bind his feet with ropes, so that he may neither be able to stand, or go forward, nor to feed. By doing of which, being forced with hunger and thirst, he lays down his sluggishness; which nevertheless is very rare in our own country cattle. And every ox, bred in our own country, is better than one that is a stranger; for he is neither tempted by the change of water, nor of fodder, nor of climate, nor infested with the state and condition of the country, as that ox is, which is brought from even and champain places into such as are mountainous and rugged; or from mountainous places into a champain country. Therefore, when we are forced to bring oxen from a distant country, we must also take care, that they be taken from such places in their own country, as are like to those into which they are brought. We must also observe, that one that is unequal in bulk of body, or in stature, or in strength, be not yoked with one that is stronger; for both these things prove destructive to the weaker.

The manners, or temper and disposition, of this cattle are most approved, which are nearer to the gentle and peaceable, than to the violent and fierce, but not sluggish and dull; which are afraid of loud blustering words, but, in confidence of their strength, are not startled at what they either see or hear, nor afraid to go into rivers, or pass bridges;

bridges ; which eat up a vast quantity of food, but are slow in chewing it ; for these digest better : and therefore, such as eat at their leisure and conveniency, preserve the strength of their body without leanness, better than those which eat in a hurry. But it is as great a fault, in one that has the care of oxen, to make an ox fat, as it is to make him lean ; for the bulk and plight of body in labouring cattle ought to be moderate, and fit for their business, robust in nerves and muscles, not swelled with fat, that they may neither be weighed down and wearied with the bulk of their own hide, nor with the drudgery of their work. But, since we have given an account of such things as ought to be observed in buying and breaking of oxen, let us now give directions for managing and keeping them.

C H A P. III.

Of the Care that is requisite in keeping of Oxen, and of the Food that is proper for them.

IN hot weather oxen must abide in the open air, and, in cold, within-doors : therefore, for their winter stabling, stubble must be prepared, which, being cut down in the month of *August*, within thirty days after the harvest is removed, ought to be put up in stacks. The cutting it down is of great advantage, both to the cattle, and the land. The corn-fields are freed from briars and thorns, which, being cut down in the summer-time, about the time that the Dog-star rises, perish to the very roots, and, being laid under the cattle's litter, make a great deal of dung. When we have thus taken care of these things, then we must both make provision of all kinds of fodder, and be careful, that the cattle don't grow lean through scarcity or want of food.

But there is not one method only of feeding oxen rightly ; for, if the great plenty of the country affords green fodder, nobody doubts but this kind of food is to be preferred to all other ; which, nevertheless, does not happen, but in places that are well watered, or where the dew falls in great abundance. Therefore, in these very places, the greatest advantage and conveniency is, that one Ploughman is sufficient for two yoke of oxen, which, on the same day, do either plow, or go out to pasture by turns. In drier lands, the oxen must be fed at their cribs ; and their food is given them according to the state and condition of the country ; and nobody doubts but vetches and chichlings, as also meadow-

dow-hay tied up in bundles, are the best food for them. We maintain and support our herds less commodiously with chaff or corn-straw, which every-where are a support to them, and, in some countries, the only one they have. Chaff or straw of millet is most approved, then that of barley, and next that of wheat also. But, besides these, they give barley to labouring oxen, which perform the full task of labour.

But fodder is dispensed to oxen, according to the seasons of the year. In the month of *January*, it is proper to give each of them four *sextarii* of bitter vetches, bruised and soaked in water, and mixt with straw or chaff; or one *modius* of soaked lupins; or half a *modius* of soaked chichlings; and, over and above these, straw or chaff in abundance. We may also, if there is a scarcity of pulse, mix with their straw or chaff washed and dried grape-stones, that are taken out of the small wine, which is last made. Nor is it to be doubted, but it is better to give them these with their husks, before they are washed; for they have the strength both of food, and of wine, and make the cattle both sleek and fair, and chearful and plump: If we keep them from grain, a fodder-basket full of dry leaves of twenty *modii* is sufficient, or thirty pound weight of hay; or, if we do not withhold corn from them, a *modius* of green laurel, and of ever-green oak-leaves. But to these you add mast, if the plenty of the country will permit it; which, unless it be given to satiety (1), breeds the scab. Also you may give them half a *modius* of bruised beans, if the great crop you have of them make it turn to your advantage.

In the month of *February*, for the most part, the same kinds of food suffice. In the months of *March* and *April*, some addition ought to be made to the weight of hay, because they are then tilling the ground; but it will be enough, if you give them forty pound weight each. Nevertheless, from the thirteenth of the month of *April*, to the fifteenth of *June*, it is right to cut green fodder for them. Also, in colder places, the same thing may be done to the first of *July*; from which time, to the first of *November*, during the whole summer, and after that in autumn, let them be satiated with leaves; which nevertheless are not useful, till they be fully ripened with showers, or continual dews. The elm-tree-leaf is most approved; afterwards that of the ash; and next that of the poplar-tree. Those of the ever-green oak, common oak, and laurel or bay-tree, are least esteemed; but, after summer, they are necessary, when the others fail. You may also give them fig-

(1) *Quæ, nisi ad satietatem datur, scabiem parit.* Some think, that the true reading is, *si ad satietatem datur*, because afterwards he limits the quantity of mast to be given, mixed with other fodder.

tree-leaves very safely, if you have plenty of them, or if it be expedient to strip the trees. Nevertheless the ever-green oak-leaf is better than that of the common oak, but of that kind which has not prickles; for cattle refuse and dislike that, as they do the juniper-tree, because of their prickles. In the months of *November* and *December*, during the feed-time, you must give the ox as much as he desires, and has an appetite for. Nevertheless, for the most part, a *modius* of mast to each of them, and chaff or straw given them till they be satiated, is sufficient; or a *modius* of steeped lupins; or seven *sextarii* of bitter vetches, sprinkled with water, mixt with chaff; or twelve *sextarii* of chicklings, sprinkled in like manner with water, and mixed with chaff; or to each of them a *modius* of grape-stones, if to these be added, as I said above, a large quantity of chaff; or, if you have none of these, forty pound weight of hay by itself.

C H A P. IV.

Of the Diseases of Oxen, and of their Remedies.

BUT it will be of no advantage, that cattle have food to the full, unless they be assisted with all diligence, that they may be of a wholesome body, and preserve their strength; both which are maintained, by giving them, for three days, a large dose of a medicine, which is compounded of an equal weight of bruised lupins, and of cypress-tree, and with water kept for one night in the open air; and this ought to be done four times in the year, about the latter end of the spring, summer, autumn, and winter. Oft-times also feebleness, and want of spirits, and nauseating, are removed, if you put an hen's egg raw, without breaking it, into their chops fasting; and, the day after, bruise cloves of *Cyprian* or common garlick (1) with wine, and so pour it into their nostrils: neither do these remedies only make them healthful.

Many also mix a large quantity of salt with their fodder; some have given them horehound with oil and wine; some infuse fibres of leeks; others grains of frankincense; others the herb savine, and rue, in pure wine; and give them these medicines to drink. Many cure their oxen

(1) *Spicas ulpici*. Both *Pliny* and our author say, that this *ulpicum* is called *Cyprian* garlick. *Pliny* says the *Greeks* also called it *antiscorodon*; but *Columella* says they called it *aphroscorodon*. See *lib. ix. c. 3.* for a further description of it.

with stalks of the white vine (2), and husks of the bitter vetch. Some bruise the skin of a serpent, and mix it with wine. Mother of thyme, bruised with sweet wine, is also a remedy for them; and squills cut small, and steeped in water. All which foresaid potions given them for three days, three *beminæ* every day, purge their belly, and, after removing their distempers, repair their strength. Nevertheless the lees of oil are reckoned the most salutary, if you mix an equal quantity of water with them, and accustom the cattle to them by degrees; but they cannot be given them immediately; but first their food is sprinkled with them, then a small quantity of them is mixed with their water, and, soon afterwards, you mix an equal quantity of both, and give them as much as they are able to drink.

C H A P. V.

Of such Things as bring the Plague upon Cattle, and what Remedies are to be applied.

BUT it is of no advantage at any time, but least of all in summer, to rouse the oxen so as to make them run; for this either gives them a looseness, or raises a fever. You must also beware, that neither a sow nor a hen creep into their cribs; for that which falls from them, being mixed with their fodder, is certain death to oxen; and that especially, which a sick sow throws up and vomits, is enough to raise the plague: and, when this lights upon an herd, you must presently change the climate, and, having distributed the cattle into several divisions, you must go with them into regions that lie at a great distance; and the diseased must be so separated from the sound, that not so much as one may come among them, which may, with the contagion, infect the rest. Therefore, when they are removed to a great distance, they must be brought into those places wherein no other cattle are fed, lest, by their coming, they bring the plague also among them.

But diseases, altho' pestilential, must be conquered and repelled by exquisite remedies. Then the roots of *allbeal* and *eringo* must be mixed with *fennel-seeds*, and sprinkled with must boiled into a third of the

(2) *Vitis alba*. Pliny says, that this plant is by some called *white bryony*. The Greeks call it by many other names, as he tells us, *lib. xxiii. cap. 1*. It shoots forth with many sprays, with long joints and knots, and jagged leaves and tendrils, like a vine; of which the foresaid author gives a distinct account in the fore-mentioned place.

first quantity, and with wheat-flour and boiling water ; and with this medicine the sick cattle must be drenched. · Then you make a potion with an equal quantity of cassia, myrrh, and frankincense, and a like quantity of the blood of a sea-tortoise, with three *sextarii* of old wine, and so pour it into their nostrils. But it will be sufficient, if you give the medicine itself divided into equal doses of one ounce and an half, with wine, for three days.

We have also known, that a small root, which Herdsmen call *confiligo* (lungwort) (1), has been a present remedy. It grows in great plenty in the *Marsian* mountains, and is exceeding wholesome for all kinds of cattle. They dig it up with the left-hand before the rising of the sun ; for they believe it has greater virtue, when it is so gathered. The account they give of the way of using it is this : They draw a round line with a brasen awl upon the broadest part of the ear, so that, when the blood issues out of it, there may appear a small circle drawn like the letter O. When this is done, both in the inside and on the upper part of the ear, they pierce through with the same awl the middle part of the small circle which they have described, and insert the fore-said small root into the hole they have made ; which when the fresh wound has taken hold of, it holds it so, that it cannot slip out. Then all the strength of the disease, and the pestilential poison, is drawn out into that ear, till that part, round which the line was described with the awl, mortifies and falls out ; and, by the loss of that very small part, the head is preserved. *Cornelius Celsus* also orders us to pour into them through their nostrils the leaves of miffelto bruised with wine. These things must be done, if all the cattle in general are sick, and those moreover, if any one in particular is out of order.

(1) *Confiligo*. The ancient rustics called this herb by this name, because they found it frequently growing among a sort of wheat they called *filigo*. *Vegetius* says, that it was called *pulmonaria*, lungwort, because it was a speedy relief to diseases of the lungs in cattle. Father *Hardouin* says, that in *France* it is commonly called *pomelée*, which seems to be a corruption of *pulmonaria* ; and that some herbalists call it *para:leonis*. See *Ruellius*, lib. ii. p. 488. The *Marsian* mountains, where it was first found, are in that part of *Italy*, which is now called *Ducato de Marfi*, in the kingdom of *Naples*, and bordering upon the Pope's territories.

C H A P. VI.

Of Remedies to be applied to Oxen, that are disordered with Indigestion.

THE signs of crudity are frequent belchings, and rumbling noise in their belly, nauseating of their food, contraction or stiffness of their nerves, dull heavy eyes; because of which the ox neither chews his cud, nor licks or wipes himself with his tongue. Two *congi* of warm water, and, presently after, thirty stalks of colewort, moderately boiled, and dipped in vinegar, and given them, will cure them; but they must, for one day, abstain from other food.

Some keep the cattle shut up in the house, that they may not feed. Then they mix four pound weight of the tops of the mastic, and of the wild olive-tree, and a pound of honey, bruised together, with a *congius* of water, which they keep for one night in the open air, and so pour it into their chops. Then, after the space of one hour, they lay before them four pounds of bitter vetches steeped in water, and keep them from all other drink. This ought to be done for the space of three days, till all the cause of their languor be discussed; for, if the crudity be neglected, both an inflation of their belly, and a greater pain in their bowels, follow upon it, which neither suffers them to take their food, nor to stand in their place; but draws groans from them, and forces them to lie down frequently, and toss their heads, and move their tails, oftener than usual. A sure remedy for this is to bind exceeding fast with a cord that part of their tail, which is next to their buttocks, and to pour a *sextarius* of wine, with an *hemina* of oil, down their throat, and so to drive them for fifteen hundred paces as fast as they can go.

If the pain still continues, you must cut their hoofs all round; and, having anointed your hand, put it into their anus, and pull out the dung, and then drive them again, so as to make them run; or, if this thing has had no good effect, they bruise dry wild figs, and give them with three-fourths of a *sextarius* of warm water. When neither this medicine has succeeded, they choose two pounds of wild myrtle-tree-leaves, and mix them with as many *sextarii* of warm water, and pour it into their chops with a wooden ladle, and so they let them bleed under the tail, and, when they have bled enough, they stop the blood with a rush-binding. Then they drive the cattle again very hard, till they be out of breath. There are also those following remedies

before letting of blood: They mix three ounces of garlick, bruised in a mortar, with three *heminae* of wine; and, after they give them this potion, they force them to run: or they bruise two ounces of salt with ten onions, and, having mixed well-boiled honey with them, they make them into suppositories, and administer them, and then they drive the ox full speed.

C H A P. VII.

With what Remedy the Pain of the Belly, and of the Intestines of Cattle, may be quieted.

THE pain, both of the belly and the intestines, is asswaged with the sight of swimming fowls, especially of a duck, which, if an ox, which has a pain in any of his intestines, looks upon, he is quickly freed from the torment. The same duck more effectually cures mules and the horse kind with her aspect: but sometimes no remedy is of any benefit. Now follows the distemper of the gripings or wringing of the guts, of which a bloody and mucous looseness is the sign. The remedies are fifteen cypress-cones, and as many galls, and of the weight of both these a quantity of very old cheese, which being bruised into one mass, they mix four *sextarii* of rough wine with them, and dispense the same to them in equal quantities for four days; nor let the green tops of the mastich, myrtle, and wild olive-trees, be wanting. A looseness wastes their body, and their strength, and makes them unfit for labour. When these things happen, the ox must be restrained from drinking for three days; and the first day he must be kept from food: but, presently after, you must give him the tops of the wild olive-tree, and the reed, also mastich, and myrtle-berries. Nor must he have liberty to drink water but exceeding sparingly.

There are some who give them a pound of the stalks or shoots of a tender young laurel or bay-tree, with an equal quantity of steeped southernwood, with two *sextarii* of warm water, and so pour it down their throat; and throw the same fodder before them as we mentioned above. Some toast two pounds of grape-stones, and so bruise them, and, with as many *sextarii* of rough wine, give them as a medicine to drink, and keep them from all other moisture whatsoever; and they also throw the tops of the foresaid trees before them. But, if neither the violent looseness stops, nor the pain of the belly and intestines abates,

and

and if he refuses his meat, and if his head is so weighty, that he cannot bear it up, and tears flow from his eyes, and rheum from his nostrils, oftener than usual, let the middle of his forehead be burnt to the bones, and his ears cut with a knife. But it is proper to rub with ox's urine the wounds that are made with fire, while they are healing; but those that are cut with a knife, are better cured with pitch and oil.

C H A P. VIII.

Of a distempered Growth or Swelling of the Tongue.

Distempered growings or swellings of the tongue, which the Farriers call *frogs*, use also to occasion loathings of their food. They cut these off with a knife, and rub the wounds with salt and garlic bruised together, till the rheum is provoked, and runs out of their mouth. Then they wash their mouth thoroughly with wine, and, after the space of one hour, they give them green herbs and leaves, till the wounds that are made heal up, and form a scar. If the ox has neither swellings or pushes in his tongue, nor a violent looseness, and, notwithstanding, has no appetite for his meat, it will be of benefit to pour into him, through his nostrils, garlic and oil beaten together in a mortar, or to rub his chops with salt or savory; or to anoint the same part with bruised garlic and a pilchard. But these things are proper, if he only have a loathing.

C H A P. IX.

Of the Fever of Oxen.

IT is proper, that an ox, that has a fever, should be kept from food for one day, and then the next day be let a little blood under the tail, when he is fasting; and that, after the space of one hour, thirty stalks of colewort or cabbage of a moderate bigness, dipped in oil, and pickle made of salt fish, be put down his throat in the manner of a drench; and that this food be given him five days fasting; moreover, that the tops of the mastich, or of the olive-tree, or the tenderest leaves of any sort, or the young leaves and shoots of vines, be thrown
before

before him; as also, that his lips be wiped with a sponge; and that cold water be given him three times a day to drink: which physic ought to be given him in the house, and the ox not to be let out, before he recovers his health. The signs that he is in a fever are, dropping tears, a great heaviness, and hanging down of his head, compressed eyes, the *saliva* flowing from his mouth, drawing his breath more slowly than ordinary, and with a certain impediment, and sometimes with a groan.

C H A P. X.

Of the Cough of Oxen.

A Fresh cough is best discussed with a drench of barley-meal. Sometimes grass cut small, and bruised beans mixed with it, are more effectual. Also they mix two *sextarii* of lentils, taken out of their hulls, and ground very small, with warm water; and, having made a potion therewith, pour it into them through an horn. Two pounds of hyssop, macerated, or steeped in three *sextarii* of water, cure an old cough; for this medicine is bruised, and given, with four *sextarii* of lentils ground small, as I said, in the manner of a drench; and then the hyssop-water is poured into them through an horn. Also the juice of a leek with oil, or the fibres themselves bruised with barley-meal, is a remedy for it. The roots of the same carefully washed, and beaten in a mortar, with wheat-meal without bran, and given him fasting, remove the oldest cough. The bitter vetch, without husks, ground with toasted barley, in equal quantity, and put down their chops, in the manner of a drench, has the same effect.

C H A P. XI.

Of Remedies for an Impostume.

IT is better to open an impostume with a lancet, than with a medicine; and when the *sinus* itself, which contained it, is emptied, you wash it with an ox's warm urine, and bind it up with linaments soaked in liquid pitch and oil; or, if that part cannot be bound up, you must drop

drop ox's or goat's tallow into it from a burning-hot plate of metal. Some, after they have burnt the part affected, wash it with stale urine; and so anoint it with liquid pitch, and old hogs-lard, or axle-tree greafe, melted together in equal quantities.

C H A P. XII.

Of the Remedy to be applied to an Ox that is lame.

THE blood falling down to the feet occasions lameness. When this happens, you must presently examine the hoof, and by touching it you know its burning heat: nor does the ox suffer the affected part to be vehemently pressed. But, if the blood be as yet in the legs above the hoofs, you may discuss it by frequent friction; or, when this has been of no benefit, it is removed by scarification. But, if it is already in the hoofs, you must open it gently with a knife between the two hoofs. Afterwards you apply linaments soaked in salt and vinegar, and then put a shoe of *Spanish* broom on his foot; and you must take great care, that he do not put his foot in water, and that he be kept in a dry stable.

This same blood, unless it be let out, will breed putrified matter; and, if it turns to a suppuration, it will be long before it be thoroughly cured: and it is brought to a perfect cure, first by cutting it round with a knife, and cleansing it thoroughly, and then by thrusting tents in to it wet with vinegar, salt, and oil, and afterwards with stale hogs-lard, or axle-tree greafe, and goats-tallow, boiled together in equal quantity. If the blood is in the lower part of the hoof, you must cut the extreme part of the hoof itself to the quick, and so let it out; and after you have wrapt up the foot with linaments, secure it with *Spanish* broom from receiving any hurt. It is not proper to open the middle of the hoof on the lower part, unless the suppuration is already begun in that place. If he halts, and is lame from a pain in his nerves and sinews, his knees, hams, and legs, must be rubbed with oil and salt, till he be cured. If his knees be swelled, they must be fomented with warm vinegar; and you must put linseed, or bruised millet, sprinkled with honey-water, upon them. And it is right also to dip sponges in boiling water, and then squeeze the water out of them, and anoint them with honey, and apply them to his knees, and surround them with bandages.

But,

But, if there is some humour under the swelling, you must put leaven, or barley-meal boiled in raisin-wine or honey-water, upon it : and, when the suppuration is ripe, you must open it with a lancet ; and, after you have let it out, you cure it with linaments, as I taught you before. The root of the lily, or a squill with salt, or the blood-herb, which the *Greeks* call *Polygonon* (1), or horehound, may (as *Cornelius Celsus* directs) cure sores which have been laid open with the lancet. But almost every pain of the body, if it be without a wound, is better discussed, when it is fresh, with fomentations ; but an old pain is best removed with burning, and dropping burnt butter, or the fat of goats, upon it.

C H A P. XIII.

Of the Remedies for curing the Scab, and the Bite of a mad Dog or a Wolf, and also for curing Hidebinding.

THE scab is diminished with rubbing it hard with bruised garlic ; the bite of a mad dog is cured with the same remedy, the which nevertheless is equally well cured, by putting a piece of old salted flesh or fish upon the wound. And there is another more speedy and effectual medicine for the scab. Wild marjoram and sulphur are bruised together, and boiled in lees of oil mixed with oil, water, and vinegar : then, when they are lukewarm, bruised scissile alum (1) is sprinkled upon them. This medicine, if they be anointed with it in the burning heat of the sun, will be of exceeding great benefit.

Bruised galls are a remedy for ulcers. The juice of horehound with foot is not less effectual. There is a plague that is troublesome to ox-cattle ; rustics call it *Hidebinding* ; when the skin sticks so close to their back, that, when they take hold of it with their hands, they can-

(1) *Polygonon*. *Plin. Hist. Nat. lib. xxvii. cap. 12.* says, that this herb has leaves like rue, and seed like grass, and that it has its name from the multitude of its seeds : it is also called *Proserpinaca*. Father *Hardouin* says, that the *French* call it *Renouée*, from its frequent knots and joints.

(1) *Alumen scissum*, or *scissile*, as *Cornelius Celsus* calls it : the *Greeks* call it *schiston*. It is a kind of alum, as *Dioscorides* says, which is not closely compacted and condensed into a mass, nor appears in solid pieces and chips, but which opens and divides itself, and separates into certain hoary capillaments, from which some call it *trichitin*, or *capillary alum*. *Plin. Nat. Hist. lib. xxxv. cap. 16.* says, that it is made of the stone they call *chalcitis*, copper-stone, which was first found in *Cyprus* : he says, it is the sweat of that stone coagulated into a froth. I see some call it *flaky alum*.

not remove it from their ribs. This thing happens by no other means, but either by the ox's being reduced to a lean habit of body by some kind of languor or other; or by his growing cold after he has been in a sweat in doing his work; or by his being wet with rain, when under his load. And, because these things are pernicious, you must take care, that when the oxen return from their work, they be sprinkled with wine, while they are yet all in a heat, and breathe short, and that lumps of fat be put into their chops. But if the foresaid disease cleaves to them, it will be of benefit to boil laurel throughly, and, while it is warm to foment their backs with it, and presently to rub them with much oil and wine; and that is best done in the open air, when the sun is very hot. Some mix a mash of squeezed or pressed olives with wine and fat, and use this medicine after the foresaid fomentations.

C H A P. XIV.

*Of Remedies for ulcerated Lungs, and Swelling of the
Palate and Neck.*

THERE is also that grievous and destructive distemper, when their lungs are ulcerated; hence a cough, and leanness, and at last a consumption attacks them: and that these things may not be the occasion of their death, you must bore a hole in their ear, and insert the root of lungwort into it, as we taught above; also you must mix about an *hemina* of the juice of leeks with the like quantity of oil, and give it them to drink with a *sextarius* of wine for several days.

Sometimes also the ox, by reason of a swelling of his palate, refuses his food, groans frequently, and makes such an appearance, that he seems to hang towards one side. It is necessary to lance his palate, that the blood may flow out abundantly, and to give him bitter vetches soaked in water, without their husks and green leaves, or some other soft fodder, till he be cured.

If his neck be bruised in doing his work, letting him blood in the ear is the most speedy and effectual remedy; or if this is not done, an herb, which they call *avia* (1), bruised with salt, and put upon it. If

(1) *Avia*. This herb is not described by any author I have seen. It is very probable, this is not the right name. There are several emendations offered by critics; but their conjectures are so ill supported, that it is better to leave it in uncertainty, than trouble the reader with them.

his neck be moved from its usual posture, and hangs down, we must consider towards which side it declines, and let him bleed in the opposite ear. Moreover, we must first beat that vein in the ear, which appears the largest, with the spray of a vine. Then, after it is swelled with the lashes, you must open it with a lancet; and, the day after, let him bleed again in the same place; and let him rest from labour for two days: then the third day you exact some easy labour of him, and by degrees bring him to perform his ordinary task.

But if his neck declines to neither side, and is swelled in the middle, you must let him bleed in both ears; and, if blood be not let within two days after the ox has received the hurt, his neck swells, and the nerves are stretched; and hence arises a hardness which cannot endure the yoke. We have found for such an ailment a most excellent medicine compounded of liquid pitch, ox's marrow, and goat's tallow, and old oil, in equal quantities, and boiled together. You must use this composition thus. When the ox is loosed from his work, you must wet the swelling of his neck with the water of that pond out of which he drinks, and then dry it, and rub it, and anoint it with the foresaid medicine. If he refuses the yoke intirely, because of the swelling of his neck, you must give him rest from his labour for a few days. Then his neck must be rubbed with cold water, and anointed with the scum of silver. *Celsus*, indeed, orders the herb called *avia* to be bruised, as I said before, and put upon his swelled neck. There is less trouble in small boils, which commonly infest his neck: for it is easy to drop oil out of a lamp into them when he is at work. Nevertheless, 'tis a better way to take care, that they may not breed there, and that their necks may not grow bald, which otherwise do not lose their hair, and become bare, but when their neck is either wet with sweat or rain, while they are at their work. Therefore, when this happens, you must rub one old brick against another, and, with the small dust that falls from them, sprinkle their necks before they are unyoked: then, after this brick-dust dries upon the part, moisten it with oil from time to time.

C H A P. XV.

Of curing their Pasterns or Hoofs when they are hurt.

IF (1) the fock has hurt his pastern or hoof, burn upon the wound, with a red-hot iron, hard pitch and hogs-lard; or axle-tree greafe, wrapped up with sulphur, and new-shorn greasy wool; which same remedy has a very good effect, after you have taken a stick or root out of the ox's foot, if by chance he has trodden upon a sprig or spray, or pierced his hoof through with a sharp tile, potsherd, or stone; which, nevertheless, if it be wounded to a greater depth, must be cut all round with a knife, to a considerable breadth, and so have these materials burnt upon it, as I directed above: then by putting a shoe of *Spanish* broom upon his foot, and sprinkling vinegar upon it for three days, it will be healed. Also, if the fock has wounded his leg, you must put the sea-lettice, which the *Greeks* call *Τισύμαλος*, mixed with salt, upon it.

When his feet are worn and bruised underneath, they must be thoroughly washed with ox's urine warmed; then you must set fire to a bundle of sprays, and, when the fire falls to embers, you must force him to stand upon the hot ashes, and anoint his hoofs with liquid pitch mixed with oil, or axle-tree greafe. Nevertheless, oxen will be less liable to be lame, if their feet are washed with plenty of cold water, when they are unyoked from their work, and afterwards their pasterns, coronets, and also the cleft itself, which divides the hoof of the ox, be rubbed with old hogs-lard, or axle-tree greafe.

C H A P. XVI.

Of Remedies for their sprained Shoulders, and broken Horns.

SOMETIMES also the ox sprains his shoulders, either with the weight of his load in a long rugged way, or when in tilling he struggles with very hard ground, or with the root of a tree that he meets with

(1) The first sentence of this chapter seems to want some words; but the meaning is obvious, and the words that are wanting may very well be supplied from *Vegetius*, who frequently copies *Columella's* own words, *lib. iii. 4.*

in his way. When this happens, you must let him bleed in his fore-legs; if he has hurt his right shoulder, he must be bled in the left leg; if his left, you must bleed him in the right leg. If he has hurt both his shoulders to a greater degree, you must also open the veins of his hinder legs.

When his horns are broken, you must put linen clouts upon them, soaked in salt, vinegar, and oil; and, having bound them up, pour the same upon them for the space of three days. Then the fourth day you must put axle-tree grease with liquid pitch in equal quantity, and pine-tree bark smoothed, upon them; and last of all, when they have begun to form a scar, you must rub them with soot.

Ulcers also, when neglected, use to swarm with worms; which, if in the morning they are sprinkled with cold water, shrink and grow stiff with the cold, and fall out of them. Or, if they cannot be taken out by this method, you must bruise horehound, or leeks, and mix salt with them, and put them upon the ulcers. This very quickly kills the foresaid animals. But the ulcers being thoroughly cleansed, you must presently apply linaments with pitch and oil, and stale axle-tree grease, and the wounds must be anointed all round on the outside, with the same medicament, that they may not be infested with flies, which breed worms when they settle upon ulcers.

C H A P. XVII.

Of Remedies against the Bitings of Serpents, and other noxious Animals.

THE bite of a serpent also is mortal to oxen, and the poison of lesser animals also is hurtful to them: for both the viper, and the fleo-worm, provoked with his weight, when in the pasture the ox has improvidently lain down upon them, often fasten their teeth on him. And the shrew-mouse, which the *Greeks* call *μυγάλη* (1), altho' its teeth are very small, is the occasion of no small mischief to them. The herb which they call *Vipers Bugloss* (2), bruised and laid with

(1) *Μυγάλη*. Some say it is so called, *quia ex mus et galina givetai*, because it is of a mouse and a weasel.

(2) *Personata*. *Plin. Nat. Hist. lib. xxv. cap. 9.* says, that *echion*, vipers bugloss, is called by this name, and recommends it, among other things, against the bitings of serpents. He says, that no herb has a broader leaf, and that it produces great burs.

salt upon the scarification made with a knife, drives away the poison of the viper. The root also of the same, bruised, is more effectual; or *Simonian Trefoil* (3), that which is found in rough craggy places, is said to be the most effectual: it is of a very disagreeable smell, and not unlike bitumen; and therefore the *Greeks* call it *Asphaltion*: but our people, because of its shape, call it *Trifolium acutum*; sharp trefoil; for it grows up with long and bristly leaves: it makes a stronger stalk than that which grows in meadows. They pour the juice of this herb, mixed with wine, into their chops; and spread the leaves themselves bruised with salt, in the manner of a pultefs, upon the scarification. Or, if the season of the year does not afford this green herb, they gather the seeds of it, and smooth them, and give them with wine to drink; and they put upon the scarification the roots of it bruised with its own stalk, and mixed with meal and salt, after they have been soaked in honey-water. It is also a speedy and effectual remedy, if you bruise five pound weight of the tops of ash, with as many *sextarii* of wine, and two of oil; and, after you have squeezed out the juice, pour it into their chops: also you may put the tops of the same tree, bruised with salt, upon the part that is hurt.

The bite of a sloe-worm causes a swelling and suppuration: that of a shrew-mouse has the same effect. But the hurt sustained by the first is cured with a brazen awl, if you prick the place that is hurt with it, and anoint it with *Cimolian* chalk, or clay (4), soaked in vinegar. The mouse pays with her own body for the mischief it has been the cause of; for they plunge the animal itself into oil, and kill it; and, after it is putrified, they bruise it, and with that medicine they anoint the part that is bitten by the shrew-mouse: or, if that cannot be had, and the humour shews the hurt that its teeth have done, they bruise cumin, and add a little liquid pitch, and hogs-lard, or axle-tree grease, to it, that it may have the clamminess of a pultefs: this put upon it removes the mischief: or if, before the swelling is discussed, it turns to a suppuration, it is best to cut off all the suppurated part

(3) *Simonianum trifolium*, so called from *Simus* a physician, who probably first found out the qualities of this sort of trefoil. *Pliny* makes mention of him, and by his authority supports his opinion, that this sort of trefoil has something of a poisonous quality; for he says, that if either a decoction of it, or the juices of it bruised, be poured into the body, it will occasion the same burnings and itchings, as it does when it is laid upon the wound made by the bite of a serpent; and advises not to use it but against the poisons of serpents, where *Pliny* supposes it may operate, as one sort of poison does against another.

(4) *Cimolia creta*, a kind of chalk or fullers earth, which is found in the island *Cimolus*, which is one of the islands the antients called *Sporades*: it lies in the *Cretian* sea, and is by the inhabitants still called *Kimolo*, tho' it seems the *Venetians* have changed its name, and call it *Argentiera*.

with a burning-hot lamin, and to burn all the affected part with an hot iron, and so anoint it with liquid pitch and oil. They also use to wrap up the animal itself alive in potters clay, and, after it is dried, to hang it at the neck of the oxen. That thing preserves the cattle from receiving any hurt from the bite of a shrew-mouse.

Diseases or blemishes in their eyes are for the most part cured with honey : for, if either they are swelled, they sprinkle honey-water upon wheat-flour ; and put it upon them, or, if there be a white spot or web in the eye, mountain salt (5), or *Spanish* salt, or ammoniac (6), or *Cappadocian* salt (7) also, bruised very small, and mixed with honey, diminishes the blemish. The shell of the cuttle-fish bruised, and blown into the eye thrice a day through a reed, has the same effect. The root, which the *Greeks* call *Silphion*, but the common people, according to the custom of our country, call *Lasèrpitium*, *Lasèrwort*, does the same. To any quantity whatsoever of this, they add ten parts of sal ammoniac, and throw them likewise into the eye, after they have been bruised in the same manner : or the same root bruised, and mixed with the oil of mastich, and put upon the eye, purges away the blemishes. Barley-meal soaked in water, and dried at the fire, and sprinkled with honey-water, and put upon their eyebrows and cheeks, suppresses an inflammation and fluxion in their eyes ; and the seeds of the wild parsnip, and the juice of the wild radish, with honey, asswage the pain of the eyes, when they are anointed therewith. But whenever honey, or any other juice, is applied with remedies, the eye must be anointed all round with liquid pitch and oil, that it may not be infested by the flies ; for not these only, but bees also, fly to the sweetness of honey, and other medicines.

(5) *Sal montanus*, by *Vegetius* called *fossil salt*, because it is dug out of pits or quarries upon mountains, where it is cut like stone out of quarries.

(6) *Sal ammoniacus*, so called, as *Pliny* tells us, because it is found under the sands in great quantity, in the sandy deserts of *Africa*, especially in the *Cyrenian* tracts : therefore it has its name, not from the place where *Jupiter-Hammon's* temple stood, but from the sand where-ever it is found.

(7) *Sal Cappadocius*. *Pliny* mentions two sorts of salt found in *Cappadocia*, one sort formed in the extreme parts of a lake, where the water is condensed into salt by the heat of the sun ; and another sort dug out of the mountains in very great quantities, and in great lumps.

C H A P. XVIII.

Of Remedies to be given them when they have swallowed an Horse-leech with their Water.

AN horse-leech also, swallowed with their water, is often the cause of great mischief. This, sticking to their jaws, sucks the blood, and by its growth shuts up the passage for their food. If it is in a place so difficult to come at, that it cannot be pulled away with the hand, put a pipe or reed into it, and so pour warm oil into it: for, whenever this touches it, the animal falls off. Also the smell of a burnt bug may be conveyed into it through a pipe; for the bug, when it is put upon the fire, sends forth a smoke, and the pipe conveys the burning smell, that it attracts as far as the horse-leech; and that smell drives it away, and makes it quit its hold. If, nevertheless, it takes hold, either of the stomach, or intestines, it is killed with hot vinegar poured into them through an horn. Although we have directed these medicines to be applied to oxen, nevertheless there is no doubt, but very many of them are also proper for all sorts of greater cattle.

C H A P. XIX.

Of a Machine in which Cattle are shut up when their Sores are dressed.

BUT a machine also must be framed, wherein horses and oxen may be shut up and dressed, and that they who have the cattle under cure, may have nearer access to them, and that the four-footed beast may not, by struggling against them, refuse the remedies at the very time they are dressing him. And this is the form of such a machine: You must lay a firm compact floor upon the ground with oaken planks, of nine feet in length; and let the fore-part have two feet and an half in breadth; and the hinder-part four feet. Upon this floor you must fix on both sides of it four upright posts of seven feet. Moreover, you must fasten such of them as are in the very four corners to one another. And bind them all to each other with six cross-poles, as if they were rails, so that the four-footed beast may be brought into it

it at the hinder-part where it is broadest, as into a cage, and may not be able to go out at the other end, the small opposite planks hindering him. But upon the two first erect posts you must place a strong yoke or beam, to which horses may be tied with an halter, or the horns of the oxen be fastened; where you may also frame stocks or collars, that, after their head is put into them, their neck may be held fast by rulers, or pins descending through holes made in them: the rest of their body is bound fast, being intangled and distended with the poles that are laid across, so that the beast is exposed to the will and pleasure of him that has him under cure, without being able to move. This very machine shall be common for all four-footed beasts of a larger size.

C H A P. XX.

Of the Form and Shape of a Bull.

FOrasmuch as we have given you sufficient instructions concerning oxen, it will be proper and convenient now to speak of bulls and cows. I am of opinion, that bulls are most to be approved, which have the largest members, are of a gentle disposition, and good-natured, and of a middle age: as to other things, we must observe almost the same directions in chusing them, as in chusing oxen. For in no other thing does a good bull differ from one that is castrated, but that he has a grim, stern countenance, a more lively, brisk aspect, shorter horns, a more brawny neck, and so huge, that it makes the greatest part of his body, with a somewhat lanker and more trussed up belly; and that he is more straight, and fitter for coupling with the females.

C H A P. XXI.

Of the Form or Shape of a Cow.

COWS also are approved, which are of the tallest make, and long, with very great bellies, exceeding broad foreheads, black, wide, and full eyes, beautiful horns, that are both smooth, and inclining to black, hairy ears, flat, compressed cheek-bones, exceeding large dew-laps and tails, moderately small hoofs and legs. As to other things, almost the same are required in the females as in the males, and especially,

cially, that they be young; because when they are above ten years old, they are useless for breeding. On the other hand, they must not be put to the bull when they are under two years old: if, nevertheless, they conceive before, I think it proper, that their young be taken from them, and that during three days their udders be emptied, that they may not be in pain, and that afterwards they be intirely removed from the milk-pail.

C H A P. XXII.

Of reviewing and picking the Cattle every Year.

BUT you must take care to review every year this sort of cattle, as well as all other herds and flocks whatsoever, and to pick them carefully: for, both such as have brought forth young, and are old, and have left off breeding, must be removed; and also such as have never been with young, which take up the place of those that are fruitful, must be banished from the herd, or broken for the plough; for, by reason of the barrenness of their womb, they can endure labour and fatigue no less than bullocks.

This kind of cattle desires to have their winter quarters upon the sea coast, and exposed to the sun; and in the summer delights more in the darkest recesses of woods, and tops of mountains, than in plain pastures: for their hoofs are better hardened (1) in grassy woods and thickets, and sedge-plots, than in stony places. Nor have they such a desire for rivers and brooks, as for pools made by hand; because river-water, which is commonly colder, makes them cast their calves, and rain-water is sweeter. Nevertheless, all cows whatsoever can endure external cold, better than horse-cattle of any kind: therefore they easily pass the winter in the open air.

(1) *Durantur ungulae.* There is very great reason to think, as *Pontedera* observes, that the text is corrupted in this place; for it cannot be, that their hoofs are better hardened in watery places, marshes, and fens, than upon hard and rocky mountains; for *Varro*, *lib. ii. cap. 8.* says, that mules, bred in marshy and dusy places, have soft hoofs; but if they be driven in the summer-time to the mountains, as in the territory of *Reate*, their hoofs become exceeding hard: and *Columella* himself says, *lib. vii. cap. 37.* that it is fit to remove a mule from its dam when it is one year old, and send it to the mountains to harden its hoofs; so that it seems necessary to read it *saturantur juvencæ.* That grassy woods and marshes afford better pasture for heifers. And this is evident from the following words, which are more suitable to this amendment. *Gesnerus* thinks, that it comes near to the common reading, to change it to *durant juvenculae.*

C H A P. XXIII.

Of making Inclosures and Stables.

BUT you must make inclosures for them in a wide space, that so, in strait and narrow places, the one may not crush the other, and make her cast her calf, and that the weak may be able to avoid the blows of the stronger. Stables that are laid with great rough stones, or round pebbles, are the best: nevertheless, such as are laid with gravel also, are not incommodious; those, because they throw off and refuse the showers; and these, because they suck them up quickly, and let them pass through. But let them both be sloping, that they may throw off the moisture; and let them look to the south, that they may dry easily, and not be exposed to cold winds.

Pasture-grounds require but very little care; for, that the grass may thrive the better, and spring up in greater plenty, commonly in the latter end of the summer they set it on fire: this both makes tenderer new grass to spring up again, and the thorns and briars being burnt, it checks the shrubs and herbs with great stalks, which would rise to a great height. But salt, thrown upon rocks and troughs near the inclosure, contributes to the health of their bodies: to this they willingly have recourse, after they have filled their bellies, when with the pastoral signal there is as it were a retreat sounded. For this ought always to be done towards the twilight, that so, at the sound of the horn, the cattle, if any of them remain still in the woods, may accustom themselves to return to their inclosures; for so the whole herd may be reviewed, and their number reckoned up, if, according to military discipline, as it were, they abide within the quarters assigned them by the keeper of the stables. But the same power and authority is not exercised over bulls, which, relying upon their great strength, wander through the woods, and have free egress and ingress, and return when they please, and are not called back, unless it be to couple with the females.

C H A P. XXIV.

Of the Age fit for a Bull to couple with the Female.

SUCH of the bulls as are younger than four, and older than twelve years, are not allowed to couple with the females: those, because of their puerile age, as it were, are reckoned not very fit for raising a new breed, and increasing the herd; these, because they are worn out with old age, and past gendering. In the month of *July*, for the most part, the females must be allowed to be with the males, that so the next spring, when the forage is grown up, they may bring forth the young they conceived at that time. For they go with young ten months, nor do they suffer the male at the command of their keeper, but of their own accord; and for the most part their natural desires answer to the time I have mentioned, because the cattle, being exhilarated with the superabundance of vernal forage, grow lascivious. But if either the female refuses, or the male has no desire, their desire is raised by the same method we shall presently direct with respect to horses which disdain the female, *viz.* by conveying the smell of their genitals to their nostrils.

But you must withhold a part of their fodder from the females about the time you put them to the male, lest the too great fatness of their body make them barren; and you must add to the bulls allowance, that they may be the stronger for gendering; and one male may abundantly suffice for fifteen cows: and when he has leapt upon an heifer, you may know, by certain signs, which sex he has generated; because, if he leapt off at the right side, it is manifest he has gendered a male; if at the left side, a female. Nevertheless, that does not appear to be true, otherwise, but when, after one coition, being with calf, she does not afterwards admit the bull; which very thing rarely happens. For, altho' she be with young, yet her lust is not fully satisfied: so mighty powerful even in cattle, beyond the bounds of nature, are the flattering allurements of pleasure. But there is no doubt, where there is great plenty of fodder, that a cow may have a calf, and bring it up every year; but, when there is a scarcity of forage, she ought to be put upon breeding every other year, which we are of opinion ought to be done, especially with respect to cows that are put to labour, that so the calves may be satiated with milk for the space of one whole year; and that the cow which is with calf may not be

grieved and oppressed with the burden both of her belly and her work at the same time : and after she has brought forth her young, unless she be sufficiently supported with food, tho' she be a good nurse, yet, being fatigued with labour, she with-holds from her son a great part of his nourishment. Therefore they give her, after she has calved, green *Cytisks*, (shrub-trefoil) and parched barley, and soaked bitter vetches ; or they give her a drench of young colewort, and toasted and ground millet (1), and soaked in milk for one night, mixed together. The *Altinian* cows (2) also, which the inhabitants of that country call *Cevas* (3), are more esteemed for these uses. These are of a low stature, and yield abundance of milk ; for which reason, their own offspring, being removed from them, are brought up and educated at the udders of those that are aliens and utter strangers to them : or, if this relief is not at hand, bruised beans and wine sustain them very well ; and this must be done especially in great herds.

C H A P. XXV.

Of Remedies for Worms in Calves.

BUT worms, which commonly breed in crudities, are usually hurtful to calves ; therefore they must be moderately fed, that they may digest well : or, if they labour already under such an indisposition, they bruise parboiled lupins, and thrust morsels of them down their throats in the manner of a drench. Also the herb *Santonica*, (wormwood of *Saintonge*) may be bruised together with dry figs and bitter vetches, and made into sops, and put down their throats, as if it were a drench. One part of grease, mixed with three parts of hyssop, has the same effect.

(1) *Tenero olere, et cætera, salivatur.* From the different readings of this sentence, *Pontedera* is of opinion, that it ought to be corrected thus ; *Et tener vitulus torrido molitque milio, &c. salivatur.* This correction is not improbable ; for *Palladius*, who copies from *Columella*, says, that toasted and ground miller, mixed with milk, ought to be given them in the manner of a drench.

(2) *Altinæ vaccæ.* *Pliny, lib. viii. c. 45.* mentions *vaccæ Alpinae* ; and Father *Hardouin* takes occasion there to correct this place of *Columella*, and says, that it ought to be read *vaccæ Alpinae* ; for if the author had meant, that they had their name from *Altina*, a town in *Italy*, they would have been called *vaccæ Altinates* ; and accordingly *Columella, lib. vii. c. 2.* has *oves Altinates.*

(3) *Cevas.* *Gesnerus* thinks, that this word is almost the same with *kube*, or *kuwe*, the *German* or *Swiss* word for *vacca*, a cow ; and the author might mean, cows brought out of *Switzerland* for the purpose mentioned in the text.

Also the juice of horehound, and of the leek, is effectual for killing animals of this sort.

C H A P. XXVI.

Of castrating Calves.

MAGO is of opinion, that calves should be castrated while they are yet very young; and advises not to do it with a knife, but to compress their testicles with cloven fennel-giant, and to bruise them by degrees; and he thinks, that of all ways of castrating, that is the best, which is performed upon the young and tender age, without a wound; for, when the calf is already grown strong, and the parts hardened, it is better to castrate him when he is two years old, than when he is one. And he directs to do it either in the spring, or in autumn, when the moon is decreasing, and to bind the calf to a machine; then, before you apply the knife, to take hold with two wooden rules (as it were with a pair of pincers) of the strings of the testicles, which the *Greeks* call κρεμαστήρας (1), for this reason, because the genital parts hang by them; and, having taken fast hold of them, presently to lay open the testicles with a knife; and, after you have squeezed them out, to cut them in such manner, that the extreme part may be left sticking to the foresaid strings: for, by this method, the steer is neither endangered by the eruption of the blood, nor intirely emasculated, by taking away all his virility; but, preserving the form of a male, he lays down his power of gendering, which, nevertheless, he does not presently lose; for, if you suffer him, after he is newly castrated, to couple with the female, it is manifest she may conceive by him. But that is not at all to be permitted, lest he perish by a large effusion of blood; but you must anoint his wounds with spray-ashes, and the scum of silver; and you must keep him that day from water, and nourish him with very little food. The three following days you must solace and cherish him, as if he were sick, with tops of trees, and green fodder cut down for him, and restrain him from much drinking. I advise you also to anoint the wounds themselves, after three days, with liquid pitch and ashes, with a little oil, that they may both close, and form a scar the more quickly, and not be infested by the flies. What we have said thus far of oxen is abundantly enough.

(1) Κρεμαστήρας, Cremasters, from κρεμάω, *suspendo*.

C H A P. XXVII.

Of Horses.

IT is highly proper, that they who have the bringing up of the horse-kind much at heart, should provide an industrious keeper, and plenty of forage, both which, suppose they be but indifferent and ordinary, may serve for other cattle. But horse-cattle requires the greatest diligence and attendance, and a large quantity of food, even as much as they can eat. This kind is divided into three sorts; for there is a noble generous breed, which furnishes horses for the *Circus*, and the Sacred Games. There is the mule-breed, the foals of which are purchased at a noble price. There is also the vulgar breed, which produces indifferent and ordinary males and females. The more excellent each of these sorts is, the more plentiful and rich field they have assigned to them for their pasture. But, for herds of this kind of cattle, spacious, marshy, and also mountainous pastures, must be chosen; such as are well watered, and never naturally dry; rather free from any kind of trees or shrubs, than intangled and incumbered with them; abounding in very thick and soft, rather than in high grass.

Vulgar ordinary horses, both male and female, are allowed to feed together promiscuously; nor are there any certain times observed for putting the males and females together. Let the males be joined to the females, of a noble and generous race, about the time of the vernal Æquinox, that so foaling at the same time of the year wherein they conceived, they may bring up their foals with little labour, the fields being now verdant, and abounding in grass after the harvest is gathered in; for they bring forth their young in the twelfth month. Therefore great care must be taken, at the foresaid time of the year, that both the mares and the stallions may have full liberty to couple, when they have a desire to it; because this kind of cattle, especially if you restrain them, is extimulated by the furious ragings of lust; and it is for that reason, that the name *Hippomanes* (1) is given to that poison, which kindles in mortals a fire of love, like the libidinous desires of horses. Nor is there any doubt, but, in some countries, the

(1) *Hippomanes*, ἀπὸ τῆς μανίας τῆς ἵππου. *Plin. Hist. Nat. lib. viii. 42.* says, that this is an excrescence in the forehead of a foal, at the time it is foaled, which was a principal ingredient in philtres, and other poisonous draughts. They who have the curiosity to know more of it, may consult *Pliny* and *Aristotle*. *Virgil* also, in his 4th *Æneid*, and in some other places, makes mention of it.

mares are inflamed with such a strong and ardent desire of coition, that, altho' they have not the male, yet, by their continual and excessive desire, raising in themselves the imagination of venery, they (in the manner of fowls constantly kept in a barton) conceive with the wind: which things the poet expresses with greater licence (2):

' But, more than all, remarkable and strange
 ' The fury of the mares: fair *Venus*' self
 ' Gave them this bent of mind, just at the time
 ' When the four *Potnian* mares, which drew the car
 ' Of *Glaucus*, all his limbs in pieces tore
 ' With their devouring jaws. Them *Cupid* leads
 ' O'er *Gargarus*, and o'er the founding stream
 ' Of loud *Ascanius*: they o'er the tops
 ' Of mountains climb, and over rivers swim.
 ' Still in their tender marrow lurks the flame,
 ' And new desires arise, which, in the spring,
 ' More ardent grow; for then the genial heat
 ' Into their bones returns; then to west winds
 ' All turn their heads, and on the lofty rocks
 ' Stand pausing, and the light and cooling breeze
 ' Snuff up; and often by the wind conceive,
 ' Without the male, (too wondrous to relate!)
 ' Then over rocks, and hills, and dales, they fly:
 ' Not where, *East Wind!* thou first beginn'st to blow,
 ' Nor where the sun first rears his radiant head;
 ' But whence the north and north-west winds arise,
 ' And south wind, which, with blackest darkness clad,
 ' With cold and rains, makes sad the chearful day.'

Forasmuch as it is a thing also very well known, that on the Sacred Mountain in *Spain* (3), which extends itself toward the west, hard by the ocean, mares have frequently been pregnant without coition, and

(2) *Virg. Georg. lib. iii. 266.*

(3) *Monte Sacro.* *Varro* says, that this happens upon mount *Tagrus* in *Portugal*, near *Lisbon*, hard by the ocean. *Pliny* also mentions this fable, and says, that it was a thing which was well known to happen upon the river *Tagus* near *Lisbon*, &c. It cannot but seem strange, that such grave authors should mention this as a thing to be depended on. *Virgil*, indeed, is to be excused, who, as a poet, might indulge his own fancy. But *Justin* speaks more rationally, and says, that many authors indeed had delivered it as a truth; but that it was only a fable, which had its rise from the fruitfulness of mares, and the vast multitude of horses, in *Gallicia* and *Lusitania*, which are so numerous, and so swift, that not
without

and have brought up their offspring ; which nevertheless is of no use, because it is snatched away by death when three years old, before it comes to maturity.

Wherefore, as I have said, we must take care, that mares be not tormented with their natural desires, about the time of the vernal Æquinox. But, during the rest of the year, you must remove from the females the horses of great value, that they may neither cover them when they have a mind to it, nor suffer harm, if they are restrained from doing it, when they are solicited by their natural desires : therefore I am of opinion, that the male ought either to be sent out of the way into very distant pastures, or kept at his manger. And, at the time when he is invited by the females, he must be strengthened with a large allowance of food ; and, when the spring approaches, you must pamper him with barley and bitter vetches, that he may endure the fatigue of venery ; and the stronger he is for this task, so much the stronger seminal principles will he communicate to his future offspring.

Some also direct us to fatten a stallion (4) in the same manner we do mules, that so, being heartened by this good keeping, he may suffice for very many females. Nevertheless, one stallion ought not to impregnate less than fifteen, nor more than twenty mares. And he may be made use of for this purpose when he is three years old ; and for the most part he is fit for it till he is twenty. But if the stallion is lazy, and backward to perform his part, they pass a sponge over the parts of the female, and convey the smell to the horse's nostrils, by rubbing him with the same. On the other hand, if the mare will not suffer the male, they anoint her natural parts with bruised squills, which thing kindles her lust. Sometimes also a vulgar ignoble horse raises in them a desire of coition ; for, when he is let into her, and has almost brought her to a compliance, they take away the female, and, now she is become more passive, they put a horse of a nobler breed upon her. From the time they are pregnant, greater care must be taken of them, and they must be strengthened with plentiful pastures : and if with the cold of winter the grass shall fail, let them be kept in

without reason they may seem to be conceived by the wind. Some authors think, that both in our author, and in *Varro*, the true reading is, *Monte Artabro*. *Pliny*, indeed, says, that in this place of the country there is a vast promontory, which runs out into the ocean, which some called *Artabrum*, *lib. iv. 21*. Perhaps it was called the *Sacred Mount*, from some famous temple that stood there.

(4) *Admissarium saginare eodem modo quo mulos*. *Pontedera* thinks, that instead of *mulos* we ought to read *tauros* ; for, as mules do not propagate, it is not probable the author had his eye upon them : but both *Varro* and *Columella*, and other ancient authors, direct us to pamper bulls at a certain season, and keep them apart from the cows till the proper time.

the house, and neither be employed in working, nor running, nor exposed to the cold, nor shut up in a narrow confined place, lest one make the other cast her foal ; for all these inconveniences have this effect.

But if the mare has suffered, either in foaling, or by abortion, rock-fern bruised, and thoroughly mixed with lukewarm water, and given through a horn, will be a remedy for her. But, if all has succeeded well, the foal must by no means be handled ; for he is hurt even by the lightest touch : only care must be taken, that he keep with the dam in a large and warm place, lest either the cold hurt him, while he is yet weak, or his mother squeeze and bruise him in a narrow straight place. Then you must bring him out, by little and little, and take care that he do not parch his hoofs with the dung. When he is grown stronger, he must be presently sent out into the same pastures where his mother is, lest the mare be in pain for want of her foal. For this kind of cattle especially, catches hurt from the love they have to their young, unless they be allowed to have them in their company. It is usual for a vulgar mare to bring a foal every year ; it is proper to restrain one of a noble breed every other year, that so her foal, growing stronger with his mother's milk, may be prepared for the labours of the public games.

C H A P. XXVIII.

Of the Age of a Stallion.

THEY think, that a male younger than three years is not fit for a stallion ; but that he may procreate till his twentieth year ; and that a female of two years old may very well conceive, that so, foaling after her third year, she may bring up her foal ; and that she is useless after her tenth year, because the breed of an old mare is slow and sluggish. *Democritus* affirms, that it depends upon our own pleasure, whether a male or a female be conceived : and he directs, that when we have a mind that a male should be procreated, we should bind the stallion's left testicle with a small flaxen cord, or with any other cord whatsoever ; and when we would have a female, the right testicle. And he is of opinion, that the same thing ought to be done with almost all cattle whatsoever.

C H A P. XXIX.

Of the Temper, Disposition, and Form of an Horse.

BUT when a foal is foaled, we may presently judge of its temper and disposition. If it is chearful, if intrepid, if it is neither frightened at the sight, nor with the hearing of any new thing ; if it runs before the herd ; if in wantonness and chearfulness, and sometimes in running a race, it surpasses all its equals ; if it leaps over a ditch, or crosses a river, or a bridge, without stopping ; these things will be documents of the noble, ingenuous disposition of his mind.

But the form of his body will appear by his very small head, black eyes, wide nostrils, short and straight erect ears ; his soft and broad, but not long neck ; thick mane, hanging down and spreading upon the right side ; broad and well-proportioned breast, with brawny and regularly-swelling muscles ; large and straight shoulders ; inflected or bending sides ; double back-bone ; lank and trussed-up belly ; two equal and very small testicles ; broad and subsiding loins ; a long bristly and curled tail ; equal, tall, and straight legs ; a round and small knee, and not looking inwards ; round buttocks ; brawny, muscular, and well-proportioned thighs ; hard and high, and hollow and round hoofs, upon which middling coronets are placed ; and his whole body so compactly formed, as to be majestic, tall, erect, and from its aspect nimble and active also ; and, as much as its figure, or natural shape, permits, with a tendency from long to round. But that temper and these manners are commended, which from gentle and quiet become fiery and eager, and, from being fiery and eager, return again to be exceeding gentle and calm : for such as these are found to be more yielding and tractable, and exceeding patient of the labour and fatigue of the public games.

It is right to break an horse for domestic use, when he is two years old ; but, for the public games, when he is three years complete ; so, nevertheless, that he be put to labour after his fourth year at farthest. The marks of his years change with his body ; for, while he is two years and six months old, his upper and lower middle-teeth fall : when he is going in his fourth year, having cast those that are called the canine teeth, he brings others : then, within the sixth year, his upper jaw-teeth or grinders fall. In his sixth year he fills up and makes even those teeth he first changed. In his seventh year they are all filled up equally, and from that time he carries them hollowed : nor afterwards can it be certainly known how many years old he is. Ne-

ver-

vertheless, in his tenth year his temples begin to grow hollow, and sometimes his eye-brows to grow grey, and his teeth to stick out. I reckon, that what I have already said, relating to his mind, temper, and manners, and his body and age, may abundantly suffice. Now our next business is to shew the care that is to be taken of them, both when they are in a good and in a bad state of health.

C H A P. XXX.

Of the Care of Horses, and of Medicines proper for them.

IF horses in good health are lean, they are more speedily restored and made up again, with parched wheat, than with barley. But a potion of wine must also be given them, and then you must withdraw this sort of food from them by degrees, mixing bran with their barley, till they be accustomed to live upon beans, and pure barley. The bodies of horses must be daily rubbed down no less than those of men: and oftentimes your having curried them, and rubbed their backs as hard as you can, is of more benefit to them, than if you should give them the largest allowance of food; but it is of great importance to preserve the strength of their body and feet, both which we may maintain, if we lead the cattle at proper times to their mangers, to water and to exercise; and take care that they be stabled in a dry place, that their hoofs may not grow moist with wet, which we shall easily avoid, if either the stables are laid with oak-planks, or if the ground be carefully cleaned, and straw thrown upon it.

For the most part, labouring horses contract diseases from weariness, and violent heat; sometimes also from cold, and from their not having made water at their own time; or if they are in a sweat, and drink presently after their having been in a violent motion: or if, after they have stood long, they are all of a sudden spurred and galloped. *Rest* is a cure for lassitude, if so be that oil, or fat mixed with wine, be poured into their chops. To a cold, fomentations are applied, and their head and back-bone are anointed with warm grease or wine. The remedies are almost the same, if he does not make water: for they pour oil mixed with wine upon his flanks and reins; and, if that has no good effect, they put a very small suppository, made of boiled honey and salt, into the hole by which the urine passes; or they put a living fly, or a grain of frankincense, or a suppository of bitumen, into his

naturals. They apply the same remedies, if the urine has scalded his genitals.

Tears running down in abundance, and flaccid ears, and a neck over-burdened with the weight of his head, and hanging down to the ground, are indications of a pain in his head : then they cut and open the vein which is under his eye, and foment his mouth with warm water, and keep him from meat the first day. But the next day they give him fasting a potion of lukewarm water, and green grafs ; also they spread old hay or soft straw under him, and give him water again in the twilight, and a little barley with two pounds and an half of vetches, that with a very small portion of food he may be brought to his ordinary allowance, and to perform his usual task.

If an horse has a pain in his jaw-bones, you must foment them with warm vinegar, and rub them all over with hogs-grease ; and you must apply the same medicine to them when they are swelled. If he has hurt his shoulders, or if the blood be fallen down into his legs, let the veins be opened almost in the middle of both his legs, and let his shoulders be anointed with the blood that flows out of them, after you have mixed fine powder of frankincense with it ; and you must apply the horse's own dung to his flowing veins, and bind them up with bandages, that they may not be emptied more than they ought to be. Also, the day after, let him be blooded in the same veins, and treated after the same manner ; and let him be kept from barley, and a little hay given him. Then the day following, and always till the sixth day, let about three *cyathi*, or cupfuls, of the juice of leeks, mixed with an *hemina* of oil, be poured down his throat thro' an horn. After the sixth day, let him be made to step slowly ; and, after he has walked, it will be proper to put him down into a pond, so that he may swim. Thus, by degrees, being cherished and assisted with stronger food, he will be brought to his ordinary allowance and, usual task.

But if bile be troublesome to an horse ; if his belly swells, and he does not break wind ; they put their hand, anointed with oil, into his fundament, and open the natural passages that are obstructed, and take out the dung : afterward they bruise wild origany (1), and lousewort (2) with

(1) *Cunila bubula* is the same with *origanum silvestre*, wild origany Pliny says, that it has a seed like pennyroyal ; it is called *Heracleion origanum*, or *panax Heraclea*. Father Hardouin quotes a verse out of Nicander, to prove, that *cunila* and *origanum Heracleoticum* are the same. Dioscorides also says, *lib. iii. 32.* that some call the *origanum Heracleoticum*, *cunila*. Columella says, *lib. ix. 4.* that the garden *cunila* is by the Rustics in Italy called *Jatureia*, savory.

(2) *Herba pedicularis*, lousewort ; so called, from the effect it has in destroying lice.

with salt, and boil them, and mix them with honey, and so make them into suppositories, and administer them to him ; these will move his belly, and bring away all the bile. Some pour a quarter of a pound of bruised myrrh, with an *hemina* of wine, down his throat, and anoint his fundament with liquid pitch. Some give him a clyster of sea-water ; others of fresh brine. Worms also, like earth-worms, use to hurt their intestines, of which the signs are, if the horses tumble frequently with pain ; if they move their head to their belly ; if they frequently toss their tails. A present remedy is as we have already directed, to thrust in your hand, and pull out the dung, and then to give them a clyster of sea-water, or very strong brine ; and afterward to pour down their throat the root of the caper-bush bruised, with a *sextarius* of vinegar : for by this means the foresaid animals are destroyed.

C H A P. XXXI.

Of Remedies for a Cough.

BUT litter must be spread very deep under all feeble cattle whatsoever, that they may lie the softer. A fresh cough is quickly cured with lentils beaten in a mortar, and separated from their husks, and ground very small ; which things being thus done, they mix a *sextarius* of warm water with the same quantity of lentils, and pour them down their throat : they give the like medicine for three days, and the sick cattle is comforted and restored with green herbs, and the tops of trees. But an old cough is disaffected with three *cyatbi* of the juice of leeks with a pint of oil poured into their chops, and by giving them the same food as we directed before.

You must rub ring-worms, tetter, and whatever part the scab seizes upon, with vinegar and alum ; and, if these continue, they are sometimes anointed with nitre and scissile alum in equal quantity, mixed thoroughly with vinegar. Then rub pimples, blisters, or risings on the skin with the currycomb, in the scorching heat of the sun, till such time as the blood be forced out of them : then they mix an equal

By *Pliny* it is reckoned to be the *staphis agria* of *Dioscorides*. It has leaves like those of the wild vine, and a flower like that of woad ; straight, soft, and black shoots, and green little hulls or pods like those of chiches ; and in them a triangular rough kernel, of a black-yellowish colour, white within, and sharp to the taste. See *Matthiol. in Dioscor. p. 850.*

quantity of the roots of *Quick-grass* (1), sulphur, liquid pitch, and alum ; and with this medicine the foresaid ailments are cured.

C H A P. XXXII.

Of Remedies for Hurts by Interfering, and for the Scab.

WHEN the skin is rubbed off, and a wound made by interfering (1), they wash it twice a day with warm water, and, presently after, they rub it with salt bruised and boiled with grease, till the strength of the corrupted matter drops out of it. The scab is mortal to this four-footed beast, unless a speedy remedy be applied to it. If it be but slight and inconsiderable, when it first begins, they anoint it in the heat of the sun, either with the rosin or pitch of the cedar-tree (2), or with the oil of mastich (3), or with nettle-seed and oil bruised together, or with whale-oil, or with that which salted tunny throws out in the dishes it is served up in. Nevertheless the fat of a sea-calf contributes most of any thing to cure this ailment. But, if it is already become inveterate, more violent remedies are necessary ; for which reason they boil bitumen, and sulphur, and white hellebore, mixt together in equal quantities, in liquid pitch, and stale hogs-lard, or axle-

(1) *Agrestis herba*. If this be the true reading, it is impossible to divine what kind of herb the author means : perhaps it may be, as some conjecture, a kind of grass called *agrostis*, which they say is a kind of herb with many knots and joints, from each of which it puts forth stalks upward, and roots downward ; and the said stalks are the seminaries of others ; and so it proceeds, till it over spreads every place, which cannot be prevented but by pulling it up intirely by the roots. *Homer* mentions it, and calls it ἀγρωσιν μελινδέα, Some call it quick-grass, or dogs-grass.

(1) *Intertrigo, interfering*, from *inter* and *tero*. It is rubbing or knocking one heel against another ; and here it signifies the hurt or sore made by interfering.

(2) *Cedria* is the rosin issuing out of the great cedar-tree. *Pliny* indeed says, that *cedria* is the pitch of the great cedar called *cedrelate*. But *Dioscorides* says, that the cedar is a great tree, from which that, which they call *cedria*, is gathered ; by which, no doubt, he means the rosin or gum. Some authors call it *gummi* ; others *lacryma* or *unguentum*, which is different from the pitch, which is extracted by fire, which *Pliny*, in his *nat. hist. lib. xvi. c. 11*. says, is made by cutting of wood, laying it in heaps, and surrounding it with furnaces ; and that the liquor, which flows first, and is the most liquid, is called *cedrium*. This some call *virgin pitch*, being the purest and the best, the other which follows being of a grosser quality.

(3) *Lentisci oleo*. *Lentiscus* is the tree, and the rosin of it is called *mastiche*. *Dioscorides* says, that the best is in the island of *Chios*, from which they extract an oil, as also from the wood of the tree. *Pliny*, in several places, mentions *oleum e lentisco*. Some say the tree has its name from its pliability and toughness.

tree-grease (4), and cure them with that composition; but they first scrape off the scab with a knife, and wash it thoroughly with urine. Sometimes also it has been of great benefit to open to the quick, and cut away the scab with a penknife, and so to cure the wounds that are thus made with liquid pitch and oil, which thoroughly cleanse and fill up the wounds equally; and, when they are filled up, that they may close and form a scar the more quickly, foot, from a caldron or kettle, rubbed upon the ulcer, will be of very great benefit.

C H A P. XXXIII.

Of Remedies against Flies, and for Pains in the Eyes.

WE shall also remove flies, which infest their wounds, with pitch and oil, or any other ointment, mixt together, and poured upon them. As for other things, they are cured very well with the meal of bitter vetches. Cicatrices (1) or specks of the eye are diminished, when they are rubbed with fasting-spittle and salt, or with the shell of the cuttle-fish bruised with fossile salt, or with the seed of the wild parsnip bruised in a mortar, and squeezed through a linen cloth upon the eyes. And all pains of the eyes are quickly eased, by anointing them with the juice of a plantane, with honey made without smoke, or, if this cannot be had, certainly with thyme-honey. Sometimes also a flowing of blood through their nostrils has brought them into danger; and this is stopped by pouring the juice of green coriander into their nostrils.

(4) *Axungia*, hogs-lard, or axletree-grease. Both *Pliny* and our author highly commend hogs-lard for several uses and cures, especially that of a boar, which they use for anointing axletrees, from which it has its name, *quasi ab unguendo axes*. Probably they intended that which had been used for some time for that purpose, and then to be taken off, and applied as they directed; for the particles of the iron, by frequent attrition, mixing with the grease, and heated to a certain degree, may be of great efficacy in many cases. See *Plin. nat. hist. lib. xxviii. c. 9.*

(1) *Cicatrices oculorum*. The *Greeks* call them *νεφέλια*; the *Latins*, *nubeculae*, little clouds. Some define them a superficial exulceration of the black of the eye, occasioned by the distillation of an humour into it. Some distinguish the *albugines* and *cicatrices* thus, that these are upon the surface, and are called *ελαϊ* and *νεφέλια*; those are called *λευκώματα*, and are the *cicatrices longius progressæ*.

C H A P. XXXIV.

Of Remedies for nauseating of their Food, and a pestilential falling away of their Flesh.

SOMETIMES also the cattle languishes with a loathing of their food. A kind of feed, which they call *git* (1), is a remedy for this, of which they put two *cyathi* or cupfuls bruised to three *cyathi* of oil, and a *sextarius* of wine, and so pour it into their chops. A nauseating is also removed, if you give them frequently to drink the head of a garlick bruised with an *hemina* of wine. It is better to open an impostumation with a red-hot *lamina*, than with a cold iron-instrument; and, when it is squeezed out, it is afterwards cured with linaments. There is also that pestilential pining sickness, when, in a few days, mares are seized with a sudden leanness, and then with death. When this happens, it is of some benefit to them to pour into each of them, through their nostrils, four *sextarii* of salt-fish-pickle, or mackrel-brine (2), if they be of a lesser size; for, if they be of a larger size, you may even pour a *congius* of it into each of them. This brings out all the rheum through their nostrils, and thoroughly purges the cattle.

C H A P. XXXV.

Of Madness incident to Mares.

THERE is a madness which seizes mares, which is rare indeed, but very well known, that, when they have seen their own image in the water, they are taken with a silly vain love of it; and thereby forgetting

(1) *Gith* or *git*. The Greeks call it *melanthion* or *melanspermon*, from the blackness of its seed. It is commonly called *nigella*, fennel-flower, or devil-in-a-bush.

(2) *Garum*, a certain salt liquor or sauce made of a fish, which the Greeks called *garon*. There is no certain account given of this fish; therefore we may say it is now unknown. The same sort of liquor was afterwards made of many different fishes, which still retained the antient name *garum*. We have this account of the way of making it: they threw the intestines of fishes into a vessel, and salted them, and then set them out in the sun to macerate, frequently turning them, till they had formed a certain quantity of liquor, the finest of which they drained off, and called it *garum*. Of the remainder or refuse of all this stuff they

forgetting their food, they pine away, and perish with desire. The signs of this madness are, when they run up-and-down their pastures, as if they were put to the spur, and from time to time looking round them, they seem as if they were seeking for, and wanted something: This phrensy of theirs is removed, if you lead them to the water; then, beholding at length their own ugliness, they abolish and lose the remembrance of their former image. What has been said concerning mares in general may suffice. The following directions in particular must be given to those, who make it their business to breed and bring up herds of mules.

C H A P. XXXVI.

Of Mules.

IN educating the mule-kind, the first and principal thing to be done is, carefully to inquire after, and find out, a male and female parent of the future offspring, of which, if either the one or the other be unfit for the purpose, even that which is formed of the two decays, and comes to nought. It is proper to chuse a mare of any age under ten, as long as she is of the largest and the most beautiful shape, with strong members, and exceeding patient of labour, that she may easily receive and bear the full time the plant of a strange and different kind, that is ingrafted into her, and is discordant to her womb; and may communicate to her offspring not only the good qualities of her body, but also those of her natural disposition and temper; for not only the seeds, which are thrown into the genital parts, are animated with difficulty, but also, after they are brought to conception, they are longer in growing ripe for the birth, and are scarcely brought forth in the thirteenth month, after the full year is past; and there is more of the paternal dulness and sluggishness, than of the maternal vigour, inherent in the offspring.

Nevertheless, as mares are found with less care for the foresaid uses, so there is greater trouble in chusing a male, because oft-times the ex-

they made another coarser sauce, which they called *alex*. In *Pliny's* time, the most esteemed of any was that made of *scombri*, which, some say, is a sort of mackrel, which they brought from *Spain*, and from an island near *Carthage*, which, from that fish, they called *scombria*; so that this exquisite liquor, as he says, *lib. xxxi. c. 8.* was made of the guts of fish, and other things, which were proper to be thrown away, macerated in salt; and that it was the juice that issued out of them when they were beginning to putrify.

periment frustrates the expectation, and does not succeed according to the opinion of him that approved him. Many stallions, of a wonderful beautiful outward appearance (1), do generate a low mean race, either as to their form or sex; for, whether they procreate females of a small body, or more males also than females of a beautiful body, they diminish the income of the master of the family: but some, of a contemptible aspect, are productive and full of most precious seeds. Sometimes there are some of them, which convey their excellent and noble qualities to their offspring: but, being dull and slow to pleasure, are very rarely provoked to venery. To a male of this temper the Keepers ought to bring near, by degrees, a female of the same kind, because nature has made animals, that are alike, more familiar with their like; for so it is brought about, that, by throwing the female in his way, when the male also is soothed into good humour by leaping upon her, being, as it were, set on fire, and blinded with lust, after they have withdrawn her, which he had a liking to, and fought after, he may be put upon the mare, which he had an aversion to.

C H A P. XXXVII.

Of restraining the Cruelty of a Stallion, mad upon gratifying his Lust.

THERE is also another kind of stallion, who runs furiously to the gratification of his lust, which, if he is not artfully restrained, proves destructive to the stud; for oft-times, having broken his bonds, he disquiets those that are with young; and, when he is admitted, he fastens his teeth in the necks and backs of the females. To prevent his doing of this, they bind him a little while to the mill, and moderate the cruelty of his love with labour, and so admit him to venery when he is become more modest. Nevertheless a stallion also, that is of more clemency in his libidinous gratifications, is not to be admitted upon other terms, because it is of much importance, that the naturally drousy and dull disposition of this beast be put in motion and roused by moderate exercise; and that the male, when he is made more lively and brisk

(1) *Multi admissarii specie tenus mirabilissimam.* This sentence seems to be imperfect; and, in order to make it intelligible, *mirabilissimam* must be changed into *mirabiles pessimam*, or, as Gesnerus corrects it, *mirabiles imam*, which will make it very consistent.

than usual, be joined to the female, that so the seeds themselves may, by a certain secret efficacy, be formed and fashioned of more lively and active principles.

But a mule is generated not only of a mare and an he-afs, but also of a she-afs and an horse, and of a wild he-afs and a mare. But some authors not to be concealed, as *Marcus Varro*, and, before him, *Dionysius* and *Mago*, have related, that, in some countries in *Africa*, the breed of mules is so far from being looked upon as prodigies, that their bringing forth of young is as familiar to the inhabitants, as that of mares is to us. Nevertheless there is none of this kind of cattle that is more excellent and valuable, either with respect to their disposition and temper, or the form of their body, than that which is begotten by an he-afs, altho' that which is begotten by a wild he-afs may, in some measure, be compared to this, except that it always carries along with it the lean and ill-favoured appearance and mein of its sire, and cannot be tamed and broken, and will not yield and submit to labour, as is the temper of every beast that is wild. Therefore a stallion of this sort is more profitable in his nephews than in his sons; for, when one that is sprung of a she-afs and a wild he-afs is admitted to a mare, whatever proceeds from him, its wildness and fierceness gradually abating, retains the form and modesty of its sire, and the strength and swiftness of its grandfire.

Such as are conceived and procreated of an horse and a she-afs, altho' they take their name from their sire, being called *hinni* (1), are, in all things, more like their dams; therefore it is most advantageous to destitute an he-afs for procreating the mule-kind, the breed of which (as I said) is found by trial to be of a more goodly, fightly and beautiful appearance. Nevertheless he ought not otherwise to be approved of from his aspect, but by his being of a very large body, with a strong neck, robust and broad ribs, a muscous and vast chest, brawny thighs, compact legs, of a black or spotted colour; for the mouse-colour, as it is very common in an he-afs, is not very suitable also in a mule. Neither let the outward appearance of the four-footed beast in general deceive us, if we behold him such as we approve; for in the same manner as the spots, which are in the tongues and palates of rams, are found, for the most part, in the fleeces of lambs, so, if the he-afs carries hairs of a different colour in his eye-lids or ears, he frequently procreates an offspring of divers colours also; which colour itself, tho' it has been

(1) *Hinni*, so called from their neighing somewhat like a horse, retaining something of their sire.

most diligently examined and searched for in a stallion, nevertheless oft-times deceives the owner: for sometimes also, without the foresaid signs, he procreates mules very unlike to himself, which, I think, does not happen otherwise, but that the colour of the grandfire, by being mixt with the primordial seed, is communicated and restored to his grandsons.

Therefore such a foal of an ass, as I have described, must, as soon as he is foaled, be presently taken from his mother, and put under a mare, without her having any knowledge of him. She is very easily deceived in the dark; for her own foal being taken away from her, the foresaid one is nourished by her in a dark place, as if she had foaled it herself. Then, when the mare has been accustomed to him for ten days, she will always afterwards give him her dugs when he seeks for them. The stallion, being thus fostered, learns, by degrees, to love mares. Sometimes also, tho' he be brought up with his mother's milk, yet, having been familiarly conversant with mares from his younger days, he may have a liking to them, and seek to be in their company, and be familiar with them. But one under three years old must not be admitted to be a stallion; and, if even this be allowed, it will be proper to be done in the spring, when he must be strengthened both with green cut-grass, and a large allowance of barley; and sometimes also you must give him a drench. Nevertheless, he must not be put to a young female; for unless she has known a male before, she drives away the stallion with her kicking, when he leaps upon her; and when he is thus violently driven away, and severely used, it makes him an enemy to all other mares also. To prevent this, they put an ignoble and vulgar little he-ass to the female, to solicit her compliance. Nevertheless, they do not suffer him to cover her, but, if the mare is brought to be passive, they presently drive away that of a more ignoble breed, and put her to a male of greater value, and of a more noble extraction.

There is a place built on purpose for these uses, (peasants call it a machine) which has two walls built into a gently rising ground, and at so small distance the one from the other, that the female may not struggle, nor turn herself away from the stallion when he leaps upon her. There is access into it at both ends, but in the lower end it is secured and shut up with cross-bars; to which the mare being bound with a halter, is placed in the lower part of the declivity, that so bending downward she may both receive the seed of the stallion, that covers her the better, and afford to the lesser four-footed beast, an easy ascent to her back from the higher part. After she has brought forth that which she has conceived by the he-ass, the following year, she nurses
and

and brings up her young one without being with foal again : for that is better than what some do, who, notwithstanding she has but lately foaled, yet fill her belly again by admitting an horse to her. When the she-mule is one year old, it is proper to drive her from her dam ; and, after she is removed, to pasture her upon the mountains, or in wild places, that she may harden her hoofs, and be afterwards fit for long journeys ; for the he-mule is fitter for the pack-saddle. She indeed is nimbler ; but both sexes are very proper, both for travelling, and also for tilling the ground ; unless the price of the quadruped be too burdensome an expence to the Husbandman, or the field, with its weighty glebe, require the strength of oxen.

C H A P. XXXVIII.

Of Medicines for curing Mules.

I Have already, in speaking of the other kinds, taught you, for the most part, the medicines proper for this cattle : nevertheless, I shall not omit certain diseases peculiar to mules, the remedies of which I have here subjoined. They give raw colewort or cabbage to a mule that has a fever. They take away some blood from one that is purfy, and has a difficulty in breathing, and mix about an *hemina* of the juice of horehound, with a *sextarius* of wine and oil, and half an ounce of frankincense, and pour them into her. They apply barley-meal to one that is affected with the spavin ; and afterwards, when they have opened the suppuration with a lancet, they cure it with linaments : or they pour into her, thro' the left nostril, a *sextarius* of the best garum, or salt-mackrel-brine, with a pound of oil ; and with this medicine they mix the liquor of three or four eggs, after they have separated the yolks from it. They sometimes are wont to cut their thighs, and to burn them with an hot iron. They let out the blood that falls down into their feet, in the same manner as they do in horses ; or if they have an herb, which peasants call *white hellebore*, they give it them for fodder. There is henbane, the seed of which, bruised, and given with wine, cures the foresaid disease.

Leanness and a languor are removed by giving them frequently a potion, into which they put half an ounce of bruised sulphur, and a raw egg, and a dram weight of bruised myrrh. They mix these three things with wine, and so pour them down their throat. But these self-same things

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things do equally cure a cough, and a pain of the belly. There is nothing of so great efficacy for leanness, as medic. That herb, when it is green, and even when it is dry, presently fattens labouring beasts : but it must be given moderately, lest the cattle be suffocated with too much blood.

They put grease into a mule's chops, when she is tired and exceeding hot, and pour pure wine into her mouth. As to what is further necessary for mules, we will put in practice the directions we delivered in the former parts of this book, which contain every thing relating to the care and management of oxen, and of mares.

L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

B O O K S E V E N T H.

AS we are now, *Publius Silvinus*, going to speak of lesser cattle, we shall begin with this lesser, vulgar, little *Arcadian* he-afs, of small value, of which most authors of Husbandry think that principal account ought to be made, and the greatest regard had to him, both in buying and managing of beasts destined for labour : and not without reason ; for he may be kept even in that farm which has no pasture, being content with a very small allowance of fodder, and of any sort whatsoever : for they nourish him either with leaves, or thorn-bushes, or thistles, or willow-rods, or with a bundle of vine-sprays thrown before him ; but he even grows fat with straw and chaff, with which almost all countries abound. Also he bears up most valiantly under the neglect of an imprudent keeper : he can endure blows, and stripes, and penury, with the greatest patience : for which reasons, he fails and decays more slowly than any other sort of cattle whatsoever. For, being exceeding patient of labour and hunger, he is rarely affected with diseases. The very many and necessary services of this animal, beyond what comes to his share, considering his size, do more than compensate the little trouble and charges in keeping him, forasmuch as with light ploughs he breaks up easy ground, such as that in *Bætica* and all *Libya* is, and draws such carriages as are not of too great weight. Oft-times also, as the most celebrated poet says (1),

— ‘ The driver of the slow dull afs,
 ‘ Returning from the city, loads his ribs

(1) *Virg. georg. lib. i. 273.*

- ‘ With cheap and paltry apples, or brings back
 ‘ His dented stone, or mafs of coal-black pitch. ’

Now, indeed, working in mills, and grinding of corn, is almost the usual and ordinary labour of this cattle : wherefore every manor whatsoever requires this little ass, as what is exceeding necessary, which, as I said, can very conveniently carry to town, or bring back again, either upon his back, or with his neck, most part of things necessary for use. But which species of them is most approved, or what is the most approved way of managing them, has been abundantly declared in the preceding book, when directions were given concerning the ass of great price, and noble extraction.

C H A P. II.

Of Buying and Managing of Sheep.

AFTER the greater quadrupeds, sheep-cattle are of second account, which may be of first account, if you have regard to the greatness of the profit redounding from them. For this sort of cattle chiefly protects us against the violence of the cold, and furnishes comely and magnificent coverings for our bodies. Moreover, it not only satiates the country people with abundance of milk and cheese, but also garnishes the tables of the elegant with agreeable and numerous dishes. To some nations, indeed, which are intirely destitute of corn, it furnishes their whole sustenance : hence it is, that very many of the *Nomades* (1) and *Getæ* (2) are called *Galactopotæ* (milk-drinkers). Therefore this cattle, though it be exceeding delicate, as *Celsus* says very prudently, enjoys a very safe state of health, and is not at all afflicted with pestilential sickness. Nevertheless, it must be chosen according to the nature of the place ; which *Virgil* directs to be observed, not only with respect to this cattle, but also in all rural discipline whatsoever, when he says (3),

‘ Nor can all sorts of lands all things produce. ’

(1) *Nomades* were such people in general, as subsisted by feeding of cattle, and had no certain habitation, but went where-ever they could find pasture for their cattle, as the wild *Tartars*, &c.

(2) *Getæ*, a people in *Dacia*, upon the confines of *Scythia* ; some think they were the *Moldavians*. *Pliny* says, that these *Getæ* were by the *Romans* called *Daci*.

(3) *Virg georg. lib. ii. 89.*

‘ A fat

A fat and champagne country sustains tall sheep; a lean and hilly, those that are square and well-set; a woody and mountainous, such as are small. Covered cattle find very convenient pasture in meadows and level fallow lands.

And this direction is not only of great importance, with respect to the several kinds of sheep, but also to their colours. Our people formerly reckoned, that the *Milesian* (4), *Calabrian*, and *Apulian* (5) sheep, were of an excellent kind; and that the *Tarentinian* (6) were the best of them. Now those of *Gaul* are esteemed more valuable; and of these, the *Altinian* (7) are preferred to all the rest. Also those which have their folds upon the lean fields about *Parma* and *Modena*. The white colour, as it is the best, so also it is the most profitable; because that of it very many other colours are made; but this is not made of any other. The black and brown dark colours, which *Pollentia* (8) in *Italy*, and *Corduba* (9) in *Bætica*, furnish us with, are of their own nature commendable for their price. Nor does *Asia* produce less plenty of those of a bright-red colour, which they call *Erythrean* (10).

But experience has taught to produce and express other varieties also in this kind of cattle; for, at a certain time, when some wild and fierce rams of a wonderful colour, as other beasts, were brought from the neighbouring parts of *Africa*, to the municipal city of *Cadix*, by those who entertained the people with public games and shews, *M. Columella* my uncle, a man of a quick discerning genius, and a famous Husbandman, having bought some of them, carried them to his own lands, and when they were tamed, admitted them to couple with covered sheep. These, at first, brought forth rough bristly lambs, but of the colour of their fire; and afterwards they themselves, being put upon *Tarentinian* sheep, generated rams of a finer fleece. Moreover, whatever was afterwards conceived by them, resembled the colour of the fire and grandfire, but the delicacy and softness of the dam. In this manner *Columella* said that any colour or outward appearance

(4) *Milesii* were a people in *Caria*, or *Ionia*, in the lesser *Asia*.

(5) *Calabria* and *Apulia*, both Provinces in the Kingdom of *Naples*; the last is mighty fruitful in cattle.

(6) *Tarentinian* sheep were such as were bred in the territory of *Taranto*, in the Kingdom of *Naples*.

(7) *Altinum*, now called *Altino*, in the *Venetian* territory, once a famous city at the mouth of the river *Sile*, which falls into the gulf of *Venice*.

(8) *Pollentia*, once a famous town, but now ruinous, upon the River *Tanaro*, in that part of *Italy* formerly called *Liguria*. The country about it was famous for black sheep.

(9) *Corduba*, now called *Cordova*, a very famous city upon the river *Bætis* in *Spain*.

(10) *Erythrean* wool, so called from its reddish colour, ἐρυθρῆς, red.

whatsoever, that was in beasts, did return with a mitigation of their fierceness and wildness, through the several degrees of their descendants. I shall return to what I proposed.

Now there are two kinds of sheep-cattle; the soft and delicate, and the rough and bristly. But, in buying both the one and the other, there are several things that are common to both. Nevertheless, there are some things that are peculiar to the noble and excellent kind, which it may be proper should be observed. In buying flocks, the following are the things, for the most part, which ought to be observed in common. If the whiteness of the wool pleases you most, you shall always chuse the whitest males: for, of a white male, there is often produced a dark tawny offspring; but that which is white is never generated by one that is red or black.

C H A P. III.

Of chusing Rams.

Therefore the way to judge and approve of a ram, is not only that of observing if he is cloathed with a white fleece, but also, if his palate and tongue are of the same colour with his wool: for, when these parts of his body are black or spotted, there arises a black or speckled offspring. And this, among other things, the same poet I mentioned above, has excellently pointed out in such numbers as these (1):

- ‘ Reject him, tho’ the ram himself be white,
- ‘ Under whose oufy palate lies conceal’d
- ‘ A black or spotted tongue; for with black spots
- ‘ He’ll stain the fleeces of his future race.’

One and the same reason holds with respect both to *Erythrean* and black rams, of which (as I have already said) no part ought to be of a different colour from the wool, and much less their whole skin be chequered with spots: therefore we must never buy sheep, except they have their wool upon them, that so the unity of their colour may the better appear; which unless it be particularly remarkable in rams, the paternal spots, for the most part, are inherent in their offspring.

(1) *Virg. Georg. lib. iii. 387.*

But the make of his body is most approved, when it is high and tall, with an hanging-down and woolly belly, an exceeding long tail, and of a thick fleece, with a broad forehead, large testicles, twisted horns; not because this last is more useful, (for a ram without horns is better) but because horns that are twisted and bended inwards are not at all so hurtful, as those that are set upright and expanded. Nevertheless, in some countries, where the climate is wet and windy, we would wish for he-goats and rams even with the very largest horns; because, when they are high and extended, they defend the greatest part of the head from the storm. Therefore, if for the most part the winter is violently cold, we will choose this kind; but, if it be milder, we shall approve of a male that has no horns; because there is this inconveniency in one that is horned, that when he perceives himself armed, as it were, with a certain natural weapon upon his head, he frequently rushes out to battle, and becomes more saucy and frolicksome with the females: for he persecutes his rival most violently, tho' he alone is not sufficient for serving the whole flock; nor will he suffer the flock to be served in due time by any other, except when he is fatigued with lust. But one that has no horns, when he knows himself to be as it were disarmed, is neither so ready to quarrel, and is more gentle in his amours. Therefore shepherds check the cruelty of a mischievous he-goat or ram, by this cunning contrivance; they stick a strong board of one foot measure full of pricks, and bind it to his horns with the points towards his forehead. This thing restrains one that is fierce from quarrelling, when he is pricked, and wounds himself with his own blow. But *Epicharmus* the *Syracusan*, who wrote very carefully of the art of curing cattle, and of the medicines that are proper for them, affirms that a fighting quarrelsome ram is tamed by having his horns bored with a gemlet, hard by his ears, where they are first crooked in the bending. The best age of this quadruped for procreating, is when he is three years old: nor yet is he unfit for it till he be eight years.

The female ought to be joined to an husband after she is two years old, and she is reckoned to be young and in her prime, when she is five years old: after her seventh year she begins to decline. Therefore, as I said, you shall purchase sheep that are not shorn: you shall reject the grey and speckled hair, because it is of an uncertain colour: you shall refuse the barren one, that threatens you with her three-year-old tooth: you shall choose her that is two years old, and of a huge body, with a long neck, long wool, but not harsh and coarse, with a woolly

and large belly; for an ewe with a peeled, bare, and very small belly, must be avoided.

And these almost are the things in common to be observed in purchasing sheep: also those following are to be observed in keeping and managing them, *viz.* that their folds be low, but rather extended in length than in breadth, that they may be both warm in winter, and the straightness of the place may not make them cast their young: and they ought to be placed against the south; for this cattle, tho' of all animals it is the best cloathed, is nevertheless most impatient of cold, and no less of the heat of summer. Therefore, a close surrounded with an high wall, ought to be placed before their porch, that they may go out into it with safety, and summer in the cool; and let care be taken, that no moisture remain in it, and that their folds be always strewed with very dry ferns or straw, that so the ewes, that are with young may lie the cleaner, and the softer. Let their baskets be exceeding clean (2), that their health, which is chiefly to be taken care of, may not be impaired with any kind of moisture.

But large allowances of food must be given to all sorts of sheep: for even a very small number, when satiated with food, yields more to their owner, than the greatest flock, if they be pinched with want. But you must endeavour to find for them fallow-grounds, that are not only grassy, but which, for the most part, are void of thorns; and let us often make use of the authority of that divine poem (3):

‘ If wool’s thy care, then first from prickly woods,
 ‘ And briars, and thorns, and burs, thy tender flock
 ‘ Keep at a distance.’ —————

For, as the same poet says, this thing makes the sheep scabby:

‘ When to their skin, which in a wholesome stream
 ‘ Has not been wash’d when newly shorn, the sweat
 ‘ Adheres; and when, with prickly briars and thorns,
 ‘ Their tender bodies wounded are and torn.’

(2) *Quala mundissima*. Some think, that the true reading is *illa*, instead of *quala*, referring to *stabula*, *viz.* that their folds be kept clean and dry, without any moisture to impair their health: and indeed it is not easy to conjecture, why the author should bring *quala* into this place, unless by it he means some close baskets, wherein they gave them fodder in hard weather; but in common fodder-baskets no moisture could remain, that could be hurtful to them.

(3) *Virg. Georg. lib. iii. 384. 442.*

Moreover, their wool is thereby daily diminished, which how much the longer and thicker it grows upon the cattle, so much the more obnoxious is it to the brambles, which catch it as it were with so many hooks, and pull it from their skins while they are feeding. The delicate sheep also lose the covering wherewith they are provided, and that is not repaired with a small expence.

Almost all authors are agreed, that the spring-time, when the feast of *Pales* (4) is celebrated, is the most proper for admitting the ram, if it be an ewe just come to maturity; but, if she has already had a lamb, about the ninth of *July* is the proper time. Nevertheless, it is not to be doubted, the first is more to be approved of; that as the vintage follows the harvest, so the yeaning-time may succeed to the gathering in of the fruit of the vine; and the lamb, being fatiated with the fodder of the whole autumn, may become strong before the melancholy colds, and the fasting-days of winter approach: for a lamb, yeaned in autumn, is better than one in the spring, as *Celsus* says very truly, because it tends more to our advantage, that he grow strong before the summer solstice, than before that of winter: and of all animals he alone suffers no inconveniency, by being brought forth in the middle of winter. And if our present occasion requires, that most males should be procreated, *Aristotle*, a man exceedingly well acquainted with the nature of things, directs us to observe and watch for the northern breezes in dry weather, at the time when the rams are admitted; that we may feed the flock against the wind, and that the cattle may take the ram when they are looking towards it: but, if females are to be generated, he directs us to catch the southern breezes, that the rams may leap upon the ewes in the same manner. For that which we taught in the preceding book, that the right, or even the left, testicle of the ram which serves the flock, be tied up with a band, is too great a labour in great flocks.

Then, after the yeaning-time is past, when the shepherd is preparing to go to pastures of a far distant quarter, let him reserve almost all the young offspring for the pastures that are contiguous to the city; for the bailiff delivers the young lambs to the butcher, before they have tasted any grass, because they are carried thence at a very small charge; and, after they are taken away, the advantage accruing from their mother's milk is not diminished. Nevertheless, it is necessary sometimes to bring up lambs for a new breed, even in the neighbourhood of the

(4) *Parilia*, or *Palilia*. Among the *Romans*, *Pales* was the goddess of shepherds, under whose protection they supposed sheep were. Her feast was celebrated the 18th day of *April*, with great solemnity, as we see in *Ovidii Fasti*, *Servius* upon *Virgil*, and others.

- ‘ And while the morning’s new, while grafs is grey,
- ‘ And dew diftilling from each tender herb
- ‘ Is fav’ry, and invites the flocks to eat ;
- ‘ Let us conduct them to cold fpacious fields ;
- ‘ And, when the fourth hour of the day has rais’d
- ‘ Their thirft, then thence to wells, or to deep pools,

let us lead them ; and, in the middle of the day, as the fame poet fays, let us conduct them to a valley,

- ‘ Where *Jove’s* huge oak, with years made hard and ftrong,
- ‘ Its mighty boughs extends ; or gloomy grove,
- ‘ With thick-fet holms fecur’d from *Phæbus’* rays,
- ‘ Its facred fhade fpreads on th’ adjacent ground.

Then, after the heat is abated, let us drive them again to water, and lead them out to the paftures a fecond time,

- ‘ Till fun goes down, when the cold Ev’ning-ftar
- ‘ Allays the heat, and dew-diftilling moon
- ‘ Repairs the forefts.’

But, about the time that the Dog-ftar firft fhews itfelf, we muft take particular notice of the fun, that before noon we drive our flock with their heads to the weft, and that they advance toward that part, and in the afternoon toward the eaft : for it is of very great importance, that their heads be not turned exactly toward the fun when they are feeding, which for the moft part is hurtful to animals when the forefaid ftar is rifing.

In winter and fpring let them be kept in their fheep-cotes during the morning, till the fun removes the frofts from the fields : for, in thefe days, grafs with hoar-froft upon it gives the cattle a great heavinefs and ftuffing in their heads, and brings a loofenefs upon them ; wherefore, in moift and cold times of the year alfo, they muft be allowed to drink only once a day. Alfo let him who follows the flock be vigilant and circumfpect, and (which is given as an injunction to all keepers of all four-footed beafts whatfoever) let him govern and rule over them with great clemency, and let this fame perfon be more like a captain and leader, than a lord and mafter ; and both when he gathers his fheep together, and houfes them, let him threaten them with a loud fhout, and with his ftaff, but never throw any offensive weapon

weapon at them, nor return to any great distance from them; neither let him either lie down, nor sit down: for, unless he is going forward, he ought to stand; because, indeed, the duty of a Keeper requires, that he be always as it were upon a high and lofty watch-tower, that he may turn his eyes every way, and neither suffer those that are slow and great with young, while they loiter, nor those that are nimble, and have already brought forth, while they run before, to be separated from the rest; lest either a thief, or a wild beast, deceive the heedless unattentive Shepherd. But these things relate in general almost to all sheep-cattle whatsoever. Now we shall speak of such things as are peculiar to the generous kind.

C H A P. IV.

Of covered Sheep.

IT is scarcely any advantage at all to have *Greek* cattle, which most people call *Tarentinian*, in one's possession, except when the owner is actually present himself; considering that they require both greater care, and a greater allowance of food: for inasmuch as the wool-bearing kind in general is more tender and delicate than any other cattle whatsoever, so the *Tarentinian* is the most tender and delicate of them all, which cannot bear with any manner of slothfulness, either of their owner or keepers, and much less with their covetousness; and it can neither endure excessive heat nor cold. They are seldom fed without doors, but for the most part in the house; and they are exceeding greedy of food, of which if any part be withdrawn by the villainy of the Bailiff, ruin and destruction follow the flock. During winter, they are fed very well at their cribs with three *sextarii* of barley, or of beans bruised with their own husks, or with four *sextarii* of chichlings each head, but so as to give them likewise dried leaves, or dry or green medic, or shrub-trefoil; as also seven pound weight of second-crop-hay, or chaff of pulse in abundance.

There is the least advantage to be had by selling the lambs of this kind of cattle, nor can any be made by their milk; for such of them as ought to be removed from their dams, are killed for the most part a very few days after they are yeaned, before they come to maturity; and their mothers, being bereaved of their own young ones, give suck to the offspring of a stranger: for each lamb is put to be suckled and brought up by two nurses, nor is it expedient, that any thing be with-

drawn from such as are put to be suckled and brought up, that so the lamb, being fuller fed, and glutted with milk, may quickly grow strong; and the ewe which brought it forth, being associated with a nurse, may labour less in the education of her own offspring. For which reason you must be very careful to observe, that the lambs be put daily both to the dugs of their own dams, and also to those of others, that are strangers to them, and do not love them.

But, in flocks of this kind, you must nourish and bring up more males, than in those which have coarse hairy wool: for the males, being castrated before they can couple with the females, are killed when they are two years old complete; and their skins are delivered to the merchants, at a greater price than other fleeces, because of the exquisite beauty of the wool. But we must remember to feed our *Greek* sheep in free open fields, void of all manner of bushes, sprigs, or briars, lest, as I said above, both their wool and their covering be pulled off them; nor yet do they require less diligence and care without doors, because they seldom go forth to the pastures, but greater care and attendance at home; for they must be frequently uncovered, refreshed, and cooled: their wool must be frequently opened and parted, and moistened with oil and wine: sometimes also they must be washed all over with water, if the mildness and brightness of the day permit it; and it is enough, if that be done three times a year. But the sheep-cotes must be often swept and cleansed, and all the moisture of their urine conveyed away, which is very conveniently dried up by boring holes in the boards wherewith the floors of the sheep-houses are laid, that the flock may lie upon them: and let their houses be freed not only from mire, and dirt, and dung, but from destructive serpents also: and, that this may be done, (1)

- ‘ Strong-scented cedar likewise learn to burn
- ‘ Within thy folds; and, with the burning smell
- ‘ Of *Galbanum*, the hurtful snakes pursue,
- ‘ And drive them thence; for oft, below the cribs
- ‘ Unmov’d, a deadly viper lurks unseen,
- ‘ Which frighted shuns the light, and hurts when touch’d;
- ‘ Or adder, which is wont to haunt the house.

Wherefore, as the same poet commands,

- ‘ Shepherd! lay hold on stones, and oaken clubs;
- ‘ And, when his threat’ning head, and hissing neck,
- ‘ Swelling with rage, he rears, then lay him flat.’

(1) *Virg. Georg. lib. iii. 414.*

Or, that it may not be necessary to do this with danger, burn womens hair, or harts horns frequently, the smell of which, most of any thing, will not suffer the foresaid pest to harbour in the sheep-cotes.

A certain fixed time of the year cannot be observed in all countries for shearing sheep; because the summer does neither advance slowly every-where, nor yet quickly; and the best way is, to consider the seasons, and the state of the weather, wherein the sheep may neither feel the cold, if you strip it of its wool, nor the great heat, if you do not as yet shear it. But, at what time soever it shall be shorn, it ought to be anointed with such a medicament as this. The juice of thoroughly boiled lupins; and the dregs of old wine, and the dregs of oil, of each an equal quantity, are mixed together; and with this liquor the sheep is soaked, after it is shorn; and when its skin has imbibed the medicaments, after it has been anointed with them for three days, upon the fourth day, if the sea is in the neighbourhood, let it be led to the sea-shore, and dipped therein; but, if otherwise, they boil rain-water a little, after it has been hardened with salt in the open air for this purpose, and wash the flock thoroughly therewith. *Celsus* affirms, that cattle treated after this manner cannot become scabby during that year; nor is there any doubt, but that even by so doing, and for that reason, their wool may grow again both softer and longer.

C H A P. V.

Of Remedies for Sheep-cattle.

FOrasmuch as we have already given an account of the way of managing and taking care of such as are in a good state of health, we shall now give directions after what manner such as labour under any ailments or disease, must be relieved; although that part of our argument has been already almost wholly exhausted, when we discoursed, in the preceding book, of remedies proper for greater cattle. For, considering that the nature of the bodies of lesser and greater quadrupeds is almost the very same, the differences that can be found in their diseases and remedies are but few and small, which, how considerable soever they may be, shall not be omitted by us.

If all the cattle in general are sick, as we both directed before, and now (because we think it most salutary for them) we again confidently affirm it, in this case (which is the most speedy and effectual remedy)

let us change the pastures and the watering-places of the whole country, and go to another climate, and a different constitution of the air; and take care, if the plague which has attacked them, has had its rise from scorching heat, to make choice of fields that are shady, and defended from the sun; or, if it seized them from cold, then such as are exposed to the sun. But the cattle must be driven softly, and without hurrying them, lest their weakness be over-burdened and oppressed with long journeys. Nevertheless, you must not drive them altogether in a slow and lazy manner; for as it is not proper vehemently to toss and drive cattle that are weary with their disease, and to put them upon the stretch, so it is an advantage to them to give them moderate exercise, and to rouse them when they are as it were benumbed, and not suffer them to grow old, and be consumed with drowsiness and sloth: then, when the flock is brought to the place, let it be distributed to the Peasants in parcels; for they recover their health more easily when they are separated, than when they are all together, either because the infectious steam of the disease is lesser in a small number, or because greater care is more expeditiously taken of a few. These therefore, and the other things (that we may not now repeat the same things) which we have made mention of in the preceding book, we ought to observe, if all our sheep in general are sick; but if only some of them in particular, then those following things are to be observed:

Sheep are more frequently infested with the scab, than any other animal whatsoever; which commonly affects them, as our poet says (1),

- ‘ When a cold show’r, or winter’s hoary frost,
- ‘ Sink thro’ their wool, and pierce them to the quick.’

Or if, after shearing them, you do not apply the foresaid medicine as a remedy; or if you do not wash away the summer sweat in the sea, or in a river; or if you suffer the flock, after it is shorn, to be wounded with the wild bramble-bushes and thorns; if you make use of a stable wherein mules, horses, or asses, have stood; but especially a scanty allowance of food causes leanness, and leanness the scab. When this has begun to creep in among them, it is known thus: The cattle either scratch the part affected with their teeth, or thump it with their horn or hoof, or rub it against a tree, or wipe it upon the walls; which when you shall see any of them doing, you must lay hold of them, and

(1) *Virg. Georg. lib. iii. 442.*

open their wool; for below it the skin is rough, and there is as it were a certain scurf under it, which you must apply a remedy to, as soon as possible, lest it defile and infect the whole progeny; and indeed it must be done quickly, forasmuch as both other cattle also, but especially sheep, are afflicted with contagious distempers.

But there are very many medicines for curing them, which we shall therefore enumerate, not because it may be necessary to use them all, because in some countries some of them cannot be found; and out of many, some one being found, may prove a remedy. But, in the first place, that composition, which we explained and informed you of a little before, does exceeding well, if with the dregs of wine, and the scum or dregs of oil, and the juice of boiled lupins, you mix white hellebore, bruised in equal quantity. Also the juice of green hemlock is effectual to remove scabbiness; which, in the spring-time, when it has begun to make its stalk, but not its seeds, they cut down, and bruise, and put up in an earthen vessel the juice they have squeezed out of it, after they have mixed half a *modius* of toasted salt with two urns of the liquor. And, when this is done, they pitch the vessel well, and bury it in a dunghil; and after it has been concocted for a whole year with the heat of the dung, they afterwards take it out, and, having warmed the medicine, they anoint the scabby part therewith, which they first reduce to a sore, by rubbing it with a rough tile or potsherd, or with a pumice-stone.

Lees of oil, boiled in two thirds, is a remedy for the same distemper. Also a man's stale urine, heated with red-hot tiles. Nevertheless, some people set the urine itself upon the fire, and thereby lessen it one fifth part, and mix with it an equal quantity of the juice of green hemlock; and then, upon potters vessels bruised, they pour melted pitch and parched salt, of each, one *sextarius*. An equal quantity of bruised sulphur and liquid pitch, boiled into a consistency with a slow fire, has also good effect. But the *Georgic* poem affirms, that there is not a more excellent remedy, than (2)

- ' With piercing lancet to rip up the sore,
- ' Where next the top it opens. This disease,
- ' If hid, new life and nourishment receives.'

Therefore it must be laid open, and cured with medicines, as other wounds are. Then it presently adds, with equal prudence, that, when

(2) *Virg. Georg. lib. 3. 453.*

sheep have a fever, they must be let blood in the pastern, or between the hoofs; for indeed

- ‘ For, to allay the fever’s burning heat,
- ‘ It has availed much, the leaping vein,
- ‘ Turgid with blood, below the foot to strike.’

We let them blood also under their eyes, and in their ears.

Boils also infest sheep two different ways, either when the *foul* and the chafe-gall arise in the very dividing of the hoof; or when there is a tubercle or swelling in the same place, almost in the middle of which there appears hair like that of a dog; and under it there is a small worm. The *foul* and chafe-gall may be rooted out, by anointing them with liquid pitch by itself; or with alum, and sulphur and vinegar mixed together; or with a tender pomegranate, before it make its grains, with brayed alum, and vinegar poured upon it; or with the green rust of copper reduced to a powder; or a burnt gall allayed with rough wine, and placed upon the part. The little swelling, under which there is a worm, must be, with as much caution as possible, cut off all round with a knife, lest, while we are cutting it off, we wound the animal also which is below; for when that is wounded, it sends forth a putrified, poisonous, bloody matter, which, when the wound is besprinkled with it, makes it so incurable, that the whole foot must be cut off: and, after you have cut it carefully off, drop burning hot tallow from a burning torch into the wound.

It is proper, that a sheep diseased in her lungs should be cured in the same manner as an hog, by inserting into its auricle what the farriers call *lungwort*. We spoke of it already, when we gave an account of such medicines as are proper for greater cattle. But that disease is for the most part contracted in summer, if they have wanted water; for which reason, all quadrupeds whatsoever ought to have liberty to drink plentifully in hot weather. *Celsus* advises, if the sheep has any disease in its lungs, to give it as much sharp vinegar as it can bear; or to pour into it with an horn, thro’ its left nostril, about three *heminae* of stale human urine warmed, and to put into their jaws two ounces of grease. Also wild-fire, which shepherds call *pufula* (3), is incurable;

(3) *Ignis sacer*. This disease is commonly called *St. Antony’s Fire*; and *sacer*, contrary to its common signification, is supposed to signify the same thing as *execrandus*, *scelerestus*, *abominandus*, *exitialis*, cursed, destructive, abominable, &c. Some call it *erysipelas*, or rather, as *Pollux*, *eruthropelas*; which is more expressive of the nature of the distemper, which they define, a *redness with a burning inflammation, attended with a fever*, &c. The Roman Shepherds called it *pufula*, by which they meant, no doubt, a blister with *pus* in it.

which, unless it be checked and confined to the first sheep that has been seized with such a disease, destroys the whole flock with its contagion, forasmuch as it does not admit of any cure, either with medicines, or the knife : for, at every touch almost, it grows angry, and is more and more inflamed ; only a fomentation of goats milk it does not make light of, which, when poured upon it, is only able to mitigate its fiery fierceness and rage, rather deferring than hindering the intire destruction of the flock. But *Bolus Mendefius*, a memorable *Egyptian* author, whose commentaries, which in *Greek* are called *ὑπομνήματα* (4), are falsely published under *Democritus's* name, advises for this frequently and carefully to view and examine the backs of the sheep, that if by chance such a disease should be found in any of them, we should presently dig a pit in the threshold of the fold, and therein bury the sheep infected with the wild-fire, with its face upwards; and, after it is put under ground, suffer the whole flock to go over it; and that by so doing the disease will be repelled.

Bile, which in the summer-time is not the least destruction *that befalls them*, is expelled with a potion of stale human urine, which is also a remedy for cattle that have the jaundice (5). But, if phlegm be troublesome to them, they wrap stalks of wild savory, or wild cat-mint, in wool, and put them into their nostrils, and turn them to-and-fro till the sheep sneezes. The broken legs of cattle are not cured otherwise than those of men, being wrapped up in wool, soaked in oil and wine, and presently afterwards bound up and surrounded with splints of fennel-giant. Knot-grass (6) is also a grievous plague to them,

(4) ὑπομνήματα sometimes signify a man's own private notes and observations for his own use; sometimes they signify what the *Romans* called *commentarium*, that is, a writing, wherein the heads only, and summaries of things, are touched upon, and which are written rather for the sake of memory, than in order to a full narration of things. Sometimes also they signify annotations or commentaries upon any author. Here, to be sure, they must signify short commentaries, or summaries of things

(5) *Pecus arcuatum*, or *arquatum*. This disease in cattle has its name from the rainbow, because some parts of their bodies, especially their eyes, lose their natural colour, and become yellowish or greenish.

(6) *Herba sanguinaria*. This herb was so called by the *Latins*, as *Pliny* says, because it stops a bleeding at the nose, by putting the juice of it up the nose; and by drinking the juice of it with wine, they used to stop a flux. The *Greeks* called it *polygonon*, as some say, because it grows and spreads every-where. Some call it *polygonaton*, because of its many joints and knots; which seems to be the reason, why it is called in *English* *knot-grass*. *Matthiolus* says, that the male sort, which creeps upon the ground, grows in the fields, areas of buildings, highways, and every-where; but the female, which grows up into a stalk, is found mostly in well-watered and moist places. Our author says, that when a sheep feeds upon it, *toto ventre distenditur, contrahiturque*; which I think must signify a swelling of

them, which if the sheep feed upon, their whole belly is distended and bound up, and they spit out a certain thin foam, of a noisome smell. You must quickly let them bleed under the tail, in that part which is next the buttocks; a vein must be also opened in their upper lip. The ears of such as are purfy and broken-winded must be cut with a knife, and they must change their quarters; which we are of opinion ought to be done in all diseases and plagues whatsoever.

Relief must be given also to lambs which have the fever, or are affected with any other sickness; which, when they labour under any disease, ought not to be admitted to their dams, lest they transfer the plague to them. Therefore the ewes must be milked apart, and an equal quantity of rain-water mixed with the milk, and that potion given to such as have a fever. Many cure the same with goats milk, which they pour into their jaws through a little horn. The scab upon their chin and lips, which shepherds call *osfigo*, is also mortiferous to sucking lambs. This, for the most part, is occasioned, if, by the imprudence of the Shepherd, the lambs, or kids also, being let out, have fed upon dewy herbs, which must not at all be allowed; but, when that is done, it surrounds their mouth and lips with filthy ulcers like wild-fire. Hyssop and salt, bruised together in equal quantities, are a remedy for it; for, with this mixture, they rub thoroughly the roof of their mouth, and their tongue, and their whole mouth. Presently after, they wash the ulcers with vinegar, and then anoint them all over with liquid pitch and hogs grease. Some think proper to mix a third part of brass, or copper rust, with two parts of hogs lard, and to use this medicine after it is warmed. Some mix with water the leaves of the cypress-tree bruised, and so wash their ulcers, and the roof of their mouth. But the way of castrating we have already described; nor indeed is there any other method observed in castrating lambs, than in castrating a larger quadruped.

of the belly, without any evacuation. The nature of this grass is astringent, so that it has a double effect upon them, both to swell and bind their belly, which is more probable, than to render the words, *convulses their belly*, which *distentio* and *contractio* frequently signify.

C H A P. VI.

Of Goat-Cattle.

AND forasmuch as enough has been said of sheep-cattle, I shall now return to the goat-cattle. But this kind requires and delights in thickets, rather than in a champain situation; and finds exceeding good pasture also in rough, rugged, and woody places: for it neither dislikes brambles, nor is hurt with briars; and it delights most of all in little trees, and in places where shrubs grow. These are the strawberry-tree, the ever-green privet, wild shrub-trefoil, as also ever-green and common-oak-shrubs, which do not leap up to a great height. An he-goat, who has two small warts hanging down from his neck, is reckoned the best, of a very large body, with thick legs, a full and short neck, flaccid and swagging ears, a small head, black, thick, shining, and exceeding long hair; for he himself also passes through the hands of the shearers,

‘ For wretched seamens coats, and th’ use of camps (1).’

But one of seven months is fit enough for procreating, because he is immoderate in his lust; and while he is yet nourished with the dug, he leaps upon his dam; and therefore he grows quickly old, even before he is six years complete, because he is exhausted with a too early desire of venery, during the very first years of his puerility. Therefore, when he is five years old, he is reckoned not very fit for impregnating the female.

A she-goat is chiefly approved, which is the most like to the he-goat we have described, if she has also a very great udder, and gives milk in great abundance. In a calm constitution of the climate, we will purchase this cattle without horns, but in a stormy and rainy climate, always that which has horns: for even in every region it is necessary, that the husbands of the flocks should be without horns; because such as are horned are almost pernicious, by reason of their petulancy, and aptness to butt. But it is not expedient to have a greater number of this kind, than one hundred heads in one inclosure, seeing a thousand of the wool-bearing kind may be provided with folds, with equal ease and conveniency. And when she-goats are first bought, it is better to buy one intire flock, than small parcels out of several, that while they

(1) *Virg. Georg. iii. 313.*

are feeding, they may not separate and divide into several distinct parcels, and that they may stand together quietly and with greater concord in the goat-house. Violent heat hurts this cattle, but cold is more hurtful, and especially to such as are great with young; for the frost destroys their conception. Nevertheless these are not the only things which occasion abortion, but mast also, when they give them less of it than is sufficient to satiate them: therefore, unless it can be given them in great abundance, no allowance of it at all ought to be given to the flock.

The principal time for the putting the male to the female is commonly during the autumn, before the month of *December*, that so they may bring forth their young when the spring approaches, when the thickets are budding, and when the woods begin first to put forth their new leaves. But you ought to chuse such a goat-cote for them, as is all paved with a natural rock, or by hand, because there is no litter laid under this cattle, and a diligent Goatherd sweeps their cotes every day, and neither suffers dung nor moisture to remain in them, nor mire and dirt to be formed, all which are hurtful to goats: but, if they be a generous race, they bring forth frequently two, sometimes three at a time. It is a very sorry increase of the flock, when two mothers produce but three kids, which, when they are brought forth, are educated in the same manner as lambs, except that the lasciviousness of the kids must be checked, and restrained within narrower bounds. Also, over-and-above plenty of milk, you must give them elm-feed, or shrub-trefoil, or ivy; or you must throw tops of the mastich-tree also, and other small leaves, before them. But of twins, one head, which appears to be the strongest, is reserved for recruiting the flock, the other is delivered to the merchants. A kid must not be put under a she-goat of one or two years old to be suckled and brought up (for both these ages bring forth young); for none of them ought to educate, but such as are three years old. But the young offspring must be presently driven away from her that is but one year old, and have admittance to her that is two years old, till it be fit for sale. Nor must the mothers be kept beyond eight years, because, being wearied with continual births, they become barren.

But the Overseer of the cattle ought to be lively and active, hardy, stout, exceeding patient of labour, brisk, chearful, courageous, and daring, and one who easily goes over rocks and defarts, and thro' briars and thorns; and that he may not, as keepers of cattle of another kind, follow, but for the most part go before the flock: wherefore it is necessary, that he be exceeding nimble and active. The young goats,
while

while they are browsing in the thickets, give place to the older goats. She that gives place ought to be checked from time to time, that she may not run before, but browse and gather her fodder quietly and slowly, that she may both have a large udder, and not be of a very lean and ill-favoured body.

C H A P. VII.

Of Medicines for Goats.

OTHER kinds of cattle, when they are afflicted with a pestilence, at first gradually decay, and fade away with their disease, and their languishing illnesses. Young goats alone, though they be in good plight of body, and chearful, are suddenly cut down, and destroy'd in whole flocks, as it were with some sudden destruction. This uses to happen chiefly from great plenty of fodder: wherefore, when the plague has struck one or two of them, they must all presently be let blood: nor must they be fed the whole day, but shut up within their folds the four middle hours *of the day*. But, if any other languishing illness infests them, they are cured with a potion made of the roots of the reed, and the white thorn, with which, after we have carefully bruised them with an iron pestle, we mix rain-water, and give that alone to the cattle to drink. But, if this thing does not drive away their sickness, the cattle must be sold; or, if this cannot be done, they must be killed with the knife, and salted. Afterwards, some space of time interposed, it will be proper to provide again another flock; nevertheless, not before the pestilent time of the year, whether that be in the winter, be removed by the summer, or, if it be in the autumn, it be changed by the spring. But, when any particular one of them is sick in the house, we shall apply the same remedies to them, as we did to sheep also. For when their skin is distended with water, which disease the *Greeks* call $\dot{\upsilon}\delta\rho\omega\psi$, (a dropsy) a slight incision made in the skin under the shoulder will let out the pernicious water, then the wound that is made may be cured with liquid pitch. When the genital parts of one that has newly brought forth, are swelled, or the afterbirths have not answered, let a *sextarius* of must, boiled into two thirds of the first quantity, or, if that be wanting, the same quantity of good wine, be poured into their jaws; and let their natural parts be filled with liquid ointment, wherein wax is the chief ingredient. But,

that I may not now treat fully of every particular, we shall cure goat-cattle in the same manner as has been already directed with respect to sheep.

C H A P. VIII.

Of the Method of making Cheese.

THE care of making cheese must not be omitted, especially in regions that lie at a great distance from town, where there is not the conveniency of carrying the milk-pail to market. Moreover, if the cheese be made of thin liquor, it must be sold as quickly as possible, while it is yet green and retains the juice. If it be made of rich and fat milk, it will bear to be kept longer. But it ought to be made of pure milk, and of the freshest, without any mixture: for that which has stood long, and is mixed, contracts a sharpness. They commonly curdle it with a lamb's or a kid's runnet, although it may also be brought into a consistency, both with the flower of the wild thistle, and with the seeds of bastard-saffron, or the blessed thistle; and also with fig-tree-milk, which the tree emitteth, if you wound its green bark. But, indeed, that is the best cheese which has the least of the drug in it. But the weight of a *denarius* of runnet is the least that a pail of milk requires. Nor is there any doubt but cheese made of milk congealed with fig-tree-twigs tastes exceeding sweet.

But the milk-tub, when it is filled with milk, ought not to be without some gentle warmth. Nevertheless, it must not be brought so near as to touch the flames, as some people are of opinion, but be placed not far from the fire; and presently after it is curdled, the liquor must be transferred into wicker-baskets, cheese-vats, or moulds; for it is of great importance, that the whey be strained and separated from the condensed substance as soon as possible: for which reason, the country-people do not indeed suffer the moisture to drop slowly from it of its own accord; but, when the cheese becomes a little more solid, they put weights upon it, that thereby the whey may be squeezed out: then, as it is taken out of the moulds or frails, it is laid up in a dark and cold place, upon the very cleanest boards, that it may not be spoiled; and it is sprinkled with bruised salt, that it may sweat out the acid liquor: and when it is hardened, it is pressed more vehemently, that it may be conspissated; and it is sprinkled again with
toasted

toasted salt, and condensed again with weights. After this has been done for nine days, it is washed thoroughly with sweet water, and placed in such a manner under a shade, upon hurdles made for that purpose, that one cheese may not touch another, and that it may be moderately dried. Then, that it may keep the tenderer, they put it close together in several stories, in a close place, not exposed to the winds. Thus it neither becomes spongy and full of holes, nor salt, nor dry : the first of which faults uses to happen, if it be pressed but a little ; the second, if it be seasoned with too much salt ; and the third, if it be scorched in the sun. This kind of cheese may be exported also beyond sea. For that which is designed to be eaten in a few days, while it is new, is made up with less care : for, being taken out of the wicker baskets, it is put into salt and brine, and soon afterwards dried a little in the sun.

Some, before they put the shackles upon the cattle, put green pine-apples into the milk-pail, and presently milk the cattle upon them ; and they do not separate them till they have transmitted the coagulated substance into moulds. Some bruise the green kernels themselves, and mix them with the milk, and so congeal it. There are some who put bruised thyme, strained through a sieve, with the milk when they curdle it. In like manner you may make it of whatever taste you please, by adding to it the seasoning you have made choice of. But that way of making what we call hand-pressed cheese, is exceeding well known ; for when it is a little congealed, and while it is yet warm in the milk-tub, they cut it ; and, having sprinkled it with boiling water, they either shape it by hand, or squeeze the whey out of it in box-wood moulds. Also that which is hardened in brine, and so coloured with the smoak of apple-tree wood, or of stubble or straw, is not of a disagreeable taste (1). But now let us return to the breeding of cattle.

(1) Cheese dried in the smoak was much esteemed by the *Romans*, and preferred to all other sorts ; and at *Rome* there was a particular place for smoking it, which *Pliny* says made it very agreeable to the taste, *lib. xi. 42.* Our author recommends the smoak of apple-tree-wood or stubble for that purpose.

C H A P. IX.

Of Swine, and of Medicines proper for them.

IN all kinds of four-footed beasts, the shape and form of the male is chosen with great care, because the progeny is frequently more like the father than the mother: wherefore, in swine-cattle also, certain of them must be approved, which are choice and singular for the largeness of their whole body, and such as are rather square, than those that are long or round, with an hanging-down belly, vast buttocks, but not so long legs and hoofs, of a large and glandulous neck, with short snouts, and turned upwards; and especially, which is more to the purpose, the males must be exceeding salacious, and such as are proper for gendering from the age of one year, till they come to their fourth year: nevertheless they can also impregnate the female when they are six months old. Sows of the longest size and make are approved, provided they be, in the rest of their members, like the boars, which have been already described.

If the country is cold, and liable to hoar-frosts, the herd must be chosen of an exceeding hard, thick and black bristle. If the country be temperate, and lie exposed to the sun, the cattle that is smooth, and has no bristles, or even that which is white, and proper for the mill, and the bakehouse, may be fed. The female is reckoned fit for pigging till she be almost seven years old; and by how much the more fruitful she is, by so much the sooner does she grow old. One of a year old is not altogether unfit for conceiving; but she ought to be put to the boar in the month of *February*, that so, being four months with young, she may farrow in the fifth, at a time when the herbs are more solid and substantial, that so the pigs may both have milk in its greatest strength and perfection, and that, when they leave off receiving nourishment from the udder, they may be fed with stubble, and with such leguminous fruits as fall to the ground of their own accord. This is what is practised in regions very remote from cities, where nothing turns to account but the bringing them up for breed; for, in regions contiguous to the city, a sucking pig must be exchanged for money; for so the mother, by not bringing-up her young, is freed from labour, and will more quickly conceive, and bring forth again; and that she will do twice a year.

The males are castrated, that they may grow fat, either after their first coition, when they are six months old, or after they have often

gendered, when they are three or four years old. They also exulcerate the wombs of the females with an iron instrument, and shut them up with the cicatrices, that they may not breed. What reason should induce people to this, I do not understand, except it be scarcity of food; for, where there is great plenty of fodder, it is always expedient to put them upon breeding, to raise a new offspring.

This cattle will make a shift in any grounds whatsoever, whatever their situation may be; for they are fed very commodiously both upon mountains and in plains; better nevertheless in marshy, than in thirsty lands. Woods are most proper for them, which are clothed with the common oak, the cork-tree, the beech-tree, the tall *cerrus* (1), and ever-green oaks, wild-olive trees, tamarisk (2), hazel, and wild pomiferous trees, such as the white hawthorns, *Greek* carob-trees, the juniper, the lote or nettle-tree, the pine, the cornel-tree, the strawberry-tree, the plum-tree, and Christ's thorn, and choak-pear-trees; for these grow mellow, and ripen at different times, and satiate the herd almost the whole year. But, where there is a scarcity of trees, we will endeavour to get for them food that grows immediately upon the ground, and prefer dirty and miry pasture to that which is dry, that they may search all the marshes and bogs, and dig out the worms, and wallow in the mire, which is mighty agreeable to this cattle; as also that they may be at liberty to spoil and waste the waters; for it is also of great benefit to them to do this, especially during the summer, and to grub up the small roots of the aquatic wood, as of the rush, the flag, and the low bastard reed, which the vulgar calls *canna*. For, indeed, land that is cultivated makes swine fat, when it is grassy, and planted with very many sorts of pomiferous trees, that throughout the different seasons of the year it may yield apples, plums, pears, nuts of many different forms, and figs. Nevertheless, we must not, because of these, be sparing of our barns: for, when forage fails without doors, we must give it them by hand. For which purpose, a great

(1) *Cerrus*. This kind of oak, as has been already said, according to the account that *Pliny* gives of it, *Nat. Hist. lib. xvi. 5.* was in his days scarcely known in most parts of *Italy*. It is a very tall tree, with an acorn unpleasant and disagreeable to the eye, rough and unpleasant to the hand, when it is handled; with an echinated calyx, or a cup belet with prickles like an hedge-hog, and much longer than that of other oaks.

(2) *Tamaricibus*. Some think that this is not the true reading, because the fruit of this tree is exceeding small, and covered with a down, and cannot be good for swine. *Pliny* says, that it is only fit for brooms, and denies that it has any fruit, *Nat. Hist. lib. xvi. 26.* *Pontedera* thinks, that the true reading is *ternitibus*, which ought to be joined with the preceding word *oleastris*, so that it may signify, boughs of the olive-tree with fruit upon them. But as other authors say, that it bears fruit, and *Matthiolus* makes it the same with the *Myrica*, probably *Pliny* meant a certain wild sort in some parts of *Italy*.

quantity of mast must be laid up in water-cisterns (3), or in the smoak in lofts: they must also have an allowance of beans, and such-like legumes, when their low price permits it; and especially in the spring, while green things are as yet in the milk, which for the most part is hurtful to swine: therefore in the morning, before they go forth to the pastures, they must be sustained with such food as has been laid up in store for them, lest the herbs, which are not come to maturity, give them a looseness, and the cattle be emaciated with that distemper; nor ought they to be all shut up close together, as our other flocks; but the swine-sties must be made after the manner of porticoes, wherein they may be shut up, either after they have farrowed, or when they are pregnant also: for swine especially, when they are shut up, and confusedly huddled in whole herds together, lie one upon another, and make one another cast their young, or overlay and smother them. Wherefore, as I said, swine-sties must be built joining to walls, to the height of four feet, that the sow may not be able to leap over the inclosures; for she ought not to be covered over, that so the Keeper may from the upper part count the number of the pigs; and if the mother be lying upon any of them, and smothering them, pull it from under her.

But let the Keeper be vigilant, active, industrious, knowing, and skilful: and he ought exactly to remember all the swine which he feeds, both such as are kept for breed, and have pigs actually under their care, and also those that are younger, that he may consider and take care of every one of their litters in particular: and let him always observe her that is near the time of her farrowing, and shut her up, that she may bring forth her young in the swine-stie; then let him mark down presently how many, and what kind the young ones are of; and especially take care, that none of them be brought up by a strange nurse: for pigs, if they escape out of the hog-stie, very easily mix themselves with others; and the sow, when she has laid herself down, gives her dugs equally to a stranger and to her own. Therefore the chief business of a swineherd is to shut up every one of them with her own offspring, who, if his memory fails him, so that he cannot know every sow's progeny in particular, may, with liquid pitch, put the same mark upon the sow and her pigs, and either by letters,

(3) *Cisternis in aquam.* It is very probable, that this sentence is corrupt, for it cannot be supposed, that mast can be kept long in water without spoiling; so that *Pontedera's* correction seems very probable, *cisternis sine aqua, vel fumosis tabulatis*; in cisterns without water, or in smoaky lofts: or perhaps the author directs, that they be laid up in order to throw them into the cisterns, when they go to drink, that they may then eat them, after they have been softened in the water.

or by some other marks, distinguish the dam and every one of her young. For, in a greater number, it is necessary to have different marks, that the Keeper's memory may not be confounded. Nevertheless, because it seems troublesome and difficult to do this in large herds; it is most convenient so to build the swine-sties, that their thresholds may rise to such an height, as the nurse may just be able to get out of it, but the suckling not be able to step over it; so a stranger does not creep in; and every litter, which, nevertheless, ought not to exceed the number of eight heads, waits for its own mother in her bed-chamber. Not that I am ignorant, that the fecundity of breeding sows is productive of a greater number; but because she that brings up more, loses her strength, and very quickly decays. And those which suckle and bring up their own young, must be sustained with boiled barley, lest they be reduced to extreme leanness, and from that to some destructive distemper. But let a diligent Swineherd frequently sweep the hog-house, and oftener the swine-sties: for tho' the foresaid beast is very nasty and dirty in its way of feeding, nevertheless it loves to have a very clean bed to lie in. This is commonly the way of managing of swine-cattle, that enjoy a good state of health.

C H A P. X.

Of Medicines proper for Swine.

OUR next business is to tell, what care is to be taken of that which is diseased. The signs of swines being in a fever, are, when they hang down their heads, and carry them awry; and, after they have run a little up and down the pastures, they suddenly stand still, and, being seized with a giddiness, fall down. We must take particular notice, to what side their heads incline, that we may let them blood in the ear on the contrary side. Let us also strike a vein under their tail, at the distance of two inches from their buttocks, which is large enough in that place; and it must be first beaten with the sprig of a vine; then, when it is swelled with the stroke of a rod, be opened with a lancet; and, after they have been blooded, the vein must be bound up with the rind of the willow-tree, or of the elm-tree also. When we have done this, we must keep the cattle one or two days in the house, and give them moderately warm water, as

much as they shall desire; and to each of them a sextarius of barley-meal.

Such of them as have swellings in the glands under the throat, must be let blood under the tongue; and, when it has flowed abundantly, it will be proper, that their whole mouth be rubbed over with bruised salt and wheat-meal. Some think it a more present and effectual remedy, when they pour into each of them, through an horn, three cup-fulls of *garum* or salt fish-pickle; then they bind cloven tallies or cuttings of fennel-giant with a small flaxen cord, and hang them so at their necks, that the swellings may be touched with the fennel-giant cuttings. Ivory saw-dust, or filings of ivory, also, mixed with parched salt, and beans bruised very small, thrown before them when they are hungry, before they go forth to their pastures, is reckoned very salutary to such of them as nauseate their food. Also the whole herd uses to be so sick, that it is emaciated, and takes no food; and when they are led forth to the pastures, they lie down in the middle of the field, and, being seized with a certain lethargy, they give themselves wholly up to sleep in the heat of the summer-sun; which when they do, they shut up the whole herd in a covered hog-house, and keep them from drinking and forrage for one day: the day after, they give them, while they are thirsty, the root of the serpentine cucumber bruised and mixed with water; which when the cattle have drunk, they are taken with a nauseating, and both vomit and purge; and, when all the bile is driven out, they allow them chichlings or beans sprinkled with very strong brine, and then they give them (as they do to men) warm water to drink.

But, as thirst, during the summer, is hurtful to all four-footed beasts whatsoever, so, most of all, is it pernicious to swine. Wherefore we do not command, that, as the goat and the sheep, so this animal also should be led twice to water: but that, if it can be done, it be constantly kept hard by a river, lake, or pond, during the rising of the Dog-star; because, as it is an exceeding hot beast, it is not contented with drinking the water, unless it plunges its nasty fat flanks, and belly distended with fodder, into it, and cools them therein: nor does it delight more in any thing, than to wallow in brooks, and in a miry lake or bog. But, if the situation of the place does not allow this to be done, you must draw water out of wells, and put it into troughs in large quantities, and give it them to drink plentifully; with which if they be not abundantly satiated, they become diseased in their lungs. And this disease is exceedingly well cured, by inserting *lungwort* into the flaps of their ears; concerning which little root we
have

have carefully and very often spoken already. Also the pain of a distempered spleen uses to plague them, which happens, when there chances to be a great drought; and, as the Bucolic poem speaks,

‘ When on all sides the apples scatter’d lie
 ‘ Each under its own tree (1).’

For it is an insatiable cattle, and the swine, while, beyond all measure, they eagerly seek after fodder that is sweet, labour and are affected in the summer with a swelling or growth of the spleen; from which they are relieved, if troughs be made of tamarisks and butchers broom, and filled with water, and set before them when they are thirsty: for the medicinal juice of the wood, being swallowed with their drink, puts a stop to the intestine swelling (2).

C H A P. XI.

Of Castrating of Swine.

THERE are two times observed for castrating this kind of cattle, the spring and autumn: and there are two different ways of performing it. The first is that which we have already given an account of; when, after two wounds or incisions are made, the testicles are squeezed out one by one, through each of the wounds: the other is more specious, but more dangerous; which, nevertheless, I shall not omit. After you have cut with a knife, and pulled out one of the virile parts, thrust in a penknife through the wound which you have made, and cut the middle skin as it were, which intervenes between the two genital members, and with your crooked fingers pull out the other testicle also: thus, having applied the other remedies, which we taught you before, there will be but one cicatrice.

But there is one thing which I thought ought not to be concealed, which concerns the religion of a Master of a family, and which may raise scruples, and superstitious fancies, in his mind. There are some sows,

(1) *Virgil. Eclog. vii.*

(2) The only difficulty here is, how troughs can be made of *ruscus*, butchers broom. Some think, that the true reading is *tamaricis e trunco*. *Pliny, lib. xxiv. 9.* speaks of canals or troughs made of the *tamarix*. Authors are not so very exact in every sentence, as to be confined always to the very letter; perhaps *Columella* meant no more, than that the inside of their troughs should be well lined with the branches of these trees.

which eat their own young, which, when it happens, is not looked upon as a prodigy ; for, of all cattle whatsoever, swine are the most impatient of hunger ; so that, sometimes, if they want food, they devour, not only the offspring of other creatures, (if they have liberty) but their own also. I have discoursed accurately enough (if I am not mistaken) of Herds of big Cattle, of the other sorts of Cattle, and of Shepherds and Herdsmen, by whom flocks and herds of four-footed beasts are taken care of, tended, and looked after, both in the house and without doors, so far as human prudence and industry are requisite.

C H A P. XII.

Of Dogs.

I Shall now, as I promised in the preceding book, speak of dumb keepers, or watches, tho' a dog is falsely called a dumb keeper : for what man living can publish or proclaim more distinctly, and with so great vociferation, the approach of a beast, or a thief, as he can do with his barking ? What servant is there, that loves his master more ? What companion more faithful ? What keeper or watchman less liable to bribes and corruption ? What watchman can be found more vigilant ? In a word, Who will be more steady in avenging your injuries, or in protecting you from them ? Wherefore an Husbandman ought to purchase and maintain this animal, even among the very first things, because he keeps and guards both the manor-house, and the fruits, and the family, and the cattle.

But there are three different purposes to which regard is had in purchasing and maintaining this animal : for one kind is chosen *to protect us* against the snares and insidiousness of men, and this keeps and guards the manor-house, and such things as are adjoining to it. But a second kind is chosen for repelling the injuries of men, and wild beasts ; and this kind watches over the stables and folds at home, and the cattle when they are feeding abroad. A third kind is provided for hunting withal ; and this not only gives no assistance to the Husbandman, but it takes him off his business, and makes him lazy and slothful : therefore we must speak of the house-dog, and of that of the Shepherd ; for the hunting-dog does not at all belong to our profession.

The keeper of the manor-house must be chosen of a very large body, and of a vast canorous bark, that the evil-doer may be first terrified when he hears him, and afterwards also when he sees him; and even sometimes when he is not seen, may notwithstanding, with his hideous roaring and growling, put to flight him that lies in wait to do you hurt. But let him be of one colour, and let that rather be chosen white in a Shepherd's dog, and black in one for the manor-house; for a various colour is commendable in neither. A Shepherd approves of the white, because he is unlike to the wild beasts; and sometimes there is great occasion for some remarkable difference to distinguish them, when he is driving away the wolves, either in a dark morning, or in the twilight in the evening also, lest, instead of the wolf, he strike the dog, if he is not very conspicuous by his white colour.

The manor-house dog, which is placed there in order to oppose the mischievous deeds of wicked men, whether the thief comes when it is fair daylight, appears more terrible when he is black; or whether he comes in the night, the dog is not so much as seen, because of the resemblance he bears to darkness; wherefore being covered with the darkness, he has safer access to him who lies in wait to hurt you. One that is square is more esteemed than one that is long or short, with so huge an head, that it may seem to be the greatest part of his body, with dejected and propendent ears, black or fiery red-coloured eyes radiant with sparkling dazzling light, a large and hairy breast or chest, broad shoulders, thick and rough bristly legs, a short tail, exceeding large toes and nails, which in *Greek* are called *δράκαι* (I). This shall be the form, and size, and make of the manor-house dog, most to be commended; but his manners or natural temper ought neither to be exceeding gentle and mild, nor, on the contrary, cruel and fierce; because with the first he fawns upon a thief also, and with the last he falls upon the domestics. It is enough, that they be severe, and not fawning; and that they sometimes look upon their fellow-servants with somewhat of a more angry and surly countenance, and be always in a fume and rage against strangers. But especially, when they are upon guard, they ought never to be seen sleeping, but always upon the watch; not wandering up and down, but assiduous and circumspect, rather than rash and inconsiderate: for those never give the alarm, or warning of any thing, but what they are very sure of; these are roused up with any vain noise, and groundless suspicion.

(I) *Δράκαι*, in some editions *δράκαι*, which signifies, handfuls of any thing. *Hesychius* says, that the word signifies the *palm of the hand*: when applied to dogs, no doubt, it signifies their toes and nails.

I thought that these things were therefore proper to be mentioned, because not nature only, but discipline also, forms the manners and temper, that so, when we have occasion to buy them, we may make choice of such as have these qualities; and, when we educate such as are whelped at home, we may form them with such institutions as these. Nor is it of any great importance, whether manor-house dogs be of heavy bodies, and not very swift, or no; for they ought to do more upon the place where they are posted, and in the passage and entry to the house, than in falling out to the open ground, and at a distance from their station: for they ought always to remain about the inclosures, and within the edifice, yea never so much as to retire to any great distance from it; and they do their duty well enough, if they both sagaciously smell any one coming toward them, and terrify him with their barking, and do not suffer him to come nearer, or violently fall upon him that persists to approach. For the first thing is, *not to be attacked*; and the second thing is, when provoked and set upon, *to defend and avenge himself* with courage and perseverance. And what has been said, relates to domestic guards; what follows, to pastoral.

A dog for keeping cattle ought neither to be in so bad a plight of body, nor so swift, as one that pursues fallow-deer and stags, and the swiftest animals; nor so fat and heavy, as the guard and keeper of the manor-house and the barn: but, nevertheless, he ought to be robust, and to a certain degree prompt and bold, because he is prepared and appointed for quarrelling and fighting, no less than for running, seeing he ought to repel and oppose the snares of the wolf, and pursue the savage and cruel robber when he flies, and shake the prey out of his jaws, and rescue it, and take it away from him. Wherefore a longer and more produced or out-stretched state or make of body is more fit and suitable for these adventures, than the short, or even than that which is square; because (as I said) necessity sometimes requires, that a beast should be pursued with great celerity: the rest of his joints, being like the members of the house-dog, are equally approved.

Almost the same food must be given to both kinds: for, if your lands are so wide and spacious, as to sustain flocks and herds of cattle, barley-meal with whey is excellent food for all dogs whatsoever, without any distinction. But if your land is planted with trees, and without pasture, they must be satiated with bread made of red or bearded or common wheat: nevertheless, you must mix the liquor of boiled
beans

beans with it: but it must be lukewarm; for, when it is boiling hot, it creates madness.

To this quadruped, whether male or female, venery must not be permitted, till after it is a year old; for, if it is allowed, it consumes both their body and their strength, and makes their minds to degenerate. The first birth of one that has brought forth must be taken away from her; for, being a young novice, without any experience, she cannot nurse them rightly: and her educating them spoils the growth of her whole habit. The males procreate in a youthful manner till they are ten years old; after that age they seem unfit for coupling with the female, because the offspring of such as are older proves dull and unactive. The females conceive till they are nine years old; nor are they useful after their tenth year. The whelps must not be let out during their first six months, till they are grown strong, except it be to their dam, in order to play and wanton: afterwards they must be kept in chains in the day-time, and loosed during the night. Nor will we ever suffer those, whose generous dispositions we have a mind to preserve, to be educated at the dugs of a strange nurse; because both the maternal milk and spirits do always much more improve the growth of their genius, and of their body. But, if she that has brought forth is deficient in milk, goats milk will be proper to be given to the puppies, till they be four months old.

Also they must be called by names that are not very long, that every one of them may hear the more speedily when he is called: nevertheless not with shorter names, than what may be pronounced with two syllables; as the *Greek* name σκύλαξ, (puppy) the *Latin* *ferox*, (surly) the *Greek* λάκων, (*lacon*) the *Latin* *celer* (nimble, or swift-foot); or for the female, as the *Greek* names σπερδῆ, (speedful) ἀλκη, (courage) ῥώμη, (prowess) and the *Latin* *lupa*, (harlot) *cerva*, (deer-like) *tigris* (tygres). It will be proper to curtail the puppies, the fortieth day after they are whelped, in this manner: there is a nerve, which creeps all along through the joints of the back-bone, as far as the extremity of the tail; they take fast hold of this with their teeth; and, after they have drawn it out a little, they bite or break it off; which being done, the tail does not grow out into an abominable length; and (as very many Shepherds affirm) madness, a disease mortal to this kind, is thereby prevented (2).

C H A P.

(2) This last paragraph, relating to the curtailling of whelps, is quoted by *Pliny*, *lib. viii. c. 41.* and commended in order to prevent their running mad, which, he says, is fatal to them during the dog-days; and says, that, in order to prevent it, they used at that time

C H A P. XIII.

Of Diseases incident to Dogs, and of the Way of curing them.

BUT commonly, during the summer, the ears of dogs are so ulcerated by flies, that they oft-times lose them intirely: to prevent which, they must be anointed with bitter nuts bruised. But, if they are already affected with ulcers, it will be proper to drop into the wounds liquid pitch boiled with hogs-lard. The tykes fall off them, when they are touched with this same medicine; for they must not be pulled off with the hand, lest, as I said before, they make ulcers.

The remedies for a dog plagued with fleas are, either cumin bruised in equal quantity with white hellebore, and mixed with water, and rubbed upon them; or the juice of the serpentine cucumber (1); or, if you have not these, old lees of oyl, sprinkled over their whole body. If the scab infest them, bruise the same quantity of *cytissus*,

time to mix the dung of a cock, or an hen, with their food; but, if the disease prevented them, they used to mix white ellebore with it: But this disease is not only fatal to the dogs themselves, but to men also, if they be bitten by them; for, as *Cornelius Celsus* says, *lib. v. c. 1.* from this wound, if timely assistance is not given to prevent the bad effects of it, there arises what the *Greeks* call an *hydrophobia*, or fear of water, a most terrible disease, whereby the sick person is both tormented with thirst, and with dread of water at the same times. There is, says he, very little hope of the recovery of a person thus afflicted; but yet there is one only remedy, which is, to throw the person all of a sudden into a pond, without his apprehending or foreseeing it before it is done. *Pliny* says, that there was lately found out a remedy by a certain oracle, *viz.* the root of the wild rose-bush, which they called *cynosphodos*.

It would be needless to give many instances of the sagacity and faithfulness of dogs, of their courage in defending their masters, and of their sorrow at their death; of which *Pliny*, in his *nat. hist. lib. viii. c. 40.* gives several instances.

(1) *Cucumis anguineus*: Probably it is so called from its figure, resembling the winding of a serpent; accordingly by some authors it is called *cucumis flexuosus*. *Pliny* says, that some thought it was the same with that which is called *cucumis silvestris*, of which they made a medicine, which they called *elaterium*, by expressing the juice out of its seed: And *Cornelius Celsus*, *lib. v. cap. 12.* says, that the juice of the seed of the wild cucumber was so called, because of its strong purgative quality, ἀπὸ τῆ ἐλαῖν, *pellere, quasi depulso-rium*. And *Galen*, in *explicat. vocum Hippocrat.* says, that not only this juice, but every thing that purged the belly downward, was so called. And *Hesychius* says, that the word signifies a *cathartic medicine*; so that it seems very strange, that the plant itself should be called by this name; or that it should be thought to be so called from the elastic force of the seed leaping out of it, as some authors have said.

or shrub-trefoil, and *sesamum*, or oily-grain together; and mix them thoroughly with liquid pitch, and anoint the part affected: which medicine is reckoned proper also for men. This same pest, if it be more violent, is removed with the liquor that distils from the cedar-tree. Their other diseases must be cured in the same manner as we directed with respect to other animals. Thus far of lesser cattle. We shall presently, in the following book, give directions concerning manor-house pasturings, which comprehend the care and management of fowls, fishes, and wild four-footed beasts.

L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

B O O K E I G H T H.

C H A P. I.

Of Pasturings in and about the Manor-house (1).

WE have in seven books, *Publius Silvinus*, given an account of those things which almost consummate the science of Tilling and Cultivating the ground; as also of such things as the consideration of the business of managing cattle required. Now this book shall bear the title of the following number: not because those things, which we intend to speak of, require the immediate and peculiar care of the Husbandman; but because they ought not to be undertaken

(1) The *Romans*, who for many ages lived after a very plain manner, and contented themselves with what their own country produced, without any great art, applying themselves more to the plain culture of the ground, than to any nice improvements in Husbandry; after they became acquainted with *Greece* and *Africa*, improved their Agriculture to a great degree; and their men of learning and curiosity collected all the knowledge they could have both from *Greek* and *Carthaginian* authors, which were very numerous, and also from their own observation; so that in a little while the art of Husbandry was carried to as great, if not greater, perfection in *Italy*, than in *Greece* and *Africa*: and they not only adopted the useful improvements of *Greece*, but soon fell into their delicacy and luxury; which was in nothing more remarkable than in their fishponds, which they carried to extravagant expences: and of such things as they derived from the *Greeks*, they frequently retained their *Greek* names, as we see in this author; who in this, and the last chapter of the VIIth book, has more *Greek* words, than in his whole work beside; which probably he did, tacitly to expose and censure a piece of vanity, which was more common in our author's days, when luxury was come to its greatest height, of giving foreign names to a great many of their delicacies. And as this chapter could not be so well translated, without leaving the *Greek* words in the text, as our author has done; if any want to know the true signification of them, they may find it, by casting their eye on the place referred to by the number placed after the word.

and

and carried on in any other place but in the country, or in manor-houses; and they turn to more advantage to those that live in the country, than to those that live in cities. For it is no very small peny that feeding of smaller animals within the precincts of the manor-house brings in to the Husbandman, as well as feeding of cattle, since with the dung of fowls they both cure the leanest vineyards, and all sorts of young trees, and of land whatsoever: and with the fowls themselves they make plentiful provision for their kitchen, and furnish their table with valuable and excellent dishes: lastly, with the price of the animals that are sold, they increase the yearly income of the manor-house. Wherefore I thought it proper to speak of this kind of pasturing also; and it is commonly carried on either in, or near to, and about, the manor-house.

In the manor-house there is what the *Greeks* call ὄρνιθῶνας (2), and περιτρεφῶνας (3); and, where there is conveniency of water at command, ἰχθυοτροφεῖα (4), also, are carried on and managed with sedulity and care. But, that we may rather speak *English*, all these are the very same as cells, and roosting-places for common poultry-yard-fowls; and likewise as receptacles of such fowls as are shut up in coops, and fattened, and of aquatic animals. Moreover, about the manor-house are placed μελισσῶνες (5), and χηνοτροφεῖα (6), yea λαγοτροφεῖα (7) also, are managed and tended with great care and attention. Which bee-stalls, or lodgings for bees, we in like manner call *apiaries*; and the harbouring places for swimming fowls, which delight in lakes, and pools, and fish-ponds, we call *aviaries*; and those also of wild cattle, which are kept confined in inclosed woods and forests, we call *vivaries*.

(2) Ὀρνιθῶνας, *acc. plur.* aviaries, or poultry houses. *Varro, lib. iii. c. 3.* by this word meant *receptacles of all manner of birds or fowls fed within the walls of the villa.*

(3) Περιτρεφῶνας, *acc. plur.* περιτρεφῶν, the same as περιτρεφειῶν, a dove-house or pigeon-house, for breeding and feeding doves and pigeons.

(4) Ἰχθυοτροφεῖον, a fish-pond, ἰχθύς, a fish, and τρέφω, to feed or nourish; a lake, pool, or pond, inclosed in such a manner as the fishes cannot escape.

(5) Μελισσῶν, a bee-hive or bee stall, where bees were kept. *Varro* also makes use of this word; and it seems the word *apiarium* was not much in use: μέλισσα, a bee.

(6) Χηνοτροφεῖον, a goose-pen, or place where geese are fed: χήν, a goose, and τρέφω, to feed.

(7) Λαγοτρεφείον, *leporarium*, a hare-warren: λαγός or λαγῶς, an hare. *Varro* says, that he would have this word taken in a larger sense than what the ancient *Romans* meant by it, who kept nothing but hares in them; but he would have it to signify all inclosures contiguous to the villa, where wild animals are shut up and fed.

C H A P. II.

Of the several Kinds of common Poultry-yard Hens and Cocks proper to be provided and brought up.

THerefore I shall first give directions concerning those that are fed within the precincts of the manor-house: and, indeed, with respect to others, it is perhaps doubted whether country-people ought to have them in their possession. But, for the most part, it is a common and usual thing for an Husbandman to bring up hens: and they are either of the common poultry kind, which they keep in farm-houses; or what they call rustic hens; or of that kind they call *African* hens. The common poultry-yard or farm-house hen, is a fowl which is commonly seen in all manor-houses whatsoever: the *rustic hen*, which is not unlike to that which is common in all farm-houses, is deceived and caught by the fowler; and there are great numbers of this kind in an island situate in the *Ligurian* sea, which mariners, by lengthening the *Latin* name of the fowl, have called *Gallinaria* (1): the *African* hen, which most people call the *Numidian*, is like to the *Meleagris* (2), except that she bears upon her head a bright-red helmet and crest, both which are blue in the *Meleagris* hen.

But,

(1) *Gallinaria*. *Varro* says, that this island is in the *Tuscan* sea, near the coast of *Italy*, over-against the *Ligurian* mountains *Intemilium* and *Album Gaunum*. Some authors say, it is rather a rock than an island. *Columella* says, that these rustic hens were, in their face, not very unlike the common farm-house hens. And *Varro* says, that at *Rome* they were rare, and seldom seen tame without a cage; that in their face they were not like the common poultry hens, but like the *African* hens, of a fair and beautiful aspect; and that commonly they did not breed in the house, but in woods. It is not easy to determine by what name these rustic hens are now called: perhaps they might be the breed of the common poultry-yard hens carried by mariners to that island, where, being left, they turned wild, as *Varro* seems to insinuate; tho' the sentence is somewhat obscure, and imperfect.

(2) *Meleagrides*. *Varro*, lib. iii. c. 9. speaking of *African* hens, which, according to our author, were also called *Numidian*, says, that they were large, various or spotted, and crook-back'd; and that the *Greeks* called them *Meleagrides*. But *Columella* says expressly, that they were different fowls; that the *African* hen was like the *Meleagris*, except that she carried upon her head a bright-red helmet and crest, which, in the *Meleagris*, were both blue. It is strange, that *Varro* and *Columella* should differ so much in their description of these two fowls; but either *Varro* was mistaken, or the sentence is imperfect, or not rightly pointed. Some authors say, that the *Gallinae Africanæ* or *Numidicæ* are what we call *Guiney hens*; and that the *Meleagrides* are what we call *Turkey hens*. But the great difficulty is, that the description given by *Athenæus* of the *Meleagrides*, does not at all agree to the *Turkey* hen, which, some say, was not known to the antients; and that

But, of these three kinds the common poultry-yard females are properly called *hens*; but the males are called *cocks*, and the half-males *capons*, which have this name given them when they are castrated, in order to destroy their lust. Nevertheless, they do not suffer this by losing their genitals, but by having their spurs burnt with a red-hot iron; which, when they are consumed with the force of the fire, are daubed over with potters-clay, till the sores that have been made are healed up. Therefore the gain, arising from this farm or manor-house kind, is not despicable, if there be a due application of skill and knowledge in bringing them up; which most of the *Greeks*, and especially the *Delians*, were very famous for, and made great account of. But they, because they fought for tall bodies, and minds obstinate in battle, and of invincible courage, did chiefly approve the *Tanagrion* (3) and *Rhodian* kind; as also the *Chalcidian* and *Median*, which, by the ignorant vulgar, is called *Melian*. Our own *Italian* kind pleases us most of any: nevertheless, we have no regard to that darling inclination of the *Greeks*, who prepared all the fiercest fowls they could find, for fighting at their public games. For we give our opinion, and declare what we think proper for establishing a revenue, or yearly income, for an industrious master of a family, and not for a cock-master, or a keeper of quarrelsome birds, whose whole patrimony for the most part, which he had laid at stake, and hazarded, the conquering cock-champion has carried away.

Therefore he who shall have a mind to follow our directions, must consider first of all how many, and what kind, of breeding hens he ought to provide: secondly, he ought to consider, after what manner he ought to manage and feed them; then, at what times of the year he ought to receive their eggs; and, afterwards, to make them fit upon them, and hatch them: lastly, he ought to take great care, that the chickens be rightly brought up. For by these cares, and

that it was first brought from *America* into *Europe*. It seems difficult to determine by what modern name they ought to be called. We are told, that they have their name from *Meleager*, the Son of *Oeneus* King of *Calydonia*, whose sisters were called *Meleagrides*; and that, being consumed, and much wasted, with mourning for the death of their brother, the poets feigned, that they were changed into *Guiney* hens, or whatever else is signified by that word. The fable is in *Ovid*, *Metamorph. lib. viii.* if any have the curiosity to look into it.

(3) *Tanagrivi Galli*. *Tanagra* is a city in *Bœotia*, very remarkable for the courage and obstinacy of its cocks. *Pliny* says, that they made their country famous by their courage. *Varro* and several other authors mention them with great commendation. *Rhodus*, an island of the *Lesser Asia*, on the coast of *Caria*; and *Delos*, in the *Ægean* sea; and *Chalcis* in *Eubœa*, an island upon the coast of *Greece*, now called *Negroponte*; were all famous for fighting cocks.

ways of managements, the whole poultry-yard business, which the *Greeks* call *ornithotrophia*, is transacted and carried on. Two hundred heads are a sufficient number for employing the whole care of one person to feed them: provided nevertheless, that either a diligent old woman, or a boy, be appointed to keep them, and watch over them when they wander up and down, lest they be snatched away, either by men who lay wait for them, or be taken in the snares of insidious animals.

Moreover, it is not expedient to purchase any fowls but the most fruitful: and let them be of a very red, or a dark-coloured feather, with black pinions: and, if it can be done, let them be all chosen of this colour, or of that next to it. If otherwise, let the white be avoided; which, as they are for the most part tender, and not very long-lived, so such of them as are fruitful are not easily found: and, being also very conspicuous, they are, by reason of their remarkable white colour, very frequently snatched away by hawks and eagles. Therefore, let such of them as are set apart for breeding, be of a right good colour, of a strong body, square, large-breasted, with great heads, straight, bright-red and small crests, white ears; and, of this make and appearance, the largest that can be found, and not with an even number of claws: they are reckoned the most generous which have five toes, but so that no cross-spurs appear and stick out upon their legs: for she that bears this masculine badge, is obstinate and refractory; and disdains to admit the male; and is seldom fruitful: and also, when she sitteth upon her eggs, she breaks them with the sharp points of her claws.

It is not expedient to keep any cocks for hens, but such as are exceeding salacious; and in these also, the same colour as in the females, and the same number of claws, but a loftier make and stature, is required: lofty crests, of a bloody colour, and not crooked, or standing awry: yellow-red eyes, or tending somewhat to black: short and crooked bills; exceeding great and very white ears: rattles from a bright-red tending to white, which hang down like grey beards: then manes of various colours, or yellow, somewhat varying from a gold colour, diffused all over their necks to their shoulders: then broad and musculous breasts, and brawny wings like arms; also very long tails, bending with a double row of large feathers sticking out on each side; as also vast thighs, covered all over with thick bristly feathers, all standing on end; robust legs, but not long, armed, as it were, with mischievous spears, in order to hurt. But their manners and natural temper, tho' they are not prepared and trained up for the

battle, nor for obtaining the prize, nevertheless such as are generous are most approved; that they be elate, chearful, watchful, and ready to crow often, not such as are easily frightened; for sometimes they ought to resist and protect their conjugal flock; yea, even kill a serpent, when he rears his threatening head, or any other noxious animal: for such males as these they provide five females each. For of the *Rhodian* and *Median* kind, because of their heaviness, neither are the fathers very salacious, nor the mothers fruitful; nevertheless, they match three of them with one husband. And when they have laid a few eggs, they are slothful and backward to sit upon them, and much more to hatch them; and seldom bring up their young ones. Therefore they who love to have these kinds in their possession, by reason of the beautiful make of their bodies, when they have got the eggs of such as are of a generous excellent breed, put them under common, ordinary hens; and, when the chickens are hatched, they are brought up by them. The *Tanagrian*, being for the most part equal in size to the *Rhodian* and *Median*, are not much different in their manners from those of our own country, as also the *Chalcidian*.

Nevertheless, of all these kinds, the bastard chickens are the best, which our own *Italian* hens have brought forth, having conceived them by foreign males: for, they both retain their beautiful paternal shape, and their native salaciousness and fruitfulness. I do not too much approve of dwarf fowls; neither on account of their fruitfulness, nor for any other advantage they may bring, unless their very low stature is pleasing to any one: nor, indeed, do I like a male that is given to fighting, or whose amours make him quarrelsome; for, for the most part, he torments and vexes the other males, and will not suffer the females to couple with them, tho' he himself is not able to content many of them: therefore his sauciness must be checked with a piece of leather, such as they make bottles of; which, when it is made into a small globular form, you cut it in the middle, and put the cock's feet into it, through that part which you have cut; and by this shackle, as it were, his fierce and savage manners will be kept within due bounds. But, as I proposed, I shall now give directions relating to the care and management of the whole kind in general.

C H A P. III.

Of the right Contrivance and Making of an Hen-house.

HEN-houses ought to be placed in that part of the manor-house which looks to the sun-rising in winter; let them be contiguous either to the oven, or to the kitchen, that the smoak may reach the place where the fowl roosts, it contributing very much to the health of this kind especially. The whole building designed for the hen-house, is to consist of three cells, built close to one another; of which, as I said, the front, being all in one continued line, is to be turned towards the east: then in this front let there be only one small entry made into the middle cell; which itself ought to be the lowest of the three, and seven feet every way: in this must be made one single entry to each of the other cells in the right and left wall; and both entries must be joined to the wall that is opposite to such as come in. But to this wall let there be an hearth applied, or a place for making a fire, of such a length, that it may be no stop or hindrance to the foresaid passages, and that the smoak may come from it into both cells; and let these have twelve feet both in length and in height, but no more breadth than the middle cell. Let their height be divided with lofts, which may have above them four, and below them seven feet, free from any incumbrance, because the lofts themselves take up one foot. Both lofts ought to be for the accommodation of the hens; and they ought to be illuminated by small windows from the east, one for each cell; which same windows may afford a passage for the fowls to go out by in the morning into the poultry-yard, as also an entry into the cells in the evening. But care must be taken, that they be always shut at nights, that the fowls may remain there in greater safety.

Below the lofts let greater windows be opened, and let them be fortified and secured with grates or cross-bars, that noxious animals may not be able to creep in; nevertheless, in such a manner, that the places may be thoroughly well lighted, that they may dwell the more conveniently: and the Poultry-keeper ought from time to time to search and watch for the eggs of those that are laying, and to consider the condition of those that the Hens are sitting upon; for, even in those places themselves, it is proper to build the walls so thick, that they may admit of nests cut out in rows for the hens; in which
they

they may either lay their eggs, or hatch their chickens; for this is both wholsomer and neater, than that which some do, who drive stakes with great force into the walls, and place wicker-baskets upon them. But whether you make hollow places in the walls for them, as I said before, or place wicker-baskets for them, there must be porches placed before them, by which the breeding hens may come to their nests, either in order to lay their eggs, or to brood; for they ought not to fly into the nests themselves, lest, when they leap into them, they break their eggs with their feet. Then there is an ascending-place made for the fowls to go up into the lofts through both cells, by joining small planks to the wall, which are made a little rugged by forming steps in them, that they may not be slippery when they fly to them. But let small ladders likewise be applied to the foresaid little windows from the poultry-yard, on the outside, by which the fowls may creep in to take their night's rest.

But, above all things, we must take care, that both these and the other aviaries, of which we shall presently speak, be well smoothed with plaister, both in the inside and without, that neither cats nor snakes may have access to the fowls, and other equally hurtful pests may be hindered to enter. It is not proper, that the fowl should sit upon the loft when it sleeps, lest it be hurt with its own dung, which gives them the gout in their feet, when it sticks to their crooked toes. That this destructive evil may be avoided, you must rough-hew poles, and cut them square, lest, when they are round and smooth, they do not receive and give a fast hold to the fowl when it leaps upon them. Then you fasten the poles which you have made square, in the two opposite walls, where you have made holes for them, so that they may be distant the space of one foot in height from the loft, and of two feet in breadth from one another. This shall be the disposition of the hen-house for the poultry-yard.

But let the poultry-yard itself, through which they straggle, be not so free from dung as from moisture; for it is of great importance, that there be no water in it, except in one place, which they may drink of, and that must be exceeding clean: for water which has dung in it gives them the pip: nevertheless you cannot keep it clean, unless it be put close up in vessels made for that purpose. There are leaden troughs, which are found by experience to be more useful, than either those made of wood, or of potters earth; and you may fill them either with water or food. These are shut up by putting covers upon them, and have small holes made in their sides above the middle part of their height, at the distance of an hand-breadth the one from the

other, so that they may admit the heads of the fowls: for, unless they be secured with covers, whatever quantity of water or food is in them, is swept out with their feet. There are some who make holes in the upper-part in the covers themselves, which ought not to be done; for the fowl, leaping up upon it, fouls both its water and its food with its excrements.

C H A P. IV.

Of Food proper for Hens.

THE best victuals given to hens are bruised barley and tares, as also the chichling, and millet or panic: but these are given only when the low price of corn permits it; but where corn is dearer, the small siftings and refuse of wheat are very convenient food for them: for it does not turn to any advantage to give them that corn by itself, even in those places where it is cheapest, because it is hurtful to the fowls. Boiled darnel also may be thrown before them; brawn likewise, from which the meal is not intirely sifted; which, if it has no meal in it, is not proper for them: nor have the fowls so great appetite for it. When they are fasting, the leaves and seeds also of the *cytissus*, (shrub-trefoil) are very much approved, and very acceptable to this kind of fowl: nor is there any country where there may not be even the greatest plenty of this little tree. Husks and kernels of grapes, tho' they are tolerable food for them, ought not to be given them, except at such times of the year when the fowl is not laying her eggs; for they make them lay very seldom, and make their eggs very small. But when, after autumn, they wholly cease from laying, they may be sustained with this kind of food. Nevertheless, whatever kind of food you shall give them, while they are wandering up and down the poultry-yard, it must be distributed to them twice; when the day begins, and when it is declining towards the evening; that in the morning they may not presently wander at too great a distance from their lodging, and may, in hopes and expectation of their food, return in better time to the hen-roost in the evening; and that the number of their heads may be more frequently reckoned up: for your volatile cattle easily deceive the watchfulness and observation of their feeder,

Dry dust also, and ashes, must be placed hard by the walls, wherever a porch or house shelters the hen-house, that the fowls may have wherewithal to sprinkle themselves; for with these things they clean their feathers, and their pinions, if so be we give credit to *Heraclitus* the *Ephesian*, who says, that swine are washed with mire and dirt, and poultry-yard fowls with dust or ashes. The hen ought to be let out after the first, and shut up before the eleventh hour of the day. This shall be the way of managing her that wanders up and down, as I have already described it: nor is that of her, which is shut up in the house, different from it; except, that she is not allowed to go abroad, but is fed thrice a day within the aviary, with a greater quantity of food: for four *cyathi* of food is the daily allowance of each head, when only three or two are given to such as wander up and down. A hen also that is shut up, must have a large porch, where she may go forth and bask herself; and let it be secured and defended with nets, lest an hawk, or an eagle, fly into it: which expences and cares it is not expedient to bestow, except in such places where these things bear a very high price. But, with respect to all cattle in general, and this also in particular, the chief and principal thing is, the fidelity of the Keeper; which unless he preserves to his master *inviolate*, no gain or advantage of the aviary will surmount the expences. There has been enough said of the way of managing and keeping them: we shall now prosecute in order what we further proposed.

C H A P. V.

Of preserving the Eggs, and setting them under the Hens.

WHEN the middle of winter is past, this kind of fowls, for the most part, is wont to breed; and such of them as are the most fruitful, in warmer climates, begin to lay their eggs about the first of *January*; but in cold countries, they begin after the fifteenth of the same month: but their fruitfulness must be drawn out with proper food, that they may bring forth the sooner. Parboiled barley is excellent food for them; and you may give it them to satiety, for it makes their eggs of a larger growth, and makes them lay the more frequently. But this food must be seasoned, as it were, by throwing leaves of *cytissus*, (shrub-trefoil) as also the seed of the same among it, both which are thought exceedingly to increase the fruitfulness of

fowls. But let the quantity of food be, as I said before, two *cyathi* of barley to such as wander up and down: nevertheless, some quantity of shrub-trefoil must be mixed with it; or, if this cannot be had, some millet or tares.

But the Keeper must take care, that the fowls, when they bring forth, have their nests strawed with the very cleanest straw; and that he sweep them from time to time, and put other straw, the freshest that can be had, into them: for they are full of fleas, and other such-like animals, which the fowl brings with herself, when she returns to the same nest. The Keeper ought to be very assiduous, and to watch them when they are laying; which the hens declare they are doing, by frequent cacklings with a shrill voice, or shriek intermixed, from time to time. Therefore he ought to be upon the watch while they are laying their eggs, and must presently go round their nests, that he may gather up what they have laid, and mark such as are laid every day, that so the very freshest may be set under clucking hens: for so do people that live in the country call those that have a desire to brood; and let the rest of the eggs be either laid up, or exchanged for money.

Moreover, the freshest eggs (1) are the most proper for hatching; yet such as are stale may be set, provided they be not above ten days

(1) *Pliny*, in his *Natural History*, speaking of eggs, says, that some of them are white, as those of pigeons and partridges; some pale, as those of water-fowls; others distinguished by points or spots, as those of the *Meleagrides*; some of a red colour, as those of pheasants, and some sorts of hawks: that the inside of the eggs of all fowls is of two colours; that those of water-fowls have more of the yellow than of the white; and that the yellow part is more lucid than that of other fowls; that those of water-fowls are round, but those of other sorts are commonly sharp, and drawing to a point at one end; and that when they are laid, the roundest part comes out first; that, when they are first laid, the shell is somewhat soft, but presently hardens with the air. *Horace*, it seems, thought, that those of an oblong figure are of a more grateful taste. *Pliny* adds, that the rounder produce the female, and the others the male: that the navel of the egg is in its top, like a drop, rising up upon the shell: that some fowls gender, and bring forth always, except two months in the middle of winter, as common farm-house hens; and that the younger lay more eggs than the elder, but of a smaller size; and that, at the different births, those they lay first and last are the smallest; and that their fecundity is so great, that some of them have laid sixty eggs at one laying, before they gave over laying; some lay once every day, some twice, yea some have so far exhausted themselves, that they have died with laying: that in the middle of the yolk of all eggs there is, as it were, a small bloody drop, which, some think, is the heart of the animal; and are of opinion, that, in every body, this is the first thing that is formed. But *Aristotle* says, that this drop is in the white of the egg, *Hist. animalium, lib. vi. cap. 4.* and that this drop palpitates and moves, as if it were animated: that the body of the animal itself is formed of the white liquor of the egg, and nourished by the yellow; *Aristotle* was also of this opinion. But it seems *Hippocrates* was of a different opinion; for he says, that the bird is formed of the yellow part, and nourished by the white. But *Harvey* differs from them

days old. But, for the most part, hens, after they have completely finished their first birth, are desirous to sit upon their eggs about the thirteenth day of *January*, which they must not at all be permitted to do; because, indeed, the young hens are more useful for laying than for hatching eggs; and their desire of brooding is checked by passing a small quill through their nostrils: therefore, veteran fowls must be chosen for this business, which have frequently done it already: and their manners and disposition especially must be thoroughly known, because some of them are best for brooding, others of them bring up the chickens in a better manner after they are hatched; but others of them, on the contrary, break and destroy both their own eggs, and those of others; and, when any of them is found so doing, it will be proper forthwith to put her out of the way.

But the chickens of two or three fowls, being hatched, ought, while they are yet very young, to be transferred to one of them, which may be the better nurse; but this must be done the very first day, while the dam cannot, because of their likeness, distinguish her own from those of others: nevertheless, you must keep to a certain number; for it ought not to be greater than that of thirty heads; for they deny, that a greater flock than this can be nursed by one. They observe, that the eggs, which are set under the hen, be of an unequal number, and not always the same: for in the first season, that is, in the month of *January*, fifteen, and never more, ought to be set: in the month of *March*, nineteen, and not fewer than these; twenty-one in the month of *April*; then, during the whole summer, the same number: afterwards any further care about this matter is to no purpose; because chickens hatched during the colds, for the most part, perish. Nevertheless most people think, that even after the

them both; and says, it is both formed of, and nourished by, the white, till it grows big; see his *Exercitat.* 52. That, when the chicken grows bigger, the white is turned into the middle, and the yellow circumfused: that the 20th day, if the egg be moved, the voice of the chicken may be heard within the shell: that from that day its feathers grow upon it: that it is so placed in the shell, that it has its head upon its right foot, and its right wing above its head: that the yolk decreases by little and little: that it is best the eggs be set under the hen within ten days after they are laid, because such as are set sooner or later are unfruitful: that the 4th day after they are set, if you take them in your hand, and look to the top of them against the light, if the colour be pure and pellucid, and of one sort, they are barren, and others are to be put in their place; or, if they float upon water, they are empty, and others that sink are to be put in their room: that they ought not to be shaken, because it confounds the vital veins: that they ought to be set after the new moon, because otherwise they will not hatch: that in warm weather they hatch sooner than in cold; therefore in summer they bring forth their young the 19th day, and in winter the 25th. What *Pliny* says further, is mostly contained in our author.

summer solstice, it is not a good time for hatching of chickens; because from that time, although they are easily brought up, yet they never come to their just growth. But in places that lie near the city, where chickens from their dams are sold at no small prices, and where they do not perish for the most part, the bringing them up in the summer-time is to be approved.

But, when eggs are set, care ought always to be taken, that it be done when the moon is increasing, from the tenth to the fifteenth; for both the setting of the eggs itself, almost during these days, is most convenient, and turns to most advantage; and matters must be so managed, that the moon may be upon the increase again, when the chickens are hatched. One-and-twenty days are requisite for animating the eggs of this kind of common poultry-hens; but a little more than twenty-seven for the peacock and goose-kind: which if, at any time, it be found necessary to set under common poultry-hens, we must first suffer them to sit ten days upon the eggs of those fowls of a different species; then they shall receive four eggs of their own kind to hatch, and never more than five; and these must be of the largest size; for of very small eggs small birds are hatched: then, if any one shall desire, that most males be hatched, he must set all the longest and the sharpest eggs; and on the other hand, if he have a mind for females, he must set the roundest he can find.

But the usual manner of setting eggs under hens, delivered to us by those who manage these things with greater ceremony and superstition, is such as this: First, they choose the most retired nests they can find, that the brooding hens may not be disquieted by other fowls: then they clean them carefully before they put straw unto them, and thoroughly purify the straw they are going to lay under them, with sulphur, bitumen, and a burning torch; and, after they have expiated it, they throw it into their beds, and so make hollow nests for them, lest, when they fly into them, or leap out of them, the eggs be rolled out, and fall down. Very many people also lay a little grass, or small branches of laurel, under the straw, in their nests; as also heads of garlick with iron nails: all which things are believed to be remedies or preservatives against thunders, whereby the eggs are spoiled, and the half-formed chickens are destroyed before they are perfected in all their parts. But he that sets the eggs observes, not to lay them into the nest in order with his hand, one by one; but puts their whole number together into a small wooden tray, and then pours them all out gently into the nest prepared for them. But food must be placed hard by such hens as are brooding, that so when they have their

their belly full, they may with more eagerness continue in their nests, and not cool their eggs by wandering at too great a distance from them; and although they themselves turn them with their feet, yet the Keeper of the poultry, when the dams leap down from their nests, ought to go round, and turn the eggs with his hand, that, receiving the heat equally, they may be easily animated; and also, that, if any of them be hurt or broken with their claws, he may remove them. And when he has done this, let him observe, upon the nineteenth day, whether any of the chickens have, with their little bills, broke through the eggs, and let him listen if they peep or chirp; for oft-times they cannot break out, because of the thickness of the shells: therefore with his hand he must take out the chickens that stick in the shell, and put them under their dam, that she may cherish and keep them warm: and he must not do that longer than three days; for, after the one-and-twentieth day, eggs that are silent have no living creatures in them: and these must be removed, that the hen, not having been able to hatch them, may not, with vain hope, be detained longer brooding to no purpose.

You must not take away the chickens one by one as they are hatched, but you must suffer them to stay one day in the nest with their dam; and keep them from food and water till they be all hatched. The next day, when the whole brood is hatched, they are brought down from *the nest* in this manner: let the chickens be placed either upon a tare- or a darnel-sieve, which has been already in use; then let them be fumigated with sprigs of penny-royal. This thing seems to prevent their having the pip, which very speedily kills them when they are very young. After these things, they must be shut up with their mother in a coop, and moderately fed with barley-meal, or with the fine flour of wheat-meal sprinkled with wine; for crudity is most to be avoided: and for this reason they must be kept in the coop the third day with their dam; and, before they are let out to their fresh victuals, they must be tried one by one, if they have any thing of yesterday's food in their gorge: for if their crop is not empty, it is a sign of indigestion; and they ought to be kept from food till they have digested.

But, while they are very young, they must not be allowed to wander and straggle at too great a distance, but be kept about the coop, and fed with barley-meal till they gather strength: and you must take care, that they be not blown upon by serpents, the smell or breath of which is so pestilential, that it intirely kills them all. This is prevented by burning harts-horn frequently, or galbanum, or womens hair;

hair ; by the burning smell of all which, for the most part, the fore-said pest is removed, and kept at a distance. But care also must be taken to keep them gently warm, for they can neither bear heat nor cold ; and it is best to keep them shut up within the hen-house with their dam, and after the fortieth day to give them full liberty to wander up and down. But the first days of their infancy, as it were, they must be often handled and dressed, and the small feathers under their tails plucked off their buttocks, lest they grow hard when they are bedaubed with their dung, and obstruct their natural passages. And tho' due care is taken to prevent this, nevertheless it often happens, that their belly has no passage : therefore they pierce it through with a quill, and open a way for the digested food.

But now, when the chickens are grown stronger, care must be taken to preserve both them and their dams from that destructive distemper the *pip* ; to prevent which, we must give them the very purest water in the cleanest vessels ; likewise we must constantly fumigate the hen-houses, and thoroughly cleanse them, and free them from dung. But if, nevertheless, the plague breaks in, and spreads itself among them, there are some who thrust into their gorge cloves of garlick moistened in lukewarm oil. Some wet their mouths with a man's lukewarm urine, and compress them so long, till the saltness of the urine forces them to press out the nauseous phlegm through their nostrils. The berry also, which the *Greeks* call ἀγρία σταφυλή, (wild grape) mixed with their meat, is of great benefit to them ; or the same bruised, and given them with water for their drink. And these remedies are applied to such of them, as are not infected with the distemper to any great degree : for if the pip surrounds their eyes, and the fowl refuses its victuals, they lance their cheeks, and squeeze out all the corrupt matter that is gathered under their eyes ; and so they sprinkle a little bruised salt upon the wounds.

Moreover, this disease arises chiefly when the fowls are much pinched with cold, and in distress with want of food ; also when they drink the standing water in the poultry-yards during the summer : also when they allow them figs and unripe grapes, but not their belly-full of them, from which kind of food fowls ought carefully to be kept. And the wild grape, gathered out of the thickets before they are ripe, will effectually make them loath it, when, after they are boiled with small flour of wheat-meal, they are thrown before them when they are hungry ; for the fowls, being offended with their taste, despise all grapes whatsoever. The wild fig produces the same effect

effect also; which they boil, and give to the fowls with their meat, and so it creates a loathing of figs.

Let the custom, which is commonly observed with respect to other cattle, of picking out all the best, and selling the worst, be observed also in this kind, that every year, in the autumn, when their fruit ceases, their number also may be diminished. But we must remove out of the way those that are old, that is, which exceed three years of age; also such as are not very fruitful, or but very indifferent nurses; and especially such as destroy either their own eggs, or those of others: nor must we be less careful to remove such of them as have begun to crow, or to tread also, as the males do; lateward chickens also, which, being hatched after the solstice, cannot arrive at their due growth.

But the same method must not be observed with respect to the males; but we will keep such of them as are generous, as long as they can impregnate the female: for it is a rare thing to find among these fowls one that will prove a good husband. At the same time also, when the fowls cease to breed, that is, from the thirteenth of *November*, their more costly food must be withdrawn from them, and husks and kernels of grapes must be given them, which are a food convenient enough for them, when the refuse and siftings of the wheat are sometimes added to them.

C H A P. VI.

Of Eggs.

THE keeping and preserving of eggs for a longer time also, is not foreign to this care: they are kept in very good order during the winter, if you cover them over and over with chaff, or corn-straw; and in summer with bran. Some cover them all over first with bruised salt for six hours, and then wash them, and so lay them deep in straw, chaff, or bran: some lay them in a heap of unbroken beans; others in beans that are bruised: some cover them with unbruised salt; others harden them in lukewarm brine. But all manner of salt, as it does not suffer the eggs to rot, so it diminishes them, and does not let them continue full; which thing deters the buyer. Therefore even they who put them into brine, do not preserve them sound and intire.

C H A P. VII.

Of fattening, and cramming of Hens.

ALthough it is the business of a Poulterer, and not of an Husbandman, to fatten an hen also; nevertheless, because there is no great difficulty nor charges in doing it, I thought it proper to give directions concerning it. An exceeding warm place, and of very little light, is requisite for this purpose; wherein the fowls may be shut up, one by one, in very narrow coops, or in hanging baskets; but so straightened, that they may not be able to turn themselves. But let them have holes on both sides; one where they may put out their head at; and another where they may put out their tail and buttocks, that they may be able both to take their meat, and, when it is digested, so to throw it out, as they may not be bedawbed with their dung. But let the very cleanest corn-straw be spread under them, or soft hay, that is, hay of the second crop; for, if they lie hard, they do not easily grow fat. Let all their feathers be plucked clean off their heads, from under their wings, and off their buttocks: there, that they may not breed lice; and here, that they may not with their dung ulcerate the natural passages of their body.

But they give them barley-meal for their food; of which, when they have sprinkled it with water, and kneaded it, they make pellets, and fatten the fowls therewith. But these ought to be given more sparingly the first days, till they be accustomed to digest a greater quantity; for indigestion is especially to be avoided; and as much must be given them as they can digest: nor must fresh victuals be set before them till you feel their crop, and it appear, that nothing of their old food remains therein. Then, when the fowl has filled its belly, they put down the coop a little, and let it go out, but so that it may not wander up and down, but rather that it may pursue, with its bill, whatever pricks or bites it. This is almost the common care of those who cram fowls in order to fatten them.

But they who are desirous not only to make their fowls fat, but also tender, sprinkle that kind of meal before-mentioned with fresh mead, and so cram them. Some mix one part good wine with three parts water, and with wheat-bread soaked therein fatten the fowl; which, beginning to be fattened with the new Moon, (for this also must be observed) grows plump, and is throughly fattened on the
 twentieth

twentieth day: But if it loaths its food, you must diminish it as many days as are past since you began to cram them; yet so, as the whole time of fattening them may not go beyond the twenty-fifth day of the Moon. But it is best, and what one ought always to propose to himself, to destinate all the largest fowls for the more sumptuous entertainments; for so a worthy and suitable reward follows their pains and expences.

C H A P. VIII.

Of cramming of Wood-pigeons, or Ring-doves, or tame Pigeons, that breed in little Cells about the House; and of making Pigeon-houses.

BY this same method you may make wood-pigeons, or ring-doves, and tame pigeons, that keep in little cells about the house, exceeding fat; nevertheless, there is not so great an income redounding from cramming pigeons, as from bringing them up: for the having of these things also in possession, is not unsuitable to, or unbecoming the care of, a good Husbandman. But this kind is fed with less care and attendance in distant regions, where the fowls have a free egress allowed them; because they frequent the seats assigned them either upon the tops of towers, or on the highest edifices, where the windows stand wide open, by which they fly out to seek their food. Nevertheless, for three or four months they willingly accept of food laid up in store for them; the rest of the months they feed themselves with seeds they gather in the fields. But this they cannot do in places contiguous to the city, because they are intercepted by various snares and traps of fowlers: therefore they ought to be shut up, and fed in the house; but neither in a place of the manor-house that is even with the ground, or in one that is cold; but a loft must be made for them in an high place, which may look to the Sun at noon in winter.

And that we may not repeat those things that have been already said, let the walls thereof, as we directed in the aviary, be made hollow with nests all in a line, one after another; or, if there be no conveniency to make it so, let boards be put upon small stakes driven into the wall, which may receive either small lockers wherein the fowls may make their nests, or earthen pots for them to breed in,

with porches placed before them, by which they may come to their nests. But the whole place, and the pigeon-cells themselves, ought to be polished with white plaster, because this kind of fowl is exceedingly delighted with this colour. Likewise the outside of the walls ought to be smoothed, especially about the window; and let that be so placed, that it may admit the Sun the greater part of the winter-day. And let it have a large-enough gallery or balcony joined to it, secured with nets, which may keep out hawks, and receive the pigeons which come out to bask themselves; and likewise afford a passage to go out into the fields, for such of the breeding pigeons as are brooding either upon their eggs, or young ones, left, being disheartened, as it were, with the grievous servitude of perpetual imprisonment, they grow old: for, after they have flown a little about the buildings, they are exhilarated and refreshed, and return more lively and brisk to their young ones, for whose sake they do not indeed endeavour to rove up and down to any great distance, nor to fly away.

The vessels, wherein water is given them, ought to be like those used in poultry-yards or hen-coops, which may only admit the necks of those that drink; and, because of their narrowness, not receive those that desire to wash themselves: for their doing this is neither expedient for their eggs, nor their young ones, on which they for the most part sit brooding. Moreover, it will be proper to scatter their food hard by the wall, because those parts of the pigeon-house are almost free from dung. Tares, or bitter vetches, are reckoned the most convenient food for them; as also small lentils, millet and darnel, and the refuse and siftings of wheat; and if there be any other sorts of pulse wherewith hens also are nourished.

But the place ought to be swept and cleaned from time to time; for how much the more garnished it is, so much the more chearful and brisk the fowl appears; and it is so squeamish, that frequently, abhorring its own places of abode, it abandons them, if it have liberty to fly away; which often happens in those regions where they have free egress. To prevent this, there is an antient precept of *Democritus*: there is a kind of hawk, which people that live in the country call a *kestrel*, which commonly makes its nest in buildings; this hawk's young ones are shut up one by one in earthen pots, and the covers are put upon them while they are yet breathing, and the vessels, being covered with plaster, are hung up in the corners of the pigeon-house; which thing does so conciliate the love of the fowls to the place, that they never abandon it. Such of the females as are neither old, nor too young, must be chosen for bringing up young
ones;

ones; but they must be of the largest bodies: but care must be taken, if it can be done, that the young pigeons be never separated, but kept together in the manner they were hatched: for, if they be married after this manner, they for the most part bring up more young ones; if otherwise, let not such at least as are of another kind be joined together, as the *Alexandrian*, and the *Campanian*; for they have less love for their mates that are not like themselves, and therefore they do not couple much with them, nor do they often breed.

The same colour of feathers is not always, nor by all, approved; therefore, which may be the best it is not easy to tell: the white, which is commonly seen every-where, is not too much commended by some: nevertheless, it ought not to be avoided in those that are shut up in a close place; for, in such as wander up and down, it is principally to be disliked, because the hawk espies it very easily.

But their fecundity, tho' it be much less than that of hens, nevertheless, it brings in a greater gain: for, if a pigeon be a good breeder, she brings up young ones eight times in a year, and with their prices the owners fill their coffers, as *Marcus Varro* (1); an excellent author, assures us; who has told us, that even in those severer times in which he lived, single pairs used to be sold for one thousand sesterces each. For I am ashamed of our own age, if we will believe, that there are some to be found, who pay four thousand nummi for a couple of birds (2); although I think even these more sufferable, who put their delights, and darling amusements, in the balance with great sums of money, merely for the sake of having them in their possession, than those who empty the river *Phasis* in *Pontus* (3), and

(1) *M. Varro, lib. iii. 7.* says, that there is nothing more fruitful than doves: for in 40 days they conceive, lay their eggs, hatch, and bring up their young; and that they do this almost the whole year, only they intermit from the winter solstice to the vernal equinox; that they who fattened them, in order to sell them at an higher price, shut them up as soon as they were covered with feathers, and crammed them with chewed bread; and in summer they fed them three times a day, in the morning, at noon, and in the evening; but in winter, twice only. And of some of them, when their pinions begin to grow, they break the legs, and leave them in their nests, throwing food to their dams, who feed their young all the day long; that such of them as are thus fed grow sooner fat, and are whiter than others; and that the old ones, if they were beautiful, and of a good colour, and good breeders, were sold at *Rome* for 200 nummi a pair, which in *English* make 1*l.* 12*s.* 3*d.* $\frac{1}{2}$; and such of them as were more beautiful than ordinary, sold for 1000 nummi, in *English* money 8*l.* 1*s.* 5*d.* $\frac{1}{2}$. And that some refused to take less than 400 denarii, in *English* money 12*l.* 18*s.* 4*d.*

(2) Our author says, that he was ashamed of the age he lived in, if it could be believed, that there were some who paid 4000 nummi for two birds, (I suppose of that kind) in *English* money 32*l.* 5*s.* 10*d.*

(3) *Phasis*, a famous river of *Colchis* in *Pontus*, much celebrated by the expedition of the

and the *Scythian* lakes of *Mæotis* (4), of all their fowls; and who even at this time, in their drunkenness, belch out and vomit up fowls brought from the *Ganges* (5), and from *Egypt*.

Nevertheless, in this aviary also may be carried on the business of fattening fowls: for if there be any among them that happen to be barren, or of a fordid disagreeable colour, they are crammed after the same manner as hens are. But young pigeons grow more easily fat under their dams, if, when they are grown somewhat strong, before they begin to fly a little, you take away a few quills from them, and bruise their legs, that they may rest in one place; and if you give plenty of food to those that have hatched them, wherewith they may the more abundantly nourish both themselves and them. Some tie up their legs gently, because, if they be broken, they think that they suffer great pain, and thereby become lean: but that thing contributes nothing at all to their fatness; for, while they endeavour to get rid of their bonds, they never rest; and by this constant exercise, as it were, they add nothing to their body. Their broken legs give them pain not above two, or three days at most; and they deprive them of all hopes of going abroad, and of wandering up and down.

C H A P. IX.

Of the bringing up of Turtle-doves.

THE bringing up of turtle-doves is of no advantage, because that kind neither lays eggs, nor hatches, in an aviary; they are destinated for cramming, so as they are taken from the flight: therefore they are fattened with less trouble and care than other fowls, but not at all times. During the winter, tho' pains be bestowed upon

the *Argonautæ*: from this river, they say, pheasants have their name; either because they abound most there, and assemble in great numbers at the mouth of that river, to gather their food; or were first brought from thence by the *Argonautæ*, as *Martial* says, *lib. xiii. Epigram 72.* in whose days it was reckoned a great luxury to feast on pheasants.

(4) *Mæotidis stagna Scythica*; by *Pliny* called *lacus Mæotius*, and *palus Mæotis*. It lies between the *Lesser Tartary* or *Tartaria Procopensis*, and *Circassia*, a country of *Asia*. It is a large gulph, or rather a sea: it is called a lake, because it is so shallow in many places, that larger vessels cannot sail in it. It is joined to the *Euxine* sea by the *Bosphorus Cimmerius*; the river *Tanais* runs into it.

(5) *Ganges*, a very great river in *India*, which runs through the dominions of the Great Mogul, and empties itself into the gulph of *Benzal*.

them,

them, it is difficult to fatten them ; and yet then the price of turtles is lower, because there is then greater plenty of thrushes. Again, in summer they grow fat, even of their own accord, provided they have abundance of food : for there is nothing more to be done, but to throw their food before them, but especially millet ; not because they fatten less with wheat, or other sorts of corn, but because they are most delighted with millet-feed. Nevertheless, in winter, pellets of bread soaked in wine fatten them, as also wood-pigeons, more quickly than other sorts of food.

They do not make lockers, or small hollow cells, for receptacles for them, as they do for tame pigeons ; but brackets fastened into the wall, all in a line, receive small hempen mats, with nets spread before them, whereby they may be hindered to fly ; because, if they do this, they impair their bodies. And, in these receptacles, they are continually fed with millet or wheat : but these seeds must not be given them, except they be dry. And half a *modius* of this food, for every day, will abundantly satisfy one hundred and twenty turtle-doves : and fresh water, and the cleanest that can be had, is given them in small vessels, such as they use for hens and pigeons. And their little mats must be cleaned, lest their dung burn their feet, which itself ought also to be carefully laid up for the culture of lands, and of trees ; as also that of all other fowls, except of those that swim. This fowl is not so fit for fattening when it is old, as when it is very young : therefore about the time of harvest, now when the young brood is grown strong, they are chosen for this purpose.

C H A P. X.

Of the bringing up of Thrushes.

GREATER pains and expences are bestowed upon thrushes, which, indeed, are fed in every country-place, but more wholesomely in that wherein they are taken ; for they are with difficulty removed into another country, because they despond, and lose heart, when they are shut up in cages ; which they also do, when, the same moment they are taken out of the net, they are thrown into aviaries : therefore, that this may not happen, some that are old ought to be mixed with them ; which, being bred up and nourished by the Fowler for this use, may, as it were, sooth and cajole the prisoners, and mitigate

mitigate their sorrow by flying up and down amongst them. They require a place equally secure, and as much exposed to the Sun, as doves do : but in it you must fasten transverse poles, and fit them to holes made in the opposite walls, upon which they may roost when they have a mind to rest, after they have filled their bellies. These poles ought not to be raised higher from the earth, than a man's stature may allow, that he may be able to touch them when he stands.

Their food is commonly placed in those parts of the aviary, which have not poles over them, that it may be kept the cleaner : but dry figs, carefully bruised and well mixed with fine flour, ought always to be given them, and, indeed, so largely, that some part may remain. Some chew them, and so throw them before them ; but it is scarcely expedient to do this, where there is a great number of them, because they who chew them are not hired for a small matter ; and they themselves always consume some part of them, because of their sweetness. Many think, that a variety of food ought to be given them, lest they loath one sort ; and that is, when the seeds of the myrtle- and mastich-trees, wild olive, and ivy-berries also, and those of the strawberry-tree, are thrown before them ; for commonly, in the open fields also, this sort of wild fowl likes and seeks after these things, which wipe off and remove the nauseating of such of them as sit loitering in the aviaries, and makes the whole volary more greedy and voracious, which is a very great advantage ; for with a larger quantity of food they sooner grow fat. Nevertheless, you must also always place by them small troughs filled with millet, which is their firmest and most solid food ; for these things, which we have mentioned above, are given them by way of dainties.

Let not the vessels, wherein fresh and clean water may be given them, be unlike those made use of for hens. *Marcus Terentius* informs us, that, in our grandfathers times, by this expence and care, these birds were frequently bought for three *denarii* each (1), with which they who triumphed made entertainments for the people. But now the luxury of our age has made this to be their ordinary price every day ; for which reasons, indeed, this income must not be despised and set at nought by Husbandmen. We have already treated of those kinds which are provided with food within the precincts of the manor-house ; now we must speak of those, which have liberty also to go out to gather their food in the open fields.

(1) *Varro, lib. iii. cap. 2.* Three *denarii*, in *English Money*, make 1s. 11 $\frac{1}{4}$ d.

C H A P. XI.

Of the Bringing up of Peacocks.

THE education of peacocks requires rather the care of a gentle Householder, who dwells in a city, than of a crabbed, surly Rustic; but neither is this foreign to the business of an Husbandman, who is always endeavouring to procure to himself pleasures from all sides, wherewith all the solitudes and irksomeness of the country may be softened and allayed: for the beauty and comeliness of these birds not only gives delight to their owners, but also to strangers. Therefore, this kind of fowl is very easily kept in small woody islands, such as lie up and down the coast of *Italy*. For because it can neither fly high, nor over any great space of ground, as also because there is no fear of the rapine of thieves, or of noxious beasts, it wanders up and down safely without a Keeper, and acquires for itself the greatest part of its nourishment. The females indeed, as if they were discharged from bondage, bring up their young ones, of their own accord, with greater care. Nor ought he that has the care of them to do any other thing, but, by giving a signal at a certain time of the day, to call together the whole flock near the manor-house, and to throw a little barley before them, when they come together, that the fowls may not be hungry; and that he may review them, and count the number of those that come to the place.

But it is rare to have the conveniency of a possession of this kind: wherefore, in inland countries, greater care must be taken of them; and let them be managed in this manner: you must inclose, with an high fence or wall, a piece of even, grassy, and woody land, to the three sides of which you must apply porticos, and, on the fourth side, two cells, that one of them may be an habitation for their Keeper, and the other, a shelter or lodging-place for the peacocks: then, under the porticos, you must make inclosures with reeds, all in a row, in the manner of cages or coops, such as they place upon the roofs of pigeon-houses; these inclosures are distinguished, *or separated from one another*, by reeds running between them like bars, so that they may have one single entry on both sides. But their lodging-place ought to be intirely free from moisture, in the floor of which must be fastened short small stakes, all in a row, the uppermost parts of which must have tenons cut very smooth, which may be put into

holes made in transverse poles. Moreover these poles, which are placed upon the small stakes, ought to be square, that they may receive the fowl, when it leaps upon them. But they are made so as to be taken away ; that, when it is necessary, they may be taken down from the posts, and give free access to those who sweep the peacock-house.

This kind of fowl, when full three years old, breeds exceeding well ; whereas their more tender age is either barren, or not very fruitful. The peacock has the salaciousness of a common poultry-cock, and therefore requires five females ; for if he frequently treads one or two of them that are laying, he mars their eggs, scarcely as yet formed in their wombs, and does not suffer them to be brought to the birth, because they fall from their genital parts before they come to maturity.

In the latter end of winter, the amorous desires of both sexes must be kindled with food provocative of lust. It contributes exceedingly to this matter, if you parch beans gently in embers that are not too hot, and give them lukewarm to them fasting every fifth day : nevertheless, you must not exceed the quantity of six *cyathi* to each fowl. These victuals must not be scattered promiscuously to them all ; but they must be laid in each of the inclosures, which, I proposed, ought to be woven with reeds, observing a proportion of five females and one male ; water also, which is fit for drinking, must be set for them ; when this is done, the males are conducted, without quarrelling, into their several inclosures with their females, and the whole flock is fed equally. For also, of this kind, there are found males given to quarrelling and fighting, who hinder those that are not so strong as themselves both from their food, and from coition, unless they are separated, and kept apart, in this manner. But commonly, in places exposed to the sun, the desire of coition disquiets and torments the males, when the gentle west winds have begun to blow, that is, the time from the thirteenth of *February* before the month of *March*. It is a sign, that his lust is stimulated, when he covers himself with the pinions of his tail, which glister as if they were set with precious stones, as if he were admiring himself ; and, when he does that, he is said to wheel, or be in his pride.

Presently after the time of coupling, the pea-hens, that are breeding, must be carefully watched, that they may not lay their eggs in any other place, but in their stalls, where they lodge ; and you must often, with your fingers, feel the parts of the females ; for their eggs are very obvious to the touch, when their time of laying them draws near.

near. Therefore such of them as are near the time of their laying must be shut up, lest they lay their eggs without their inclosures: and especially at those times when they are going to lay, the aviary must be well filled with a great quantity of straw, that their eggs may be preserved, and received sound and intire. For commonly, when the pea-hens are come to take their night's rest, they lay their eggs when they are sitting upon the forementioned poles; and the nearer and softer they fall, the less injury are they liable to receive, and the sounder are they kept.

Therefore, during the times of their laying, you must daily, in the morning, go round the places where they roost, and gather the eggs that are lying there; and the fresher they are set under common poultry-hens, so much the more commodiously are they hatched: and it is most for the Householder's advantage, that this should be done. For pea-hens, which do not fit upon their eggs to hatch them, for the most part, lay eggs thrice in a year: but such of them as sit upon and hatch their own eggs, consume the whole time of their fecundity either in hatching, or in bringing up, their young ones.

Their first birth or laying is, for the most part, of five eggs; their second of four; their third either of three or two: nor is there any pretence for being guilty of such a mistake, as to let *Rhodian* hens sit upon pea-hens eggs, which do not, indeed, rightly nurse and bring up their own offspring. But, let all the largest veteran hens, of our own *Italian* breed, be chosen; and let them sit on nine eggs, nine days from the first increase of the moon; and let five of them be pea-hens eggs, and the rest of the common poultry-kind. Then, upon the tenth day, let all the common poultry-hens eggs be taken away, and as many fresh ones, of the same kind, put in their place, that they may be hatched with the pea-hen's eggs on the thirtieth day of the moon, which is almost new moon.

But let it not escape the care of the Keeper, to observe when the hen that is brooding leaps down, and to come frequently to her nest, and turn the pea-hen's eggs with his hand, which, by reason of their bigness, are more difficultly moved by the hen: and, that he may do this the more carefully, one side of the eggs must be marked with ink, which the keeper of the aviary shall have as a sign to know whether they have been turned by the hen, or no. But, as I said before, we must remember, that the largest common poultry-hens be prepared for that purpose; which, if they be of a middling size, ought not to be put to sit on more than three pea-hen's eggs, and six of her own kind: then, after she has hatched the young ones, those

of the common poultry-kind ought to be transferred to another nurse; and those of the peacock-kind, which shall be hatched from time to time, gathered to one nurse, till a flock, consisting of twenty-five heads, be made up.

But, when the young ones are hatched, in like manner as the chickens of the common poultry-kind, let them not be removed the first day: the next day let them be transferred into a coop, with their nurse that is to educate them; and the first days let them be nourished with barley-meal besprinkled with wine, as also with boiled pottage or gruel of any kind of corn, and cooled. Then, after a few days, to this food must be added *Tarentinian* leek, cut very small, and soft cheese, out of which the whey has been squeezed with great force; for it is manifest, that whey is hurtful to the pullets. Locusts also, when their feet are taken from them, are reckoned useful for nourishing those little ones; and they ought to be fed with them till the sixth month: afterwards it is sufficient to give them barley by hand.

But after the thirty-fifth day that they are hatched, they may be safely enough led out into the fields, and the flock follows the clucking hen, as if she were their mother. She is shut up in a cage, and carried out to the fields by their Feeder; and the hen being let out, is secured with a long line tied to her foot, and the young ones fly up and down round her: and, when they are fed to satiety, they are brought back to the manor-house, following, as I said, the cluckings of their nurse. But authors are well enough agreed, that other hens, which bring up chickens of their own kind, ought not to be fed in the same place; for, after they have seen the peacock-offspring, they cease to love their own chickens, and leave them before they are grown up, hating them indeed, because they are not equal to the peacock either in bigness, or in beauty. The same diseases, which use to hurt the common poultry-kind, infest these fowls: but no other remedies are given them, than those which are applied to the common poultry-kind; for the pip and crudities, and if there are any other pests, are checked by the same remedies which we have already proposed. Then, when they are above seven months old, they ought to be shut up in the aviary with the rest, to take their night's rest. But care must be taken, that they do not abide upon the ground; for such of them as use to lie down so, ought to be taken up, and placed upon the poles, lest they suffer by the cold.

C H A P. XII.

Of the Bringing up of Numidian and Rustic Hens.

THE way of bringing up *Numidian* hens, is almost the same with that of peacocks. But wild or wood hens, which are called rustic, do not breed when in bondage: and therefore we give no directions concerning them, but that food be given them to satiety, that they may be the fitter for feasts, and delicate entertainments.

C H A P. XIII.

Of Fowls which the Greeks call ἀμφίβια, (amphibious) and the Latins, duplicis vitæ (of a double Life).

COME now to those fowls which the *Greeks* call ἀμφίβια, (*amphibious*) because they not only seek for food upon the dry land, but in the water also: and they accustom themselves not more to the dry ground, than to the lake. Of this kind the goose especially is acceptable to people that live in the country; because it does not require the greatest attendance and care, and keeps a better watch than a dog: for, by their cackling, they discover him that lies in wait to surprise you, as history also has informed us, in the siege of the Capitol, when, at the arrival of the *Gauls*, they made a loud noise, when the dogs were silent.

But this fowl cannot be kept every-where, as *Celsus* judges very truly, who thus speaks: The goose is not easily sustained either without water, or without much grass; nor is it profitable in such places as are sown or planted, because it plucks whatever tender or young thing it can reach; but, where-ever there is a river, or a lake, and plenty of grass, as also corn-fields hard-by, there this kind of fowl must be nourished. This we also advise you to do; not because it is of any great fruit or advantage, but because it is of very little burden or trouble: nevertheless, out of itself it both produces goslings, and yields feathers; which you must not gather as you do wool from your sheep, only once a year, but you may pluck them twice a year, in the spring and autumn; and, indeed, for these reasons, if the condition of the
place

place will allow it, you must bring up a few at least, and to each male assign three females; for, because of their heaviness, they cannot couple with more. As also you must make goose-pens for them in retired corners, within the poultry-yard, that they may be protected and sheltered, and lodge, and lie down, and lay their eggs, and hatch them, therein.

C H A P. XIV.

Of the Bringing up of Geese, and making a Goose-pen for keeping and feeding them.

LET those, who are desirous to have flocks of swimming fowls in their possession, constitute proper places for feeding and keeping them, which then will turn to account, and answer expectation, if they be duly ordered in such a manner as this: A large yard is inclosed, remote from all other cattle, surrounded with a wall nine feet high, and with porticos, so that the Keeper's cell may be in one part of it; then under the porticos are built square goose-pens, with rubbish, or any rough materials for building, or with small bricks also; it is sufficient, that each of them have three feet every way, and each of them an entry, secured with strong little doors; because they ought to be carefully shut up during the time they are laying their eggs, and hatching. Then, if, without the manor-house, not far from the building, there be a pond or pool of standing water, or a river, let no other water be sought for; if not, let a lake or pond be made by hand, that they may be such as the fowls can dive in: for they can no more live conveniently without this shelter and defence, than they can do without that upon dry land.

Let marshy land also, but such as is grassy, be destinated for them; and let other sorts of food be sown for them, such as tares, trefoil, fenugreek, but especially a kind of endive, which the *Greeks* call *serin* (1); the seeds of lettuce also ought, above all things, to be sown for this use, because it is both an exceeding soft and tender pot-herb, and very

(1) *Genus intubi quod Σέειν Græci appellant.* In *Dioscorides* you read it also Σείσα in the Accusative: he distinguishes it into wild and tame. See *Matthiolum in Dioscoridem* his description of it, where he mentions the several sorts, both of the wild and tame; and says, that the wild is the same with what they call *cichorium sylvestre*, and *picrin*, because of its bitterness.

much fought after, and much liked, by these fowls; as also very useful food for their young ones. When you have prepared all these things, you must take care, that males and females, of the largest bodies, and of a white colour, be chosen: for there is another kind of divers colours, which, from being wild, is softened and made tame. That kind is neither equally fruitful, nor so valuable; for which reason it must not be brought up at all.

The fittest time for putting geese to couple is after the shortest day of winter is past; and, afterwards, for laying their eggs, and brooding, from the calends of *February* or *March* till the solstice, which falls in the latter part of the month of *June*. They couple, not as those other fowls of which we have already spoken, resting upon the ground; for, for the most part, they do that in a river, or in ponds: and each of them lays eggs three times in a year, if they are kept from hatching their own eggs; which is more expedient, than when they themselves sit upon them in order to hatch them; for they are both better nursed by common hens, and a much greater flock of them is made up.

But, the first time of their laying, they lay five eggs; the second, four; and the last, three: which last laying some people allow the dams themselves to bring up, because the rest of the year they will cease from laying any more eggs. The females must not at all be allowed to lay their eggs without the inclosure; but, when they shall be seen seeking for a place to settle in, you must stop them, and feel if they are with egg: for, if the time of their laying approaches, you may with your finger touch their eggs, which are near the entry of their genital parts. Wherefore they ought to be brought to their goose-pen, and shut up, that they may lay their eggs: and it is sufficient to have done this once to each of them, because every one of them runs again to the same place where she first laid her egg. But, at the last time of their laying, when we have a mind, that they themselves should sit on their own eggs, the eggs of every one of them in particular must be marked, that so they may be put under her that laid them; because they deny, that one goose can hatch the eggs of another, unless she also have her own eggs put under her. But five eggs of this kind, as those of the pea-hen, are the most that are set under common hens, and three the fewest: but, under the geese themselves, the fewest are vii, and xv the most.

But great care must be taken; that when nettle-roots are laid under the eggs, by which remedy, as it were, they are cured, they may not hurt the goslings, when they are come out of the shells; for
nettles

nettles kill them, if they prick them when they are very young. But thirty days are necessary for forming and hatching the young ones, when the weather is cold; for in mild, warm weather xxv days are sufficient: but, more frequently, the gosling comes out of the shell the thirtieth day. And, while it is very little, it is shut up and fed with its dam in the goose-pen, during the first ten days: afterwards, when fair weather permits, it is carried out into the meadows and ponds; and care must be taken, that it be neither pricked with the prickles of nettles, nor sent out to pasture when it is hungry; but be satiated, before it go out, with endive, or lettuce-leaves cut in pieces. For if, while it is as yet not very strong, and standing in need of food, it come out to the pasture, it struggles so obstinately with shrubs, or the more solid herbs, that it chokes itself, or disjoints its neck. It is right to give it millet also, or wheat mixed with water: and, after it has gathered a little strength, it is driven to a flock of goslings of the same age with itself, and nourished with barley: which it is not improper to give also to such geese as are laying eggs, or brooding.

But it is not expedient to assign more than twenty goslings to each goose-pen; nor, on the other hand, must they be shut up at all with such as are older than themselves, because the stronger kills the weaker. The cells, wherein they lie, must be exceeding dry; and they must have straw spread under them: or, if this cannot be had, hay also is most acceptable to them. As to the rest, the very same things must be observed with respect to them, as to the young brood of other kinds of fowls, that neither a serpent, nor a viper, nor cats, nor a weasel also, may be allowed to breathe upon them; which pests reduce them, while they are very young, almost to utter destruction. There are some who set soaked barley by such as are sitting on their eggs, and do not suffer those that are brooding to leave their nests frequently. Some also give them green cresses with water, cut very small; and this is a most agreeable food to them. Afterwards, when they are four months old, all the largest of them are destined for cramming, because their tender age especially is reckoned the fittest for this purpose: and these fowls are easily fattened; for, besides dried barley-meal soaked in water, and wheat-flour three times a day, it is not necessary to give them any other thing, provided they have liberty to drink abundantly, but are not allowed to wander up and down, and that they be kept in a warm and dark place: which things contribute very much to breed fat. In this manner they grow fat in two months; and, by such management, even the tenderest brood is often brought, in forty days, to be exceeding fat and plump.

C H A P. XV.

Of Ducks, Teals, and the like.

A Place for feeding ducks requires the like care, but greater expences. For ducks, teals, pocards, *phalerides* (1), and such-like fowls, which search all the holes and corners of ponds and pools of standing water and marshes, are put under confinement, and fed in a close place. An even, level place is chosen *for this purpose*, and fenced round with a wall fifteen feet high: then it is covered with grates or cross-bars placed over it, or with nets with large meshes, that neither the fowls within the house may have liberty to fly out, nor eagles and hawks to fly into it.

But this whole wall must be smoothed with plaster, both without and within, that so neither a cat, nor a ferret, may creep over it. Then, in the middle part of this duckery, a lake is digged two feet deep, and as much space is assigned to the length and breadth thereof, as the condition of the place will permit. The edges or sides of the pool are all laid with *Signinian* work, (plaster of *Paris*) lest they be consumed with the violence of the waving and overflowing of the water, which ought always to flow and be in motion between them: and they must not be raised and formed into steps, but gradually subside with a gentle descent, that there may be an easy descent into the water as from a shore. But the bottom of the pond or pool, as far almost as two thirds of the whole dimension, must be strongly paved all round with stones well driven in, and plaster, that it may not throw up grass and weeds, but preserve the surface of the water pure for such fowls as swim in it.

Moreover, the middle part of it ought to be of earth, that it may be planted with *Egyptian* beans, and other green things, which commonly grow in water, which darken, and furnish a shade, for the places where the fowls retire and shelter themselves. For there are some of them which delight to abide either in little woods of tamarisk-trees, or in thickets of shrubs and rushes: nevertheless, let not the

(1) *Phalerides*. *Plin. lib. 3. cap. 48.* says, that in *Seleucia* of the *Parthians*, and in *Asia*, these are the most commended of any water-fowls whatsoever. Father *Hardouin*, in his note upon this place, says, that they are frequent in the country about *Soissons* and *Beauvois* in *France*. It is a beautiful fowl, which delights in ponds and lakes: but whether there is any such fowl in *England*, or by what name it is called, I know not.

whole place, for this reason, be taken up with little woods ; but, as I said, let it be free and open all round, that the fowls, when a clear, warm, sun-shining day makes them leap and skip for joy, may, without any hindrance, strive together which of them can swim the swiftest. For, as they desire to be where they have holes to creep into, and where they may lie in ambush for animals that live in rivers, and lurk and hide themselves from them ; so they are offended, if there are not free, open spaces, where they may go freely up and down.

Then, without the lake, let the banks be covered with grafs for twenty feet on all sides ; and behind this extent of ground, about the wall, let there be places for them to lodge in, of a foot square, built with stone, and smoothed with plaister, in which the fowls may make their nests ; and let them be covered with box and myrtle-shrubs planted among them, which must not exceed the height of the wall. Then let a little chanel be built all along, and sunk under-ground, through which their food may daily run down mixed with the water ; for in this manner does this kind of fowl gather its food. Terrestrial food also of puls, as millet, panic, and barley also, is very acceptable to them : but they also give them mast, and husks, and kernels of grapes, where there is plenty of them. But, of aquatile food, they give them crab-fish, if they have them in plenty, or small river pilchards, or anchoves of little value ; or if there be any other river animals of a small growth.

They observe the same times of coupling, in *March* and the following month, as other wild fowls do ; during which, stalks of herbs, sprays, and sprigs, must be scattered here-and-there in the aviaries, that the fowls may gather them, and build their nests therewith. But it is a very old practice, and exceeding proper, that when one has a mind to constitute and form a duckery, he should gather the eggs of the foresaid fowls about the marshes, wherein, for the most part, they lay them, and breed, and set them under common poultry-hens ; for their young ones, being thus hatched and brought up, lay aside their wild disposition, and will certainly breed when they are shut up in aviaries : for, if you would put into custody, and shut up, fowls that are newly taken, which have been accustomed to live at full liberty, they delay laying their eggs in their servitude. But enough has been said of the tutelage of swimming fowls.

C H A P. XVI.

Of Fish-ponds, and of feeding of Fishes.

BUT, while we are making mention of aquatile animals, we shall come opportunely to the care and management of fishes. For tho' I think, that the gain, redounding from them, is most un-uitable and alien to Husbandmen, (for what can I imagine so contrary as terrestrial and fluid, or dry land and water?) nevertheless, I shall not omit it. For our ancestors took great delight in, and applied themselves much to, these things, even to such a degree, that they shut up salt-water fishes also in fresh waters, and nourished the mullet, and the scare, with the same care as the sea-lamprey, or sea-pike, are now educated. For that antient, rustic progeny of *Romulus* and *Numa* valued themselves mightily upon this, and thought it a great matter, that, if a rural life were compared with a city life, it did not labour under the want of, or come short in, any part of riches or wealth whatsoever. Wherefore, they not only stored the fish-ponds, which they themselves had built, with great numbers of fishes, but also filled the lakes, which nature had formed, with spawn, or young fishes, brought from the sea. Hence it was, that the lakes of *Velino* (1), *Bracciano* (2), *Bolseno* (3), and *Vico* (4) also, did procreate sea-jacks and gilt-heads; and if there be any other kinds of fishes which can endure fresh water.

Afterwards the following age abolished that care; and the daintiness, magnificence, and sumptuousness of the rich, have shut up the very seas, and *Neptune* himself also; and now, with the history of our grandfathers, the action and saying of *Marcus Philippus* (5) is

(1) *Lacus Velinus*, a lake in *Umbria*, upon the borders of *Sabina* in *Italy*; it is now called *Lago de Pie di Luco*. It lies between *Reati*, a Town in *Sabina*, and *Tarni*, a town in *Umbria*: the river *Velino* runs through it.

(2) *Lacus Sabatinus*, now called the lake of *Bracciano*, from the adjacent town of that name.

(3) *Lacus Vulturnensis*, or *Vulsiniensis*; the lake of *Bolseno*, in the duchy of *Castro* in *Hetruria* in *Italy*, almost round, and thirty miles in circumference. It has other names from the places adjacent, which it is needless to trouble the reader with.

(4) *Lacus Ciminus*, now called *Lago di Vico*, between *Viterbo* and *Ronciglione*. It may as properly be called the lake of *Viterbo*, as *mons Ciminus* is called the hill of *Viterbo*.

(5) *Marcus Philippus*. This story our author has taken from *Varro*, lib. iii. cap. 3. who says, Did not *Philippus*, when he turned aside to lodge with his friend *Immidius* at *Cassinum*, and at supper had tasted of a beautiful pike, which his friend had set before

is published every-where, and is in every body's mouth (as mighty pleasant and polite, which was, indeed, exceeding luxurious): for at a certain time, when he was at supper in his friend's house, with whom he lodged, at *Cassinum*, and had tasted of a pike, out of the neighbouring river, which was set before him, and had spitten it out, he followed the impudent and naughty action with a jest, *May I perish*, said he, *if I did not think it was a fish!* Therefore, this false oath has put many upon more nice and uncommon contrivances to gratify their gluttonous appetite, and taught delicate, wise, and learned palates to loath and make no account of the river-pike, except that which the adverse stream of the *Tiber* had wearied. Therefore *Terentius Varro* says, 'That, in this age, there is not a vain, paltry, ' sorry fellow, or a stage-player (6), who will not say, That it is no ' matter to him whether his fish-pond be well stored with this kind ' of fish, or with frogs; and that, in his opinion, there is no dif- ' ference between them.' Nevertheless, in those very times, wherein *Varro* gives an account of this luxury, *Cato's* severity was exceedingly commended, who, notwithstanding, when he himself was *Lucullus's* guardian (7), sold his pupil's fish-ponds for the sum of four hundred thousand *sestertii*. For then the dainties of taverns, and of houses of riotous entertainments, were in great vogue, and much sought after, when fish-ponds were brought from the sea; and they who took great delight in them, and made them their chief study, rejoiced,

him, and had spit it out, say, *May I perish, if I did not take it to be a fish!* *Cassinum*, now called *Monte Cassino*. It was antiently a town of the *Volsci* in *Latium*, near the borders of *Campania*; now it is in the province of the *Terra di Lavoro*, in the kingdom of *Naples*. It is very uncertain who this *Marcus Philippus* was; probably he was one of the *Marcian* family, which was very noble and antient, being descended from *Ancus Marcius*, who was once king of *Rome*. By *Varro's* manner of relating the story, it seems to have happened in *his own time*. It seems they only valued such pikes as were taken in a certain place of the river *Tiber*.

(6) *Rhinton*. This was probably the name of some famous actor or buffoon; and *Varro* perhaps had in his view, and applied it to, *Æsop* the stage-player, who was known to him; and whose extravagant luxury and profusion *Pliny*, in his *natural history*, and several other authors, take particular notice of, and condemn.

(7) *Tutor Luculli grandi ære sestertium millium quadringentorum pupilli sui piscinas venditabat*. *Cato*, who perished at *Utica*, was guardian to this *Lucullus*; and our author says, he sold his fish-ponds for 400000 *sestertii*, which, in *English* money, amount only to 3229 *l.* 3 *s.* 4 *d.* But *Pliny* says, that they were sold for four millions of *sestertii*, which amount, in *English* money, to 32,291 *l.* 13 *s.* 4 *d.* so that there seems to be an error in the text of *Columella*; for the sum mentioned by *Pliny* seems much more probable, considering the vast profuseness of *L. Lucullus*, and the great sums he expended in making fish-ponds near *Naples*, and the prevailing humour of the great men at *Rome* about that time, who spared no cost in order to excel in the magnificence of their villas and fish-ponds; so that *Lucullus's* fish-ponds must have sold for much more than this sum, as it now stands in our author.

and were glad, to be called by the names of the fishes they had caught. So Sergius was called *Orata* (8); and Licinius, *Muræna* (9); just as Scipio was called *Numantinus* (10), and P. Servilius, *Isauricus* (11), from the nations they had before conquered.

But because the manners of this age are become so callous, that these things are reckoned not as customary and common amusements, but as highly commendable and honest studies; we also, lest we should seem to be late censurers of so many ages now past, shall explain and point out this kind of gain also, that a master of a family may make at his villa. Let the man who has purchased islands, or lands contiguous to the sea, and cannot receive any fruits from his ground, because of the poorness of the soil, which, for the most part, is the case near the sea-shore, raise to himself a revenue from the sea. But it is, as it were, the beginning of this affair, carefully to view and consider the nature of the place, where you resolve to make and constitute your fish-ponds: for all kinds of fishes (12) cannot be had in all shores. A slimy, muddy region educates the flat fish, as the soal, the turbot, the plaise: the same also is exceeding proper for conchylys (13), burrets, oysters, and others of the purple kind:

(8) *Sergius Orata*, as *Pliny* says, *lib. ix. 52.* was the first who invented oyster-beds at *Baia* near *Naples*. He was, as some think, called *Aurata*, because he delighted much in a sort of fish called *aurata*, which, as *Festus* says, were of the colour of gold: he says, that the common people called *orum*, what ought properly to be called *aurum*, which is the reason why he was called *orata*.

(9) *Licinius Muræna*, as *Pliny* says, *lib. ix. 55.* was the first who invented ponds for many sorts of fishes; and from one sort of them, which he delighted most in, had the surname of *Muræna*: many of the quality followed his example, as *Philippus Hortensius*, *Lucullus*, and others.

(10) *Scipio* was called *Numantinus*, from his taking *Numantium* in *Spain*, after a long and tedious siege: but he got nothing but the bare walls; for the people chose rather to burn themselves, and all that they had, than submit to him, and live with the loss of their precious liberty.

(11) *P. Servilius* was called *Isauricus* from his conquering *Isauria*, a country of *Lesser Asia*, on the south of *Galatia*, and bordering upon *Pisidia*.

(12) It is not easy to determine by what *English*, or other modern names, several of the fishes, mentioned by our author, ought to be rendered: authors, who have written upon this subject, are not at all agreed upon this particular; many of them are not known in our seas, so that it cannot be expected, that they have any names in our language. Both the *Greeks* and *Romans* called several fishes by the names of terrestrial animals, and other things to which they thought they bore some resemblance, either in their shape, colour, or some other remarkable quality; and these I have rendered accordingly: and of others I have retained the original names, as has been often done by others who have had occasion to mention them.

(13) *Conchyliæ* sometimes signify small shell-fishes of the purple kind, which yielded a kind of juice or blood, wherewith they dyed purple. But *Pliny* frequently makes use of

kind: as also of the scallop kind, the pectuncles (14), and the sea-acorns (15), or the sphondyli (16): but sandy gulphs afford not very bad food indeed to flat fishes; but they feed better such as are bred in the deep sea, as gilt-heads, and sea-ruffs, and the *Carthaginian*, and our own *Italian* ombers or shade-fishes; but they are not so proper for conchylys, or shell-fishes of the purple kind. Moreover, a rocky sea nourishes very well fishes of its own name, which, doubtless, are called *saxatile*, or rock-fishes, because they harbour and lodge in rocks, as the merle, the sea-thrush, and the sea-bream (17): And it is necessary to know the differences of seas also, as well as of shores, lest fishes, bred in different seas, deceive us: for all fishes cannot subsist in every sea, as the *belops* (18), which is fed in the *Pamphylian* deep, and in no other whatsoever: as the *dory* in the *Atlantic* sea, which also, in our municipal city of *Cadiz*, is numbered with the most generous fishes, and, by antient custom, we call it *zeus*. As the *scarus* (19), or cud-fish, also, which, in great numbers,

of the word *conchylium* to signify the colour itself, and always distinguishes it from the beautiful *Tyræan* or deep-purple colour, which was so highly esteemed by the antient *Romans*; and, for the most part, the *murex*, which some call a *burret*, was only used for this valuable colour, and was most sought after. The *conchylium* was much paler, and more diluted, than the *purpura*, which had abundantly more of the juice or blood of the fish than the other: the matter used for both these colours might be the same, but differed in the way of tempering it; for that for the rich purple was only mixed with water, whereas the other was mixed with urine, which gave the *conchyliatæ vestes* a disagreeable smell, and made them less esteemed; and, according to the mixture, they had more or less of the purple, but all had something of a tendency to blue.

(14) *Pectunculus*, the diminutive of *pecten*, which is a large kind of scollop. They have a double shell channelled; and are so called, because their shells are channelled, and formed in the fashion of a comb.

(15) *Balanus*. It is so called, because it is shaped like an acorn.

(16) *Sphondylus*, or rather *spondylus*, as it is in *Pliny*, a kind of shell-fish; probably so called, because it bears some resemblance to a vertebra of the neck, and is what *Athenæus* calls *τετραχνα*. *Pliny* sometimes calls by this name that callous and white part of an oyster, or other shell-fishes, which sticks to the shell.

(17) *Melanurus*. Some call this a *bream*: it has its name from the blackness of its tail.

(18) *Helops*. *Plin. nat. hist. lib. xxxii. c. 11.* makes mention of this fish from *Ovid*, who had seen it in *Pontus*, and says, that it was not known in the *Mediterranean* sea; and that many preferred it to all other fishes for its exquisite taste.

(19) *Scarus*. *Pliny* says, that this is the only fish that is said to chew its cud; and that it feeds on herbs, and not on other fishes; and is very frequent in the *Carpathian* sea: that, of its own accord, it never passes the promontory *Lection* of *Troas*; but that, in the reign of *Tiberius Claudius*, a certain admiral disseminated them on the coast between *Ostium* and *Campania*; and that for five years, when any of them were taken, they were thrown again into the sea; and that afterwards there were abundance of them taken

bers, comes out of the coasts of all *Asia* and *Greece* as far as *Sicily*, but has never swum out of them into the *Ligurian* sea, nor by *Gaul* into the *Hiberian* sea: therefore, suppose they were taken and brought into our fish-ponds, they could not be long in our possession. Of all the rare and valuable fishes, the sea-lamprey alone, tho' it is originally a native of the *Tarsian* sea, and of the *Carpathian*, which is the utmost sea, endures a foreign sea, whatever frith it is a guest in. But now we must speak of the situation of fish-ponds.

C H A P. XVII.

Of the Situation of a Fish-pond.

WE are of opinion, that that pond is incomparably the best, which is so situated, that the succeeding wave of the sea may remove the former, and not suffer the old one to remain within the inclosure: for that pond is the most like the sea, which, being agitated by the winds, is continually renewed, and cannot grow warm, because it constantly revolves the cold wave from the bottom to the uppermost part. But this pond is either cut out of a rock, of which it is very rare to find the conveniency; or it is built with *Signinian* work, or plaster of *Paris*, upon the sea-shore: but, whatever way it be built, if it be exceeding cold by the gulph flowing constantly into it, it ought to have caves hard by the bottom, some of them single without windings, and straight, where the scaly flocks may retire; others of them crooked and winding, but not too spacious, in which the sea-lampreys may lurk: although some do not think it proper, that they should be mixed with fishes of a different sort, because, if they are seized with madness, which this kind is liable to, in the same manner as dogs are, they persecute the scaly fishes most cruelly, and devour and eat a great many of them.

And, if the nature of the place will allow it, it is proper that passages be made for the water on every side of the fish-pond: for the old water is more easily removed, when, by whatever part the wave presses, there is an open outlet for it through the opposite side. But

taken upon the coast of *Italy*; see *lib. ix. c. 17*. The *Carpathian* sea, where they abound most, has its name from the island *Carpathus* between *Crete* and *Rhodes*, and is one of the *Sporades*.

we are of opinion, that these passages should be made along the lower part of the inclosure, if the situation of the place will allow it, that a plumbet, being placed in the bottom of the fish-pond, may shew, that the surface of the sea is seven feet higher ; for this measure of the depth of the gulph is abundantly sufficient for pond-fishes : nor is there any doubt, but, by how much deeper the sea is, which the water comes from, by so much the colder it is, which is most proper for swimming fishes. But if the place, where we advise you to build the fish-pond, be upon an equal level with the surface of the sea, let it be digged to the depth of nine feet ; and below, two feet from the uppermost part, let a small canal be laid all along for a gentle current of water ; and care must be taken, that it come in very plentifully, because that quantity of water, which lies below the level of the sea, is not otherwise squeezed out, but by a greater force of recent sea-water rushing in upon it.

Many think, that, in these kinds of ponds, there ought to be built long places of retirement for the fishes, and winding caves in the sides of the same, that so they may have the darker lurking places when they are very hot. But, if recent sea-water does not always pass freely through the pond, it would be hurtful to them to do this : for receptacles of this sort do neither easily admit new waters, nor emit the old but with great difficulty ; and rotten water does more hurt, than the darkness of *those places* does good. Nevertheless, there ought to be like as it were hollow cells made in the walls, for protecting them when they fly from the heat of the sun ; and which, notwithstanding, may easily let out the water which they have received : but it is necessary to remember, that brazen cross-bars, or lattices, with small holes, be fastened before the canals through which the water flows, that the fishes may be hindered from making their escape. But, if the extent of the place will allow it, it will not at all be amiss to place rocks from the sea-shore, especially such as are covered with sea-weeds, in several places of the pond ; and, as much as the wit of man can contrive, to represent the appearance of a real sea, that the confined may be as little sensible of their imprisonment as possible.

Having in this manner prepared stables for the aquatile cattle, we must bring them in to them. And, let it be a principal point with us to remember also, in all river-business, and water-affairs whatsoever, the direction given relating to what is done upon dry land :

‘ Consider well what ev’ry place will bear.’

For we cannot, if we had a mind to it, feed a multitude of barbels in a fish-pond, as we have sometimes seen in the sea; forasmuch as it is a most delicate, tender kind of fish, and suffers bondage with great indignation; therefore, of many thousands, rarely one or two of them endure confinement: but, on the other hand, we frequently observe, within inclosures, shoals of sluggish sea-mullets, and rapacious sea-wolves, which commonly breed in the deep sea. Wherefore, as I proposed, let us consider the quality of our sea-shore, whether we avoid rocks, or if we approve of them.

We must shut up in our ponds the several sorts of sea-thrushes, merlins, and the greedy sea-weasels; as also sea-wolves, or sea-jacks, that have no spots, (for there are some of them of divers colours) as also floating lampreys, which are very much commended; and if there be any others of the *saxatile* or rock character, which bear a very great price; for it profiteth nothing indeed to catch, much less to nourish, such as bear a low price: these same kinds also may be kept in ponds upon a sandy shore: for such ponds as grow dirty with slime and mud, as I said before, are more proper for conchylys, and for animals that lie.

Nor is a pond, for the reception of such fishes as lie, to have the same position: but the same food is given both to erect and to prostrate fishes: for, for soals and turbutts, and such-like animals, they sink a pond two feet deep, in that part of the shore which is never left destitute of water by the ebbing of the sea; then they fasten very close cross-bars upon the brim or side of the pond, which may always appear above water, even when the tide swells, and rises to its full height. Afterwards they cast up moles before it, and round the whole circumference of it, and so as they may encompass it, and contain it in their bosom, and exceed the dimensions of the pond: for so the raging and violence of the sea is broken by the interposition of the bank; and the fish, keeping in a quiet and calm place, is not disturbed and driven out of its habitations, nor is the pond itself filled up with a heap of sea-weeds, which the raging of the sea throws up in stormy weather. But in some places, the moles must be cut through in the manner of a *Mæander* (1), with small but strait narrow passages, which may let the sea pass through without a wave, in the most stormy winter-weather whatsoever.

(1) *Mæander*, a river in *Phrygia*, which runs through *Caria* and *Ionia*, full of various windings and turnings: hence any place, with many turnings and windings, is called by that name.

Here the food of fishes, that lie prostrate, ought to be softer than that of rock-fish; for, because they want teeth, they either lick their victuals, or swallow them whole; for, indeed, they cannot chew them: therefore it is proper, that rotten or damaged pilchards should be given them; and sardels consumed with salt, and rotten sardines, as also the gills of *scares*, or whatever entrails the young tunny and the sea-lizzard have; as also the ventricles of the mackrel, the *carcharus* (2), and the distaff-fish (3); and, that I may not mention every thing in particular, all the garbage of salted fish, which are swept out of fishmongers shops. But we have mentioned several kinds of them, not because all of them come forth of all sea-shores, but that we may give them some of those which we shall have in our power to give.

Of green fruit of the apple-kind, the fig laid open is very proper for them; and nuts also, broken with your fingers, must be given them; as also the soft forb-apple boiled, and such victuals as are next to such as are supable, as new cheese or curds out of the milk-pail, if the condition of the place, or the plenty and cheapness of the milk, will permit it. But there is no food that is equally proper and convenient for them, as the foresaid salted provision taken out of the brine, because they have a strong smell: for every fish that lies, searches for, and finds out, its food more with its nose than with its eyes; for, while it constantly lies upon its back, it looks more aloft, and does not easily see such things as are upon a level with itself, upon the right and left: therefore, when salted fish is thrown to them, they follow their smell, and come to their victuals.

But other fishes, that either live among rocks, or in the open sea, are well enough nourished with these salt things, but better with such as are fresh: for the small pilchard or anchove newly taken, and the crevice, and the small gudgeon, and, in a word, every other fish that is of a minute growth, nourishes the greater. Nevertheless, if, at any time, the boisterousness of the winter does not suffer this kind of food to be given them, either morsels of coarse bread, or, if there be any apples of this season, they are cut small, and given to them. Indeed the dry fig is always thrown to them, and is excellent, if it be large, as is that of the regions of *Batica* and *Numidia*. But that ought never to be practised which many do, who give them nothing

(2) *Carcharus*. I do not find this among the many fishes mentioned by *Pliny*, and probably this is not the true reading.

(3) *Elacata*. This fish has its name from its resembling a distaff. *Pliny* calls fishes of this sort *Helacatenes*.

at all, because, even when they are shut up, they can support themselves for a long while: for, unless the fish is fattened with its owner's victuals, when it is brought to the fish-markets, its leanness declares, that it was not taken in the open sea, but brought out of a place of confinement; for which reason there is a very great abatement made of the price. And, let this sort of manor-house pasturing put an end to this present discourse, lest the reader be wearied with the immoderate length of the volume. But, in the following book, we shall return to the care and management of wild-cattle, and to the culture of bees.

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O F

H U S B A N D R Y.
B O O K N I N T H.

The P R E F A C E.

I Come now to the tutelage of wild cattle, and the education of bees; which very things, *Publius Silvinus*, I may also very justly call manor-house pasturings: forasmuch as antient custom placed parks for young hares, and wild goats, and such-like wild beasts, hard by the manor-house; for the most part situated below the owner's apartments, that so the seeing of them hunted within the inclosure might both delight the eyes of him who had them in his possession; and that they might be brought forth, as it were, out of a storehouse, when he had occasion to make entertainments. And, even in our own memory, bees had seats assigned them, either in the walls of the manor-house cut into niches, or in porticos sheltered from the weather, and in orchards. Wherefore, seeing there is a reason given of the title, which we have prefixed to this discourse, let us prosecute particularly each of the things we have now proposed.

C H A P. I.
Of making Parks, and shutting up wild Cattle in them.

WILD cattle, as young roe-bucks, fallow deer, as also the several kinds of ounces, and stags, and boars, sometimes serve for the magnificence, and splendor, and pleasures of their owners; and,
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at other times, to make gain, and increase their revenue: but they who shut up wild beasts, in order to hunt them for their pleasure, are satisfied, whatever the situation of the place next to the dwelling-house may be, with inclosing a park for their cattle, and giving them always food and water by hand. But they who are desirous of gain, and of a revenue from them, when there is a wood near to the manor-house, (for it is of great importance, that it be not far from the owner's eyes) destinate it for the foresaid animals, without any hesitation: and, if natural water is wanting, they either bring running water into it, or dig ponds in it, and lay them with *Signinian* work, (plaster of *Paris*) that they may contain the rain-water that they shall have received.

There is such an extent of wood taken in, as is suitable to every man's estate; and, if the cheapness of stone and labour give encouragement, without all manner of doubt a wall, made of rough stone and lime, is built round it; if otherwise, it is built with unburnt brick and clay. But, when neither of these is for the advantage of the master of the family, reason requires that it should be inclosed with wooden rails; for so a certain kind of bars is called: and they are made of red-oak, or evergreen-oak, or of the cork-tree; for it is rare to have the conveniency of the olive-tree: in a word, whatever is more lasting under the injuries of the rains, is chosen for this use, according to the circumstances of the country. And whether it be the round stock of a tree, or it be cloven into stakes, as the thickness of it requires, it is bored through the side in several places, and erected and fastened round the whole circumference of the park, certain spaces intervening between each stake: then cross-bars are put through the holes that are made in their sides, which may shut up all passages for the wild beasts to go out at.

But it is sufficient to fasten the pales in the ground, at the distance of eight feet from one another, and to bind them together so closely with cross-bars, that the wideness of the spaces between the holes may not give the cattle an opportunity to make their escape: and, in this manner, you may inclose even the broadest countries, and tracts of mountains, as the vast extent of the countries in *Gaul*, and also of places in some other provinces, will bear; for there is both very great plenty of wood for making pales, and every other thing necessary for this purpose is ready at hand, and can be easily obtained; for the soil abounds in frequent springs, which is exceeding wholesome for the foresaid kinds of wild beasts: and it also furnishes forage for them very liberally of its own accord. And such forests are chiefly

chiefly chosen, which abound both in fruits of the ground, and in fruits of trees; for as they have need of all sorts of grafs, so likewise of oak-mast: and those forests are most commended, which are the most fertile of acorns, both of the common- and evergreen-oak, likewise of the cerrus-oak, as also of the arbut- or strawberry-tree, and other wild apples, which we carefully treated of, when we discoursed of such cattle as are kept in yards about the manor-house; for the forage of wild cattle is almost the same with that of tame.

Nevertheless, a diligent master of a family ought not to be contented with those sorts of food, which the earth produces naturally of its own accord; but, at such times of the year, wherein the woods want sustenance for them, he ought to relieve the confined with the fruits of the earth, which he gathered in harvest, and laid up in his store-houses, and nourish them with barley- or wheat-meal, or beans, and most of all with husks, and kernels of grapes; and, in a word, to give them whatever costs but very little. And, that the wild beasts may understand, that that is laid before them, it will be proper to send out among them one or two which have been tamed at home, which, wandering over the park, may lead the cattle, which stand boggling, to the victuals that are thrown before them. And it is expedient, that this be done, not only during the scarcity of the winter, but also after such as are with young have brought them forth, that they may bring up their young ones the better: therefore the Park-keeper ought frequently to be upon the watch, and see if they have already brought forth their young, that they may be sustained with corn given them by hand. But neither ought the ounce, nor the wild boar, nor any other of these wild beasts, to be suffered to grow above four years old; for till that time they always advance in their growth; afterwards they decay, and grow lean with old age: wherefore, while their green age preserves the beauty of their body, they must be exchanged for money: but a stag can be sustained for a great many years; for he continues long young in your possession, because he has a life of a longer duration bestowed upon him.

But, concerning animals of a lesser growth, such as the hare, we give those following directions: That, in those parks which are surrounded and secured with a wall, the seeds of barley, and of several other sorts of grain, mixt together, and of pot-herbs, wild endive, and lettuce, be thrown into small beds of earth made at various distances. Let also the *Carthaginian* chich-pease, or that of our own country, as also barley and chichlings, that have been laid up in store, be brought forth out of the barn, and moistened with rain-water,
and

and thrown before them ; for dry things are not too much sought after by hares. Moreover, it is easily understood (suppose I should be silent) how improper it is to bring these animals, or others like to them, into that park which is surrounded with rails ; considering, that, by reason of the smallness of their body, they easily creep under the bars, and, having gotten open passages to go out by, they endeavour to make their escape.

C H A P. II.

Of Bees.

I Come now to the management of bee-hives, concerning which no precepts can be given with greater diligence, than have been already delivered by *Hyginus* ; nor more gracefully and handsomely, than by *Virgil* ; nor more elegantly, than by *Celsus*. *Hyginus* has industriously collected the sentiments of antient authors, that were dispersed in their writings, which were unknown to the world. *Virgil* has illuminated them with flowers of poetry ; *Celsus* has adapted and made use of the manner of both these mentioned authors : wherefore we would not have so much as attempted to discourse of this subject, but that the consummation of the profession we have undertaken required the handling of this part of it also, lest the body of the work, which we have begun, should appear maimed and imperfect, as if some member were cut off from it. And I would rather allow to poetical licence, than to our belief, those things which have been fabulously related concerning the origination of bees, which *Hyginus* has not past over. Nor, indeed, is it worthy of an Husbandman, to inquire whether there ever was such a woman as *Melissa*, of a most exquisite beauty, which *Jupiter* transformed into a bee ; or whether (as *Euhemerus* the Poet says) bees were bred of hornets and the sun, which the *Phryxonian* nymphs (1) educated ; and that soon afterwards they became nurses to *Jupiter* in the *Dictæan* cave (2) ; and, by the free gift of the god, they obtained

(1) *Phryxonides nymphæ*. I have not seen any other antient author, beside *Columella*, that mention these nymphs : whether he means by them *Amalthea* and *Melissa*, daughters of *Melisseus*, a king of *Crete*, who, as the fable says, educated *Jupiter*, and fed him with honey, I know not. Perhaps they were so called, because they were afterwards made priestesses to *Cybele* by their father ; and from this *Melissæa* the succeeding priestesses were, by the antients, called by the same name.

(2) *Dictæ*, a mountain in *Crete*, where the Poets say *Jupiter* was educated.

the same food for their own sustenance, wherewith they had brought up their little foster-child: for, tho' these things are not unbecoming a poet, nevertheless *Virgil* touched upon them slightly, and very briefly, only in one small verse: *In Dicte's cave they fed the king of heav'n.*

But neither does that indeed belong to Husbandmen; when, and in what country, they were first produced, whether in *Theffaly* under *Aristæus* (3); or in the island of *Cea* (4), as *Eubemerus* writes (5); or in the times of *Erichthonius* (6), in mount *Hymettus* (7), as *Euthronius* (8); or in the times of *Saturn* of *Crete*, as *Nicander* says (9), no more, than whether the swarms procreate their offspring by coupling together, as we see other animals do; or choose the heir of their family from among the flowers, which our *Maro* affirms; and whether they vomit the liquid honey out of their mouth, or yield it from any other part of their body; for it rather belongs to the searchers into the secret and hidden things of nature, than to Husbandmen, to inquire after these and such-like things. Also these things are more agreeable to men of study and learning, who have leisure to read, than to Husbandmen, who are full of business; because they neither assist them in their work, nor contribute any thing to increase their estate.

(3) *Aristæus*, a king of *Theffaly*, the inventor of honey, as *Virgil*, *lib. iv. l. 283.*

(4) *Cea* or *Ceos*, an island in the *Ægean* sea; one of the *Cyclades*.

(5) *Eubemerus*, an ancient *Greek* writer of *Messina* in *Sicily*: he wrote the history of the heathen gods, their death, burial, &c. *Ennius* translated him into *Latin*, and followed his opinion of them. *Tullius*, *de nat. deorum*, *lib. i.* makes mention of him; and seems to think, that the account he gave of them took away all pretence for worshipping them.

(6) *Erichthonius*: some make him a king of *Athens*. *Plin. hist. nat. lib. vii. c. 56.* mentions him as the inventor of silver, and the first that made use of a chariot and four. Perhaps he may be different from another of that name, who was son of *Dardanus* the first king of *Troas*.

(7) *Hymettus*, a famous mountain in *Attica*, where they say is the best honey, and where it was first found out.

(8) *Euthronius*. Perhaps this is the same as *Euphronius*, whom both *Varro* and *Columella* mention as a rustic writer.

(9) *Nicander* was of *Colophon*, a city of *Ionia* in the *Lesser Asia*: he was both a poet, a physician, and an excellent grammarian: his *Theriaca* and *Alexipharmaca* are still extant. Several of his writings are mentioned by *Suidas*; amongst other things he wrote of Husbandry, which *Tully* commends very much for its poetry, *lib. i. de Oratore*. *Athenæus* also mentions several of his works. He lived in the times of *Attalus*, the last king of *Pergamus*.

C H A P. III.

Of the several Kinds of Bees, and which of them is the best.

W Herefore let us return to those things which are more proper for them who have bee-hives under their care and management. *Aristotle*, the founder of the *Peripatetic* sect, in those books which he wrote of animals, shews, that there are several kinds of bees, or of swarms of bees; and that some of those swarms have bees that are exceeding large, but round and compact, and the same black and shaggy; others lesser indeed, but equally round, and of a dusky colour, with horrid grisly hair; and others of a smaller size, but not so round, but nevertheless fat, and broad, and of a somewhat better colour: and they have some that are very small and slender, with the trunk of their belly sharp, and drawing to a point, of divers colours, somewhat shining like gold, light and nimble. And *Virgil*, following his authority, approves most of such as are very small, oblong, smooth and nimble, bright and shining (1):

‘ Whose bodies, mark’d with pairs of spots like drops
‘ Of liquid gold, a dazzling lustre cast:’

Of gentle and mild dispositions; for by how much the greater, and rounder also, the bee is, by so much the worse it is: but if it be of a more fierce and cruel temper, it is by much the worst of all. But, nevertheless, the angry disposition of bees of a better character is easily mitigated and softened by the continual intervention of those who take care of the bee-hives; for they grow quickly tame when they are often handled, and endure for ten years, if they are carefully managed: nor can any swarm of bees exceed this age, although they yearly substitute young ones in the room of those that are dead; for, in the tenth year, almost the whole family, that lives together in one hive, is consumed, and reduced to utter destruction. Therefore, lest that should be the case of the whole apiary, a new race must be constantly propagated; and, in the spring, you must carefully observe when the new swarms issue forth in great numbers, that they may be received, and the number of their dwelling-houses increased: for they are often seized with diseases. After what manner the same must be cured, shall be declared in its proper place.

(1) *Virg. Georg. lib. iv. 98.*

C H A P. IV.

Of the Pastures proper for Bees, and what Sort of Situation the same ought to have.

IN the mean while, having made choice of bees according to the marks we have now mentioned, you ought to destinate proper places for them to gather their food; and let them be the most retired that can be had; and, as our *Maro* directs, void of cattle, and in such a situation as is exposed to the Sun, and sheltered from stormy weather (1);

- ‘ Where winds have no access; for winds impede
- ‘ Their course, when with their food they’re homeward-bound,
- ‘ Where neither sheep, nor frisking kids, insult
- ‘ The flow’rs; nor heifers, rambling o’er the fields,
- ‘ Shake off the dew, and crush the rising herb.’

Let the same quarter also be abundantly productive of small shrubs, and especially of thyme, or bastard marjoram (2), as also of thymbra, or Greek favory, or our own *Italian* favory, which the country-people call *satureia*: after these, let there be abundance of shrubs of a greater growth, as rosemary, and the *cytissus* or shrub-trefoil (3), of

(1) *Virg. Georg. lib. iv. 9.*

(2) *Origanum*, bastard-marjoram; so called, because it delights in mountains.

(3) *Cytissus*. We see here, that our author places the *cytissus* among the shrubs. *Pliny* also, *Hist. Nat. lib. xiii. c. 23.* calls it a shrub. It is mightily commended by many ancient authors, as good for sheep, swine, hens, &c. and they speak of it as a mighty common thing in *Italy* in their days; so that it is strange, that writers are not agreed about it. Both *Columella* and *Pliny* speak of it, as if it were sown or planted, grew up, and were cut down, like trefoil. *Pliny* says, it may be sown in seed, or planted in stalks; and if any would express the likeness of it, it is *angustioris trifolii frutex*, has leaves like trefoil, but lesser: and *Dioscorides* says, *κύτισος δάμνός ἐστιν*, i. e. a shrub or bush. *Pliny* says it was found in the island *Cythisus*, from thence translated into all the *Cyclad* islands, and soon afterwards into all parts of *Greece*. It seems, it was not very plentiful in *Italy* in *Pliny*’s time; for he says, that, considering the usefulness of it, he wonders that it is so rare. All writers upon Husbandry celebrate it much, which makes it seem strange, that it has not been more cultivated, or, at least, that it is not better known. The account that *Columella* and *Pliny* give of this shrub, does not very well agree with what our writers say of it. *Pliny*, as has been already said, among other things, says, that it may either be sown in seed at the time they sow barley, or set in stalks or slips (*caule*) in autumn before winter; that it comes to perfection in three years, and is cut down about the equinox; that it is of an hoary aspect, and so hardy, that it fears neither heat nor cold, hail nor snow.

both sorts: for there is one sort of it that is sown or planted, and another sort which grows of its own accord. And, likewise, the ever-green pine, and the lesser ever-green oak; for the taller one is disapproved by all: ivy-trees also are received, not for their goodness, but because they yield very much honey. But, the most approved trees are, the bright-red and white jujube-tree, likewise the *amaranth* (4), as also walnut-trees, peach-trees, and pear-trees; in a word, the greatest part of pomiferous trees, that I may not insist upon each of them. But, of forest or wild trees, the most suitable and convenient for them are the mast-bearing red oaks, as also the turpentine-tree, and the mastich-tree, which is not unlike to this, and the sweet-smelling cedar: but of all, the lime- or linden-trees alone are hurtful to them; yew-trees are intirely rejected. Moreover, a thousand plants, which either spring up and flourish upon the uncultivated turf, or are cultivated and improved with the furrow, produce flowers exceeding friendly to bees; as are the shrubs of the *amellus* (5) in

(4) *Amaranthus*. The *amaranth*, so called, because its flower does not soon wither, but keeps the beauty of its colour a long while. Some authors call it *flower-gentle*, and the *amaranthus maximus* they call *great floramour*, or *purple flower-gentle*: but some authors think, that it ought not to be read *amaranthus*, but *tamarix*, because the author is here speaking of trees, and not of herbs; and the *tamarix*, when it flourishes, is very proper for bees.

(5) *Amelli frutex*. There is some dispute about this herb; *Matthiolus* thinks that it is the *aster Atticus*, the *Italian starwort*, because *Virgil's* beautiful description, *Georg. lib. iv.* shews, that it has certain characters which belong to the *aster Atticus*; and that the words in *Virgil*, *ipse aureus*, ought to be understood of the flower itself; and the following words, *sed in foliis quæ plurima circum funduntur, violæ subluceat purpura nigra*, are to be understood of the leaves that surround the flower itself, which somewhat resemble the black violet in their colour: therefore he says *subluceat purpura*, because that purple colour, which is seen in these leaves, is not so bright as in the violet itself, but much more diluted; so that it is a great mistake to think, that *Virgil* understood this colour to be that of the leaves of the herb. Moreover *Virgil*, in effect, says, that the flower of this herb is found in the end of summer, or beginning of autumn, *tonsis in vallibus*, in the mown valleys, it growing up after the hay is cut down. The description he gives of the *amellus* is this: 'It is an herb that sends forth from its root straight, solid, and woody stalks, of a dark, yellowish colour, from which, about the top, spring forth small little branches, on the top of which are seen flowers radiated after the manner of a star; in the middle they are yellowish, all surrounded with little leaves, shining with a diluted purple colour; it bears leaves acuminate like those of the olive-tree, but smaller, rough, hairy, blackish, of a rough-bitterish taste; those that surround the stalk are by much the smallest: it has a multifidous fibrous root, of no unpleasant smell, something like that of gilliflowers. It blossoms or flourishes in the end of summer, or beginning of autumn, in *August* and *September*; the leaves grow at length flaccid, and dissolve into down, with a small oblong seed, not very unlike endive: it grows in rough uncultivated hills and valleys.' I have transcribed this out of *Matthiolus*, because I have not found it under this name in any of our best

in well-watered ground, branke-urfine-ftalks, the fhank of the *afphodel* or king's-fpear (6), the fword-like leaves of the daffodil (7). But the white lilies, planted in the garden-ridge, make a bright appearance; nor are the white violets or ftock-gilliflowers inferior to thefe in beauty; alfo fcarlet rofes, and yellowifh and purple violets (8); and likewife the fky-coloured hyacinth (9); alfo the *Corycian* (10) and *Sicilian* faffron-bulb is planted, in order to give a colour and flavour to the honey. Moreover, innumerable herbs of a bafier character fpring up, both in cultivated- and in pafture-lands, which furnifh and replenifh the honey-combs with abundance of wax; as the *lapfanæ*, or common wild coleworts (11); and, which is not more precious than

Englifh books of herbs. *Columella*, cap. 13. fays, there is a fort of it with a yellowifh ftalk, and purple flower.

(6) *Asphodeli fcapus*, by *Pliny* called *bacillus regius*, or *hastula regia*, king's-fpear, becaufe, when it is in the flower, it refembles a royal fceptre. Some *French* authors call it *hache royale*: it has a round and very fmooth ftalk, which rifes a cubit high, fometimes two cubits. *Columella* calls the ftalk of it *fcapus*, becaufe it refembles the fhank or fhaf of a column.

(7) *Narciffus*, daffodil. Probably fo called from *vάξου, torpor*; the fmell of it is ftupefying, and caufes an heavinefs of the head: its leaves, which arife from its root, are fhaped like a fword, which is the reafon why our author fays *gladiolus narciffi*. There are many different forts of it, which *Mr. Miller*, in his Dictionary, gives us an exact description of: and *Matthiolus* has given us cuts of the different forts, whofe leaves have all the fhape of a fword, fome broader, fome narrower: perhaps the bees fuck honey out of the leaves and flowers.

(8) *Sarranæ violæ*, purple violets. *Sarranus*, the purple colour, either from *farra*, the name of the fhell-fifh, with whofe blood they dyed this colour; or from *Sor*, the *Hebrew* name of *Tyre* and *Sidon*. *Sarranæ veftes*, in many authors, fignify cloaths of a purple colour. Some fay, that formerly *Tyre* was called *Sarra*, and the fifh *Sar*.

(9) *Cæleftis numinis hyacinthus*. The learned *Morgagni* of *Padoua* thinks, that it ought to be read *luminis*, fo that the author means the fky-blue hyacinth; this would be very well, if warranted by fome manufcript: what makes it very probable is, that *Columella* very frequently mentions the colour of herbs, or of their flowers, without any further description; or perhaps he means, that this flower was facred to fome deity.

(10) *Corycius bulbis croci*. *Corycus*, a high hill in *Cilicia*, where grew plenty of excellent faffron. *Pliny* gives the preference to the *Cicilian*, efpecially to that which grew upon this mountain, next to the *Lycian* upon mount *Olympus*, and the third place to that of *Sicily*: he fays, that it is eafily adulterated; he gives a mark whereby to know the genuine, *viz.* if it cracks, and makes a noife when the hand is laid upon it, as if it were brittle, this is to be underftood, when it is dry; and that the moift, which becomes fo by adulteration, yields when it is handled. Another fign of its being genuine is, that, when any one has handled it, and brings his hand to his mouth, it gently bites the face, and the eyes; with feveral other remarks to be feen in his *Natural History*, lib. xxi. cap. 6.

(11) *Lapfana*. *Pliny* places it among the wild coleworts or cabbage; fays it is a foot high, with hairy leaves, very like thofe of the navew, except that it has a whiter flower, lib. xx. cap. 9. And in another place he calls it *olus filveftre trium foliorum*; a wild kind of pot-herb, with three leaves, much celebrated by fome verfes *Julius Cæfar* made

than these, the wild radish (12), and the *charlock*, or wild mustard pot-herb, and the flowers of wild endive, and black poppy; also the wild parsnip, and the cultivated one of the same name, which the *Greeks* call *staphylinon*. But of all these I have mentioned, and of those which I have omitted, endeavouring to save time, (for their number could not be reckoned up) thyme gives the most exquisite taste to honey: then the next is *thymbra* or *Greek favory* (13), and mother of thyme: of the third sort, but yet exceeding good, is rosemary, and our own *Italian favory*, which I call *satureia*: then tamarisk- and jujeb-flowers, and the other kinds of food which we have proposed, are of a middling taste. But, of all, wood-honey, which cometh of the broom-tree, and the strawberry-tree, and the manor-house honey also, which breeds in pot-herbs, and in herbs that grow in dunghills, are reckoned of the very worst character. And since I have described the situation of their pastures, and also their several sorts of food, I shall now speak of the receptacles of the swarms, and of their little dwelling-houses.

made upon it, which his soldiers used to sing by turns; and by these, and their own military jokes, they used to reproach him with their living upon this herb at *Dyrrhachium*, scoffing and cavilling at the niggardly rewards they received for the hardships they endured. Some think that the root, wherewith *Julius Cæsar's* army sustained themselves, and of which they made bread, was different from this, and was the wild parsnip.

(12) *Armoracia*, the wild radish. The *Italians* have made but very little alteration in this word, and call it *aramorico*, and *remolaco*. *Dioscorides* says, *Ῥαφανὶς ἀγρία*, ἢ *Ῥωμαῖοι ἀρμορακίαν καλεῖσι*, the wild radish, which the *Romans* call *armoracia*.

(13) *Thymbra*. Some make this *thymbra*, *cunila*, and *satureia*, to be the very same; but our author seems to make them different herbs. *Matthioli* says, that there are two sorts of the *thymbra*; first, that of *Dioscorides*, which is like thyme, but lesser and tenderer; that its small stalks end in spiked processes, in which appear flowers something of a purple colour: the other sort is more bushy, with many little, round, woody branches circularly disposed: that it has leaves larger than thyme, somewhat rough, and harder, which sprout out about the shoots several together, at certain distances; and from the place where these leaves arise, certain spiked processes come forth, crowded with little leaves smaller than the rest, out of which spring small flowers, tending from purple to white: and this he thinks to be the *cunila* so often mentioned by *Columella*; and that in *Tuscany* they call it *coniella*, which is a corruption of *cunila*. *Pliny* says, that it has seed like that of penny-royal. See *Matthioli* in *Dioscorid.* for a further description of it.

C H A P. V.

Of chusing Seats for Bees.

A Seat for bees must be placed opposite to the Sun at noon, in the middle of winter, far from tumult, and crouds of men and cattle, in a place neither warm nor cold; for both the one, and the other, is very troublesome to them. But let it be in the lower part of a valley, that both the empty bees, when they go forth to forage, or to gather their food, may fly up the more easily to the higher grounds; and, having gathered such things as are proper for their use, may fly down through the steep places, with their burden, without any difficulty.

If the situation of the manor-house will admit of it, it is not to be doubted, but we should join the apiary to the building, and surround it with a wall; but it must be in that part which is free from the noisome smells of the necessary-house, the dunghil, and the bagnio. But, suppose the situation be unfavourable, nevertheless, if other very great inconveniences do not concur, it is more expedient, that the apiary be thus placed, and be under the eyes of the owner. But, if all things be unfriendly, without doubt let a neighbouring valley be pitched upon, whither the possessor may frequently go down without any great inconveniency: for that business requires the greatest honesty and fidelity; which, because it is exceeding rare, is better secured and preserved by the owner's coming unawares. Nor does it only hate and abhor a fraudulent Overseer and Manager, but slothfulness also, which produces nastiness: for it is equally provoked and offended with dirty and slovenly treatment, as with fraudulent management.

But, where-ever the bee-hives shall be placed, let them not be inclosed with a very high wall; and if, through fear of robbers, you are better pleased with one that is higher, let it be passable for the bees, with small windows, all in a row, three feet high from the ground; and let a cottage be joined to it, wherein both the Keepers may dwell, and the implements be laid up: and let it be chiefly replenished with hives prepared before-hand for the use of the young swarms, as also with wholesome medicinal herbs; and if there be any other things which are applied to such as are sick and languishing.

- ‘ And let the palm, or huge wild-olive tree
- ‘ O’ershade the porch, that, when new kings lead forth
- ‘ The first-hatch’d swarms; and when the sportive youth,
- ‘ From close confinement freed, shall, in the spring,
- ‘ Make sallies from their hives, and play all round;
- ‘ The neighb’ring bank may, from the scorching heat,
- ‘ Invite them to retire; and th’ obvious tree
- ‘ With verdant leavy shelters stop their flight (1).’

Then let continually running water, if you have the conveniency of it, be conveyed into it; or let it be given by hand in a canal or trough, built for that purpose, without which neither the honey-combs, nor the honey, nor the young bees, can be formed. Whether therefore, as I said, water that is constantly running by, or well-water, be sent into them by canals, let there be piles of stones and rods raised in it for the conveniency of the bees (2);

- ‘ That on these frequent bridges they may stand
- ‘ Secure, and to the summer-sun expand
- ‘ Their wings, if chance the east wind’s headlong blast
- ‘ Has sprinkled, or has plung’d them in the deep.’

Then round the whole apiary ought to be planted little trees of small growth, especially for their wholesomeness: for *cytissus* or shrub-trefoil, as also the cassia, and the pine-trees, and rosemary, are a remedy for them when they are languishing; as also the stalks of wild marjoram and thyme; as also those of violets, or whatever other things the quality of the ground suffers to be usefully planted. Let not only green things of a disagreeable and noisome smell, but also all other things whatsoever, of the same quality, be kept at a distance from them; such as the smell of a crab, when it is burnt in the fire; or the smell of mud and dirt taken out of a marsh. Likewise let hollow rocks, or shrill loud-sounding valleys, which the *Greeks* call *ἠχῆς*, (echoes) be avoided.

(1) *Virg. Georg. lib. iv. 20.*

(2) *Virg. Georg. lib. iv. 27.*

C H A P. VI.

Of such Sorts of Bee-hives as ought to be approved.

THerefore, when their seats are put in order, bee-hives must be fabricated according to the condition and circumstances of the country. For if it be fertile of the cork-tree, without any doubt we may make very useful hives of its bark, because they are neither extremely cold in winter, nor exceeding hot in summer : or, if it abounds in fennel-giants, of these also vases are woven with equal conveniency, as they are like to the nature of bark. If neither of these is ready at hand, they join willows together, and weave them like weavers work : and, if these cannot be had, they must be made of the wood of a tree made hollow, or sawn into boards. Those made of potters earth have the very worst quality of any ; for the summer-heats set them on fire, and they are frozen with the winter-colds.

There are two other kinds of hives remaining, which may either be made of dung, or built of brick : one of which *Celsus* very justly disapproved, because it is very obnoxious to fire ; the other he approved, tho' he did not dissemble its chiefest disadvantage, *viz.* that, if there should be occasion for it, it cannot be removed from one place to another : therefore I do not agree with him who thinks, that, notwithstanding this inconveniency, bee-hives of this kind ought to be had ; for not only is it repugnant to the interest of the owner, that they be such as cannot be removed, when at any time he may have a mind either to sell them, or to furnish other grounds with them (for this conveniency relates only to the advantage of the Master of the family) ; but as to what ought to be done for the advantage, and on the account, of the bees themselves, when they are afflicted either with a distemper, or with the barrenness and penury of the place ; and it may be proper, that they be sent into another quarter ; and they cannot be moved for the foresaid reason ; this is principally to be avoided. Therefore, altho' I reverence the authority of that most learned man, yet, setting aside all ambition, I have not omitted to declare my own opinion : for that which chiefly moves *Celsus*, *viz.* lest the bee-stalls be liable either to fire or thieves, may be avoided by building a brick-work round the hives, that an obstacle may be put to the rapaciousness of the robber, and the hives be protected against the violence of fire : and when it is necessary to move them,

and carry them to another place, it may be done by loosening the joinings of the structure.

C H A P. VII.

After what Manner the Hives must be placed.

BUT because most people think, that this requires too much labour and pains, therefore whatever sort of hives they shall think most proper to be placed, there ought to be a bank of stone extended through the whole apiary, three feet in height, and as many in thickness; and, when it is thus built, it ought to be carefully smoothed with plaister, that there may be no way for lizzards, or serpents, or other noxious animals, to climb up to them. Then upon this bank are placed, either (as *Celsus* directs) domicils made of bricks, or (as we are best pleased with) hives, with brick-work built about them, except behind: or, which is the common practice with all people, who are diligent and careful about these things, there are vases placed all in a row, which are fastened and bound either with small bricks, or with rough stone and mortar, so that each of them is contained within two narrow walls, and the back- and fore-parts are open and free: for sometimes they must be laid open both on that side where the bees go forth, and much more on the back-side, because the swarms are cured from time to time.

But if no walls are built between the hives, nevertheless they must be so placed, that they may be a little distant from each other, lest, when they are viewed and looked into, that which is handled in the cleaning and curing of it, should shake the other, which sticks close to it, and bruise the neighbouring bees, which are afraid of every motion given to their weak wax-works, as of ruin and destruction to them. It is sufficient indeed, that there be three rows of vases built up in height one above the other, because even so the person that cures them cannot very conveniently look into the uppermost.

Let the mouths of the hives, which afford entries to the bees, lean more downward, and be more sloping, than their backs, that the rains may not flow into them; and if, notwithstanding, they chance to get in, that they may not remain there, but run out by the entry: for which reason it is proper, that the hives be fenced and secured with porches above the entries: if otherwise, they must be shadowed

with green boughs daubed over with *Carthaginian* clay, which covering keeps out both the colds, and the rains, and the heats. Nevertheless the burning heat is not so hurtful to this kind of *animals* as the winter is: therefore let there always be a building behind the apiary, which may receive the injury of the north wind, and give a moderate heat to the bee-hives. Likewise the domicils themselves, altho' they be protected by the building, ought to be so placed, as to be directly opposite to the sun-rising in winter, that so the bees may have the benefit of the warmth of the sun when they go out in the morning, and may be thereby the more brisk and active; for cold begets sluggishness: for which reason also the holes, by which they go out and come in, ought to be very strait, that they may admit as little cold as possible: and it is sufficient, that they be so bored, that they may not receive more than one bee at its full growth. So neither the poisonous newt, nor the unlucky and mischievous kind of beetle or butterfly, nor the light-shunning wood-louse, as *Maro* says, plunder the honey-combs through the gate, when it is wider and larger than it ought to be. And it is a very great advantage, that, in proportion to the number of bees in the bee-hive, there be two or three passages made in the same cover, at some distance the one from the other, to guard against the deceit and craft of the lizzard, who, like a watch or keeper of the entry, and gaping for his prey, with open mouth destroys the bees as they go out; and fewer of them perish when they are at liberty to avoid the snares of this pest, that besieges them, by escaping through another passage.

C H A P. VIII.

Of purchasing Bees, and how wild Swarms may be taken.

WHAT we have said may suffice concerning the chusing of pastures, dwelling-houses, and seats for them; which being provided, the next thing we are to do is to seek for swarms: and they come to us either by purchase, or by free gift. But such of them as we shall purchase with money, let us try, and approve them more carefully by the foresaid marks: and let us consider how numerous they are before we buy them, by opening the hives, and looking into them: or, if we cannot conveniently look into them, doubtless we shall mark what we can cast our eyes upon, whether there

there are very many of them standing in the porch of the gate, and a vehement sound be heard of those that are humming within doors; and also (if peradventure they are all silent, and at rest within their dwelling-house) we may make an estimate either of the greatness or smallness of their number, from the sudden noise and murmuring, that will follow upon our having applied our lips to the holes of the entry, and breathed strongly into them.

But we must especially be careful, that they be brought rather from the neighbourhood than from distant regions, because they use to be highly provoked with the strangeness of the climate. But if this cannot be obtained, and we be under the necessity of carrying them long journeys, we must take care, that they be not disturbed and made uneasy by the ruggedness of the roads: and it will be best to carry them upon one's shoulders in the night-time; for in the day-time they must have rest given them; and such liquors as are acceptable to the bees must be poured into the hives, whereby they may be nourished within their inclosures. Then after they are brought home, if the day come upon you sooner than you expected, the hive must neither be opened, nor placed in the bee-stall, except in the evening, that the bees may go out peaceable and quiet in the morning, after they have rested the whole night: and we ought to be upon the watch for the space of three days almost, to observe if they fall out all in a body; which when they do, they are contriving to make their escape: we must presently give orders for such remedies as ought to be made use of, in order to put a stop to them. But such as come into our hands, either in presents, or which we catch by surprize, are not so scrupulously inquired into: although even in that manner, I would not have any in my possession but the very best; seeing both the good and the bad require the same expence, and the same labour of a Keeper: and, which is of very great importance, the base and degenerate, which may bring infamy and reproach upon those that are of a generous kind, must not be intermixed with them; for the produce of honey is less than you expected, when more slothful and idle swarms intervene.

Nevertheless, because sometimes, by reason of the nature and circumstances of the places, we must provide ourselves even with cattle that are but indifferent, (for, to be sure, that which is bad is by no means to be provided) we must use our endeavours to search out the swarms after this manner: Where-ever there are forests proper for making of honey, there is nothing that the bees do sooner, than to make choice of the neighbouring fountains, which they may make

use of. Therefore it is proper to beset them, for the most part, from the second hour of the day, and to watch what numbers of them come to fetch water: for, if there are few of them that fly about, (except there be several heads of rivulets, which make them thinner, when they are separated from one another) they give us to understand, that there is a scarcity of them; by reason of which we will suspect, that the place is not productive of honey. But, if they assemble in great numbers, they give us also greater hopes of catching swarms of them, and they are found out after this manner:

First, we must search, and find out, how far off they are; and for this purpose liquid oker must be prepared, wherewith having tinged some straws, or stalks of herbs, when with the same you touch the backs of the bees that sip in the fountains, if you stay in the same place, you will the more easily know them, when they come back; and if they make no great stay, you may know, that they have their abode in the neighbourhood: but, if they be a long while before they return, you shall make an estimate of the distance of the place according to the time of their delay. But, if you observe, that they return quick, if, with no great difficulty, you can follow them in the way they fly, you shall be easily conducted to the place where the swarm has its seat.

But you must make use of more skill and prudence, with respect to those which shall be seen to go farther off; which is such as this: You must cut off an intire joint of a reed with its own knots, and bore an hole in the side of the cutting; and, having dropped a little honey, or sodden must, into it through the said hole, you must place it hard by the fountain: then, when, at the smell of the sweet liquor, several bees shall have crept into it, you must take up the cutting; and, having put your thumb upon the hole, you must let out only one of them at a time, which, after it has made its escape, shews the Observer the place to which it directs its course; and he, as long as he can hold it out, pursues it as it flies away: then, when he loses sight of the bee, he sends out another; and if it flies towards the same part of the heaven, he continues to pursue in the same path; but if otherwise, he suffers one after another to go out at the open hole: and let him mark the quarter towards which most of them fly, and pursue them, till he be brought to the lurking-hole of the whole swarm.

But, if the swarm be hid in a cave, you may fetch them out with smoak; and, when they have sallied out, you check and stop them with the noise of brass: for, being presently terrified with the sound, they

they will sit down either upon a shrub, or on an higher bough of a tree; and the person that searches for them, and finds them out, puts them up in a vase prepared for that purpose. But if they have taken up their seat in an hollow tree, and if either the branch, which they have seated themselves upon, stands out from the body of the tree, or they are in the very trunk of the tree itself, then, if the middling size of it will suffer it, first the upper-part of it, which is empty of bees, is cut off with a very sharp saw, that it may be done the sooner; then the lower part also, as far as it seems to be inhabited. Then, after it is cut through at both ends, it is covered over with a clean garment; for this also is of very great importance; and, if it has any gaping chinks, you fill them up with clay, and so bring it to the place: and, some small holes in it (as I said already) being left open, it is placed in the same manner as the rest of the bee-hives.

But it is proper, that the person, who makes it his business to search for them, and find them out, make choice of the morning-tide, that he may have the whole day before him to spy out the places where the bees frequent, and go and come. For often, if he has begun to observe them too late, when they have their seat in the neighbourhood, they retire, after they have finished their ordinary task of work, and do not return to the water; whereby it comes to pass, that the person who searches for them is ignorant how far the swarm is distant from the fountain. There are some who, in the beginning of the spring, gather mint, and (as the foresaid poet says)

‘ Bruis’d balm, and honeywort’s ignoble grafs (1);’

And other-like herbs, wherewith this kind of animals is delighted; and so rub the hives throughly with them, that the smell and the juice of them may stick to the vessel; which, when they have cleaned them, they sprinkle again with a little honey, and place them up and down the woods not far from the fountains; and, when they are filled with swarms, they carry them home. But it is not expedient to do this, except in places where there is abundance of bees; for often they who by chance pass by, when they find the empty vessels, carry them away with them: nor is the obtaining one or two full ones of so great account, as to compensate the loss of several empty ones. But in a greater plenty, altho’ many of them are intercepted, yet more is acquired by the bees that are found: and this is the method of catching wild swarms of bees.

(1) *Virg. Georg. iv. 70.*

C H A P. IX.

*After what Manner our own Country-Bees ought to be observed,
and put up into Hives.*

Moreover, there is such another method of retaining the swarms that are bred in our own country. The Keeper, indeed, ought always carefully to go round the bee-hives; for there is no time wherein they do not want his care and management: but they require a more punctual and diligent attendance, when they swarm in the spring, and their new offspring breaks out of their hives, which cannot contain them; and unless the Overseer constantly besieges them, and presently receives and entertains them, the young ones make their escape; because, such is the nature of bees, that every commonalty is generated at the same time with their kings, which, as soon as they have got strength to fly out of their hives, disdain and despise the company, and the society, of their seniors, and much more their government and command: for as mankind, endued with reason, will not allow of any partnership in the regal power, far less will these dumb animals, who are destitute of counsel.

Therefore the new chieftains come forth with their youth, which remaining conglomerated for one or two days in the very porch of their dwelling-house, by their coming out of it they shew, that they desire to have a seat of their own; and if one be presently assigned them by their Keeper, they are satisfied with it, as if it were their native country. But if the Keeper be out of the way, and neglects it, they go to a strange country, as if they were wrongfully cast out of their own. To prevent this, it is the business of a good Overseer to have his eyes upon the hives, during the spring-time, almost till the eighth hour of the day, after which the young swarms do not precipitantly withdraw themselves; and carefully to watch and observe both when they go out, and when they return: for there are some, which, breaking out all of a sudden, steal away without any delay. He may certainly find out, and know beforehand, their intended flight, by applying his ear to each of the hives in the evening: for so it is, that almost for three days before they design to make an eruption, there arises a tumult, and confused noise and murmur among them,

them, as of an army going to march: from which, as *Virgil* says very truly (1),

- ‘ ’Tis easy to foreknow the vulgar’s minds :
- ‘ For such as loit’ring stand, the martial found
- ‘ Of the hoarse brags reproves ; likewise a voice
- ‘ Is heard, which imitates the broken sounds
- ‘ Of trumpets.’

Therefore the hives that do this ought especially to be observed, that whether they shall fall out to battle, (for they often fight amongst themselves, as in civil wars, and with other hives, as with foreign nations) or break out all of a sudden, in order to make their escape, the Keeper may be present, ready prepared for both events. A quarrel, indeed, either of one hive disagreeing among themselves, or of two hives at variance the one with the other, is easily quelled: for, as the same poet says (2),

- ‘ With throwing of small dust the strife is check’d,
- ‘ And ceases’ —

Or with raisin-wine, or mead, or any other such-like liquor sprinkled upon them: for so it is, that the sweetness of these things, being familiar to them, appeases their wrath, when they are in a rage. For the same things also have a wonderful influence to reconcile the kings that are at variance: for often there are more captains of one people, and by the sedition, as it were, of the nobility, the common people is divided into factions, which must not be suffered to happen frequently, because whole nations are consumed by intestine wars. Therefore, if the princes be in friendship and favour with one another, peace continues without bloodshed: but, if you shall observe them very often engaged in a pitched battle, you shall take care to kill the ring-leaders of the seditions; but by the foresaid remedies, their battles and quarrels are composed. And, furthermore, when a great multitude of them sits down all in a lump, upon the next branch of a green leavy little tree, observe whether the whole swarm hangs down from it like one cluster of grapes: and this shall be a sign, either that there is only one king among them; or that, if there be more of them, they are heartily reconciled; which you may suffer to continue so, till they fly back again to their own habitation.

(1) *Virg. Georg. iv. 70.*

(2) *Virg. Georg. iv. 87.*

But if the swarm be divided and distinguished, as it were, into two, or several udders also, you need not doubt but there are several rulers among them, and that they are as yet angry: and you ought to search for their captains in those parts wherein you see the bees are assembled and conglomerated in greatest numbers. Therefore, having anointed your hand with the juice of the fore-mentioned herbs, that is, of balm-gentle or mint, lest they run away when you touch them, you must put in your fingers gently among them; and, having separated the bees from one another, you must search till you find the author of the quarrel, whom you ought to squeeze to death.

C H A P. X.

Of the Form and Make of the King of the Bees.

BUT these kings are a little larger and more oblong than the other bees, with straighter legs, but not so large wings, of a beautiful bright-shining colour, brisk and nimble, and without hair, without a sting, unless any think, that the fuller hair, as it were, which they carry in their belly, is their sting; and even of this itself they make no use to hurt withal. Some of them also are found of a dusky colour, and bristly, whose disposition and temper you may condemn from the habit and make of their body.

- ‘ Two sorts of features, and two diff’rent forms
- ‘ Of bodies, have the kings, which rule this folk :
- ‘ The one with spots of glist’ring gold adorn’d,
- ‘ And with bright-shining scales, and comely face,
- ‘ In splendid state appears (1).’

And this, which is the best of the two, is most approved; for the worst, like fordid spittle, is as ugly and ill-favoured as

- ‘ The traveller, who comes from depths of dust,
- ‘ And from his parched mouth spits moist’ned earth :’

And, as the same poet says,

- ‘ With sloth inglorious drags his spacious paunch.’

(1) *Virg. Georg. iv. 93—95.*

Therefore all the Generals of a baser character

- ‘ Destroy, and let the better Prince bear sway,
- ‘ And reign without a rival in his court.’

Nevertheless he himself must be stript of his wings, when he often makes eruptions with his swarm, and endeavours to run away: for, having pulled off his wings, we shall retain the vagabond General, as it were, with a chain at his foot; who, being deprived of all means of making his escape, will not dare to go without the bounds of his kingdom; for which reason he does not indeed allow the people of his dominion to ramble up and down, and wander at a greater distance from him.

C H A P. XI.

How the Smalness of the Number of the Bees may be remedied.

BUT sometimes the King must be put to death, when the old bee-hive has not a sufficient number of bees; and its want of number must be supplied by some other swarm. Therefore, when, in the beginning of the spring, a numerous young brood has been hatched in that hive, the new King must be squeezed to death, that the multitude may continue to live with their parents without discord. But if the honey-combs shall have produced no progeny at all, you may bring the commonalty of two or three hives together into one; but they must be first sprinkled with sweet liquor: then afterwards you may shut them up, and, having placed meat for them, you may keep them shut up almost for the space of three days, leaving small breathing-places for them, till they accustom themselves to converse familiarly, and live together.

There are some who may rather chuse to put the older King out of the way, which proves very hurtful; because the more aged multitude, if he be put to death, must of necessity, like a number of old senators, obey those that are younger than themselves; and, if there be any of them that obstinately despise the commands of those that are stronger, they are punished, and put to death.

Nevertheless this inconveniency usually befalls a younger swarm, when the King of the antienter bees, which was left by us, fails, and, through old age, becomes incapable to govern, that the family falls into discord from too great licentiousness, as if their Lord were dead. To which a remedy is easily applied: for out of those hives, which have several kings, one General is chosen; and, being translated to those bees which are without any government, is constituted their ruler.

But the paucity of the bees may be remedied with less trouble, in those domicils which labour under any pestilential distemper: for after the havock and destruction of the hive, reduced to a small number, is known, you must examine and view what honey-combs it has: then, afterwards, from the wax which contains the seeds of the young bees, you must cut away that part wherein the offspring of the royal kind is animated: for this is easy to be seen; because, at the very end of the wax-works, there appears, as it were, the nipple of a pap rising higher, and of a wider cavity than the rest of the holes are of wherein the young bees of vulgar note are contained. *Celſus* indeed affirms, that, in the outmost honey-combs, there are transverse pipes or cavities, which contain the young royal progeny. *Hyginus* also, following the authority of the *Greeks*, denies that the Captain-general is formed of a little worm or maggot (as the rest of the bees are); but that in the circumference of the honey-combs there are found straight holes, somewhat larger than those of the *Plebeian* seed, filled, as it were, with a sordid substance of a red colour, out of which the winged King is at first immediately formed.

C H A P. XII.

Of putting up a Swarm of Bees into their Hive, and hindering them from making their Escape.

THere is also that care which is to be taken of a swarm bred in our own bee-stall, if by chance they should grow weary of, and abhor, their native country; and, by making an eruption at the foresaid time, declare their intention of betaking themselves by flight to a more distant habitation. And the hive gives intimation of this, when the bee so avoids the porch of her house, that not one of them

flies back to it, but presently raises herself to a greater height. Let the youth that are making their escape be terrified with brazen timbrels, or rattles, or with the found of earthen vessels, or tiles, which, for the most part, lie every-where: and when, after they are frightened, they either return to their maternal hive, and hang all in a clow in the entry to it, or presently betake themselves to the next green leavy bough; let the Keeper presently rub and anoint all over a new hive, prepared for that purpose, with the foresaid herbs: then having sprinkled it with drops of honey, let him apply it to them; then, gathering the bees together, let him put them into it, either with his hands, or with a bowl: and after all other due care has been taken, and the vase has been carefully adjusted and daubed over, let him suffer it, in the mean while, to remain in the same place, till it draws towards evening; then, in the beginning of the twilight, let him remove it thence, and place it in the row of the other hives. But it is necessary also to have empty houses placed for them in the apiary: for there are some hives which, as soon as they come forth, presently seek for a seat for themselves in the neighbourhood, and take possession of that which they find empty. This is almost a complete account of the care that is necessary both for acquiring and retaining of bees.

C H A P. XIII.

Of Remedies for Bees labouring under any Distemper.

THE next thing is to inquire after remedies for such as labour under any distemper, or are afflicted with the pestilence. The plague rarely proves destructive to bees: nevertheless I do not find that any other thing can be done, than that which we directed with respect to other sorts of cattle, that the hives be removed to some distant place. But, in these, both the causes of their diseases are more easily discerned, and their remedies found out. But their greatest annual distemper is in the beginning of the spring, when the young sprigs of *spurge* blossom, and the elms disclose their seeds; for as with new apples, so they are allured with these primitive flowers; and they feed greedily upon them after their winter hunger, such food being no otherwise hurtful to them but their eating of it to excess, with which having glutted themselves, they die of a looseness, unless

they have speedy relief; for spurge gives a looseness to other animals also, but elms particularly to bees: and this is the reason why bees seldom continue numerous in the regions of *Italy*, which are planted with trees of this kind. Therefore in the beginning of the spring, if you give them medicated food, by the same remedies you may both prevent their being afflicted with such a plague, and they may be cured when they are seized with it.

For as to what *Hyginus*, who followed authors that lived before his time, has delivered, I myself dare not affirm it, not having made the experiment; nevertheless they who have a mind to it may try it. For he directs us about the time of the vernal equinox, when the clemency of the day invites, after the third hour, to bring forth, and expose to the Sun, the bodies of those bees, which, when such a plague has seized them, are found killed in heaps under the honey-combs, and have been laid up in a dry place during the winter, and to cover them over with fig-tree ashes; which being done, he affirms, that, within two hours, being animated with the enlivening steam of the heat, and having resumed their spirit, they will creep into an hive prepared for that purpose, if it be set before them. We rather, that they may not perish, advise that such things, as we shall hereafter prescribe, be given to the hives when they are sick: for either the kernels of the pomegranate bruised, and sprinkled with *Aminean* wine, or raisins of the Sun bruised in a mortar with *ros Syriacus* (1) (*Syrian* fumach) in equal quantity, and well soaked in rough wine, ought to be given them; or, if these by themselves have no effect, all these same things, an equal weight of each, being smoothed, and reduced into one mass, and boiled with *Aminean* wine in an earthen vessel, and afterward cooled, ought to be set before them in wooden troughs.

Some people make a decoction of rosemary and mead, and, after it is turned to a gelly, pour it into hollow tiles, and give it them to sip. Some set ox's or human urine by the hives (as *Hyginus* affirms). Likewise that disease also is very remarkable, which consumes them, and makes them shrink, and become ill-favoured; when some of

(1) *Ros Syriacus* is the *Rhus Græcorum*. *Pliny* says, that the *Romans* had no name for it, *lib. xxiv. cap. II. plura Rhois nomina apud Galenum, modo Syriacum, modo Ponticum, modo Olfoniorum*. *Matthiolus* says, they are all of one sort, and that there was no manner of difference in the trees; that the seed was used for seasoning victuals, and the tanners made use of the leaves and sprigs because of their astringent quality; so that, it seems, they are mistaken, who think, that *Ros Syriacus*, in *Columella* and *Celsus*, is a sort of manna or dew that falls from the air; so that *Rhos*, which is a *Greek* word, must be the true reading. It is of an astringent quality, and prescribed by our author as a remedy for bees, when they are troubled with a looseness.

them frequently carry out of their houses the bodies of those that are dead, and others of them sit dull and languishing within their houses, in sorrowful silence, as in a public mourning. When this happens, food poured into pipes, or troughs made of reeds, is offered them; especially of well-boiled honey, and bruised with a gall, or a dry rose. It is proper also to burn galbanum, that they may be cured with the smell of it; and, when they are wearied, to sustain them with raisins of the Sun, and old sodden must: nevertheless the root of *amellus*, of which the stalk and sprigs are yellowish, and the flower purple-coloured, does exceeding well; it is boiled with *Aminean* wine, and strained, and so the dissolved juice of it is given them.

Hyginus indeed, in the book he wrote of bees, says, that *Aristomachus* was of opinion, that relief ought to be given to such of them as are sick, in this manner: first, That all the vitiated honey-combs be taken away, and fresh food placed anew for them; and then that they be fumigated. He also thinks, that it does good to bees, wasted with old age, to add a new swarm to them, altho' they may be in danger of being consumed by sedition; nevertheless they will be glad when a multitude is joined to them. But, that they may live together in concord, the Kings of those bees, which are translated from another habitation, being, as it were, a foreign people, ought to be removed out of the way. Nevertheless there is no doubt, but that the honey-combs of very numerous swarms, which have young ones already formed in them, ought to be translated, and subjected to those swarms which are fewer in number, that so their houses may be confirmed and established by the adoption, as it were, of a new offspring. But, whenever this shall be done, we must be mindful to put those honey-combs under their care, whose young bees do already break open the places of their abode, and gnaw through the wax which was laid over them as covers to their holes, putting out their heads: for, if we translate the honey-combs while the brood is not come to maturity, the young bees will die, when they cease to be cherished and kept warm.

Oft-times also they die of a disease, which the *Greeks* call *φαγέδαινα* (2): forasmuch as this is an ordinary custom with bees, to make as much wax-work at first as they think they shall be able to fill up; it sometimes comes to pass, that, after their wax-works are finished,

(2) *Φαγέδαινα*. *Pliny, Hist. Nat. lib. xxvi. 11.* tells us, that this word has two significations; either an eating ulcer, or a voracious appetite that cannot be satisfied, which the *Greeks* call *βέλμω*. Probably our author took it in the first sense, to denote some disease incident to bees.

the swarm, wandering at too great a distance, in order to search for honey, is overwhelmed with sudden showers, or whirlwinds, in the woods, and loses the greatest part of the *Plebeians*: whenever this happens, the few that remain are not able to fill up the honey-combs; then those parts of the wax-works which are empty rot, and diseases creeping in by little and little, after the honey is corrupted, the bees themselves perish also. To prevent this, two different people ought to be united, which may be able to fill up the wax-works while they are yet sound; or, if we have not another swarm fit for our purpose, we must, with a very sharp knife, free the honey-combs from the empty parts before they begin to rot: for this also is of very great importance, that the iron tool be not very blunt, lest, being pressed in with greater force, (because it does not easily penetrate) it move the honey-combs out of their places; for, if this be done, the bees forsake their habitation.

There is this cause also of their destruction, that sometimes for several years following very many flowers come up, and the bees are more intent upon making honey than upon brooding. Therefore some who have less knowledge in these things, are delighted with a great produce, not knowing that the bees are upon the very brink of destruction; because, being wearied with too much labour, very many of them perish; and their numbers not being increased with new supplies of youth, at last the rest die also. Therefore, if such a spring should happen, that both the meadows and the corn-lands should abound in flowers, it will be of very great advantage, that all the passages of the hives, through which the bees go out, be shut up, leaving small holes, through which they may not be able to go out, that so being withdrawn from their business of making honey, because they have no hopes of filling up all their wax-works with liquors, they may fill them up with a young breed. And these are ordinarily the remedies of swarms of bees that labour under any distemper.

C H A P. XIV.

Of that which the Bees do at all Times, and what the Person that has the Care of them ought to do.

HERE follows next the care that is to be taken of them through the whole year, as the same *Hyginus* has described it, in a very easy and agreeable manner. From the first equinox, which happens about the twenty-fourth of *March* (1), in the eighth part of *Aries*, to the rising of the *Pleiades* (2), there are reckoned forty-eight days of spring-time. He says, that the bees ought to be cured, for the first time, by opening their hives, that all the filth and nastiness, which has been gathered during the winter, may be taken out of them; and that after the spiders, which spoil the honey-combs, are pulled out, the smoak, made by kindling of ox's dung, may be conveyed into them; for this smoak, from a certain cognation or sameness of parentage and extraction as it were, is very suitable and proper for bees. The little worms also, which are called *moths*, and the butterflies, must be killed: which pests, adhering for the most part to the honey-combs, fall down from them, if you mix ox's marrow with the dung, and, having set them on fire, convey their burning smell to them: by this management, during the time which we have mentioned, the swarms will be strengthened, and they will, with more courage and resolution, apply themselves to their business, and carry on their works.

(1) Although *Columella* was very well acquainted with the exact times of the rising and setting of the stars, and of the equinoxes and solstices, &c. yet, as he himself declares in this chapter, he rather chose to follow the commonly received opinions, which Husbandmen had been long acquainted, than to disturb them with new computations: so that no person need be offended, when they hear him speaking of the Sun's entering into such and such signs, and of the equinoxes and solstices falling upon such and such days, when they really do not happen, since he only accommodated himself to the common way of reckoning at the time he wrote. Thus, in this chapter he says, that the first equinox, that is, the *vernal*, falls about the 24th of *March*; whereas, according to the computations of the best astronomers, it happens about the 10th day of the said month, old stile.

(2) *Pleiades*. The cluster of seven small stars, in the neck of the Bull, are usually thus called. Some say they are thus called, because formerly they thought, that, when they began to rise, they might safely go to sea: others assign different reasons of their name, which do not seem to be well founded. They were by the *Romans* called *vergilia*, because they rise in the spring.

But

But he who has the charge of them, and who nourishes the bees, must be exceeding careful, when he is going to handle the hives, that the day before he be chaste, and pure from all venereal affairs; and, that he neither come to them when he is drunk, nor till such time as he has washed himself; and that he abstain almost from all eatables of a strong disagreeable smell, such as salt-fish or flesh, and all manner of pickle or gravy belonging to them: as also from garlick, onions, and other such-like things, of stinking, acrimonious qualities. On the forty-eighth day from the vernal equinox, when the *Pleiades* arise about the eighth day of *May*, the swarms begin to increase, both in strength and number: but, on the same days also, such swarms as have few and sick bees utterly perish; and, at the same time, are generated, in the extremities of the honey-combs, young ones of a larger size than those of other bees are; and some think, that they are Kings. But some of the *Greeks* call them οἰστροί (3), because they vex and molest the swarms, and do not suffer them to rest: therefore they command them to be killed.

From the rising of the *Pleiades* to the solstice, which falls in the latter end of the month of *June*, about the eighth part of *Cancer* (4), for the most part, the hives begin to swarm; at which time they ought to be watched very narrowly, lest the young offspring make their escape: and then, from the time that the solstice is past, till the rising of the *Dog-star* (5), which are almost thirty days, the combs and the honey-combs are cut down together. But, after what manner these ought to be taken away, we shall afterwards direct, when we come to give directions concerning the making of honey.

But *Democritus*, and *Mago*, and *Virgil* also, have reported, that bees may, at this same time, be generated or produced from a slain bullock. *Mago* indeed affirms, that the same may be also done from the bellies of oxen; which method of production I think it needless to pro-

(3) Οἰστροί, *æstrus*, a gad-bee, or a horse- or ox-fly, by *Homer* called αἰολοὶ οἰστροί, perhaps from its spots. *Columella* does not mean, that these larger bees, which are generated in the extremities of the honey-combs, are properly gad-bees; but that they were so called, because of their mischievous qualities of tormenting the bees, as the gad-bees do oxen.

(4) The Sun enters the tropic of *Cancer* about the 11th of *June*, being then arrived at his utmost northern declination, making the longest day, and the shortest night, in north latitude; and then is the summer solstice, when the Sun appears to stop his course northward, and returns back again towards the equator.

(5) *Canicula*, the *Dog-star*, is a bright star of the first magnitude, in the mouth of *Canis major*; which, as some say, rising with the Sun about the 24th of *July*, and setting about the 28th of *August*, gives occasion to that time, which is usually very hot and dry, to be called the *Canicular*, or *Dog-days*. This star was by the *Greeks* called *Sirius*, because of its scorching and drying influence.

secute more carefully, being of the same mind with *Celsus*, who says very prudently, that this sort of cattle is never lost with so great a destruction, as to make it necessary to seek to recover them in such a manner. But during this time, and always till the autumnal equinox, the hives must be opened, and fumigated, every tenth day; which, tho' it be troublesome to the hives, yet it is agreed, that it is exceeding wholesome. Then you must cool and refresh the bees after they have been fumigated, and are all in an heat, by sprinkling the empty parts of the hives, and pouring the coldest new-drawn water into them: then, if there be any thing that cannot be washed away, it must be cleaned with the pinions of an eagle, or of any other huge fowl also, which have a stiffness in them.

Moreover you must take care, that, if any moths appear, they be swept out of the hives; and that the butterflies be killed, which commonly, abiding among the hives, are destructive to the bees: for they both gnaw into and consume the wax, and with their dung breed worms, which we call hive-moths. Therefore, at the time when the mallows blossom, when there is the greatest multitude of these butterflies, if an high brazen vessel, with a narrow neck like the mile-column (6), be placed in the evening among the bee-hives, and some light put down to the bottom of it, the butterflies gather together to it from all places; and, while they flutter about the small flame, they are scorched, because they can neither fly easily upward out of the narrow place, nor, on the other hand, can they retire at a greater distance from the fire, since they are surrounded by the sides of the brazen vessel: therefore they are consumed by the burning heat that is near them. Almost after the fiftieth day from the rising of the Dog-star, *Arcturus* riseth (7), when the bees make their honeys from the dewy flowers of thyme, and *Italian* and *Greek* savory; and this honey, which is of the best sort, appears in all its lustre and beauty at the autumnal equinox, which is before the first of *October*, when the Sun is just arrived at the eighth part of *Libra*. But great care must be taken, between the rising of the Dog-star, and that of

(6) *Simile miliario*. It is manifest from *Palladius*, *lib. v. tit. 8.* that this vessel was high and narrow, such as they used in baths for warming water; but what the author means by directing it to be made *simile miliario*, is not so easy to determine. It is probable he means, that it should be shaped like the stones which marked the miles, which were long and narrow towards the top, or like the column which was erected in the *forum*, to mark the place from whence they began to count their miles: other reasons are assigned, which are not satisfying.

(7) *Arcturus*, a fixed star of the first magnitude, placed in the skirt, or, as others express it, between the knees, of *Arctophylax*, a constellation in the northern hemisphere, otherwise called *Bootes*.

Arcturus, that the bees be not surpris'd and intercepted by the fury and violence of wasps, which, for the most part, lie in wait before the doors of the hives, and watch for their coming out.

After the rising of *Arcturus*, about the time of the equinox, when the Sun is in *Libra*, (as I said) is the second taking out of the honey-combs. Then from the time of the equinox, which falls about the twenty-fourth of September, to the setting of the *Pleiades*, for the space of forty days, the bees lay up for their winter provision the honeys they have gathered from tamarisk-flowers, and shrubs which grow in thickets and woods; from which nothing at all must be taken away, lest, being disheartened by repeated injuries, they should, through despair, as it were, of retrieving their affairs, run away, and forfake all.

From the setting of the *Pleiades* to the winter solstice, which happens almost about the twenty-third of *December*, in the eighth part of *Capricorn* (8), the hives then make use of the honey which they laid up in store, and with it they are nourished and supported till the rising of *Arcturus*. Nor am I ignorant of *Hipparchus's* computation, which teaches, that the solstices and the equinoxes do not happen in the eighth, but in the first parts of the signs. But, in this rural discipline, I now follow the calendars of *Eudoxus* and *Meton* (9), and those of the antient Astronomers, which are adapted to the public sacrifices; because Husbandmen are both better acquainted with that old opinion which has been commonly entertained: nor, yet, is the niceness and exactness of *Hipparchus* necessary, to the grosser apprehensions, and scanty learning, of Husbandmen. Therefore, at the first setting of the *Pleiades*, it will be proper to open the hives presently, and to cleanse them from all manner of filth and uncleanness, and to cure them the more carefully, because in the winter-time it is not expedient to move, or lay open, the vases: for which reason, while there is yet any part of the autumn remaining, after you have cleansed their domicils in a very bright sun-shining day, the covers must be put in the inside, close to the honey-combs, all the empty part of their seat being excluded, that so, their cages being reduced to a narrower compass, they may the more easily gather heat during the

(8) The Sun makes his entrance into *Capricorn* the 11th of *December*, and then is the winter solstice, when he is got farthest from the equator; and, in northern regions, the nights are at the longest, and the days at the shortest.

(9) *Eudoxus* and *Meton*, both mentioned in the preface to the first book; and *Hipparchus*, in the first chapter of the first book: this last was of *Nicea* in *Bithynia*, according to *Suidas*, and the most renowned Astronomer of his age: he flourished about 120 years before the Christian æra.

winter. And this must always be done, even in those hives, which, by reason of the fewness of the common people, are but thinly inhabited.

Moreover, whatever chinks or holes there are in them, we must dawb them on the outside with clay and ox's dung mixed together, and leave nothing but the entries for them to go out and come in by. And, altho' the vases be protected by a portico, nevertheless we must cover them over with straw and leaves put close together, and secure them from cold and storms, as much as the thing will bear. Some kill fowls, and, after they have taken out their entrails, shut them up in the hives; and they afford a gentle heat to the bees, which lurk in their feathers in the winter-time: as also, if their provisions are spent, they feed commodiously upon them when they are hungry, and leave nothing but their bones. But, if the honey-combs are sufficient for them, the fowls remain intire; nor do they offend the bees with their smell, altho' they love cleanliness exceedingly. Nevertheless we think it better, in the winter-time, when they are in distress with hunger, to give them, in little troughs at the very entry of their hives, either dry figs bruised and moistened in water, or rob of grapes, (*must boiled in to a third part*) or raisin wine; with which liquors you must moisten and imbue clean wool, that the bees, standing upon it, may draw up the juice, as it were, through a siphon. It will also be very proper to give them raisins of the sun, sprinkled a little with water, after we have broken them. And with these sorts of food they must be supported, not only in winter, but also at such times (as I said before) as the spurge, and also the elm-trees, blossom.

After the shortest day of winter is past, they consume almost, in forty days, all the honey that was laid up in store for them (unless a more liberal allowance was left them by their Overseer); and oft-times also, after they have emptied their wax-works, they lie in the honey-combs fasting, and benumbed, without motion, in the manner of serpents, till the rising of *Arcturus*, which is about the thirteenth of *February*, and by their rest preserve their life: nevertheless, that they may not lose it, if a longer famine assaults them, it is best to put into the hives, through the entrance of the porch, sweet juices or gellies in tubes, and so sustain them during the scarcity of the times, till the rising of *Arcturus*, and the coming of the swallow, promise that the ensuing weather will be more favourable. Therefore after that time, when the cheerfulness of the day permits, they have the courage to go out to the pastures: for after the vernal Equinox,

without any delay, they wander up and down every-where, and pluck the flowers that are fit for the production of their young ones, and carry them home to their houses.

These things *Hyginus* commands to be most carefully observed through all the seasons of the year : but *Celsus* adds to them the following things, that few places have the happiness of being in a condition to afford one sort of food for bees in winter, and another in summer ; therefore he denies, that, in those places where flowers, that are proper for them, fail, after the spring of the year is past, the hives ought to be left without moving them ; but that, after the vernal pastures are consumed, they ought to be translated into those places which can nourish the bees more liberally with the lateward flowers of thyme, bastard marjoram, and *Greek* savory, which, he says, is practised both in the regions of *Achaia*, where they are translated into the *Attican* pastures, and in *Eubæa* (10), and the *Cyclad* islands, where they are transported out of the other islands into *Scyrus*, as also in *Sicily*, when they are brought to *Hybla* out of other parts of the country. The same author says, that the wax-works are made of flowers, and the honey of the morning dew, which assumes so much the better quality, the sweeter the materials are, of which the wax is compounded. But he directs us to look carefully into the hives, before they are removed from one place to another ; and to take out the honey-combs that are old, and full of moths, and ready to drop down ; and to reserve only a few of them, and of the best sort, that so as many of them as can be, may be made, at the same time, of the best flowers ; and that such vases, as any one has a mind to remove, be carried only in the night-time, and without shaking them.

C H A P. XV.

Of the Making of Honey, and of the Time when the Hives ought to be castrated.

PResently after the spring is past, follows, as I said, the time for gathering in and making the honey ; for which the labour of the whole year is employed. We understand, that the honey is ripe

(10) *Eubæa*, now called by many writers *Negroponte*, an island upon the coast of *Achaia* ; and *Scyros*, an island in the *Ægean* sea, about 28 miles distant from it ; and the *Cyclad* islands, in the same sea, have been already mentioned.

for gathering, when we observe the bees expelling and driving away the drones, which is a kind of animal of a larger growth, and very like a bee, and, as *Virgil* says, *an idle sluggish cattle*, and, that sits constantly by the honey-combs, without any industry: for they do not gather any provisions themselves, and consume those that are brought in by others. Nevertheless these drones seem to contribute something towards the procreation of the young generation, they sitting upon those seeds, of which the bees are formed: therefore they are admitted into greater familiarity, in order to hatch, cherish, and educate the new offspring; but, after the young bees are hatched, they are thrust out of the houses by force, and, as the same poet says, *driven from the mangers*. Some order them to be intirely exterminated; but I am of *Mago's* opinion, and think that this ought not to be done, but that bounds ought to be set to cruelty; for the whole race ought not to be utterly destroyed, lest the bees be infected with sloth and idleness, which, when the drones consume a part of their provisions, become more nimble and active in repairing their losses: nor, on the other hand, must we suffer a multitude of robbers to grow strong, and form themselves into a body, lest they pillage and destroy all the wealth and riches belonging to others. Therefore, when you see the bees and the drones frequently quarrelling with one another, you must open the hives, and look into them, that if the honey-combs be half-full, they may be deferred, and let alone, for some time; or, if they are already full of liquor, and all daubed over with wax, as it were, with covers placed upon them, they may be cut down.

But we must seize upon almost the morning of the day for castrating the hives; for, it is not proper that the bees, which are already exasperated, should be provoked in the middle of the heat of the day. Two iron-tools are necessary for this use, made of the measure of one foot and an half, or a little larger; of which, let one be an oblong knife, with a broad edge on both sides, having a crooked scraper or bill for paring on one side; let the other be plain, and very sharp on the forepart; that by this the honey-combs may be the better cut down, and by that other scraped off; and whatever filth falls down from them, may be drawn towards you: but where the bee-hive has no open porch on the backside, we must convey into it smoak made with galbanum, or dry dung. Moreover, these you must put up into an earthen vessel, mixed with live-coals; and this vessel is made with handles, and shaped like a strait narrow pot, so as one part of it may be sharper, or draw towards a point, by which the
smoak

smoak may issue out at a small hole; the other part broader, and with a wide mouth, by which the coals may be blown. When such a pot is applied to the hive, by blowing into it, the smoak is conveyed to the bees, which, not being able to endure the burning smell, presently betake themselves to the forepart of their domicil, and sometimes retire without the porch.

And, when you have made way for looking more freely into the hives, if there be two swarms of bees, for the most part there are also two kinds of honey-combs found in them: for, even when they live in concord together, each commonalty observes its own custom and manner of shaping and fashioning their wax-works. But all honey-combs do always hang down from the roofs of the hives, and adhering a very little to the sides, so as not to touch the bottom, because that affords a way for the swarms to go and come by. But the figure of the wax-works is such as the shape or make of the hive is; for both the square and round spaces, and also such as are long, give their own shape, as if they were certain moulds, to the honey-combs; therefore the honey-combs are not always found of the same figure. But, whatever form they may be of, let them not be all taken out: for, at the gathering of the first crop, while the fields do yet abound in pasture, the fifth part of them must be left; and, at the latter crop, when now we are under apprehensions of the winter, the third part must be left. And, yet, this is not a certain measure in all countries; because due regard must be had for the bees, and provision left for them, in proportion to the multitude of flowers, and the plenty of food, they have. But, if the dependent wax-works run out in length, the honey-combs must be cut with that iron-tool, which is like to a knife; and then they must be received by putting your two arms under them, and so brought out: but, if they run cross-wise, and stick to the roofs of the hives, then there is occasion for the iron-tool, made with the paring-knife on the side of it, that, thrusting it into them, they may be cut down with the forepart of the tool turned towards you. But such of them as are old, or spoiled, ought to be taken out, and those that are the soundest, and full of honey, left; and, finally, if there be any of them that contain young bees, that they be reserved, in order to form a new swarm.

Then your whole store of honey-combs must be brought together into that place, wherein you resolve to make the honey; and the holes of the walls and windows must be carefully daubed over, and filled up, that there may be no place for the bees to pass through, which eagerly search after their lost goods, as it were, and, having

traced them, and found them out, consume them: therefore a smoak must be made, of the same materials, in the entrance of the place also, which may repell such of them as attempt to come in. Then, if any of the hives, that are castrated, shall have honey-combs that lie cross the entry, they must be turned, that so the hinder-parts may, by turns, becomes the porches or entries: for so the next time they are castrated, the old honey-combs shall rather be taken away than the new, and the wax-works will be renewed, which by how much the older, by so much the worse they are. But if peradventure the hives are surrounded, and inclosed with a wall, and are immoveable, we must take care, that they be castrated at one time in the hinder-part, and in the forepart at another time: and this ought to be done before the fifth hour of the day, and then repeated, either after the ninth hour, or the morning following.

But how many honey-combs soever are cut down, it is proper to make the honey the same day, while they are warm. A willow basket, or a sack woven pretty thin with osiers, like an inverted cone, such as that wherewith wine is racked or strained, is hung up in a dark place; then the honey-combs are gathered into it one by one, as they are taken out. But care must be taken, that those parts of their wax-works, which either have young bees, or red fordid matter in them, be separated from them: for they are of a bad taste, and spoil the honey with their juice. Then, when the strained honey has flowed into a tub set under it to receive it, it is transferred into earthen vessels, which are left open for a few days, till the new honey leave off fermenting; ~~and it must be frequently scummed with a ladle or scummer.~~ Then presently afterwards the fragments of honey-combs, which have remained in the sack, are dressed and handled afresh, and the juice squeezed out of them; and the honey that flows from them is of a secondary sort, and, by persons that are more exact and careful in their affairs, is laid up apart by itself, lest that which is of the most exquisite taste, by adding this to it, should become worse.

C H A P. XVI.

Of the Making of Wax.

THE crop of wax, tho' it amounts to very little money, is nevertheless not to be neglected, inasmuch as the use of it is necessary for many things. The remains of the honey-combs, when
the

the honey is squeezed out of them, after they are carefully washed with sweet water, are thrown all together into a brazen vessel: then water being put to them, they are melted upon a good fire: and, when this is done, the wax is poured out, and strained through straw or rushes, and then boiled over-again in the same manner as before, and poured out into such moulds as every one thinks most proper, water being first put into them: and it is easy to take it out of the moulds after it is congealed and hardened, because the moisture that is under it does not suffer it to stick to the moulds. But now having finished my dissertation upon cattle, that are kept in or about the manor-house, and the several ways of pasturing the same, that part of Husbandry, which yet remains to be treated of, *viz. the culture of gardens*, I shall next put into verse, as both you, *Publius Silvinus*, and our friend *Gallio*, have been pleased to require.

L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

B O O K T E N T H.

Of the Culture of Gardens.

The P R E F A C E.

REceive, O *Silvinus*, the remaining small payment of your usury, which you demanded, and I engaged to pay you: for, with the nine former books I payed what I owed, except this part only, which I now fully pay. There remains, therefore, the culture of gardens, notably neglected formerly by antient Husbandmen, but now in very great request. Tho' it is true, indeed, that, among the antients, there was greater parsimony and frugality, nevertheless the poor were wont to fare better, and to be frequently admitted to public feasts; the highest and the lowest sustaining themselves with, and living upon, plenty of milk, venison, and flesh of tame cattle also, just in the same manner as they did upon corn and water: but afterwards, when the following age, and especially our own, did set a mighty value upon dainty dishes, invented for promoting lust and wantonness, and suppers were estimated, not by mens natural wants and necessities, but by the value of their estates, and yearly income, *Plebeian* poverty was removed from the more costly and delicate viands, and forced to betake itself to common and ordinary fare.

Wherefore we must be more careful and diligent, than our ancestors were, in delivering precepts and directions for the cultivation of gardens, because the fruit of them is now more in use; and I would have subjoined them in prose to the preceding books, as I had resolved, unless your frequent and earnest demand had overcome my pur-

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pose,

pose, and prevailed with me to fill up, with poetical numbers, those parts of the *Georgic* poem, which were omitted, and which even *Virgil* himself intimated, that he left to be treated of by those that should come after him. And, indeed, we would not have dared to attempt that any otherwise, but at the desire and command of that poet, who is worthy of the greatest veneration and honour, by whose divine instigation and authority, as it were, (slowly without doubt, because of the difficulty of the work, nevertheless not without hope of prosperous success) we have undertaken a very slender and lean subject, and almost intirely destitute of a body, which is so very small and inconsiderable, that, in the consummation indeed of the whole work, it may be reckoned and considered as a particle of our labour; but by itself, and confined, as it were, within its own bounds, it can by no means be put into such a dress, as to make any graceful appearance. For altho' it has many members, as it were, of which we may be able to say something; nevertheless they are so very small, that (as the *Greeks* say) *of the incomprehensible smallness of sand a rope cannot be made* (1). Wherefore, whatever it is that our elucubrations have produced upon this subject, it is so far from laying claim to any commendations peculiar to itself, that it will be very well satisfied, if it be no disgrace to the things which I have formerly written and published. But now let us leave off prefacing.

THEE likewise, O *Silvinus*, I will teach
 The culture of thy gardens, and those things
 Which *Virgil* (2), in too narrow bounds confin'd,
 Unfinish'd left, by us to be supply'd;
 5 When of the fruitful fields, the plenteous crops,
 The gifts of *Bacchus*, and celestial honey,
 And, O great *Pales*! thee, likewise, he sung:
 First, to thy num'rous garden (3) let fat land

(1) This *Greek* proverb, ἐξ ἄμμου σχοινίον πλέκεις, you plait a rope of sand, is applicable to such as undertake impossibilities.

(2) *Virgil*, in his 4th book of *Georgics*, l. 146. says, that, if he had had time, he would have sung also of gardening, of which he has given a most beautiful sketch, and touched a little upon the pleasures and advantages of it in his description of the *Corycian* old man; which shews how lovely a performance it would have been, if he had pursued it; but he left it to the care of future poets. *Columella*, his great admirer, in obedience to him, as he says, attempted it. How far he has succeeded, or whether, in any part of his performance, he has come up to the beauty of *Virgil's* short sketch, all they who understand the original will judge for themselves.

(3) *Numeroso hortus*. This epithet is given to the garden, because of the vast variety of plants, shrubs, &c. in it; or it may signify large and spacious, with a vast many beds and borders.

- Afford a feat, whose loose and crumbling glebe,
 10 And open surface, to the piercing spade.
 Yields freely ; which, when digg'd, resembles sand.
 Fit is the nature of that soil, which grafs
 In great abundance brings ; or moist'ned well,
 Dwarf-elder's ruddy berries, bright like gold,
 15 Produces : for I neither love the dry,
 Nor that where water stagnates, and doth form
 A marsh ; and which, of the complaining frog,
 The curses and reproaches still endures (4).
 That soil is also good, which leavy elms
 20 Spontaneous educates, and is made glad
 With branches of wild vines, or rough with woods
 Of wild pear-tree (5), or with the stony fruits
 Of plum-trees overspread, or strew'd with fruits
 Which uncommanded apple-trees produce ;
 25 But bears no hellebores, nor galbanum (6),
 With noxious juice ; nor yew-tree doth endure,
 Nor pungent poisons sweats, altho' it may
 The mournful hemlock (7), and the mandrake's flow'rs (8),
 Produce, whose root shews half a man, whose juice
 30 With madness strikes ; it may likewise bring forth
 The fennel-giant (9), which to school-boys hands
 No pity shews ; and brambles, to the legs

(4) The poet here alludes to the fable of *Latona*, who transformed the *boors* into frogs, because they refused to let her drink out of a pond of clear water, which they had cleared of weeds ; of which we have an account in *Ovid. Metamorph. fab. 9.*

(5) *Abrados. Pyri silvestris. Columella* retains the Greek name and termination. *Dioscorides* says, *lib. i.* that it is a kind of wild pear-tree, whose fruit ripens very late ; and that it has a more styptic quality than the pear-tree.

(6) *Galbanum*, a gum that issues out of a species of fennel-giant. *Pliny* says, that the mountain *Amanus*. in *Syria* yields it. It is the juice of a ferulaceous tree or plant, and from the juice dropping out of it the tree is called *stagonitis*.

(7) *Cicuta*, hemlock. *Pliny*, in the book and chapter above-mentioned, says it was *publica Atheniensium invisa pœna* ; they put their state-prisoners and other criminals frequently to death with it ; for which reason, I suppose, our poet calls it *mæsta cicuta*.

(8) *Mandragora*, a mandrake. *Plin. Nat. Hist. lib. xxv. cap. 13.* gives a large description of it ; and altho' he mentions some of its hurtful effects, yet I don't observe, that he mentions its causing madness ; neither, if I mistake not, does he take any notice, in describing the roots of it, of their resembling the lower parts of the human body. The ingenious Mr. *Miller* says, that all this is fable ; tho' *Pliny* takes notice of the danger of taking up its roots. Perhaps it may be either a different herb from what we call by that name ; or, in very hot countries, it may have different qualities from what it has here.

(9) *Ferula*, fennel-giant : the rods of it were the instruments of school-discipline.

Unkind, or Christ's-thorn with sharp prickles arm'd.
 Likewise let near this ground some rivers flow,
 35 Whose streams the hardy gard'ner may attract
 To help to quench his garden's constant thirst.
 Or let some gentle spring into a well
 Distil, not sunk too deep; lest too much toil.
 The drawer's panting sides should over-stretch.
 40 And let such ground with walls, or prickly hedge,
 Thick-set, surrounded be, and well secur'd;
 Not pervious to the cattle, nor the thief.
 Search not for gifts of the *Dædalian* hand (10),
 Nor those of *Polyclete* (11); nor statues carv'd
 45 By *Phradmon's* curious art, or *Agelad'*.
 But chuse the trunk of some huge antient tree;
 Rough-hue it, use no art; *Priapus* (12) make
 With frightful members, of enormous size;
 Him, in the middle of thy garden, place,
 50 And to him, as its guardian, homage pay,
 That with his monstrous parts he may deter
 The plund'ring boy; and with his threat'ning scythe,
 The robber from intended rapine keep.
 Come now, *Pierian Muses* (13), and spin out,

In

(10) *Dædalus*, a famous statuary of *Sicyon*; he lived in the days of *Minos*: he was the inventor of many useful things in life, as the saw, the ax, the plumber, the auger, glue, cement, sails for ships, &c. *Plin. Nat. Hist. lib. vii. cap. 56.* Some say he was an *Athenian*, and the first statuary who separated the legs of statues, they being united and joined before his time. All curious pieces of workmanship are from him called *Dædalian*; so that our author only means curious statues, by whatever hand they were made.

(11) *Polycletus*, *Phradmon*, *Agelades*, three famous statuaries, who flourished about the 87th olympiad. *Polycletus* was scholar to *Agelades*, who, by *Pausanias*, is called. Πολύκλειτος both he and *Pliny* make frequent mention of them, and of many of their pieces.

(12) The antients put their gardens under the protection of *Priapus*, whom they called the son of *Dionysus* and *Venus*. He is said to have been of *Lampsacus* in the *Helle-spont*; so *Virgil* calls him *Priapus Hellepontiacus*: *Columella* calls him *Ithyphallus, ob pudendi erectam formam*. It seems the antients set him over their gardens as a symbol of fruitfulness. Both *Virgil*, *Horace*, *Ovid*, and *Tibullus*, make mention of him as the keeper of gardens, or a scarecrow to thieves and fowls.

(13) Our author, as all other poets, antient and modern, invokes and implores the assistance of the *Muses*, a set of fictitious deities, which were called *Pierides* or *Pierie*, from mount *Pierus* in *Thessaly*, as *Festus* and *Cicero* say. Some affirm, that *Pieria* was a mountain in *Thracia*, where *Orpheus* lived: others, that it was a mountain in *Macedonia*, where the *Muses* were born, which mountain, they say, touched upon *Thracia*; and some say, that the foundation of this fiction was, because *Orpheus*, the first wise man, poet, and divine among the *Greeks*, went and made his abode in these places. *Ovid* and others give

- 55 In slender verve, the culture, and the times,
 Of sowing every seed; the *care*, when sown;
 Beneath what star fair flow'rs first shew their heads,
 And *Pæstum's* rose-beds (14) first begin to bud;
 And *Bacchus's* genuine plants, or other trees,
- 60 Mild by ingraftment on a borrow'd stock,
 Bend with the burden of adopted fruits.
 Now, when the thirsty *Dog-star* shall have drank
 Full draughts of *Ocean's* streams; and when his orb
 With equal hours bright *Titan* shall have pois'd,
- 65 And *Autumn*, glutted with all sorts of fruit,
 Shaking his hoary head, with apples deck'd,
 And all his garments wet and stain'd with must,
 Shall from ripe grapes the foaming liquor squeeze;
 Then let the lovely ground, with strength of spades
- 70 Well arm'd with iron, be turned up-side-down,
 If delv'd before, and moist'ned with the rains.
 But if, with burning heat, and sky serene,
 Made hard, it without culture still remains,
 Then let commanded brooks, and cooling springs,
- 75 In sloping paths descend; that so the earth
 May drink, and therewith fill her gaping mouth.
 But if no moisture from the clouds your fields
 Derive, nor in themselves the same contain;
 If nature of the place, or heav'n itself,
- 80 With-holds the show'rs; then wait till winter come,
 Till in the sea's green waves, the sparkling *Crown*,
 The gift of *Bacchus* to his *Gnosian* bride (15),
 By turning of the world's poles be hid,

give us different reasons why they were so called: if any have a mind to know their several names and offices, they may consult the *Greek* epigrams, and some poems attributed to *Virgil*; where they may satisfy themselves.

(14) *Pæstum*, a town of *Lucania* in the kingdom of *Naples*, between *Salerno* and *Velia*. *Pliny* says, that the *Greeks* called it *Posidonia*, which is the reason why *Velleius* calls it *Neptunia*: the gulph near it was called *Sinus Pæstinus*, now called the *Gulph of Salerno*. This place was very much celebrated for its roses, which flourished twice a year, in *May* and *September*. *Virgil* commends *biferi rosaria Pæsti*.

(15) These lines allude to the story of *Bacchus's* marrying *Ariadne*, daughter of *Minos* king of *Crete*, at *Cnossus* in *Crete*; and his making her a present of a crown, which afterwards, to preserve her memory, he translated into the heavens, of which was formed a constellation, called *Corona borealis*, or *Corona Cnossia* or *Gnosia*, or *Ariadne's Corona*, &c.

And *Atlas*' loving daughters (16), struck with fear,
 85 Shun of the rising sun the adverse rays.
 And now when *Phæbus* (17) in some parts of heav'n
 Does not confide, nor think himself secure,
 But from the *Scorpion*'s claws and deadly sting
 Flees trembling, and on *Crotus*' horse-like back
 90 Makes haste the threat'ning danger to escape,
 Ye vulgar, unacquainted with your race (18),
 Her spare not, whom, deceiv'd, you falsely call
 Your mother; she, who of *Promethean* clay
 Was form'd, is mother of a diff'rent race,
 95 Not yours: another parent brought us forth,
 When unrelenting *Neptune* with the sea
 O'erwhelm'd the earth, and shook the lowest pit
 Of hell, and *Lethe*'s streams with terror struck.
 Then, first, th' infernal hosts, the *Stygian* king
 100 Saw, with his trembling joints, betray his fear,
 When, with the Ocean's weight, departed souls
 Oppress'd, complain'd, and an uproar made.
 Us, when this globe of mortals was bereft,
 A fruitful hand did form; *Us* ragged rocks,
 105 Torn by *Deucalion*'s hands from lofty hills,
 Brought forth. But lo! an harder toil us calls,

(16) *Atlantides* were the daughters of *Atlas*, a certain King of *Mauritania*, as some say, who was a great astronomer; they were fifteen in number, and, as the poet tells us, were translated into the heavens, and converted into stars; and they fancy, that some of them are the cluster of small stars in the neck of the *Bull*, called *Pleiades*, which have been already mentioned; and that others of them are the five stars in the *Bull's* face, by the *Greeks* called *Hyades*, because they imagined they were the cause of rain: these, by the *Romans*, were called *Suculæ*, from a wrong interpretation of the *Greek* name, they being, at that time, it seems, very little acquainted either with the *Greek* learning or language.

(17) Here *Columella* describes, poetically enough, the Sun's retiring from the sign *Scorpio* to that of *Sagittarius*, in the month of *November*; and, because of the shortening of the day, he is said to fly away upon the back of *Crotus*, who, as the mythologists say, was transformed into this constellation at the prayer of the *Muses*, with whom he had lived familiarly, being son to their nurse *Euphemes*. They paint him half a man, and half an horse; and put a bow and arrow into his hands, he being an excellent hunter and archer.

(18) Here the poet addresses himself to Husbandmen; and tells them, that they need not be afraid to dig the earth, from a vain apprehension of tearing out their mother's bowels; for, says he, you are not of that race of mankind which *Prometheus* formed of clay; these all perished by *Deucalion*'s flood; you are of another race of mortals; you were not formed out of the earth, but made of stones, which *Deucalion* and *Pyrrha* threw behind their back.

- A never-ceasing labour: rouse, awake,
 Ye drowsy sluggards, rise, drive sleep away,
 Now come, and with the plough-share's crooked tooth
 110 Her green hairs tear, now her green garments cut;
 With pond'rous rakes pierce her unyielding back;
 And fear not, with large mattocks, to pull out
 Her entrails, and them mix with th' upmost turf,
 And place them to be pinched with hoar-frosts,
 115 To frozen scourges, and the wrath expos'd
 Of north-west winds; and let the fierce north wind
 Them bind, and let the eastern wind unbind.
 But, as soon as white *Zephyr* (19), with his gale
 Warm'd with the Sun, the numbing colds and frosts
 120 Of the *Riphaean* winter (20) shall have thaw'd;
 And *Orpheus'* *Lyre* (1) shall from the starry pole
 Retire, and plunge itself into the deep;
 And swallows (2) in their nests the spring's advent
 Shall chant; then let the Kitchen-gard'ner bring
 125 Himself full baskets yielding with the weight,
 And with fat rubbish, or the solid dung
 Of asses, or with that of other herds,
 Feed to the full the hungry fasting ground.
 Nor let him shew reluctance to present
 130 As food to weary fallow ground, whate'er
 The privy vomit from its dirty sinks.

(19) That wind, which the *Greeks* called *Zephyrus*, because of its animating influence, was by the *Romans* called *Favonius*, both names denoting the gentleness of the weather, when the gentle western breezes began to blow, whereby all things were enlivened and cherished. *Pliny* says, that this wind blows from that place in the heavens where the Sun sets at the time of the equinox; that it begins the spring, opens the earth, and is very wholesome with its gentle cold, *lib. xviii. 34.* Our author says, *lib. viii. 11.* that they begin to blow about the 5th of *February*; and *Varro*, before the 7th day of the said month; and *Pliny* says they begin to blow commonly about the 8th.

(20) *Riphaea bruma.* The *Riphaean* mountains are in the northern parts of *Muscovy*, out of which the river *Tanais*, now called the *Don*, ariseth, and empties itself into the *Palus Maotis*. In these mountains the colds in winter are exceeding severe.

(1) *Orphæi Lyra.* The *Harp* is a constellation in the northern hemisphere. The poets feign, that it was placed in the heavens in honour of *Orpheus*, who was, as some say, son of one of the *Muses*. *Varro, lib. ii. cap. 5.* says, that what the *Greeks* called *ἄραξ*, was by the *Romans* called *Fidis*. Our author says it begins to set the first of *February*. The brightest star in the constellation was by the *Romans* called *Fidicula*: but *Pliny*, if I mistake not, calls always the whole constellation by this name: and *Columella* seems to call it sometimes *Fidis*, sometimes *Fidicula*.

(2) *Hirundo cantârit.* *Pliny* says, that swallows are seen the 22d of *February*; and *Columella*, on the 23d of the said month.

Now let him with the sharp point of the hoe
 Attack again the surface of the ground
 Condens'd with rains, and hard'ned with hear-frosts :
 135 Soon after with the tusk of rake or spade
 The green turf's lively herbage let him bruise,
 And mix well with the clods ; that of the field,
 Now ripe for plants, and seeds, the nursing breasts
 May be unbound, and [*nourishment convey*].
 140 Then let him also take the glitt'ring spade,
 Worn with the ground, and from each adverse bound,
 Straight narrow furrows draw, from side to side,
 And then obliquely with small paths divide.
 Now, when the well-comb'd earth her filthy garb
 145 Puts off, and in gay dress, and well-set hair,
 Appears, and her own plants and seeds demands,
 Then plant the various flow'rs, those earthly stars,
 White *gilliflow'rs*, and the bright-yellow eyes
 Of *marigold*, and fair *Narcissus' hairs* (3),
 150 The stern and furious *lion's gaping mouth* (4),
 And *lilies*, which in baskets long preserve
 Their verdure ; and the *hyacinth*, white as snow,
 Or blue ; then let the beauteous *violet*
 Be planted, which, with purple and with gold
 155 Richly adorn'd, its boughs and leaves extends,
 And that which creeps pale-colour'd on the ground ;
 The *rose* likewise, too full of modest blush.
 Now scatter *all-heal*, with its healing tear,
 And *horned poppies*, with their wholesome juice,
 160 And *poppies* which bind fast escaping sleep.
 From *Megar*is now let the genial seeds
 Of *bulbs* (5) be brought, which sharpen mens desires,
 And put young modest ladies on their guard.

And

(3) *Narcissi comas*, daffadil. The poet tells us, that a certain beautiful boy, seeing himself in a fountain, fell in love with his own image, and, pining away, died ; and was changed into a flower of that name.

(4) *Hiantis fera leonis*. I have not found out the name of this flower, which, when it opens, resembles the gaping mouth of a lion.

(5) *Bulbi*. *Pliny*, *Cato*, and several other antient authors, make great account of bulbs, which, in their days, were so common, that, as father *Hardouin* observes, they thought it needless to mention their names ; and that now they are so much in disuse, that we scarcely have any knowledge of those which the antients valued most. *Pliny* reckons the *scilla* or *squilla*, the sea-onion, as the *French* call it, among the first ; and mentions a few others with *Greek* names, which I believe few at present know what they

- And such as *Sicca* (6) gathers, and finds hid
 165 Below *Getulian* (7) clods; and *rocket* (8) sown
 Near to *Priapus*, crown'd with ears of corn,
 That slow and drowsy husbands it may rouse.
 Small *lettice* now is sown, which, full of leaves,
 With tender fibres grows; and short *chervil*,
 170 And *endives*, which the blunted palate please:
 And garlicks, small and great (9), which far and wide
 From their divided cloves diffuse their smell;
 And herbs they mix with beans for vulgar fare (10).
 Now is the time for *skirwort*, and that root
 175 Which comes of *Syrian* seed (11), which slic'd is given

they are. Those of *Megara*, a city of *Achaia*, between *Athens* and *Corinth*, are most commended; they were, it seems, great provocatives, and as such are taken notice of by *Petronius*, *Martial*, *Ovid*, and others; and as such our author mentions them.

(6) *Sicca*, an inland town, and a colony in *Numidia*, as *Pliny* says, *lib. v. c. 3.* Some authors call it *Veneria*.

(7) *Gætuli*. The *Getulians* were a very numerous people of *Africa*. *Pliny* mentions them as inhabiting many different places thereof, and distinguishes them by several names, as *Gætuli Autolotes*, *Gætuli Daræ*, &c. He places some of them in *Mauritania Cæsariensis*. *Ptolemy* places them in *Inner Libya*. Some authors place them between *Carthage* and *Numidia*. It is probable, that, being a numerous people, they sent some of their number into different places.

(8) *Rocket*, a very hot herb, good for generation, as *Pliny* and several others affirm, it being a great provocative to venery; which the author insinuates by saying, it is sown near to *Priapus*.

(9) *Ulpicum*, a larger sort of garlick: I have not found it under this name, in such of our botanists as I have looked into. *Columella* says, *lib. xi. c. 3.* that some call it *Punic garlick*, but the *Greeks* call it *Aphroscorodon*; and that it is of a much greater growth than common garlick. *Pliny*, *lib. xix. c. 6.* says, that the *Greeks* called it *Cyprian garlick*; others *Antiscorodon*; and that it is much esteemed in *Africa*, as a principal ingredient in their delicate salads: that it ought to be sarcl'd or hoed, *simulatque tria folia eruperint*, as soon as three blades or leaves shall spring out of it. *Columella* says, *cum ternas fibras emiserint spicæ*, when its cloves send forth three fibres; by which we may observe, that *Columella* means the same thing by *fibræ*, as *Pliny* does by *folia*, viz. the blades, as he says, that wheat ought to be sarcl'd *cum est trium fibrarum*. I believe it was observed before, that father *Hardouin* understood this to signify when it has three fibres at the root, which, I think, is a mistake. When mixed with oyl and vinegar, it raiseth a surprisingly great froth, as *Pliny* observes, which, perhaps, is the reason why it is called *aphroscorodon*.

(10) *Quæque fabis habilis fabrilia miscet*. Some authors say, that they used to mix with beans water-creffes, cat-mint, and mother of thyme, penny-royal, &c. so that in this line he comprehends all these and other herbs usually mixed with beans, without naming them, as being very well known: but the general opinion is, that we have not the true reading of this line; and the attempts that some have made to correct it, are so different from the text, that it is needless to mention them.

(11) *Radix quæ venit Assyrio semine*. What this root is, it is not easy to determine: some say it was *gingidium*, toothpick-chervil. *Pliny* and *Dioscorides* say it is like the *staphylinus*, the wild parsnip, but smaller and bitterer; and is eaten both raw and boiled, and is of great benefit to the stomach.

With moist'ned lupines joined, that it may
 Provoke fresh bumpers of *Pelufian* beer (12).
 The low-pric'd pickles at no other time,
 Nor *caper-bush*, nor mournful *el'campane*,
 180 Nor *fennel-giant*, with its threat'ning rods,
 Are planted: now the creeping grafs of *mint*,
 And *dill's* sweet-smelling flow'rs, are scattered;
 And *rue* (13), which the *Palladian berry's* taste
 Excels; and *mustard*, which will force to weep
 185 Him that provokes it: now is fet the root
 Of *Alifander* (14), and, which causeth tears,
 The *onion*; and that herb (15) which seasons milk,
 And from the slave's audacious front removes
 The shameful brand, and tokens of his flight;
 190 And, therefore, by its *Greek* name it declares
 Its virtue; and at this same time is sown
 That herb (16), which o'er the whole terrestrial globe

Doth

(12) *Zythum*, a kind of drink made of barley, first in use among the *Egyptians*; hence our author calls it *Pelusiacum Zythum*. Some authors say it was made both of barley and wheat.

Pelusium, once a city in *Egypt*, now only a village, called *Bebais*, as some authors say, near the eastern mouth of the *Nile*, about 150 miles from *Alexandria*.

(13) *Ruta*. Our author says it excels the taste of the *Palladian berry*, meaning the olive, which was dedicated to *Minerva*. Some, instead of *victura*, read *jutura*, to signify that rue, joined with oil, improved the taste thereof.

(14) *Oleris pulli radix*; in other places, *Columella*, as also *Pliny*, call it *olus atrum*, from the blackness of its root and seed. The *Greeks* call it *Smyrniium* and *Hippofelinum*. The *English* writers call it *Alexander*, which some think to be a corruption of *olus atrum*.

(15) This herb, by the description the author gives of it, is *lepidium*. *Pliny* says it is only used with milk. *Columella*, lib. xii. 8. prescribes it for making what he calls *oxygala*, four milk. *Pliny*, lib. xx. c. 17. says, that it is placed among the caustics; that it removes freckles, cicatrices, and marks upon the face. It seems that slaves used it to remove certain *stigmata* or marks their masters put upon them; which being observed, father *Hardouin* says, they introduced the custom of branding them with a hot iron. It seems it has its name from *λεπίς*, a spot or mark upon the face: probably it may be so called from *λεπίζω*, *decortico*; for *Dioscorides* says, that the leaves of it have an acrimonious ulcerating quality.

(16) *Brassica*: what the *Romans* understood by this word, is but imperfectly expressed by the word *cabbage* or *colewort*. They comprehended a variety of pot-herbs under this name, of which our author here mentions fifteen different sorts, which, no doubt, were all distinguished by something peculiar to each, which I believe is very difficult now to find out, he mentioning most of them without any particular description. *Pliny* indeed gives a pretty distinct account of a few of them, but takes no notice of several of the sorts mentioned here. The *Romans* were great lovers of those kinds of pot-herbs; and both *Cato* and *Pliny* commend them highly for their great usefulness, both for food and physic. What *Cato* says is very remarkable, that the *Romans* made use of no other things

- Doth flourish, and in great abundance yields
 To low *Plebeian*, and the haughty King,
 195 In winter, cabbage; and green sprouts, in spring:
 Such as in antient *Cuma's* turfy shore (17),
 And in *Abruzzo* (18), and near *Segni*, grow (19)
 On mount *Lepinus*, and fat *Capua's* plains (20):
 Such as the gardens in *Caudinian* straits (1),
 200 And *Stabian* lands (2), for fountains much renown'd,
 And learned *Naples* (3), with *Sebethis'* stream (4)

Bedew'd,

things for physic for six hundred years, from the foundation of *Rome*; and about that time Physicians began to introduce themselves among them, very much against his opinion, who was a mighty stickler for their antient plain way of living, which, no doubt, contributed much to the preservation of their health; but, when once luxury got footing among them, and they began to loath their former plain diet, their diseases, no doubt, varied also, and different medicines became necessary. Both *Cato* and *Pliny* mention a great many cases, wherein the use of *brassica*, differently prepared, was very beneficial; which is not my business to trouble the reader with.

(17) *Brassica Cumana*. *Pliny* says, that this kind is of a low stature, with leaves sitting upon the ground, and a broad spreading head: Father *Hardouin*, from *Dodonaus*, says it was of a red colour, and is what the *French* call now *Chou rouge*, red cabbage. It seems it was originally of *Cuma*, once a colony, and a very considerable town, upon the sea-shore in *Campania*; the place is now intirely ruinous, the shore is grassy, and may very well be called *cesposum littus*; as it is in our author, tho' some editions have it *ceposo*, others *teposo*: probably the editors thought, that, if the author meant a turfy shore, he would have said *cespitoso*; but this is what they could not be very sure of.

(18) *Quæ Marrucini pariunt*. These people formerly inhabited a part of the kingdom of *Naples*, now called *Abruzzo*, on the coast of the *Adriatic* sea. *Pomponius*, in his notes on our author, says, this sort was somewhat reddish with few leaves.

(19) *Quæ parit Segnia*. *Segni*, a town in *Latium*, which antiently belonged to the people called *Volsci*. It lies about 30 miles east of *Rome*; it stands upon the top of mount *Lepinus*. This sort, as the forementioned author says, is shorter, thicker, and more savoury, than the others; and they commonly eat them with oil.

(20) *Capua*, a famous town in *Campania* in the kingdom of *Naples*. Some very good authors, as *Livy*, *Pliny*, and others, say, that it has its name a *Campo*, from the spacious fields where it is situated; and it is called *pinguis*, fat, from their great fertility.

(1) *Caudium oppidum*, and *Furcæ Caudinæ*; a very remarkable place, where the *Roman* army was surpris'd by the *Sammites*, and made to pass under the yoke, of which *Livy* gives an account in his ixth book. It lies about four miles from *Santa Agatha*, and sixteen miles east of *Capua*. These *Fauces Caudinæ* are now called *Stretto d'Arpaia*, and *Giogo di Santa Maria*; the village itself is called *Arpaia*. The said *Pomponius* says, that this sort is the tenderest of any.

(2) *Stabiæ*, a small town in *Campania*, upon the sea-coast, about 5 miles from the mouth of the river *Sarnus*, which empties itself into the gulph of *Naples*. It is about 10 miles from *Surrentum*; the river *Sarnus* is now called *Scafati*.

(3) *Doctaque Parthenope*. The city of *Naples* was antiently so called, as *Pliny* says, because *Parthenope*, one of the *Sirenes*, was buried there. Our author calls it *learned*, because, in his days, probably it was famous for learned men. *Pomponius* says, that the *brassica* of this place was formed like a *thyrsus*; by which, I suppose, he means, that the leaves were so set upon the stalk as somewhat to resemble a spike, a name given to the flowers of any herb which are set so close, and in such a manner, as to form an acute

Bedew'd, and the *Vesuvian* (5) fields, produce :
 Such as the charming sweet *Pompeian* marsh (6),
 Near the *Herculean* salt-pits (7), does afford ;
 205 And *Siler* (8), which flows down with crystal stream :
 Those which the hardy rough *Sabellians* (9) give
 With sprouty stalks, and servile *Brutian* lands (10),
 And apple-bearing *Tibur*, and the lake
 Of *Turnus* (11), and *Aricia*, mother of leeks (12).

When

cone ; but, in the *thyrsus*, the leaves, or flowers, or fruit, are set more loosely ; so that there are spaces visibly betwixt them.

(4) *Sebethis*, a very small river hard by *Naples*, of which the water is conveyed to most of the streets of that city : the common people call it *Fornello* ; some call it the river *della Maddalena* : a part of it runs by the walls of the city, and falls into the gulph near *St. Magdalen's* bridge.

(5) *Vesuvia rura*, *Vesuvum*, or *Visuvium*, a well-known mountain near *Naples* ; all the country round it was very delicious, before it was ruined by the eruptions of the volcano. *Pomponius* says, that the *brassica* of these lands was of a more bitterish taste than that of others, notwithstanding very agreeable to the taste.

(6) *Pompeia palus*. *Pompeii*, or *Pompeianum*, formerly a considerable town, but now ruinous, in *Campania*, situated at the mouth of the river *Sarnus*, upon the gulph of *Naples* ; it is now called *Torre dell' Annunciata*. *Pliny* says, that this kind of cabbage was of a taller sort ; that its stalk was small from the root upward, but that it grew thick amongst the leaves, which were thinner and narrower than those of other sorts, and were exceeding tender, which made amends for their not bearing the cold.

(7) *Salinis Herculeis*. *Herculaneum* was a town in *Campania*, upon the gulph of *Naples*, where it seems were salt-pits. Some authors say it is now called *Torre di Ripalta* ; others call it *Torre del Græco*. *Pliny*, in enumerating the places upon the coast of this gulph, mentions it after *Naples*, and after it he places *Pompeianum*.

(8) *Siler*, or, as *Pliny* calls it, *Silarus* ; a river, which formerly separated the *Picentini* from the *Lucani* almost in the middle, between *Salernum* and *Pæstum*, about 12 miles from each : it emptieth itself into the gulph of *Salerno*, and is now called *Selo*.

(9) *Brassica Sabellica* ; so called from *Sabelli*, a rough and hardy people, who dwelt in the mountains between the *Sabini* and the *Marfi*. *Pliny* makes them a colony of the *Samnites* ; but *Cato*, in his *Excerpta Orig.* says, that the *Sabelli* were so called, because they were the offspring of the *Sabini*. *Pliny*, lib. xix. c. 8. says, that the leaves of this sort of cabbage are curled even to admiration, the thickness of which extenuated their stalks ; they are said to be the sweetest of all. Our author says, they had a sprouty stalk.

(10) *Bruttii*, a people that inhabited that part of the kingdom of *Naples* now called *Calabria*, which lies partly on the *Adriatic*, and partly on the *Mediterranean* seas. *Aulus Gellius*, lib. x. says, that they were conquered by the *Romans*, and reduced to a state of servitude, because they were the first who received *Hannibal*. *Pliny* says, their cabbage was nourished by the cold, of exceeding large leaves, small stalks, and of a sharp and poignant taste.

(11) *Lacus Turni*, or, as *Pliny* calls it, *Lacuturris*, from a lake and tower in the valley of *Aricia*. This sort of *brassica* had a very large head, and numberless leaves ; some of them grew up round, others extended themselves in breadth. Some think they are that sort which the *French* call *choux cabus*, headed cabbage, because they grew into the shape of a man's head.

(12) *Aricia*, now called *P'Arriicia*, a place in *Latium*, where there was a famous grove sacred to *Diana*, called *Lucus Aricinus*, near *Veletri*. This place was called the

mother

- 210 When to the loose and well-prepared earth
 We have committed all these feeds and plants (13),
 With constant culture, and unweary'd care,
 While pregnant, we her cherish, that full crops
 With double uf'ry may repay our pains.
- 215 First, I advise large fountains to convey
 Into your garden, lest the parching drought
 Mar the conception, and burn up the birth.
 But, when the pregnant earth her fruitful womb
 Does open, and her hidden knots unbinds,
- 220 And all her florid offspring, unconfin'd,
 Breaks forth; then let the careful Gard'ner come;
 And from his wat'ring-pot, with gentle drops,
 Like misting rain, bedew the infant plant,
 And with his forked iron the surface comb,
- 225 And from the furrows throw the choaking weed.
 But if on bushy hills your garden's plac'd,
 And from the woody tops no gentle streams
 Glide down; then, with the clods of well-trench'd ground,
 Together thrown, thy beds and borders raise,
- 230 That so the plant may be inur'd to grow
 In the dry dust, and, when it changes place,
 The dry and scorching heats it may not dread.
 'Soon as the Prince of flocks, and of the signs (14),

Who

mother of leeks; probably because they were first cultivated there, and, because of their excellency and great plenty, they were sent from thence to other countries: they are much celebrated by many authors, particularly *Martial*, lib. xiii. epigr. 19. *Pliny* says, that the cabbage of this place did not grow higher than that of *Cuma*, whose leaves sat upon the ground; that it was reckoned the most profitable kind, because it put forth sprouts with little stalks almost under all its leaves.

(13) Our author has mentioned several sorts of *brassica*, which *Pliny* has taken no notice of; but he has mentioned some which are not in our author: and he tells us, lib. xx. cap. 8. that the antient *Greeks* divided their *brassica* into three different sorts; viz. the *curled*, which they called *selinoidea* from its likeness to parsley, which is good for the stomach, and softens the belly; the other smooth, with smaller leaves growing out of the stem; the third, properly called *crambe*, with smaller leaves, single, and very thick, bitterer than the other, but very efficacious. *Cato* esteemed the curled sort the best; next to it, the smooth, with great leaves, and a great stem: some say, that the wild *brassica* is properly the *crambe*. Some call it *brassica petraea*, because it grows in steep rocky places, *ἐν κρημνώδεσι τόποις*, as *Dioscorides* says; and from this, they think, it has its name; which seems too far fetcht. Of all these different sorts the *cymata*, i. e. the sprouts, as *Pliny* says, are, by all nicer palates, reckoned the sweetest, and more tender and delicate than the *brassica* itself. They are the small stalks shooting out of the main stem or stalk.

(14) Here the author alludes to the story of *Phryxus* and *Helle*, son and daughter of *Athamas*

- Who cloud-born *Phryxus* safe to harbour brought,
 235 But dropt his sifter *Helle* in the deep,
 Shall from the swelling waves lift up his head,
 The nursing earth her bosom shall expand,
 And claim the adult seeds, and shew desire
 In wedlock with set plants herself to join :
 240 O men! keep constant watch, good reason why!
 With silent pace the seasons fly away,
 And without noise the year is turned round.
 Behold! with ardent wish, and fond desire,
 The most indulgent mother now demands
 245 Her offspring, her own children which she bore,
 To nurse and bring them up with tender care.
 The time's now come, now to the mother's care
 The tender pledges of her love commit :
 The parent with her own green offspring crown ;
 250 Adorn her with her hair ; in order set
 Her locks : now likewise let the florid earth
 Be curled with green parsley, and made glad
 With the green leek's long and dishevell'd hair ;
 Let the wild parsnip her soft bosom shade.
 255 Now let sweet-smelling plants, of foreign lands
 The gifts, from the *Sicanian* (15) hills descend,
 And from mount *Hybla's* (16) lofty saffron tops.

Athamas King of *Thebæ*, by his wife *Nephele*, who, flying from the snares of their step-mother *Ino*, swam over the sea upon the back of the ram with the golden fleece. *Helle* fell into the sea, and was drowned; from her that sea has since been called the *Hellepont*. *Phryxus* got safe to *Colchos*, and sacrificed the ram to *Mars*, and hung up the golden fleece in his temple, which afterwards became the subject of two noble poems; the one *Greek*, the other *Latin*. *Phryxus* is called *Nubigena*, cloud-born, from his mother's name *Nephele*, which, in *Greek*, signifies a cloud. The poet's intention here is, only to describe the Sun's entering into the sign *Aries*, the Ram, which he calls the *Prince of flocks*, because of the worth and usefulness of that animal; and *the first of the signs*, because the antients began their year in the month of *March*; and, in enumerating the signs of the *Zodiac*, we still begin with *Aries*. The *Hellepont* is a narrow sea by *Constantinople*, dividing *Europe* from *Asia*: it is narrowest between *Sestos*, a town in *Thracia* in *Europe*, and *Abydos*, a town of *Phrygia* in *Lesser Asia*, distant about seven or eight furlongs: these two places are now called the *Dardanelles*. Some call the sea *the straits of Gallipoli*, or *il braccio di San Giorgio*.

(15) *Sicania*, another name for *Sicily*: a well-known, large and opulent island in the *Mediterranean* sea, separated by a very narrow sea, of 1500 paces, from the kingdom of *Naples*.

(16) *Hybla*, a mountain in *Sicily*, famous for honey; the bees feeding there upon many odoriferous plants.

From gay *Canopus* (17) let sweet *marjorams* (18) come,
 And let sweet *cicely* from *Achaia* brought (19),
 260 With better juice than the myrrh-tree distills,
 And always imitates thy doleful tears,
 O *Cinyreian virgin!* and those flow'rs
 Be planted, which from *Ajax'* mournful blood
 Arise, who was by partial judges doom'd (20);
 265 And *amarantbs*, which never fade nor die.
 And, in due order let the Gard'ner place,
 In plants, a thousand various colours, which
 Rich nature does bring forth, and which he sow'd
 In feed; now let sea-cabbage also come,
 270 Tho', to the eyes a foe, it blunts the fight.

(17) *Canopus*, a town in *Egypt*, at the mouth of the *Nile*. Our author gives it the epithet of *bilaris*, chearful; other authors say it was much addicted to voluptuousness. It seems to have given name to one of the mouths of the *Nile*; although the learned father *Hardouin* says, in his note on *Plin. Hist. Nat. lib. v. cap. 10.* that it is uncertain whence the *Canopic* mouth of the river had its name; whether from a town, or a man; or some other thing, *Pliny* having made no mention of the town. But, it seems pretty clear, from *Pliny's* own words, that it had its name from this town: *Sunt in honore & intra decursus Nili multa oppida, præcipue quæ nomina dedere ostiis, non omnibus, sed celeberrimis septem, proximo Alexandriæ Canopica, deinde, &c.*

(1) *Sampsuchum*, *Amaracus*. *Pliny*, *lib. xxi. cap. 12.* says, that *Diocles* the physician, and the *Sicilians*, called that herb *amaracus*, which the *Syrians* and *Egyptians* called *sampsuchum*. Father *Hardouin*, in his note on this herb, says that it is a mistake to think, that what in the shops is called *majorana*, *la marjolaine*, is the *sampsuchum* or *amaracus* of the antients; for this reason especially, because *Dioscorides* says, that the *sampsuchum* creeps upon the ground, but the *majorana* rises high; but *Matthioli* thinks, that they are much the same: and, if any desire a full description of both, they may consult this learned author, who has delineated and described them fully, but does not make the *sampsuchum* to creep on the ground in father *Hardouin's* sense: he thinks, that *majorana* was so called, because, being of a very agreeable smell, it was cultivated by the ladies with great care, both in the ground, and in earthen pots; and upon no herb greater pains was bestowed, p. 535.

(19) This herb is called *myrrhis*, or *myrrha*, or *smyrrbiza*, as *Pliny* says; and, according to him, it is very like hemlock in its stalk, leaves, and flower, but lesser and smaller; not unpleasant to eat. *Dioscorides* adds, that it has an oblong, soft, round, and sweet-smelling root. Mr. *Miller* calls it *sweet cicely*; some think it to be *angelica*; others *chervil*; others *laserpitium*, or *smyrniun*; the *French* call it *chervil musqué*.

Myrrha, the daughter of *Cynaras* King of *Cyprus*, was transformed into a tree of that name, which always sweats out a juice, in memory of the many tears she shed in the time of her affliction. See the fable elegantly told by *Ovid*, *Metamorph. lib. x.*

(20) *Ajax*, a famous Hero in the *Grecian* expedition against *Troy*: he contended with *Ulysses* for *Achilles's* armour, and was cast by the Princes who judged of their pretensions; which so affected him, that he grew delirious, and killed himself. The poet tells us, that he was turned into an *hyacinth*, which wears upon it the two first letters of his name, *a, i.* Our author says, this herb sprung out of his blood.

And

- And now let *lettice* (1), with its healthful sleep,
 Make haste, which of a tedious long disease
 The painful loathings cures; one sort grows green,
 With num'rous thick-set leaves; a second sort
 275 With dusky purple hair is sprucely dress'd,
 Both call'd *Cecilian* (2), from *Metellus'* name;
 The third with thick, but a smooth top, looks pale;
 Of *Cappadocia*, its own nation, this
 Retains the name: there's that which is mine own,
 280 Which *Cadiz* (3) on *Tartesus'* shore brings forth;
 White is its curled top, white is its stalk.
 And that which *Cyprus* (4) on fat *Paphian* land
 Doth nourish, which with well-trimm'd scarlet hair,
 And milk-white leg, a gay appearance makes.
 285 As many as their features, so the times

(1) *Lactuca*, lettuce. *Pliny* says, that all sorts of it have a soporiferous quality, but especially a blackish sort, which, from the abundance of soporiferous milk contained in it, as in poppy, was called *meconis*; and that this kind alone, amongst the antient *Italians*, was greatly esteemed, and from the abundance of milk in it was called *lactuca*: that all sorts of it are of a cooling nature; therefore in summer are very grateful to the stomach, and free it from nauseating, and give a good appetite; and adds, that the Emperor *Augustus* was, by the use of it, cured of a great fit of sickness, by the prudent advice of *Antoni^{us} Musa* his physician, his former physician having denied him the use of it; for which cure the commons of *Rome* erected a statue to *Musa*, hard by that of *Æsculapius*. See *Sueton. in August. cap. 59*. This, says he, gave such reputation to lettuce, that they used to preserve it in oxymel, to be used during the months it was not to be found green.

(2) *Columella* mentions here five different sorts of lettuce, most of which have their names either from the persons who brought them to *Rome*, and cultivated them much; or from the country which they were brought from. That of a dark, and somewhat of a purple colour, and that of a green colour, and a curled leaf, he calls *Cecilian*, from *Cecilius Metellus*, who was Consul in the first *Punic* war, in the year of *Rome* 502. *Pliny* says, that the purple-coloured, with a very great root, was so called; and that it was rightly sown in *January*. The *Cappadocian* has a pale, smooth, thick leaf, and is sown best in *February*.

(3) That of *Bætica*, and upon the borders of *Cadiz*, which *Columella* calls his own, because he was a native of that country, was white, with a leaf very much curled: the season for sowing it was in *March*.

(4) There was the *Cyprian* kind, of a whitish-red colour, with a smooth and very tender leaf, which is planted very commodiously till the 13th of *April*. See for all these sorts *Columella, lib. xi. c. 3*.

Pliny mentions several other sorts, one of which he calls *Cilician*, which has the leaf of the *Cappadocian*, except that it is curled, and broader.

The *Greeks* had various sorts, some with broad, some with round stalks, some white, some red, some black, some purple, some with large, some with narrow leaves like endive. They had one sort they called *Laconicon*, because it was short, and sat close to the ground; another they called *picrida*, because it was of a bitterish taste, which was the worst of all. They had another sort they called *eunuchion*, because they reckoned it hurtful to generation; this sort, *Pliny* says, was round, with a very small root, and broad leaves.

Of planting each; when the new year begins,
Aquarius (5) the *Cæcilian* lettuce sows,
 And in the mournful month (6) the priests of *Pan*
 The *Cappadocian* preps into the ground.
 290 *Mars!* in thy calends the *Tartesian* (7) sow,
 The *Paphian*, O fair *Venus!* in thine own (8).
 While ardently it seeks itself to join
 To its own moth'r inflam'd with like desire;
 And she, most soft, beneath the easy ground
 295 Reposeth; make her pregnant, now's the time;
 For now the world's genial times are come,
 Now *love* impatient to coitions hastes:
 The spirit of this orb now headlong driv'n,
 With *Cupid's* piercing stings, impetuous joins
 300 With *Venus* in her revels, and promotes
 Her plots of love: to every congruous part
 He love for love repays, and fills with young.
 The *Father of the seas* (9) now with fair words
 His *Thetys* courts, and to his bed allures;

(5) When the Sun is in the sign *Aquarius*, viz. in the month of *January*, it is proper to sow *Cæcilian* lettuce.

(6) The month of *February* was called *mensis feralis*, because then they used to offer sacrifices to their infernal gods, or ghosts of men departed this life; these sacrifices they called *parentalia*: they then pretended to purge the city, which the *Sabines* called *februare*. The priests of *Pan Lyceus*, called *Luperci*, then ran up and down the city naked, after they had sacrificed a goat to *Pan*; and, with girdles made of his skin, they struck the hands of pregnant women, that they might have a safe delivery: thus they pretended to purge the city. *Pan* was called *Lyceus*, as they say, *a lupis abigendis*, because they thought he drove away the wolves. In this month our author directs to sow *Cappadocian* lettuce.

(7) *Tartefida*, *Tartesian* lettuce. *Tartesus* was a municipal city near *Cadix*, the native country of *Columella*; from whence, it seems, this sort was first brought to *Rome*, for which reason he calls it his own lettuce. The month of *March* was sacred to *Mars*, and from him called *Martius*; and then was the season for sowing this sort.

(8) The month of *April* was sacred to *Venus*, who was called *Paphia* from *Paphos*, a city in *Cyprus*, where she was either born or worshipped; so the poet calls upon her to plant the *Paphian* lettuce in her own month of *April*, so called from *aperiundo*, as some think, because the earth then opens her womb, and produces all things in abundance, or receives the seeds of many things into her womb.

(9) The heathen theology, and fictions of the poets, are in nothing more inconsistent and contradictory, than in the accounts they give of their marine gods; sometimes one is supreme, sometimes another. By some *Oceanus* is called the *Father of the seas*, and by *Hesiod* he is said to be the son of *Cælum* and *Terra*, the Heaven and the Earth: they tell us, he has his name from the swiftness of his motion, *ωαγγ' τὸ ἀνέως νέειν*. Some make him the Father of all rivers, fountains, and springs: his wife, they tell us, is *Tethys*; so called from *τήθη*, a nurse, because the water nourishes all things.

- 305 And he who o'er the waters rules supreme (10),
 For *Amphitrite* the same fondness shews:
 And both these ladies, to their husbands joy,
 An azure offspring quickly bring to light,
 And with a swimming people fill the sea.
- 310 The *greatest of the gods* (11) himself lays down
 His thunderbolt, and with deceitful arts,
 As with th' *Acrisian* maid of old, re-acts
 His am'rous scenes, and, in a violent shower,
 Into his mother's bosom now descends:
- 315 Nor does she treat his filial love with scorn,
 But, with desire inflam'd, the patient earth
 To strongest bonds of love submissive yields:
 Hence seas, hence mountains, hence the world intire,
 Feel of returning spring the warm effects;
- 320 Hence spring the flaming love, and fond desires
 Of mankind; and of fowls, of flocks and herds,
 Which by degrees get strength, and seize their hearts,
 And in their marrow rage like wasting fire,
 Till *Venus*, with enjoyment glutted, fills
- 325 Their fruitful joints, and various offsprings brings
 To light, and, with a new succeeding race
 The world's constant ruins still repairs,
 Lest with old age it languish, and be void.
 But why so bold should I allow my steeds
- 330 With loos'ned reins, and unrestrained course,
 In paths sublime through boundless skies to fly?
 Let him whose head the *Delphic* laurel crowns,
 And warms with more of *Phœbus'* heav'nly fire,
 Who into nature's secret rites doth pry,
- 335 And who the fixed secret laws of heav'n,
 And of all things the hidden causes knows,

(10) *Neptunus* is here called *regnator aquarum*, as if the government of the seas was committed to his charge; and his wife is called *Amphitrite*, from ἀμφιτεῖθεν, its surrounding, rubbing upon, wearing and pressing the earth all round; or from ἀμφιπᾶν, because the sea strikes with terror, on all sides, such as sail upon it, &c.

(11) Here the poet alludes to the story of *Jupiter* turning himself into a golden shower, and dropping through the tiles into *Danae's* lap, who was shut up in a strong tower by her father *Acrisius* King of the *Argives*, and getting her with child.

It is very common with the poets, to represent *Jupiter* as the father, and the Earth as the mother, of all things. Here our poet represents *Jupiter* as the son, and the Earth as his mother; and by it they signify, that the rain makes the earth fruitful.

- Make such-like things the subject of his song.
 Let *Phœbus* spur this Poet o'er the tops
 Of *Dindymus* (12), where *Cybele* encamps,
 340 And o'er *Cithæron* (13), and *Nysæan* cliffs (14),
 To *Bacchus* sacred; and the lofty tops
 Of his own hill *Parnassus* (15), where he dwells;
 Through silent groves of the *Pierian* wood (16),
 The *Muses* friendly and secure retreat;
 345 Like frantic priestesses, with an hideous voice,
 Incessantly invoking each by turns,
 Thee, *Euan* (17), and thee, *Pæan*, *Delian* born (18),
 Me, my *Calliope*, from fruitless cares,
 And wand'ring after vain pursuits, recalls,
 350 And bids me move in more confined orb,
 And with her verses knit with slender thread,
 Which, with a tuneful voice, when hard at work,
 The Pruner, hanging on his elms, may sing,

(12) *Dindymus*, a famous hill in *Phrygia*, with two tops, where *Cybele*, whom the poets call the wife of *Saturn*, and the mother of the gods, was worshipped, and her ceremonies celebrated with noise of arms, drums, &c. by the *Corybantes*, a company of mad enthusiastic priests.

(13) *Cithæron*, a famous mountain in *Bœotia*, sacred to the *Muses*, near *Parnassus*, of which some make it a part: it is now called *Cithærone*.

(14) *Nysæa juga*. The poet here means, either one of the tops of *Parnassus*, called *Nysa*, which was sacred to *Bacchus*; as the other, called *Cyrrha*, was to *Apollo*: or, perhaps, he had his eye upon *Nysa*, a city in *Arabia*, where *Bacchus* was educated by the *Nysæan* nymphs, at the desire of *Jupiter*, after the death of his mother *Semele*. Some say *Nysa* was one of the tops of *Cithæron* or *Helicon*.

(15) *Parnassus*, a very famous mountain in *Phocis* in *Achaia*, sacred to the *Muses*, and the constant theme of poets.

(16) *Pierius*, a mountain in *Thessaly*, sacred also to the *Muses*; from which, as some think, they are called *Pierides*.

(17) *Euius*. They say this name was given to *Bacchus* by his father *Jupiter*, upon his having performed some great exploit: it signifies a good son; and the priestesses of *Bacchus*, in their mad processions and revels, used to call upon him by this name; and it is common with the poets also to give him this name. *Columella* here puts the poet, who, he wishes, would undertake what he himself could not perform, into a strange fit of enthusiastic madness, and sends him from one hill and wood into another, and makes him invoke both *Apollo* and *Bacchus*: this last is frequently called *Euan*; and his priestesses, in their mad processions, commonly called him by this name.

(18) *Apollo* is called *Delius*, because he was born in the island *Delos* in the *Ægean* sea: it is the chief of the *Cyclades*, much revered by the antients.

Pæan was a name they gave to *Apollo*, from a Greek word *παίω*, *percutio*, to strike, supposing him very dextrous at shooting with arrows: or, perhaps, *ἀπὸ τῆς παύειν τὰς ἐνίας*, a sedando molestias, supposing him the inventor of physic, and the protector of physicians.

Calliope, one of the *Muses*, the mother of *Orpheus*; she is said to be the protectress of heroic poetry: she has her name from the sweetness of her voice.

- And Gard'ner in his gardens cloath'd in green.
 55 Wherefore what follows here, observe to do:
 Let *cresses*, direful to those latent worms,
 Which, with food ill-digested, th' unsound bowels
 Bring up, be scatt'ed on small ridges, rais'd
 Between small furrows at small distance plac'd,
 360 And *savory*, in taste resembling thyme:
 The *cucumber*, with tender neck; the *gourd*
 With brittle; let the prickly *artichoke* (19)
 Be planted, which to *Bacchus*, when he drinks,
 Is grateful; not to *Phæbus*, when he sings:
 365 This sometimes rises with a purple head,
 Sphere-like, with scales close, and compactly set;
 Sometimes with myrtle hair, and bended neck,
 It verdant grows; sometimes with pungent top,
 Like pine-tree cone; expanded some appear:
 370 Sometimes 'tis like an osier-basket shap'd,
 With threat'ning prickles horrid; sometimes pale,
 It imitates brankursine's crook'ned leaves.
 'Soon as the *punic-tree* (20), whose num'rous grains,
 When throughly ripe, a bright-red covering hides,
 375 Itself shall with its bloody blossoms cloathe;
 Then is the time *wakerobin-seed* to sow;

(19) *Columella* says here, that the artichoke gives an agreeable taste to wine, and improves it; and therefore is acceptable to *Bacchus*; but, by reason of its bitterish taste, it is disagreeable to *Apollo*, because it hurts the voice. He mentions here six different sorts of artichokes, distinguishing them by their colour, shape, form of their leaves; and other things peculiar to them: the first, he says, is formed round, and closely compacted with a purple *corymbus*; by which he means, that either the scales are so set as to form something of a spherical figure, that they have something of a purple colour, or that it puts forth its flower in such a manner; for *corymbus* signifies a cluster of flowers or fruit, standing on pedicles, which are disposed in such a manner as to form a sphere. A second sort is of the colour of myrtle-tree flowers; I suppose he means, has a flower like that of the myrtle-tree, and that it bends with the weight of its head. A third sort, he says, *manet adaptata, i. e.* open and expanded, in opposition to the fourth sort, with a *pinæa vertex*; by which, I suppose, he means, that it is shaped like a pine-tree cone. A fifth sort, he says, is shaped like a wicker basket, which, I suppose, was somewhat of an oblong figure, wider in the middle, and narrower and more contracted at each end, in which form such as are more prickly may grow. The sixth sort, he says, is of a palish colour, and like the bended or crook'ned leaves of the *acanthus*, such as we see them on the chapiters of pillars, of the *Corinthian* order.

(20) *Arbos Punica*, the pomegranate-tree; so called, as some think, from the red colour of its flowers and fruit. But *Pliny, lib. xiii. c. 19.* says, that it has its name from *Carthage*; probably because it grew there in great plenty, and was first brought from thence, being a native of *Africa*: the apple is called *granatum*, because of the great number of grains or seeds it contains. The flower of this tree they called *balauftium*.

- Then *corianders*, much renown'd, spring up;
 Then to the slender cumin grateful grow
 The fennel-flowers; then from its prickly herb
 380 The sperage-berry leaps, the mallow shoots,
 Which follows with its bending head the Sun:
 Then likewise rises that *audacious plant*
 Which imitates, O *Bacchus!* thine own vines,
 Nor dreads the thorns; for 'midst the prickly briers
 385 The *briony* lifts up its fearless head,
 And with its claspers binds the wild pear-trees
 And alder-trees, which culture has not tam'd.
 As that *Greek* letter, which in order stands
 Next to the first (1), is on the yielding wax
 390 Imprinted with the learned master's style,
 So then the *beet*, with white foot, and green leaf,
 And with its *Grecian* name, is, with the stroke
 Of the iron-pointed tool, set in the ground.
 Yea, now the harvest, with its fragrant flowers,
 395 Approaches; now the purple spring is come;
 Now the kind parent does rejoice to see,
 With changing-colour'd offspring of the year,
 Her brows furrounded; now their gem-like eyes
 The *Phrygian melilots* disclose; the *violet* beds
 400 Unfold their winking eyes; the *lion* yawns (2).
 The *rose* abashed, with a comely blush
 Unveils her virgin-cheeks, and to the gods
 Due honours pays, and with its fragrant smell,
Sabean odours like, perfumes their domes.
 405 Ye Nymphs (3), which dwell on *Achelous'* banks (4),

Com-

(1) Our author here alludes to the second letter of the *Greek* alphabet, *Beta*; and says, that, as this letter is imprinted upon the wax with a style, so the herb, which bears the name of this letter, is set into the ground with a dibble.

(2) *The lion yawns*; by this he understands, that, at such a time, a certain flower, which has some likeness to the mouth of a lion, begins to open and spread. The name of this herb I have not as yet found.

(3) Here the Poet addresses himself to the Nymphs of several denominations, and invites them to gather the flowers of this agreeable season: what kind of beings these Nymphs were, is difficult to determine. Both the *Greek* and *Latin* Poets, who delighted in fictions, make mention of many different sorts of them; and by them they understood certain powers, who presided over, or had their residence and abode in certain places and things; and they represent them, as appearing in the form of beautiful young women; and there is no end of their several names and sorts; some celestial, others terrestrial; some belonged to the sea, some to rivers, some to mountains, some to valleys,

Companions of the *Muses*, which frequent
 The *Pegaseian* spring (5), I you beseech ;
 Likewise, ye choirs of Nymphs, which sport and dance
 Amongst *Mænalian* oaks (6) ; and ye which dwell
 4 10 In forests (7), or in the *Amphrysi*an wood (8),
 Or in *Theſſalian Tempe* (9), or the cliffs
 Of mount *Cyllene* (10), or the ſpacious lawns
 Of dark *Lycæus* (11), or the caves, bedew'd
 With conſtant drops of the *Caſtalian* ſpring (12) :
 4 15 And ye, who in *Sicania* (13) pick'd the flowers
 Upon *Haleſus*' banks, when *Proſerpine* (14),
 Of *Ceres* born, the blooming lilies cropp'd

leys, ſome to woods and forests, others to ponds and lakes, &c. and there is ſcarcely any remarkable river, fountain, lake, mountain, wood, or grove, but the Poets have aſſigned Nymphs to them. Some ſay theſe beings were called *Nymphæ*, ἀπὸ τῆ ἀσι νεας εαίνεσθαι, becauſe they always appear young ; or ἀπὸ τῆ φαίνεσθαι, becauſe of their ſplendid appearance ; for which reaſon they gave this name to young brides, when they firſt ſhewed themſelves in public. Whatever may be the occaſion or original of their name, they ſeem to be nothing but certain powers or divinities of the Poets own making, which, upon all occaſions, have been of mighty ſervice to them, and always helped them forward, and ſupported them when they began to flag and be dull upon their main ſubject. Our author addreſſes himſelf to the greateſt part, if not the whole tribe.

(4) *Achelous*, a famous river in *Greece*, riſing out of mount *Pindus*, dividing *Ætolia* from *Acarmania* : it runs into the *Ionian* ſea, over-againſt the iſlands called *Echinades*.

(5) *Pegafides* were the *Muses* that frequented a certain fountain called *Hippocrene*, or, as *Perſius* ſays, *Fons Caballinus*, pretended to be made by the winged horſe *Pegasus*'s foot. It is a fountain in *Bœotia*, by mount *Helicon*, not far from *Thebæ*.

(6) *Mænalus*, or *Mænalius*, a famous mountain in *Arcadia*, near the city *Tegea* : the *Dryades*, or Nymphs that delighted in oaks, the Poet tells us, frequented this place very much.

(7) *Nymphæ Napeæ*, were ſuch as inhabited valleys and forests.

(8) *Amphryſus*, a ſmall river in *Theſſaly*, much celebrated by the Poets. Our author ſpeaks of a wood, which, it ſeems, growing upon the banks of the ſaid river, took its name from the ſame.

(9) *Tempe*, a moſt delicious ſmall valley in *Theſſaly*, through which the river *Peneus* runs, ſurrounded by the mountains *Pelion*, *Oſſa*, and *Olympus*, much celebrated by the Poets.

(10) *Cyllene*, an high mountain in *Arcadia*, famous for cypreſs-trees, where the Poets ſay *Mercury* was born, and for that reaſon was called *Cyllenius*.

(11) *Lycæus* is alſo a mountain in *Arcadia*, ſacred to *Pan*, the Protector of the Shepherds.

(12) *Fons Caſtalius*, a famous ſpring in a mountain of the ſame name in *Phocis* : it was a part of *Parnaffus* : the fountain was ſacred to the *Muses*. The Poets ſay it had its name from *Caſtalia*, a virgin, who, flying from *Apollo*, was changed into a fountain.

(13) *Sicania*, another name for *Sicily* ; and *Haleſus* is a river in *Sicily*, which riſes in a mountain not far from mount *Ætna*.

(14) *Proſerpina*. The Poets tell us, that ſhe was daughter of *Ceres*, and raviſhed by *Pluto* on the plains of *Enna*, near a city of that name, in the middle of *Sicily*, where *Ceres* had a famous temple ; and carried to the infernal regions, where ſhe became his Queen.

- Of the *Ennæan* plain, with mind intent
 Upon your dances, and was snatch'd away
 420 By the *Lethæan* Tyrant, and became
 His wife; and so the gloomy shades prefer'd
 To the bright stars; the mansions of grim death
 To those of life; and the *Tartarean* pit
 To heav'n; and *Pluto* to the mighty *Jove*;
 425 And o'er th' infernal kingdom now she reigns:
 Now lay aside your mourning, and sad fear,
 And with a gentle pace your tender feet
 Turn hither; and our parent *Earth's* soft hairs
 In order in your sacred baskets lay.
- 430 Here are no snares to catch unwary Nymphs,
 No rapes to fear; by us chaste *faith* is kept
 Inviolate; pure are our household gods:
 With jokes, and careless laughter, and with wines
 Unmixt, each place is fill'd; with chearful feasts
 435 And banquets the green meadows gay appear.
 Now is the lukewarm spring, and of the year
 The softest season; now young *Phæbus'* rays
 Are gentle, and invite us to lie down
 Upon the tender grass, where with delight
 440 We drink of springs, which are not chill'd with cold,
 Nor heated with the Sun, which with shrill voice
 O'er grassy fields resounding fly away.
 And now *Dione's* daughter (15), with sweet flowers,
 The gardens crowns; and now the *rose*, more bright
 445 Than *Tyrian* scarlet, does begin to blow.
 Not with so bright and radiant face appears
 The daughter of *Latona* (16), *Phæbe*, when
 The cold and cloud-dispelling North-wind blows;
 Nor yet the ardent *Sirius* (17), when his heat
 450 Is most intense; nor star of fiery *Mars*

(15) *Dione*, the mother of *Venus* by *Jupiter*: *Venus* presided over gardens, and the month of *April* was sacred to her; from her mother's name she was called *Dionea*.

(16) *Latona*, in the heathen mythology, is said to have brought forth two children to *Jupiter*, *Apollo* and *Diana*, otherwise called *Phæbus* and *Phæbe*; the first frequently put for the Sun, and the second for the Moon.

(17) *Sirius* is a bright star in the mouth of *Canis major*, so called from its drying and scorching influence.

- So brightly shine; nor *Hesperus* (18), with face
 So glittering, from th' eastern climes returns,
 'The forerunner of the approaching day;
 Nor *Iris* (19), with her glorious rainbow cloath'd
 455 So fulgent, as the chearful gardens shine
 With their bright offspring, when they're in their bloom.
 Mark therefore when the night is near its end,
 And the Day-star appears, or when the Sun
 His horses plunges in th' *Iberian* sea,
 460 Where-e'er sweet *marjoram* perfumed shades
 Does spread, come now and pluck it; and the hairs
 Of daffodil; and fragrant leaves and flowers
 Of the wild *punic-tree*, which bears no fruit.
 And, that *Alexis* (20) may not look with scorn
 465 On *Corydon's* great wealth, fair *Nais!* come,
 More beauteous than the beauteous boy, and bring
 In baskets *violets*, and fragrant *balms*,
 Mixt with white *privet*; and with *saffron-flowers*
 Sweet *cassia* bind; and with the purest wine,
 470 Which *Bacchus* most approves, all these bedew;
 For *Bacchus* odours with this juice preserves.
 Likewise, ye rustics, who with hard'ned thumb
 The tender flowers crop, with *hyacinths*
 Iron-colour'd, the white *osier* baskets fill.
 475 Now let the *rose* the threads of twisted rush
 Distend; and, with flame-colour'd *marigolds*
 Let the squeez'd panier burst; of vernal wares
 For sale, let rich *Vortumnus* (1) have great store;

And

(18) *Hesperus*. The planet *Venus*, appearing in the morning before day-light, is called *Lucifer*; and in the evening, after the Sun sets, is called *Vesperus*: the morning and the evening star.

(19) *Iris*, the rainbow, reckoned, as *Mercury*, the messenger of the gods; but, as some think, mostly in litigious matters, so called *quasi* *iris*, i. e. strife and contention; others, as *Plato* and *Proclus*, rather think she was so called from *ἰρῆνῃ*, to speak, because she was employed by them for this purpose. *Cicero*, *de Natura Deorum*, lib. iii. says, she was said to be the daughter of *Thaumans*, because of her wonderful and beautiful appearance: she is called by our author *Thaumantias*.

(20) Here our author imitates *Virgil*, *Formosi pecoris custos formosior ipse*; and alludes to the second *Eclogue*.

(1) *Vortumnus*, the god of merchandise: he presided over buying and selling, a *vertendis mercibus*: all the first fruits were dedicated to him, grapes, apples, pears, cherries, &c. There are several other reasons given of this name; one is *ab anno vertente*, which

- And let the Carrier, with a stagg'ring pace,
 480 Wet with much wine, from town with joy return,
 Weigh'd down with cash with which his bosom's fill'd.
 But when the harvest with ripe ears of corn
 Grows yellow, and bright *Titan* (2) with his *Twins*
 Extends the day, and with his burning heat
 485 Shall scorch the claws of the *Lernæan Crab*,
 Then *garlick* join with *onions*, and with *dill*
 The *Cerealian poppies* (3); and, when bound
 In bundles, while they're green, to market bring;
 And, when your wares are sold, with chearful voice
 490 The praises of propitious *Fortune* sound,
 And to your gardens hasten back with joy:
 And, in new-broken and well-wat'red ground
 Sow *basil*, and with weighty cylinders
 Compress it, lest the scorching heats pervade
 495 The loose and open dust, and parch the seeds;
 Or the small garden-insect, creeping in
 By stealth, infest and vex them with its teeth;
 Or the rapacious plund'ring ant destroy.
 Not only dares the *snail*, wrapt in its shell,
 500 And hairy *palmer-worm*, presume to gnaw
 The tender buds and leaves; but, as soon as
 The lurid *cabbage*, on its thriving stalk,
 Begins to swell, and pale *beet* bulky grows;
 And Gard'ner, free from fear, rejoices in
 505 His adult wares, and, now they're ripe, prepares
 The sickle to put in; oft-times fierce *Jove*
 Does dart his grievous show'rs, and with hail-stones
 The labours both of men and beasts destroys:

which was so called by the antients, when the Sun returns to the sign from whence it began its course. If any desire to have a full account of this pagan divinity, he may consult *Propertius*, lib. iv. de *fabula Vortumni*.

(2) *Titan*: the Sun is frequently called by this name; and the author's meaning is, That, when the Sun is in the signs *Gemini* and *Cancer*, the day lengthening, and the heat increasing, then such and such things are proper to be done. The Poet tell us, that, when *Hercules* was fighting with the serpent *Hydra*, with many heads, *Juno* sent the *Crab* to bite his heel, and that *Hercules* slew it. It is called *Cancer Lernæus*, because it was of the lake *Lerna* in *Peloponnesus*, near *Argos*. They tell us also, that *Juno* placed it among the stars.

(3) *Cereale popaver*: this our author borrows from *Virgil*, *Georg.* i. 211. where *Servius* says, that poppy was so called, either because it was eaten as corn, or because *Ceres* made use of it to forget her sorrows. *Pliny*, lib. xix. 8. says, that rusticks used to sprinkle it upon the crust of their bread, mixed with an egg, to make it stick to it.

He, likewise, oft with rains, pregnant with seeds
 510 Pestiferous, bedews them, which produce
 Those worms, which to grey *willow-groves*, and *vines*,
 Are hurtful; and o'er all the gardens creeps
 The caterpillar, which, with pois'nous bite,
 Dries up the plants, which, of their comely hair
 515 Bereft, lie mangled with their naked tops,
 And with the baneful poison pine and die.
 That, with these direful woes, the Husbandmen
 Should not be overwhelm'd, labour and use,
 And various experience itself
 520 Of things, their teacher, and their safest guide,
 Has shown to wretched men new arts and means
 Of safety; how to still the raging winds,
 And to avert, with sacred *Tuscan* rites (4),
 The boist'rous storm: hence is it that with blood,
 525 And entrails of a whelp, snatch'd from the dug,
Rubigo (5), full of mischief, is pleas'd,
 That so the verdant herbs he may not parch.
 Hence *Tages* (6), (as we're told) the *Tuscan* Seer,
 In borders of his field was wont to place
 530 Th' *Arcadian* ass's head, stript of its skin.
 And *Tarchon* (7), to avert the thunderbolts
 Of mighty *Jove*, his seats with white-vine hedge

(4) *Tuscan rites*. The *Tuscans* were very famous of old for their sacred ceremonies and superstitions, and were the great directors of the *Romans*, who adopted most of them.

(5) *Rubigo* or *Rubigus*. Our author puts it feminine; some write it *Robigo*. They offered sacrifice to this god, that he might not smite the corns with blasting and mildew: see *Aul. Gell. lib. iv. c. 6. also lib. v. c. 12.* They used to sacrifice to him a whelp and a sheep in the month of *April*, and offered them with frankincense and wine: they celebrated his festival at *Rome*, on the 25th day of that month, because, about that time, the corns began to be blasted. *Numa* instituted this feast in the 11th year of his reign, as *Pliny* tells us, *lib. xviii. cap. 29.* Of these superstitious practices, &c. he says a great deal, *lib. xvii. cap. 28. and Palladius, lib. i. cap. 35.*

(6) *Tages* was had in great veneration among the *Hetrusci*; was the Inventor of Divination, as *Tully, de Divinatione*, and *Valerius Maximus*, affirm: it seems he wrote some books upon the art for expiaining of prodigies, thunders, lightnings, &c. *Plutarch, Isidorus*, and several other authors, mention him as the Founder of the *Hetruscan* ceremonies; and the *Auspices, Haruspices*, and all the other Diviners among the *Romans*, derived their discipline from him, which they improved, and amplified afterwards by their own observations. If any want to know more of this Diviner, they may consult *Tully, de Divinatione, lib. ii.*

(7) *Tarchon*. Perhaps this is the same with that *Tarchon* General of the *Hetrusci*, who came to assist *Aeneas* against *Turnus* and the *Rutuli*, *Virg. Aeneid. lib. viii. l. 121, &c.*

- Surrounded; and *Amythaon's* son (8), who learn'd
 Of *Chiron* various arts, was wont to hang
 535 Nocturnal birds on crosses, and forbid
 On high house-tops their mournful songs to weep.
 But, that dire animals may not devour
 The tender blades, it sometimes has avail'd,
 With lees of olive-oil, not mixt with salt,
 540 To sprinkle; or to satiate the seeds
 With that black foot, which in the chimney breeds.
 It also has avail'd, on tender plants
 The bitter waters of *borebound* to pour,
 Or with much juice of *kousleek* to anoint.
 545 But, if no medicine this hurtful plague
 Is able to repel, then to your aid
 Let the *Dardanian* arts (9) make haste and come:
 Thrice round the garden's hedge, and all its beds,
 With open bosom, and dishevell'd hair,
 550 Barefooted, sad and pensive, and asham'd,
 A woman they conduct, who then does feel
 The force of settled laws, to which her youth
 Is subject; and when, with a gentle pace,
 She has survey'd them, ('tis a wond'rous sight)
 555 Just as a show'r of mast wrapt in its bark,
 Or apples round, rains from the shaken tree,

(8) *Amythonias* is *Melampus* the son of *Amythaon*, a famous Diviner and Physician, as *Pliny* says. He is much celebrated by *Homer*, and other Poets: he found out the virtues of one kind of hellebore, which, from his name, is called *Melampodion*. He was, as our author insinuates, *Chiron's* scholar, who was *Achilles's* Tutor, and, as some say, the Inventor of Physic, which he taught *Æsculapius*.

(9) *Dardania artes*. Magic was so called from one *Dardanus*, a famous Magician, and a great Promoter of this vain, pretended, occult science: he wrote a great deal upon this art, from whom, as *Pliny* says, *Democritus*, a great Promoter of it, derived his pretended knowledge. *Pliny*, lib. xiii. cap. i. exclaims highly against the vanity of this art, and calls it the most deceitful of all arts whatsoever; says, that it had its rise, at first, from Physic; and that, from a pretext of curing people by a more profound and sacred art of Physic, it crept in gradually, and became in great request; and to the art of curing diseases it added that of foretelling things by Mathematical knowledge, Astronomy, &c. so that it prevailed over all nations almost in his time. This *Democritus*, he says, gave the first recommendation to the art, which the greatest Philosophers afterwards were at the greatest pains to attain to; as *Pythagoras*, *Plato*, &c. He wonders that this art and Physic flourished at the same time; for *Democritus* and *Hippocrates* were cotemporaries, about the three hundredth year of *Rome*. *Columella* here gives us an account of as vain and ridiculous a practice as any, and yet, in some other places, he inveighs against all superstitious practices; and, indeed, it is strange, that both he, and the other rustic writers, should so gravely recommend this.

The caterpillar, of all sense bereft,
 Rolls, with distorted body, to the earth :
 Thus once, in former times, *Iolcos* saw (10)
 560 The *Dragon*, lull'd asleep with magic songs,
 From *Phryxus*' golden fleece, fall to the ground.
 But now's the time, the early *cabbage* stalks
 First to cut down, and also to pluck up
 The *Paphian* and *Tartesian* lettuce-thyrse,
 565 And with the *leek*, form'd to be often cut,
 And *parsley*, the green bundles to surround.
 Now in the fruitful garden springs apace
 Salacious *rocket* (11); likewise now begin
 The slipp'ry *rhubarb* (12), *buckthorn*, and *sea-leek*,
 570 Spontaneous to wax green; the prickly hedge,
 Horrid with *butchers-broom*, begins to shoot :
 Wild *sperage* likewise, which great likeness bears
 T' *asparagus*, comes forth; the outmost ranks
 Opprest with thirst, moist *purslane* now protects :
 575 And the long *kidney-bean*, a constant foe
 To *arrach*, at same time lifts up his head.
 The crooked *cucumber* (13), and pregnant *gourd*,
 Sometimes from arbors pendent, and sometimes,
 Snake-like, through the cold shades of grass they creep,
 580 And from the Summer-sun a shelter seek.
 These have not the same features, nor one shape ;
 For, if the longest pleases most, which grows
 Suspended by its own head's slender top,

(10) *Iolcos*, a town in *Theffaly*, the native country of *Jason*, who, by the assistance of *Medea*, recovered the golden fleece from *Colchus*, whither *Phryxus* had carried it, where it was constantly watched by a dragon, which she, by her magic arts, lulled asleep, till *Jason* carried away the fleece.

(11) *Eruca salax* : Rocket is so called, because it is a provocative to venery.

(12) *Lubrica lapathos*, slippery rhubarb ; so called from its lubricating and purging quality.

(13) *Cucumis*. It seems that this word, amongst the *Romans*, was of a larger signification ; and signified not only what we call *cucumbers*, but pompions and melons also : such of them as grew bulky, and ran out in length, and became very mellow, tender, and flaccid, when thoroughly ripened, lost their name, and were called *pepones* ; but such of them as grew round, like an apple, they called *melo-pepones* : but the true *cucumis*, the riper it grows, the more solid cartilages does it consist of, and is covered, as it were, with an hard woody crust. Our author seems here to have described particularly the *cucurbita*, which grows to a great bulk, so that they formed vessels of them for containing honey and pitch, and goblets for drinking ; and, when dried, were made use of by boys for supporting them in the water, when they were learning to swim.

- Then from its slender neck select the seeds ;
 585 But if that, with a globe-like body, please,
 Which with too huge a belly swells, then choose
 The seed which in its womb inclosed lies ;
 This will an offspring bring, fit to contain
Hymettian honey (14), or *Narycian* pitch (15) :
 590 It likewise flagons, fit for *Bacchus*' use,
 And goblets, meet for water, will produce ;
 And boys in rapid streams will teach to swim :
 But then the livid *cucumber*, which grows
 With pregnant womb, and hairy like a snake,
 595 Lies on its crooked belly, always coil'd,
 And, cover'd with the knotty grafs, impairs
 The health, and of th' unfriendly Summer makes
 Diseases more acute ; of this the juice
 Is fetid ; likewise with fat seeds 'tis stuff'd.
 600 But that which to the dropping water creeps (16)
 Below the arbour, and pursues the fame
 As down it trickles, and with too much love
 Extenuated, and of a colour white,
 More trembling than the udder of a sow
 605 Which newly has brought forth, and foster is
 Than curdled milk just in the cheefe-vat pour'd,
 Shall to the taste be sweet ; and, when 'tis ripe,
 In land well watered it yellow grows,
 And to sick mortals sure relief will bring.
 610 When of *Erigone* (17) the faithful *Dog*,
 With *Phæbus*' scorching heat all in a flame,
 Shall of the fruitful trees the fruits disclose ;

(14) *Hymettus*, a mountain in *Attica*, famous for honey.

(15) *Naricia*, a town in *Magna Græcia*, belonging to the people called *Locri*. It seems this country produced abundance of pines, which yielded abundance of tar and pitch.

(16) *Pliny* mentions this quality of the *cucumis*, of the pompion-kind, that, when it grows hanging, it always inclines towards water ; and, if water be placed near it, it will soon shew its tendency towards it : so here our author says it grows slender with too much love, *nimio tenuatur amore*.

(17) *Erigone* was the daughter of *Icarus*, who first taught the people of *Attica* the use of wine, of which the Shepherds having drunk too freely, were intoxicated with it, and slew *Icarius*, whose dog discovered the murder to the daughter, by conducting her to the dead body : her grief was so excessive, that she hanged herself. The Poets have placed her in the heavens, and made her one of the twelve signs ; and they have done the same favour to the dog, and called him *Sirius*, or the Dog-star : it is said to disclose the fruits, because it parches the leaves which cover them.

- And when the small white osier-basket, fill'd
 With mulberries, distils with bloody juice ;
 615 Then from twice-bearing tree the rathe-ripe fig
 Descends ; then are the wicker baskets cramm'd
 With *Damasc'*, and *Armenian*, and wax plums (18) ;
 And apples, which most barbarous *Persia* sent (19)
 With native poisons arm'd (as *Fame* relates) :
 620 But now they've lost their pow'r to kill, and yield
Ambrosian juice, and have forgot to hurt ;
 And of their country still retain the name :
 Those of small size, to ripen make great haste ;
 Such as *great Gaul* bestows observe due time,
 625 And season, not too early, nor too late.
 In colds the *Asian* come, a tardy fruit :
 But underneath *Arcturus'* hurtful star
 The *Livian-tree*, which with *Chalcidian* vies,
 As *Caunian* with the *Cbian*, brings forth figs (20) ;

And

(18) Our author mentions here only three different sorts of plums, *viz.* the *Armenian*, which, *Pliny* says, are commendable for their smell. Father *Hardouin* says, that some modern writers have in vain contended, that they are the same as apricocks; the *cereola*, or, as *Pliny* calls them, *cerina*, from their wax colour; and the *Damascus plums*, so called from *Damascus* in *Syria*, which are commonly called *Damasc prunes*. *Pliny* mentions several other sorts, and says, *nec aliud pomum ingeniosius geminatum*, so curiously diversified by ingraftments.

(19) *Persica*, peaches: they are natives of *Persia*, and still retain their name, with very little variation, in several languages. *Pliny* says, they were foreign both to *Asia* and *Greece*, and that it was late before they were brought into *Italy*; and with difficulty took there; that it is false, that they were poisonous in *Persia*, &c. By this he seems to confute *Columella's* opinion, which, I suppose, was commonly received at that time, and not improper to be mentioned in a poem, where fictions often help the Poet very much forward in his work, which he is not to be supposed always to believe.

Our author mentions only three sorts; *Præcocia*, *Asiatica*, *Gallica*. The first, *Pliny* says, ripen in summer, and were brought into *Italy* not thirty years before his time. *Dioscorides* says, that the smaller peaches were called *Armeniaca*, and by the Romans *Præcocia*. Some call them *apricocks*, but others, with more reason, call them *early peaches*: the *French* call them *les avant-peschés*. The *Asian* and *Gallican* were of a larger size, and have their names from the countries where they were most cultivated, and did thrive best, and from whence probably they were first brought to *Rome*. *Pliny* gives the preference to a sort he calls *duracina*, of a firmer and harder fleshy substance, which does not cleave, and is not easily separated from the stones.

(20) *Columella* mentions here nine different sorts of figs; they take their names either from the persons who first cultivated them, or delighted most in them; the places where they abounded most, or grew in greatest perfection; or from their colour, shape, &c. Most part of them have been already mentioned in the fifth book, except three or four; *viz.* the *Chelidonian*, so called from *χελιδών*, a *swallow*; either because swallows feed on them, or, as some say, because they are ripe about the time the swallows depart; but this does not agree with what *Pliny* says, *lib. xv. c. 18.* that it ripens the last in the

Winter-

- 630 And *Cbelidonians* of a purple hue,
 And the *Mariscans*, which are fat and plump;
 And *Callistruthian*, which with rosy feed
 Does smile; the *white*, which of the yellow wax
 The surname keeps; and *Libyan*, chanel'd round;
- 635 The *Lydian* also with its painted back.
 But, when slow-footed *Vulcan's* (21) sacred rites
 Have duly been perform'd, and clouds begin
 To rise, and rains hang hovering in the air,
 Then is the *turnep* (22) sown, which *Nursia* sends
- 640 From her renowned fields; and *navews*, brought
 From the well-manur'd *Amiternian* lands.
 But anxious *Bacchus*, now the grapes are ripe,
 Requires our cares, and our attendance waits,
 And all our well-drest gardens bids us shut;
- 645 We rustics shut them, and without delay,
 Dear *Bacchus!* (23) we, submissive, thy commands
 Obey: we own thy empire, and with joy
 Thy gifts we gather, and, reviv'd, we tofs

Winter-time. *Columella* says they are of a purple colour. The *Mariscan fig* is so called, perhaps, from its strong robust quality: some think they ought rather to be called *moriscæ*, from *μωρός*, *fatuus*, because *Martial* calls them *fatuas mariscas*, because of their insipid disagreeable flat taste: the *Italians* call it *fico lardare*, it being exceeding large and fat. They used to dry them in the Sun, and keep them for the service of the whole year; *albaque quæ ceræ*. *Pliny* calls these *albiceratæ*, from the resemblance they bear in their colour to white bees-wax.

(21) *Vulcan*, according to the Mythologists, was the son of *Jupiter* and *Juno*. They tell us, that his father, once in an angry fit, threw him headlong out of heaven, down to the island *Lemnos*; and that by his fall he contracted a lameness; for which reason they call him *tarpides*, and by the *Greeks* he is called *κυλλοποδίων*, and *κυλλυίπης*, and *χολοίπης* and they frequently make themselves very merry with the misfortunes and adventures of this lame divinity. His feast was celebrated in the month of *August*.

(22) *Rapum*, a turnep, by the *Greeks* called *γογγύλη*, from its round figure. *Napus*, a navew, by them called *βυβίας*, from *βυβός*, an hill, perhaps because they were planted on rising grounds. Our author says, that the first grew out into a broad belly, and the second did strike its small root downward. The turneps of *Nursia*, a town of the *Sabines*, as *Pliny* says, were most esteemed both for their bigness and sweetness; but the navews of *Amiternum*, a town in *Campania*, according to our author, were the best.

(23) *Bacchus*, as every body knows, was reckoned the Inventor of Wine, and by the heathens numbered amongst their gods, and worshipped: amongst other names he was called *Mænalus*, as some say, from a mountain in *Arcadia*, where he had a temple, and was worshipped. *Eusebius*, de *Præparatione Evangelii*, says he was called *Manolos*, *quasi totus furens*, which is a name more suitable for him: his sacred rites were called *orgia*, as the same author thinks, *ἐπὶ τῆς ὀργῆς*, because of the madness and fury wherewith his priests celebrated his festivals: his priestesses were called *Mænades*, *ἐπὶ τῆ μαινέσθαι*, from the madness of their behaviour also at the same time. He is also called *Lyæus*, from *λύειν*, to *dissolve*, because wine dissolves cares; and *Lenæus*, *ἐπὶ τῆ ληνῆς*, because he presided over the wine-press: all which names our author has distinctly expressed in a few lines.

Our arms, enfeebled with stale wine: 'midst crouds
 650 Of wanton *Satyrs*, *Fauns*, and *Pan* himself,
 With double form, we thee invoke and praise,
 Who dwell'st in *Mænalus*, who all our cares
 Dissolv'st; thee, Father *Bacchus*! who presid'st
 O'er the wine-press, we to our homes invite,
 655 That in our vats the grape's prest juice may work,
 And all our tuns with much *Falernian* fill'd,
 And richest must, may foam and overflow.

Thus far, *Silvinus*, I've essay'd to teach
 The culture of the ground, and to relate
 660 The precepts which our heav'nly *Maro* taught,
 Who first the antient fountains to unlock
 Adventur'd, and through all the *Roman* towns
 His rural verse, like *Ascra's* Poet (24), sung.

(24) *Ascræum carmen*. *Hesiod*, a very antient Pbet, probably as old, if not older than *Homer*: he was of *Ascra* in *Bæotia*, and was therefore call'd *Ascræus vates*. He wrote of Husbandry in verse: *Virgil* imitated him, and therefore he call'd his *Georgics* *Ascræum carmen*.

L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

B O O K E L E V E N T H.

C H A P. I.

What things ought to be done within the Manor-house, by a Man advanced to, and intrusted with the Office of a Bailiff.

CLAUDIUS, a fellow of the college of *Augustus's* priests (1), a youth of as ingenuous a natural disposition, as of excellent learning, incited by the discourses of several learned men, and especially of such as are skilful in Husbandry, has, by his importunity, engaged me to compose a treatise of the Culture of Gardens, in prose: nor indeed was I mistaken, as to this event of the matter, when I reduced the foresaid subject to the laws of verse. But as you, *Publius Silvinus*, still persisted to ask a taste of my versification, I had not

(1) *Claudius Augustalis*. The Emperor *Tiberius* instituted a college of priests, 21 in number, to the honour of the *Julian* family, as he pretended; and, as they had ranked *Augustus* among their gods, these priests were appointed to celebrate the sacred ceremonies they performed to this new divinity: *Claudius*, who was afterwards Emperor, was, as *Suetonius* says, by a vote of the Senate, added to their number, contrary to the usual way of election, which was by lot. It is very probable, that this *Claudius*, mentioned here by *Columella*, is the same who was afterwards Emperor, who, in the beginning of the reign of *Tiberius*, might properly enough be called *adolescens*, being but about 24 years old, for he died aged 64: he reigned 13 years, 8 months, 28 days; so that he was about 50 years old when he began to reign; from which if we subtract 22 years that *Tiberius* reigned, there remain 24, the age of *Claudius* when *Augustus* died; and we may find some above that age called *adulescentes* by classical authors. From this we may conclude, that *Columella* wrote this book either in the latter end of *Augustus's* reign, or in the beginning of that of *Tiberius*.

power to deny you, intending presently afterwards, if it should be acceptable to you, to do that which I am now undertaking; *viz.* to subjoin the business of a Gardener to the offices of a Bailiff: which tho' I seemed, in some measure, to have fully done in the first book of Husbandry; nevertheless, because our friend of the college of *Augustus's* priests has frequently, with earnestness, demanded it of me, I have exceeded the number of books, which I had now almost completed, and have published this eleventh book of the precepts of Husbandry.

It is proper, that a Bailiff, who has the charge of your land and family committed to him, should be neither in the first, nor in the last stage of life: for the servants despise a novice as much as they do an old man; because the former is not as yet acquainted with rural affairs, and the latter is not now in a condition to manage them; and youth makes the one negligent, and old age the other slow and unactive; therefore a middle age is the fittest for this office: and, if accidental defects and indispositions of body do not happen, from thirty years old to sixty, he may be able to perform all the offices of an able and sufficient Husbandman.

But whoever he be, that shall be destinated to this business, he must be very knowing, and exceeding robust, that he may teach those that are under his command, and that he himself may easily do what he commands: for, indeed, nothing is either taught or learned rightly, without an example; and it is best, that a Bailiff be the master of the Labourers, and not their scholar; considering what *Cato*, who was an example of the manners of antient times, did say, *That a Master is ill dealt by, whom his Bailiff teaches.* Therefore in *Xenophon's Oeconomic*, which *Marcus Cicero* translated into *Latin*, that excellent man *Ischomachus* the *Athenian* (2), being asked by *Socrates*, whether he used, when the affairs of his family required it, to purchase a Bailiff in the market, as he did a common Handicraftsman, or to train him up himself; I myself, says he, instruct him: for he, who, in my absence, is substituted in my room, and succeeds as my deputy, to supply my diligence, ought to know such things as I myself know. But these things are too antient, and, indeed, belong to that time wherein the same *Ischomachus* denied, that there was any man ignorant of acting the part of an Husbandman. But let us,

(2) *Ischomachus*. It is no matter whether this was a fictitious or a real person: he is introduced by *Xenophon* as discoursing with *Socrates* about the management of domestic affairs; where we have many wise precepts of œconomy put into his mouth by that noble and ingenious antient author, many of which are here mentioned by *Columella*.

who are mindful of our own ignorance, commend to the care of the most skilful Husbandmen such young men, as are of a quick and lively apprehension, and of a robust body; by whose instructions, if it were but one out of many (for it is a difficult thing to instruct perfectly) may attain to the knowledge, not only of acting the part of an Husbandman, but of commanding also: for there are some, who, tho' they are most excellent and approved workmen, and understand all kinds of work, having very little prudence and skill to command, ruin their Masters affairs, by acting either with too much cruelty, or with too much lenity also. Wherefore, as I have said, the future Bailiff must be taught, and, from the time he is a boy, hardened in rural business and labour, and, by many trials, be first narrowly examined and looked into; not only whether he has thoroughly learned, and attained to the knowledge of rural discipline, but, also, if he is honest and faithful to his Master, and has a real good will and affection to him, without which the Bailiff's greatest knowledge is of no advantage.

But the chief and principal thing, in this kind of mastership, is to know and to judge rightly, what sort of office, and what sort of labour, is to be assigned and enjoined to every one in particular: for even the strongest cannot execute what is commanded, if he be ignorant of what he is doing; nor the most skilful, if he has not strength: so the quality of every thing must be considered; because there are some works that require strength only, such as removing weighty things, and carrying burdens; some require strength and art united, as digging and plowing, and cutting down corns and meadows; to some less strength, and more art, is applied, as to the pruning and grafting of vineyards: also knowledge is of most account in some things, as in feeding of cattle, and giving them medicines: of all which offices the Bailiff, whom I have already mentioned, cannot be a right judge, unless he be also skilful, that, in every thing whatsoever, he may be able to correct what is done amiss: for it is not enough, that he has reprov'd one that has done a fault, if he does not teach him the way to do right. Therefore I am willing to say the same thing over again: it is as necessary, that one, that is to be a Bailiff, be taught, as one that is to be a Potter, Carpenter, Mason, or any trade whatsoever: and I would not take upon me to determine, whether these trades are not so much the more expeditiously learned, inasmuch as they are of less compass. But the subject-matter of Agriculture is great and diffuse; and, if we would fully enumerate all its parts, we could scarcely number them. Wherefore I cannot enough admire, which

I very justly complained of in the first book of my writings, that of the other arts, which are less necessary for life, there were found Masters and Teachers; but of Husbandry, there were neither Scholars nor Teachers to be found, unless the greatness of the subject has begotten an awe and reverence, either of learning or professing a science which is almost boundless, when notwithstanding it ought not therefore to have been neglected, by basely despairing of it. For neither is the art of Oratory deserted, because a perfect Orator has no-where been found; nor Philosophy, because there is no man of consummate wisdom; but, on the contrary, very many men encourage themselves at least to learn some parts of them, altho' they cannot understand them all: for what justifiable reason is that of being intirely speechless, because you cannot be a perfect Orator; or to be driven to sloth and idleness, because you despair of wisdom? for it is no small glory to have had a share of a great thing, how little soever you may have possessed of it.

Who therefore, say you, shall teach him that is to be a Bailiff, if there is no Professor? And I myself know very well, that it is a most difficult thing to attain to the knowledge of all the precepts of Husbandry from one author, as it were: nevertheless, tho' you will scarcely find any one man thoroughly acquainted with the whole art, yet you may find many that are masters of parts of it, by whom you may be able to form a complete Bailiff. For there is both somebody to be found who is a good Tiller of the ground, and an excellent Digger, or Mower; as also a good Planter and Dresser of trees, and a Vine-dresser; as also a Farrier, and a very good Shepherd or Herdsman; and none of these will refuse to communicate the principles of their knowledge to one that desires it.

Therefore let him, who is formed and instructed by the knowledge and skill of several Husbandmen, and who shall take upon himself the office of a Bailiff, avoid, in the first place, the familiar and intimate conversation of those of the family, and much more that of strangers. Let him be very abstemious with respect to wine and sleep, both which are very great enemies to diligence: for as a drunkard impairs his memory, so he becomes remiss and careless in his office; and very many things escape one that is given to sleep: for what can he either do himself, or command any other, when he is asleep? Also let him have an aversion to venereal amours, to which if he once give up himself, he will not be able to think of any other thing whatsoever, but that which he loves: for his mind, being inveigled and bewitched with vices of this sort, thinks that there is neither any
reward

reward more agreeable than the gratification of his lust, nor punishment more grievous than the being deprived of what he desires, and is fond of.

Therefore let him be first awake, and up in the morning, before any other body; and, according to the seasons of the year, let him bring out the servants to their work quickly, who are always for lingering and delaying to go to it; and let him march at their head himself, and show himself active and forward: for it is of very great importance, that such as labour the ground should begin their work as soon as the morning begins to dawn, and not through idleness and laziness proceed slowly in it: for, as the same *Ischomachus* before-mentioned says, I would rather have the service and labour of one active and industrious man, than that of ten men who are negligent and slow; for it occasions a great deal of mischief, if labouring men have liberty to trifle away their time wantonly (3). For as in going a journey, the man, who always goes on, and does not loiter and stop by the way, frequently comes by one half sooner to the end of his journey, than he, who, having set out at the same time, sought after, and amused himself with the shades of trees, the delightfulness of springs, or the refreshing coolness of the air; so, in the business of Agriculture, it can scarcely be told, how much an assiduous constant labourer is preferable to one that is sluggish, and a loiterer. Therefore it is necessary, that the Bailiff take care, that all the servants, as soon as it is light, go forth to their work, not in a dilatory languishing manner, but that with vigour, and cheerfulness of mind, as if they were going forth to some battle, they boldly follow him, marching at their head as their Captain; and let him frequently encourage and cheer them up, while they are actually at work: and sometimes, as if he were going to assist him that is flagging and fainting, let him, for a little while, take the iron-tool out of his hand, and do his business; and admonish and direct him, that it ought to be done so, as he himself has vigorously done it.

And in the evening, when the twilight is come, let him leave no body behind him; but let him march after them all, like a good Shepherd, who suffers none of the cattle in his flock to be left in the field. Moreover, when he comes under the roof, let him do the same thing that that careful Shepherd does; and not presently shut up and hide himself in his apartment, but take as much care of every

(3) *Meretricandi*. Some divide this word into two; and thus it signifies, *to pass the time with mere trifling*; if it is to be read in one word, it signifies, *following after lewd women*: but the first seems to be the true reading.

body as possibly he can. Or, if there be any body (as it often happens) wounded, or that has received hurt in doing his work, let him apply something to assuage his pain; or, if there be any other in a more weak and languishing condition, let him presently convey him to the infirmary, and give orders, that every other thing, convenient and necessary for his cure, be given him. But, of those who are in a good state of health, no less care must be taken, that their meat and drink be given them without fraud, by those who have the charge of the provisions. And let him always accustom the Rustics to eat their meals in their Master's house, and by the fire appointed for the use of servants; and let him eat his own meals within their view, and be an example of frugality to them: neither let him sup leaning upon a couch, except upon solemn holidays; and let him so celebrate the festivals, as to bestow some largesse upon the stoutest and most active and frugal among them: and let him sometimes admit them to his own table, and vouchsafe to confer some other honours also upon them.

Let him also, upon idle days, review all the implements of Husbandry, without which no work can be done; and frequently examine, look into, and review the iron-tools: and let him always purchase them double; and, having mended and repaired them from time to time, let him keep them safely, that so, if any of them be damaged while they are at work with them, there may be no necessity of borrowing of a neighbour; for there is more lost by diverting the servants from their business, than the price of such things amounts to.

Let him keep the family rather neatly and profitably, than delicately cloathed; that is, well fenced against, and defended from the colds and rains; both which are best guarded against by coats of skins with sleeves, and frocks with hoods: and if this be done, they may endure any winter-day whatsoever, when they are at work. Wherefore he ought to review, and count over, as well the servants cloaths as the iron-tools, as I said before, twice every month: for a frequent reviewing and taking an inventory of them, neither affords hope of impunity, nor room for committing a fault. Therefore he ought daily to call by name all the slaves which are in bonds, and which are condemned to prison, or the house of correction (4), and examine
if

(4) After the *Romans* had conquered *Italy*, and many other countries, the most powerful amongst them got possessions of lands into their own hands, contrary to the laws formerly made for restraining them from possessing above 500 jugera at most: but they frequently eluded these laws, and, under fictitious names, purchased, or, by other means, got into their possession, vast tracts of land, which they either let to others at a certain rent,

if they are carefully fettered; as also if the place where they are in custody be well secured, and strongly fortified: neither let him, if either his Lord, or he himself, has put any body in fetters, loose them from their bonds, without the Master of the family's express command: let him not know what it is to offer sacrifices, but by his Lord's direction. He shall never willingly know, or have any acquaintance with any Diviner (5), or Sorcerers, both which sorts of people disturb simple and ignorant minds with vain superstition.

He shall not frequent the town, nor any fairs and markets, but in order to sell or buy some necessary thing. Neither ought he to go out of the bounds of his own colony or farm, nor by his absence give the servants opportunity and time to leave off working, and commit misdemeanours. Let him hinder all new paths, or new limits, to be made in the land. Let him very rarely receive and entertain any stranger, except it be his Master's intimate friends. Let him not make use of his fellow-servants for any service of his own, nor allow any (except great necessity shall force him) to go out of the bounds. Let him not make use of his Master's money, either for buying cattle, or any other thing to sell again: for this thing diverts and withdraws the Bailiff's care from his proper business, and makes him rather a Trader than an Husbandman; and never suffers him to balance accounts with his Master, and pay him what he owes him: but, when he is required to tell down the money, instead of the cash, the goods are produced.

rent, or cultivated them by vast numbers of slaves, which they constantly employed and kept at their villas, where they commonly built an house they called *ergastulum*, which, according to its etymology, signifies a *work-house*, but was really a prison: it was mostly built under-ground, with small windows, and well secured; there they confined their slaves, sometimes only in the night-time, and then led them out to work in the day-time. But our author seems to intimate, that they were designed for naughty servants, who were confined there as a punishment for crimes they had committed; and, no doubt, were condemned to hard labour; as grinding of corn, beating of hemp, &c. To these places also they commonly confined, in the night-time, such of their slaves as they suspected were inclined to run away. These private prisons, as has been already said, were so much abused in after-times, that several Emperors thought fit to abolish them; it having been found, that several innocent persons, and even freemen, had been trepanned into them, and kept as slaves therein, by the tyrannical and oppressive proprietors of the same.

(5) *Aruspex*, a Diviner: their business was to look into the entrails of their sacrifices; and from the appearances they made, *viz.* if the parts were found and intire, or decayed, or not in their natural position, or from the appearance of the flame when they were burning, &c. to foretel good or bad success, &c. They were once in great esteem at Rome, and their discipline, which was brought from *Tuscany*, was greatly revered by the *Romans*: but, it seems, our author had no great opinion of them, and looked upon them as a pack of deceivers; and advises a Bailiff not to be acquainted with any of them.

Therefore

Therefore he must be obliged to avoid this, as much, indeed, as an inclination for hunting and fowling is to be avoided; by which things very many servants are taken away from their proper business.

Also, he ought carefully to consider and observe those things, which with difficulty are observed in greater governments, that he deal neither too cruelly, nor too remissly, with those that are subject to him; and that he always cherish the virtuous and the diligent, and also spare such as are not so good and dutiful as they ought to be; and that he use such moderation, that they may rather be afraid of his severity, than detest and abhor his cruelty. And it will be in his power to guard against and prevent this, if he rather choose to use precautions, that the Labourer may not commit a fault, than to punish him in the evening after he has committed it: for there is no surer guard can be set even upon the naughtiest man living, than the daily exacting a certain task of him: for that famous saying of *Marcus Cato* is as true as an oracle, *That by doing nothing men learn to do evil.* Therefore the Bailiff must take care, that the tasks be performed; and these things he will with no great difficulty obtain, if he always make his appearance, and shew himself: for thus the Overseers of every particular sort of business will diligently execute their offices; and the servants, after having been kept hard at work, being tired, will rather set their minds upon their victuals, and upon rest and sleep, than upon doing of mischief.

Moreover, in every thing relating to Husbandry, and in all rural affairs whatsoever, as in all other affairs of life, the most valuable thing of all is, that every man should be sensible, that he is really ignorant of what he knows nothing of, and be always desirous to learn what he is ignorant of. For, tho' knowledge is of great advantage, nevertheless imprudence, or negligence, does more hurt than it, *viz. knowledge*, does good; especially in Husbandry, of which art the principal point is to have done, once for all, whatever the nature and method of the culture shall require to be done: for altho' what is done amiss, either through negligence or imprudence, may sometimes be mended; nevertheless, the Owner has already sustained a present loss: nor can the thing afterwards yield such an increase, as both to repair the loss of the article that has been lost, and make up again the advantage which would have redounded from it. Who is it that doubts how irrecoverable time is, that maketh its escape, and slideth away before our eyes? Therefore let him remember this, and always beware, above all things, that, for want of foresight, he be not overcome by his work: for the business of Agriculture is most insidious,
and

and apt to deceive a dilatory man: which very thing *Hesiod*, a most antient author, has more expressly intimated in this verse (6),

- ‘ The man, who, full of doubts, delays his work,
- ‘ With losses always wrestles.’

Wherefore let the Bailiff be of opinion, that that common saying, which Husbandmen make use of, concerning the planting of trees, *viz.* *Do not hesitate to plant*, is to be applied to the whole culture of the ground; and believe, that not twelve hours are neglected and let pass, but that a year is lost, unless he do and finish pressing business upon its own day. For since every thing ought to be done almost in its own proper moments, if one work be done later than it ought to have been done, the other parts of Culture also, which follow, will be entered upon too late, after their proper seasons are past; and the whole order of the work being disturbed, and put out of its due course, deprives you of the hope of the whole year. Therefore such a directory, concerning the work and business of every month, as depends upon the observation of the position and influence of the stars of Heaven, is very necessary; for, as *Virgil* says (7),

- ‘ With as much care we must observe the stars,
- ‘ *Arcturus*, and the *Kids*, and glist’ring *Snake*,
- ‘ As they, who, homeward-bound, through stormy waves
- ‘ Of th’ *Euxine* sea, *Abydos*’ narrow chops,
- ‘ Where breeds the purple-fish, attempt to pass.’

Against which observation I do not deny I have disputed with many arguments, in those books which I wrote against Astrologers. But, in these disputations, inquiry was made into the truth of that which the *Chaldeans* most impudently affirm as a thing certainly to be depended on, That the changes of the air answer to certain stated days, as if they were confined within certain bounds. But, in this rural discipline, such scrupulous niceness is not required: for the prognosticating the future weather, tho’ it be done but grossly and inartifi-

(6) *Hesiod*, *Eps.* 2. 31.

(7) *Virg. Georg. lib.* i. 204.

The antients, as has been already said, were of opinion, that the rising and setting of several stars had a mighty influence upon all the fruits of the ground, and some of them they looked upon as mighty pernicious; for which reason *Pliny* calls them *horrida sidera*, as *Arcturus*, *Orion*, and the *Kids*, which they thought always produced storms and tempests.

cially, as they say, and not with that exactness as might be wished, yet will be of as great advantage to the Bailiff as you can desire, if he be fully persuaded, that the star will have its due force and influence, sometimes before, sometimes after, and sometimes also upon the very day when it rises or sets: for that man will be provident enough, who shall have it in his power to take precautions, and secure himself several days before, against suspected weather.

C H A P. II.

What must be done every Month, by accommodating all Sorts of Work to the Times and Seasons.

T Herefore we shall give directions what must be done every month (1), so accommodating rural business to the times and seasons, as the state of the weather will allow; of the variety and changes

(1) The antients were great observers of the heavenly bodies, and, from their observations, they formed to themselves certain rules for their guidance and direction in all the different parts of Agriculture: they not only considered the rising and setting of certain constellations, and particular stars, as indications and signs when to begin plowing, sowing, and other works of Husbandry, but they thought, that they had great influence over the temperature of the air, and the fruitfulness of the earth: and tho', at first, they only took notice of them as signs pointing out the times of the year, when heat or cold, driness or moisture, are usually predominant; yet, in process of time, many began to look upon them as the causes of these qualities. But *Columella* was so far from attributing so great virtue to the stars, that he composed some books against those Astrologers, who pretended certainly to foretel the changes of the weather: and all that he pretends in this chapter is, to warn Husbandmen to be constantly upon their guard; because, from a long series of observations, made both by himself and others, there was reason to expect, that such and such changes of weather would happen about the rising or setting of such and such stars, not always indeed upon the very same day, but sometimes before, sometimes after: accordingly, in this chapter, he gives an account of the rising and setting of such of them as he thought necessary to be known for the purposes of Husbandry; and he has formed a calendar for the direction of Husbandmen in every part of it, throughout all the months of the year. And here it may not be amiss, for the information of such as are unacquainted with such things, to tell them, that the antient Astronomers, in order to assist the memory to retain the number and disposition of the stars, and to enable themselves and others to speak intelligibly of them, and communicate their thoughts to others concerning them, divided or reduced the starry firmament to certain systems and collections of stars, or constellations, which they imagined or supposed to represent the figures of some real or imaginary animals, or of some other known visible thing, and gave them names accordingly; most of which they borrowed from the fabulous histories of their gods, heroes, &c. By which contrivance, whenever any mention is made of any of these constellations, or of any particular star belonging to the same, such as are acquainted with the celestial sphere, can as easily turn their thoughts

changes of which, if, from this brief account, the Bailiff shall be forewarned, he shall either never be deceived, or, I am persuaded, not very often. And, that we may not depart from our excellent Poet (2),

- ‘ When Spring begins, let him begin to till
- ‘ The ground.’


But an Husbandman ought not to observe the beginning of the new Spring in the same manner as an Astronomer, so as to wait for that particular day, which is said to begin the Spring; but let him even take in some part of the Winter: because after the shortest day is past, the year begins to grow warm, and a milder day permits him to begin his works.


Therefore from the 13th day of *January*, (that he may shew regard to the first month of the *Roman year*) he may auspiciously begin the several parts of every sort of Culture, of which he shall finish some that have been already begun, and are not yet finished, and begin others which belong to the future time. And it will be sufficient, that every work be finished towards the middle of each month: for a work dispatched and finished fifteen days sooner than is needful, cannot be said to be done too much out of season; nor, on the other hand, can that which is done so much later, be said to be done too late. The xiii of *January* is stormy windy weather, and an uncertain state. The xv of *January* uncertain weather. On the xvi of


thoughts or their eyes towards them, as they can to such places of the earth where they dwell, or are well acquainted with. *Columella*, in this chapter, mentions not all, but many of these constellations, and only tells us when they rise and set, without any further description; so that he supposes his readers to have some knowledge of the celestial sphere, and which he did not think it his business to teach. But, as it is probable there may be some who may have the curiosity to look into this chapter, who are not very well acquainted with these things, perhaps it may not be unacceptable to them, to give them an imperfect hint, from *Aratus*, *Hyginus*, and some others, of the places of the sphere wherein they are situated, and of their situation in respect of those that are near them; and of the characters wherewith the twelve signs of the Zodiac, through which the path of the Sun passes, are commonly marked; and sometimes give the reasons of the names of the constellations, &c. and this without any order, but just as they are mentioned by the author: and, as the greatest part of the *Latin* names of the Constellations are become familiar to our language, and are as easily understood as if they were rendered into *English*, it will not seem necessary always to translate them; and, probably, it may be thought better frequently to retain them, and put the *English* names after them.

(2) *Virg. Georg. lib. i. 43.*

January the Sun passes into *Aquarius* (3); *Leo* (the Lion) (4) begins to set in the morning: a south-west wind, sometimes a south wind, with rain. The xvii of *January*, *Cancer* (the Crab) (5) leaves off setting: it is cold Winter-weather. The xviii of *January*, *Aquarius* begins to rise: the south-west wind is the sign of a storm. The xxii of *January*, the bright star in the *Harp* (6) sets in the evening: a rainy day. The xxiv of *January* forebodes a storm, from the setting of the Constellation *Pristes* (the Whale): sometimes also there is a storm. The xxvii of *January*, the bright Star which is in the breast of *Leo* sets: sometimes it is a sign, that the Winter is divided into two parts (7). The xxviii, either the south, or south-west wind blows, cold Winter-weather: a rainy day. The xxx of *January*,

(3) *Aquarius*, the Water-bearer, is the eleventh sign of the Zodiac: it is commonly marked thus , which represents the wavy surface of the water, there being a certain number of Stars in this Constellation so placed, as seem to have this appearance. *Aratus*, and some other antient Astronomers, have reckoned about thirty Stars in this Constellation. He has his feet fixed in the tropic of *Capricorn*, and stretches out his left-hand as far as the back of *Capricorn*, and with his right-hand almost touching the mane of *Pegasus*. Some say, that this Constellation had its name in memory of *Ganymedes*, who was cup-bearer to *Jupiter*: others say, that it was so called in memory of *Deucalion*, in whose reign a great deluge of water happened.

(4) *Leo*, the Lion, is the fifth sign of the Zodiac, and is marked thus , which represents the tail of the Lion, and, as some say, is an emblem of his courage, he lashing himself with his tail when he is angry: perhaps they, by this furious animal, intended to express the violent heat of the Sun, at the time when the Sun enters into this sign. He is represented as looking towards the west, and placed above the body of *Hydra*, from its head to its middle part, and divided by his middle by the tropic of *Cancer*; and as having his fore feet placed below the circle itself. The antient Astronomers reckoned about 19 Stars in this Constellation.

(5) *Cancer*, the Crab, is the fourth sign of the Zodiac, drawn on the globe in the figure of a Crab: it is marked with this character . The learned Dr. *Long's* opinion seems very reasonable, that the intention of the Inventor of this character was to represent the change of the Sun's declination from north to south, by two lines drawn so as to point contrary ways. The circle that is parallel to the equinoctial, and passes through the beginning of this sign, is called the tropic of *Cancer*, or the northern tropic, to which when the Sun comes, about the 11th of *June*, it makes the Summer-solstice, and he then turns his course back again towards the equator: they reckoned formerly 18 Stars in this Constellation. It is represented as divided by the middle by the tropic of *Cancer*, and placed a little above the head of *Hydra*.

(6) *Fidicula* is the biggest star in the Constellation *Lyra*, or the *Harp*: sometimes by authors it is put for the whole Constellation.

(7) *Hiems bipartita*. If regard be had to the number of days, more than the half of the Winter is now past: but, it may be, *Columella's* meaning is, that, with respect to the weather, or coldness of the season, the setting of the bright Star in the breast of *Leo* signifies, that only the half of Winter is past; but the meaning of this expression seems very dubious: however, it cannot be, that, according to the number of the days they assigned to the Winter, it was then divided into two equal parts.

Delphinus (8) (the Dolphin) begins to set; also *Fidicula* (the Harp) sets. The xxxi of *January* the setting of the forementioned Stars causes a storm: sometimes it is only a sign of it.

We have run over this half month, and those following, one after another, by taking particular notice of, and mentioning the storms, that the more cautious Bailiff, (as I have already said) may either abstain from all manner of work, or make the greater dispatch. Therefore from the xiii of *January*, which is accounted to be the time between the Winter solstice and the coming of the western breezes, if you have a larger extent of vineyard, or of plantations of trees for supporting of vines, you must return to prune that part which remained unpruned in Autumn, but so that the vine may not be wounded in the morning; because the firm-wood of it being as yet stiff with the hoar-frosts, and the nocturnal frosts, greatly dreads the iron-tool. Therefore while you give it leave to thaw, till the second and third hour of the day; the thorn- and briar-hedges may be thinned, lest by their growth they incroach upon, and take up the land, the corns may be weeded, the rods and sprays gathered into heaps, and, finally, wood may be cut for fuel, that so when the day grows warm, the business of pruning may be carried on.

In places exposed to the Sun, and also in such as are lean and dry, the meadows must now be cleansed, and preserved from the cattle, that there may be plenty of hay. It is also a proper time to till dry and fat lands; but both such as are of an ousy and of a middling habit, must be fallowed in Summer; but such as are very lean and dry, must be plowed after Summer in the beginning of Autumn, and afterwards sown. But a *jugerum* of fat land, at this time of the year, is very easily plowed by two labourers; because the earth, being as yet wet with the Winter rains, yields easily to culture. And in the same month, before the first of *February*, the corns sown in Autumn must be sarcl'd, whether they be of the seed of red-bearded husked wheat, which some call our own *Italian* husked wheat, or of common wheat: and the proper time for sarcling them is, when the corns that are sprung up have begun to have four blades or leaves: and they who have a Labourer to spare from other work, ought now at length to sarcl the early barley also.

(8) *Delphinus*, the Dolphin; a Constellation in the northern hemisphere: it is represented not far from that called the *Eagle*, with its head almost touching the nose or snout of *Pegasus*: it contains ten Stars: it rises with the hinder-part of *Sagittarius*, and it sets when the head of *Virgo* rises: it consists of ten Stars, according to the antients.

The bean also requires the same culture, if now its stalk be grown up to the height of four inches: for it is not expedient to sarcle it before, while it is too tender. It will be better for us to sow vetches the preceding month; nor yet will it be amiss to sow them in this very month, or in the next: for Husbandmen direct, that by no means they should be committed to the earth in the month of *March*. It is right now to dig vineyards, which are propped and supported with stakes, and tied. Such grafts or cyons, as blossom first, must be presently grafted about the 13th of the month, as those of cherry-trees, *tuberes* or peach-nuts (9), almond-trees, and peach-trees. It is a fit time for making cloven vine-props, or pales on stakes also: nor is it less proper for cutting down trees for buildings. But both these things are better done when the Moon is decreasing, from the twentieth to the thirtieth day; because all wood so cut is thought not to be infested with cariousness. One workman can, in one day, cut down one hundred pales or stakes, and lop, sharpen, and point them: but he can cleave, chip, and plain on both sides, and sharpen sixty oaken or olive vine-props. Also he can by candle-light in the evening make ten pales or stakes, and five cloven vine-props; and the like number by candle-light in the morning. If the wood be of oak, one Carpenter ought to hew perfectly well twenty feet square of it, and this shall make one load: but if it be of pine-tree, twenty-five feet square may be as expeditiously done by one man; and this also is called a load: as also of elm and ash xxx feet square: but of cypress-tree xl feet. As also of the fir- or poplar-tree, every single workman may hew perfectly well sixty feet square; and all these measures are in like manner called loads. In these days also the early lambs, and the young of other cattle, and the larger four-footed beasts also, ought to be marked with a branding iron.

The first of *February Fidis* (the Harp) begins to set: the wind is easterly, and sometimes it is a south-wind with hail. The iii of *February* all the *Harp*, and the half of *Leo*, set: the wind is north-west or north, and sometimes west. On the v of *February* the middle parts of *Aquarius* rise: windy stormy weather. The vii of *February* the Constellation *Calisto* sets (10): the westerly winds begin to blow.

(9) *Tuberes*: a kind of fruit-tree, brought out of *Africa* in the time of *Augustus*. *Pliny*, lib. xv. c. 14. reckons it among pomiferous trees; and says that its fruit is but small, and more like berries than apples. Father *Hardouin* says, they call them in *France* *pesches-noix* (peach-nuts): they are mentioned in some other parts of this work.

(10) *Calisto occidit*. Antient authors call *Ursa major* (the great Bear) by this name: she was, as the Mythologists say, the daughter of *Lycæon* King of *Arcadia*; and, being
by

blow. The viii of *February*, windy stormy weather. The xi of *February* the east-wind blows. During these days, in such places as lie upon the sea-coasts, and are warm and dry, the meadows, or arable lands, are cleansed, and set apart and kept for hay. Such parts of vineyards as were omitted, and left unfinished, because of the shortest day, or the colds, must now be propped and tied, lest afterwards the swelling buds be hurt, and the eyes bruised and rubbed off. Also in the same places, the digging of the vineyards must be dispatched and finished, and both the lopping of the trees planted for the supporting of vines, and the binding of the vines to them, must be finished; of which things no certain tasks can be assigned.

Then, between the 5th and 13th, nurseries of apple-trees must be made, and the plants that are come to maturity must be transferred from the nurseries to trenches. The pastination also, which was begun in the month of *December*, or of *January*, must now be put an end to, and planted with vines. But a *jugerum* of ground, if the earth be digged down to the depth of three feet, is pastinated by lxxx labourers in one day; or, if it be digged to the depth of two feet and an half, by L. Labourers; or if to the depth of two feet, by xl. Nevertheless, in dry land this is the least depth that the pastinated ground must have, where young stocks or cuttings are to be planted: for even the depth of one foot and an half may suffice for any kind of pot-herbs that are to be planted in it, which, for the most part, is dispatched by thirty Day-labourers to each *jugerum*.

At this same time a part of the dung must be spread upon the meadows, and a part of it sprinkled round the olive-trees, and other trees: as also nurseries of vines must be carefully made, and most carefully planted with the very freshest cuttings. Now it is profitable to plant poplars, willows, and ash-trees, before they put forth their leaves, and also elm-plants; or to lop such as have been set before, and to dig round them, and cut off their uppermost small Summer-roots. You must now also carry out of the corn-lands all the sprays of the vines, while the vineyards are not yet digged, and the branches of the trees that support the vines; or briars; and, in a

by *Diana* changed into a bear, because she had not preserved her virginity, she was by *Jupiter*, who had debauched her, placed among the Stars, &c. The seven principal Stars of this northern Constellation are commonly called *Charles's wain*, having four Stars in the form of a parallelogram, which represent the wheel; and three lying almost in a straight line, which represent the beasts of draught; these were the Stars they chiefly took notice of: but in all, the antients reckoned twenty-one Stars therein. But, as this Constellation does not set, it is probable the text is corrupted in this place, or that the author means some other Star by this word.

word, whatever thing is lying upon the ground, and may hinder the person that digs, or in any other way moves and labours the earth, and lay them to an hedge: you must plant new rose-beds, or dress the old ones: you must now plant nurseries of reeds, or cultivate the old ones also; and make willow-groves, or lop, weed, and dig them: and either sow broom-feed, or set it in plants in trenched ground; or also in a furrow. Also it is not improper to sow trimeſtrian corn in this season; altho' in warm regions it is better to do it any time in the month of *January*.

The xiii of *February Sagittarius* (the Archer) (11) sets in the evening: it is extremely cold Winter weather. The xiv of *February Crater* (the Cup) (12) rises in the evening: the wind changes. The xv of *February* the Sun passes into *Pisces* (the Fishes) (13): sometimes there is a storm of wind. The xvii and xviii of *February*, it is a west or south wind, with hail and showers of rain. The xx of *February Leo* (the Lion) ceases to set: the north winds, which are called *Ornithian* (14) are wont to continue for thirty days: then also comes the swallow. The xxi of *February Arcturus* rises in the fore-part of the night: the day is cold, with a north or north-west wind, and sometimes rain. The xxii of *February*, in the twilight in the evening, *Sagitta* (the Arrow) begins to rise: variable weather (they are called the *Halcyon* days) (15). In the *Atlantic* sea indeed, there is observed

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(11) *Sagittarius*, the Archer, is the ninth sign of the Zodiac, and it is marked with this character ♐. In old books he is represented as a Centaur, with a bow and arrow, in a posture of just going to shoot: he is placed from his feet to his shoulders in the circle of *Capricorn*, so that his head seems to appear without the circle: his bow is divided by the *circulus lacteus*, and, according to the antients, he consists of 15 Stars.

(12) *Crater*, the Cup, is a small Constellation, consisting of eight Stars, placed above the first curvature of that great southern Constellation called *Hydra*.

(13) *Pisces*, the 12th and last sign of the Zodiack; it is commonly marked thus ♓, and, in some old books, it is the picture of two fishes tied together back to back: one of them is called the northern fish, because it is placed between the equinoctial and the tropic of *Cancer*, under the arm of *Andromeda*, and looks towards the north: the other is called the southern fish, and is placed in the extremity of the Zodiac, under the shoulders of the *Horse*, and they are joined together with certain Stars like a small line, from the first foot of *Aries*: the southern fish has 17 Stars, and the northern 12; and the line of Stars that joins them are 12 in number.

(14) *Venti Ornithiæ*. *Pliny*, lib. 2. c. 47. gives an account of *Etesian* or anniversary winds, which, in different countries, blow from different quarters; and says, that when they blow from the south-east they are called *ornithiæ*; probably because with them came some birds, which change countries at certain seasons of the year, *ὄρνις* signifying a bird.

(15) *Halcyonei dies*. These days have their names from a certain bird they called *halcyone* or *halcedo*, ἁλκυὼν τὸ ἐν ἀλὶ κνεῖν, as some think, because it makes its nest, and hatches its eggs in the sea, during which time it is very calm. *Pliny* says, that the *Halcyon* days

are

to be the greatest calm. The xxiii of *February* windy weather: the swallow is seen. During these days, in cold places, is the proper season for the doing of those things we have already mentioned; but in warmer places, altho' it is too late, nevertheless it is necessary. But this seems to be the best season for planting cuttings and quicksets; nevertheless, it is not worse between the first and fifteenth of the following month, provided the country be not exceeding hot: but, if it be colder, it is even better. Also, in moderately warm places, this will be a convenient time for grafting trees and vines.

On the first of *March* a south-west wind; sometimes a south wind with hail. On the second of *March* *Vindemiator* (the Vintager) (16) appears, which the *Greeks* call *τρυνήτης*: northerly winds. The fourth of *March* a west wind, sometimes it is a south wind: it is very cold weather. The vii of *March* *Pegasus* (the Horse) (17) rises in the morning: a blast of the north-east wind. The xiii of *March* the northern *Pisces* leave off rising: northerly winds. The xiiii of *March* the ship *Argo* (18) rises: a west or a south wind, sometimes a north-east wind. In these days it is proper to put in order, and furnish gardens with every thing necessary, of which I shall speak more particularly in their proper place, lest, in this croud, as it were, of different sorts of business, I should seem to have described somewhat too negli-

are about the time of the Winter-solstice, and that about seven days before that time they make their nests, and hatch their eggs about seven days after, and then the sea is calm and navigable: he says also, that this bird is a little larger than the sparrow; the greatest part of it of a bright azure colour, with some purple and white feathers intermixed, with a small long neck, and is seldom seen but at the setting of the *Pleiades*, and about the time of the Solstices; so that, in the opinion of some, it is not what is commonly called the *King's fisher*. *Gesnerus* thinks, that these words are an addition to the text, and not originally of the author, but added as an explication of the text: perhaps the author only meant, that they were only like the halcyon days because of their calmness: tho' they were not the Halcyon days properly so called; for both *Aristotle* and *Pliny* say, that they were seven days before, and as many after, the Winter-solstice.

(16) *Vindemiator*, *τρυνήτης*, by others called *protrygeter*, because it riseth a little before the vintage begins. It is a fixed Star of the third magnitude, in the right wing of *Virgo*. *Ovid*, lib. iii. *Fast.* mentions this Star; and tells us, that a certain boy, beloved of *Bacchus*, being killed by a fall from a tree when he was gathering grapes, was translated into Heaven, and transformed into this Star.

(17) *Pegasus*, the Horse; a Constellation of the northern Hemisphere, consisting of 23 Stars: he is represented as looking to the *Arctic Circle*, and with his feet leaning upon the Tropic of *Cancer*, and seems to touch the *Dolphin* with the extremity of his mouth, and with his neck as joining the right-hand of *Aquarius*.

(18) *Argo*, the ship; a Constellation of the southern Hemisphere, consisting, according to the antient Astronomers, of 23 Stars: with its hinder part it touches the Tropic of *Capricorn*, and with its under part the tail of *Canis major*; and then bends towards the *Antarctic Circle*, which it touches: it sets when *Sagittarius* and *Capricorn* arise, and rises with *Virgo* and *Libra*.

gently the offices of a Gardener, or to have interrupted the order of the other sorts of culture, which I have now begun. Therefore from the first to the xxiii of *March* is an excellent time for the pruning of vines, if, nevertheless, the buds do not as yet move themselves. This is also the principal time for chusing, to best advantage, cyons that have not begun to bud, in order to graft withal; and it is now by far the very best time for grafting both vines and trees. Also, in cold and moist places, now is the principal time for planting of vines: also the tops of fig-trees, that are now swelling, are set to most advantage. Also this is an excellent season for sowing corns a second time: one Labourer sows very well, in one day, as much corn-land as three *modii* will sow.

Now is the proper time to cleanse meadows, and to defend and secure them from cattle: in warm and dry places indeed, that ought to be done even from the month of *January*, as we said above; for in cold places it is soon enough to shut up meadows, and set them apart, for growth, at the feast of *Minerva* (19): at this time you must prepare all the trenches wherein you design to plant trees in autumn; if the ground be convenient, and easy to work, one man may make xiiii of them of four feet every way; but xviii when they are three feet. But for planting of vines, or trees of no great growth, a furrow one hundred and twenty feet long, and two feet in breadth, ought to be sunk to the depth of two feet and an half, and one Labourer will make it in one day. Now it is time to have finished the digging and dressing of your lateward rose-beds: now it will be proper to pour lees of oil, which have no salt in them, round the roots of olive-trees that are in a bad state; six *congi* suffice for the greatest trees, and an *urn* for those of a middling size; for the rest a proportional quantity must be allotted. But even those which have no defect will thrive so much the better, if they be watered with lees of oil-olive that have no salt in them. Some have said, that this is the best time for instituting and forming of nurseries, and also have directed to sow laurel and myrtle-tree berries, and the seeds of other green things here and there, in small beds and gardens. The same persons also have given it as their opinion, that the stiff upright ivies, and other ivy-trees, must be planted soon after the xiii of *February*, or the first of *March* also.

(19) *Quinquatribus*. *Quinquatria* were feast-days instituted in honour of *Minerva*; so called, as *Ovid* says, because they lasted five days; or, as others, because celebrated the fifth day after the ides of *March*, about the 19th or 20th of this month.

Upon the xv of *March Nepa* (the Scorpion) begins to set, and is the sign of a storm. The xvi of *March Nepa* (the Scorpion) sets: very cold weather. The xvii of *March* the Sun passes into *Aries* (the Ram) (20): a west or north-west wind. The xxi of *March* the *Horfe* sets in the morning: northerly winds. The xxiii of *March Aries* begins to rise: a rainy day; sometimes it snows. The xxiv and xxv of *March*, the vernal Equinox is the sign of a storm. From the fifteenth the same things, above-mentioned, must certainly be finished. Now, and not before, is the best time for tilling ousy and fat places: and such places as we fallowed in the month of *January*, must be twifallowed in the latter end of *March*; and if there be any arbours of generous vines, or any single trees married to vines, either in the fields or thickets, left by the Pruner, they ought certainly to be pruned before the first of *April*; after which day the culture of such sort of things will be too late and fruitless. Also this is the first time for sowing millet and panic, which ought to be finished about the xiii of *April*: five *sextarii* of each seed take up one *jugerum*. Also it is the fit time for castrating woolly cattle, and other fourfooted beasts: but in warm places, it is a right time for castrating all cattle whatsoever, from the xiii of *February* till the xiii of *April*; and in cold places, from the xv of *March* till the xv of *May*.

The first of *April*, *Nepa* (the Scorpion) sets in the morning: it signifies a tempest. The v of *April*, a westerly or south wind with hail: sometimes this same thing happens the day before. The vi of *April* the *Pleiades* (21) are hid in the evening: sometimes it is winter weather. The vii, viii, and ix of *April*, the south and south-west

(20) *Aries*, a Constellation, drawn on the globe in the figure of a Ram; it is the first of the 12 signs of the Zodiac, and marked thus ♈. He is represented as standing in the Equinoctial Circle, with his head turned to the east, and his rising head is placed below the Triangle, and with his feet almost touches the head of the Whale: it consists of 18 Stars. The Sun enters this Sign about the 10th of *March*, old style, and makes the vernal Equinox, his apparent diurnal motion being then in the Equator, when the night and day are equal over the face of the whole earth. It is reckoned the beginning of the astronomical year, because it is the entrance into the Spring, when the face of the earth is renewed, and the vegetables, that grow thereon, recover from the languishing state into which they were thrown by the coldness of the Winter; and many of them, which seemed to be intirely dead, rise again, as it were, and recover a new life; and the animals, which seemed to decline apace, and tend towards a dissolution, by the returning of the warmth of the Sun, have new vigour and life communicated to them: from that time the Sun appears to decline more and more towards the north, till the Summer begins about the 11th of *June*. It is probable, that the antients intended, by this prolific animal, to represent the genial fertilizing warmth of the Sun in the Spring.

(21) *Pleiades*, by the *Romans* called *Vergiliæ*, are a cluster of small Stars in the neck of the *Bull*: these have been already mentioned in the ixth and xth books.

winds signify a storm. The x of *April*, when the Sun rises, *Libra* (the Balance) begins to set: sometimes it is a sign of a storm. The xii of *April*, the *Hyades* (22) are hid: it is exceeding cold, as in Winter. In these days the first digging of vineyards, in cold places, must certainly be finished before the xiii; and such things as ought to have been done in the month of *March*, after the equinox was past, must now, at length, be done as soon as possible. It is yet a right season to ingraft fig-trees and vines: nurseries, which are made before, may be, as yet, very conveniently weeded and digged. *Tarentinian* sheep ought to be washed with soapwort-root (23), that they may be prepared for shearing.

The xiii of *April* *Libra* (24) sets, as above: it is very cold. The xiiii of *April*, a storm of wind and showers; nor does this constantly happen. The xvii of *April* the Sun passes into *Taurus* (the Bull) (25): it is a sign of rain. The xviii of *April* the *Hyades* hide themselves in the evening: it is a signification of rain. The xxi of *April* divides the Spring into two parts (26): it is rain, and sometimes hail. The xxii of *April*, the *Pleiades* rise with the Sun: a south-west or south wind; a moist day. The xxiii of *April*, in the beginning of the night, *Fidicula* (the Harp) appears: it is the sign of a storm. The xxviii of *April*, the wind is almost south, with rain. The xxix of

(22) *Hyades* are five Stars in the *Bull's* face; so called by the *Greeks*, perhaps, because they thought they had great influence to produce rain: by the *Romans* they were called *Suculæ*, from a wrong interpretation of their *Greek* name, as has been already said.

(23) *Radix lanaria*. It is highly probable, that the plant, the juice of whose root our author recommends for whitening wool, is what is called *saponaria*, soapwort. *Pliny* says, that it is wonderful how effectual the juice of this root is for washing and whitening wool, and making it soft, which is the reason why it is called *radix lanaria*.

(24) *Libra*, the Balance, or the Scales; one of the 12 Signs of the Zodiac, the seventh in order, exactly opposite to *Aries*; it is commonly marked thus ♎ , which is the beam of the balance. It is probable, that the antients made use of this mark to shew, that when the Sun enters into this Sign, about the 12th of *September*, he distributes day and night equally to all the earth; and this is called the autumnal Equinox.

(25) *Taurus*, the Bull, the second Sign of the Zodiac, marked thus ♉ , to represent the head and horns of the *Bull*; the Equinoctial Circle divides his knees from the rest of his body, and with his left horn he is joined with the left foot of *Auriga*: besides the *Vergiliæ*, already mentioned, it consists of 14 Stars, five of which on his face are, as has been said, called *Hyades*.

(26) *Ver bipartitur*. *Varro*, lib. i. c. 28. says, that the Spring begins about the 12th of *February*, and has ninety-one days; so that according to this computation, the twenty-first of *April* does not divide the Spring into two equal parts: but it is probable, that *Columella* only means, that, if regard be had to the weather, the half only of the Spring is past; but, with respect to the number of days, more than the half is past: for, according to *Varro*, the Summer begins about the 11th of *May*; but here the author's meaning, to me, seems not very plain.

April,

April, Capra (the Goat) (27) rises in the morning: the wind is south the whole day; sometimes rains. The xxx of *April, Canis* (the Dog) (28) hides himself in the evening: he signifies a tempest. During these days we will prosecute the things above-mentioned; and olive-trees, if they have now slackened their back, may either be ingrafted or inoculated; and other pomiferous trees may be grafted with the same kind of emplastration or inoculation. It is also right to begin to shred off the superfluous leaves and twigs for the first time, while the buds that are creeping forth by little and little, can be struck off with the finger. Moreover, if the Digger has put any things in the vineyard out of their due place, or by negligence omitted any things, the diligent Vine-dresser ought to restore it; and to observe and take notice of the broken frames, and repair them, or replace the poles or stakes that are thrown down, so as he may not pull off the tender buds or leaves. At the same time cattle that are fruitful, and have brought forth their young, must be marked (29).

The first of *May*, during these two days the Sun is said to keep in one particle or degree of the Ecliptic. The ii of *May*, one of the *Hyades* rises with the Sun: northerly winds. The iii of *May*, the whole Constellation *Centaurus* (30) (the Centaur) appears: it is the sign of a tempest. The v of *May* the same Constellation forebodes

(27) *Capra*, a She-goat; a bright fixed Star in the left shoulder of *Auriga* (the Waggoner); its longitude 77 degr. 16 min. lat. 22 degr. 50 min. The Poets tell us, that this was the goat which suckled *Jupiter* in *Crete*: in recompence, *Jupiter* transformed her into this Star.

(28) *Canis major*, a Constellation of Stars, drawn on the globe in figure of this animal; by his hinder-feet he is divided by the tropic of *Capricorn*; with his head he almost joins the right foot of *Orion*; he looks with his head to the west, but stretches his head to the Equinoctial Circle: he sets when *Sagittarius* rises, and riseth with *Cancer*. He has in his mouth that vast Star by some called *Canicula*, the true name of which seems rather to be *Sirius*: this Constellation consists of 19 Stars. One would think, that the Constellation *Canis minor* ought rather to be called *Canicula*.

(29) *Pecudes secundæ partus*: this is the reading in some editions; in others it is *secundæ partus*: it is uncertain which is the true reading: I have followed the former; if the latter be right, then the meaning probably is, that such cattle as have brought forth a second time, ought to be marked; or perhaps the author means, that such cattle, as were brought forth at the second birth, were the strongest and the best; and therefore ought to be marked: but the meaning seems very uncertain.

(30) *Centaurus*, a Constellation of the southern Hemisphere: he is represented as leaning with his feet on the *Antarctic* Circle, and as seeming to support with his shoulders the Tropic of *Capricorn*, and with his head almost joining the tail of *Hydra*: they also represent him as holding some wild beast supine in his right-hand, which with its feet and snout touches the Tropic of *Capricorn*; being placed between him and the *Antarctic* Circle, the *Circulus Lacteus* divides the legs of the Centaur from the rest of his body. He sets wholly when *Aquarius* and *Pisces* rise, and riseth with *Scorpio* and *Sagittarius*: he consists of 34 Stars. The Mythologists tell us, that this is the famous *Chiron*, who taught *Æsculapius* Physic, and was Tutor to *Achilles*.

rain. The vi of *May* the middle of *Scorpio* sets: it forebodes a storm. The vii of *May* the *Pleiades* rise in the morning: a west wind. The ix of *May* Summer begins: a west or north-west wind; sometimes rain also. The x of *May* all the *Pleiades* appear: a westerly or north-west wind, and sometimes rains. The xiii of *May* *Fidis* (the Harp) rises in the morning, and forebodes a storm. During these days the corns must be weeded; and they must begin to cut down and make the hay. A good Labourer cuts down a *jugerum* of meadow in one day; and one Labourer also binds one thousand and two hundred bottles of hay, weighing four pounds each. It is also the time to dig round the trees that have been ablaqueated, and to cover them: one Labourer will be able to dig round eighty young trees in a day, sixty-five of a middling size, and fifty large ones.

This month you must dig all your nurseries frequently: but, from the first of *March* to the xiii of *September*, you must bestow a digging every month, not only upon nurseries, but upon new vineyards also. During the same days, where the weather is very cold and rainy, olive-trees are pruned and cleared from moss: but, in warm regions, you do this at two times of the year; the first time, from the xv of *October* till the xiii of *December*, and the second time from the xiii of *February* to the xv of *March*; provided nevertheless, that the tree does not flacken its bark. In this same month is the last season for setting an olive-cutting in a pastinated nursery; and when you set it, you must smear it over with dung and ashes mixed together, and place moss upon it, lest it be cloven with the heat of the Sun. But this same work will be better done in the latter end of the month of *March*, or in the beginning of the month of *April*; and at other times wherein we directed you to plant nurseries, either with plants or branches.

The xv of *May* *Fidis* (the Harp) rises in the morning: a south or south-east wind; sometimes it is a moist day. The xvi of *May* the same as above. The xvii and xviii of *May*, a south-east or south wind with rain. The xix of *May*, the Sun makes his entry into *Gemini* (1) (the Twins). The xxi of *May* the *Hyades* arise: northerly winds; sometimes a south wind with rain. The xxii and xxiii of *May*

(1) *Gemini*, the Twins; one of the 12 Signs of the Zodiac, the third in order, and marked thus II. Probably the antients, to represent the fraternal affection of *Castor* and *Pollux*, put together two logs of wood, and joined them by two cross pieces. They seem to be placed toward the right side of *Auriga*, above *Orion*; their heads are divided from the rest of their body by the Tropic of *Cancer*: they set upright upon their feet, and rise inclined, as if they were lying: this Constellation consists of 18 Stars.

Arcturus sets in the morning: it signifies a storm. The xxv, xxvi, and xxvii of *May*, *Capra* (the Goat) rises in the morning: northerly winds. From the xv of *May* to the first of *June*, you must dig your old vineyard a second time, before it begins to blossom, and, at the same time, shred off all the superfluous buds and leaves from the same, and all the rest of your vineyards; which if you do frequently, a boy, with one day's labour, will pampinate a *jugerum* of vineyard. In some countries they now shear their sheep, and take an account of what young cattle they have bred, and what are lost. Also he who sows lupins, in order to dung the land therewith, now at length turns them up with the plough.

On the first and second of *June* *Aquila* rises: a storm of wind, and sometimes rain. The vii of *June* *Arcturus* sets: a west or north-west wind. The x of *June* *Delphinus* rises in the evening: a west wind; sometimes there falls a dew. In these days, if we have been overcome by our work, the same things must be done, which ought to have been done in the latter end of the month of *May*: also all fruit-bearing trees, having been digged round, ought to have new earth laid to, and heaped up about their roots, that that work may be finished before the Solstice. Moreover, according to the state and condition of the country and climate, the earth is either cut up for the first time, or twifallowed; and, if it be difficult to labour, a *jugerum* of it is cut up, for the first time, by one Labourer in three days, twifallowed in two, and fallowed a third time in one day; but one Labourer will roll and break the clods of two *jugera* in one day. But, if the ground be easy to labour, a *jugerum* is tilled by one Labourer in two days, twifallowed in one; and four *jugera* harrowed, and furrows drawn in them, with one day's labour; from which reckoning we infer, that during the Autumn, one hundred and fifty *modii* of wheat may be easily sown by one yoke of oxen, and one hundred *modii* of any kind of pulse.

In these same days the threshing-floor must be prepared, that every thing, as it shall be cut down, may be brought into it. The culture also of vineyards, which are of a greater extent, ought to be performed a second time. Before the Solstice, fodder (if you have any store of it) must be given to the cattle either now, or even the fifteen days preceding the first of *June*: but, from the first of *June*, if green grass is now wanting, till the latter end of Autumn, we must cut down boughs and leaves of trees, and give them. On the xiii of *June* the heat begins. The xix of *June* the Sun makes his entry into *Cancer*: it forebodes a storm. The xxi of *June* *Serpentarius*, which

which by the *Greeks* is called $\epsilon\phi\iota\epsilon\chi\omicron\varsigma$ (2), sets in the morning: he signifies a storm. On the xxiv, xxv, and xxvi is the *Solstice* (3): a west wind, and heat. In these days the same things must be done, as I directed above: but you must cut down vetches for fodder before the pods are hardened; reap barley, pull up lateward beans, thresh early-ripe beans, and lay up their chaff carefully; thresh barley, and lay up all its straw and chaff; castrate the bee-hives, which you ought from time to time to view, and cure every ninth or tenth day, to the first of *May*. But now, if the honey-combs are full, and have covers or lids upon them, they must be cut down: but if they are, for the most part, empty, and open, without lids or covers, it is a sign, that they are not yet ripe; therefore the gathering and making of the honey must be deferred. In the provinces beyond sea, some sow their sesam-seeds either in this or the following month.

The first of *July*, a west or a south-west wind, and heat. The iv of *July Corona* (4) (the Crown) sets in the morning. The vi of *July* the middle of *Cancer* (the Crab) sets: a great heat. The viii of *July* the middle of *Capricornus* sets. The ix of *July Cephæus* (5) sets

(2) *Anguifer* or *Ophiuchus*, commonly called *Serpentarius*; a Constellation of the northern Hemisphere: he is represented as leaning backward with his head, and holding a serpent in his hands, and the greatest part of which he supports with his left arm: his shoulders are divided from the rest of his body by the Tropic of *Cancer*; and towards his knees he is terminated by the Equinoctial: with his left he treads upon the eyes of the *Scorpion*, and with his right he leans upon his back; and the serpent, which is held by him, with the extremity of its mouth almost touches the *Crown*, and twists itself round his middle, and with the extremity of its tail joins the Equinoctial line with the tail of the *Eagle*: when he rises, he appears with *Scorpio* and *Sagittarius*, and sets when *Gemini*, *Cancer*, and *Leo* arise. The Poets tell us, that this is *Æsculapius* the son of *Apollo*, who, being by *Jupiter* struck with a thunder-bolt, because, by his skill in Physic, he had raised the dead to life, was afterwards, at the request of *Apollo*, translated into the heavens. This Constellation consists altogether of between 30 and 40 Stars.

(3) *Columella*, as has been said, places the Sun's entry into the several signs later by several days than it really happens; and here he reckons the Summer-solstice to be about the 24th of *June*, according to the antient computation then in use among Husbandmen; but, according to the corrections made in the Calendar, the Summer-solstice falls about the 11th of *June*.

(4) *Corona borealis*, the northern Crown; a Constellation, consisting of about 20 Stars: nine of them are placed circularly, so as to represent a Crown. *Bootes* seems almost to touch the *Crown* with his left shoulder, and *Enzonasin*, or *Hercules* kneeling, joins it with the heel of his right foot: it sets when *Cancer* and *Leo* rise, and rises with the *Scorpion*. The Poets tell us, that this is the crown of gold and precious stones made by *Vulcan*, which *Bacchus* gave to his bride *Ariadne*, daughter of *Minos* King of *Crete*. No doubt the Astronomers, who divided the Stars into Constellations, took this name out of some history of *Crete*, which gave an account of this marriage.

(5) *Cephæus*, a Constellation in the northern Hemisphere, consisting of about 20 Stars: he is placed behind the *Lesser Bear*: from his feet to his breast he is inclosed within the *Arctic Circle*, so that nothing of him is seen to set, except his shoulders and his head:

sets in the evening: he forebodes a storm. The x of *July* the *Harbinger* or *Forerunner* winds (6) begin to blow: in these days, the same things to be done as above. But it is also very proper now to twi-fallow such fallow ground, as has been tilled for the first time; and, when the Moon is upon the decrease, wood-land is grubbed up to very great advantage. The xv of *July Procyon* (the Lesser Dog) (7) rises in the morning: he signifies a storm. The xx of *July* the Sun passes into *Leo*: a west wind. [The xxiv of *July* the bright Star in the breast of *Leo* rises]: sometimes it is the sign of a storm. The xxv of *July Aquarius* (the Water-bearer) begins to set bright and clear: a west or south wind. The xxvi of *July* the *Canicule* appears: a sultry hot fog. The xxvii of *July Aquila* (the Eagle) rises. The xxix of *July* the bright Stars in the breast of *Leo* arise: sometimes this is the sign of a storm. The xxx of *July Aquila* sets: it forebodes a storm.

In these days the harvest is finished, in places that are temperate, and lie near the sea; and, within thirty days after the corns are cut down, the stubble is cut down, and gathered together into heaps: one Labourer cuts down a *jugerum* of stubble in one day, which being removed before the violent heat of the Sun scorches the earth, you must dig round all the trees that were in the corn-land, and heap up the earth round them. Also they who make preparation for the seed-time, in order to sow a great quantity, ought now to plow their land a second time: for, as to digging and cultivating new vineyards, I have already often said, That no month ought to be omitted, till the autumnal

head: he is not far distant from the winding that the *Dragon* seems first to make with his head: he is represented with both his arms projected, and is as far distant from the feet of the *Lesser Bear*, as the space between his own feet seems to be: his head seems to set when the *Scorpion* rises, and to rise with *Sagittarius*. This *Cepheus* is said to have been a King of the *Ethiopians*, and father of *Andromeda*, whom *Perseus* rescued from the sea-monster to which she was exposed; a story much celebrated by Poets and Painters. From this history, Astronomers have taken names for some other Constellations contiguous to, or not far distant from this; as *Cassiopea*, *Andromeda*, and *Perseus*.

(6) *Prodromi flare incipiunt*. *Pliny* says, that, about eight days before the rising of the *Dog-star*, the north-east winds begin to blow; and, because they come before the rising of this Star, they are called the *Forerunners* or *Harbingers*.

(7) *Procyon*, or *Anticanis*. The Lesser Dog is so called, because he rises before *Canis major* (the Greater Dog) he with his feet fixed in the *Circulus Lacteus* touches the Equinoctial: he looks to the west, as placed between *Gemini* and *Cancer*: he sets when *Capricorn* rises, and riseth with *Leo*; according to *Hyginus, de signis celestibus*, it is a small Constellation, consisting of three Stars, and must be considered as different from that vast bright Star in the mouth of *Canis major*, which is commonly called *Canicula*, the *Dog-star*, and tho' but one single Star, yet takes the name of the whole Constellation. *Pliny*, and some other authors, seem to take *Procyon* and *Canicula* for one and the same Star; but our author mentions them as different.

Equinox be past. But we must remember, that, during these days, and the days of the month of *August*, early in the morning, and in the evening, we cut down boughs and leaves for the cattle; also whatever vineyards we design to cultivate, that we do not dig them during the great heat, but in the morning, till the third hour of the day, and from the tenth hour till the evening.

In some countries, as in *Cilicia* and *Pamphylia*, they sow sesame-seeds in this month: but, in the moist regions of *Italy*, they may be sown in the latter end of the month of *June*. It is also the time for hanging branches of wild fig-trees (8) upon fig-trees; which some think ought to be done for this reason, that the fruit may not fall off them, and that it may come the more speedily to maturity.

The first of *August* the *Etesian winds* blow (9). The iv of *August* the middle of *Leo* rises: it forebodes a storm. The vii of *August* the middle of *Aquarius* sets: a foggy heat. The xii of *August* *Fidis* (the Harp) sets in the morning, and Autumn begins. In these days the same things are to be done as above: nevertheless, in some places they cut down the honey-combs, which if they are not full of honey, nor have lids upon them, the gathering and making of the honey must be deferred till the month of *October*. The xiii of *August* the setting of *Delphinus* is the signification of a storm. The xiv of *August*, the setting of the same Constellation in the morning forebodes a storm. The xx of *August* the Sun passes into *Virgo* (10): it forebodes a tempest in this and the following day; and sometimes

(8) *Pliny*, lib. xv. c. 19. tells us, that they used to hasten the ripening of figs, by taking branches of the wild fig-tree, which itself never produces fruit, and hanging them amongst the fig-trees; and that these branches did produce a certain sort of flies, which, when the branches began to rot, being deprived of their natural nourishment, left them, and flew to the fig-trees, and fed greedily upon the figs, and, with their bite opening the tops of the figs, gave free entrance to the Sun, and the ripening breezes; and sucked out the acid milky juice of the young figs, and thereby hastened their ripening. *Palladius*, speaking of the same thing, advises to take wild figs, and, putting a flaxen rope through them, hang them up among the fig-trees: this the *Romans* called *caprificatio*.

(9) *Etesia*, anniversary winds, formed from the *Greek* word ἔτησις, which signifies a year: they are north-east winds, which blow yearly about this time in Summer.

(10) *Virgo*, one of the 12 Signs of the Zodiac, the sixth in order; it is marked thus ♍. In some old books she is represented as holding three ears of corn in her left-hand, for which reason she is supposed to represent *Ceres*; but *Aratus* and others say, that this Sign represents *Justice*, which, abhorring the wickedness of mankind, forsook the earth, and retired to heaven. She is placed below the feet of *Bootes*: with her head she touches the hinder-part of *Leo*, and with her right-hand the Tropic of *Cancer*; the lower part of her body is seen above the *Raven*, and the tail of *Hydra*: she sets with her head before the rest of her members. This Constellation consists of 16 or 18 Stars, one of which in her right-wing, fixed to her shoulder, is called *Vindemiator*, the Vintager, and by the *Greeks* called *Protrygeter*; probably because it riseth before the vintage, as has been already said.

it thunders. This same day *Fidis* (the Harp) sets. The xxiii of *August*, from the same Constellation, for the most part, a storm ariseth, and rain. The xxvi of *August Vindemiator* (the Vintager) rises in the morning, and *Arcturus* begins to set: it is sometimes rain. The xxx of *August* the shoulders of *Virgo* appear: the *Etesian* winds cease to blow, and sometimes it is Winter-weather. The xxxi of *August Andromeda* (11) rises in the evening: sometimes it is very cold, as in Winter.

And in these days fig-trees are inoculated, which kind of ingrafting is called *Emplastration* (12): and this, indeed, may be done more conveniently in the preceding month, after the xv of *July*, in which time some inoculate other trees also. In some places the vintage is finished, as in *Bætica*, in the regions that lie upon the sea-coast, and in *Africa*: but in colder regions they make their *Pulverization* (13), which Rustics call *Harrowing*, when every glebe in the vineyards is broken, and reduced into powder. At this same time, before the vineyards are pulverized, if the vines themselves are very small or thin, three or four *modii* of lupins are scattered upon each *jugerum*, and harrowed in; which being turned up with the first digging, after they have sprung up into stalks, afford dung good enough for vineyards.

Many also, if the constitution of the climate be rainy, as in that region of *Italy* which lies contiguous to the city, strip the vine of its young shoots and leaves, that the fruit may be thoroughly concocted and ripened, and not rot with the showers. But on the contrary, in warmer places, as in the provinces just now named, about the time of the vintage, the grapes are overshadowed either with straw, or other coverings, that they may not wither, and be dried up by the winds or heats. This same time is also proper for making dry grapes and figs, of which, after what manner they may be dried in the Sun, we shall afterwards give an account, when we shall treat of the offices of

(11) *Andromeda*, a northern Constellation, consisting of 20, or, as others say, of 27 Stars: she is represented as placed near *Cassiopea*, above the head of *Perseus*, there being a small distance between them: her head is joined to the belly of the Horse *Pegasus*, the same Star being called the *navel of Pegasus*, and the *head of Andromeda*; the Tropic of *Cancer* passes through and divides her breast, and her left-hand by the middle: she rises with the signs *Piscis* and *Aries*.

(12) *Emplastratio*: of this way of ingrafting amongst the antients, you have an account *lib. v. c. 11.*

(13) *Pulveratio*. *Pliny*, *Theophrastus*, and others, recommend the pulverizing of vines, in order to plump and ripen the fruit: it is digging the vineyards when the ground is very dry, breaking the clods, and raising the dust. *Vide lib. iv. 28.* and *Palladius*, *Jun. 7. 2.*

the Bailiff's wife. It is right also to extirpate fern or sedge in the month of *August*, where-ever they grow : nevertheless, it is better to do it about the xv of *July*, before the rising of the *Dog-star*. The first of *September*, hot weather. The ii of *September*, the southern *Piscis* ceases to set : hot weather. The v of *September* *Arcturus* rises : a west or north-west wind. The vii of *September* the northern *Piscis* ceases to set, and *Capra* rises : it is the sign of a storm. The xi of *September* a west or south wind ; the middle of *Virgo* riseth. In these days, in places that lie upon the sea-coast, and are warm, it is a convenient time for carrying on the vintage, and managing the other things above-mentioned. Also twifollowing the plowed land ought then to be finished, if the ground has been tilled, for the first time, somewhat too late ; but, if it has been tilled sooner than usual, it is proper also, that the ground be plowed a third time. At this time also they, who are accustomed to preserve wines, prepare sea-water, and, after they have brought it home boil it : concerning the preparing of which I shall give directions, when I come to treat of the offices of a Bailiff's wife. The xiii of *September* sometimes signifies a tempest, from the Constellation they call the *Whale* (14). The xvii of *September* *Arcturus* rises : a west or south wind ; sometimes an east wind, which some call *Vultur*. The xviii of *September* *Spica Virginis* (the ear of corn in the left-hand of *Virgo*) rises : a west or north-west wind. The xix of *September* the Sun passes into *Libra* ; *Crater* (the Cup) appears in the morning. The xxi of *September* *Pisces* (the Fishes) set in the morning ; also *Aries* (the Ram) begins to set : a west or north-west wind ; sometimes a south wind with showers. The xxii of *September* the ship *Argo* sets : it forebodes a storm, sometimes rain also. The xxiii of *September* *Centaurus* (the Centaur) begins to rise in the morning : it forebodes a storm, and sometimes rain. The xxiv, xxv, and xxvi of *September*, the autumnal equinox forebodes rain. The xxvii of *September* *Hædi* (the Kids) arise (15) : a west wind, sometimes a south wind, with rain. The xxviii of *September* *Virgo* ceases to rise : it forebodes a storm.

In these days they gather their grapes, and make their vintage, in many countries. Some take the indication of their being ripe from

(14) *Cetus*, the Whale ; otherwise called *Pristes*, or *Pristinum sidus* ; a Constellation in the southern hemisphere, consisting of 13, or, as others say, of 23 Stars. The Tropic of *Capricorn* divides its tail by the middle ; with its snout it almost joins the hinder foot of *Aries* ; the river *Eridanus* almost washes the fore-part of its body : it sets when *Cancer* and *Leo* rise, and rises with the *Centaur* and the *Twins*.

(15) *Hædi*, the Kids, are two Stars in the left-arm of *Auriga*, the Waggoner, which is a Constellation in the northern hemisphere, under the feet of *Perseus*.

one thing, some from another. Some, when they had seen some part of the grape grow mellow, have believed, that the time of vintage was come, and that the grapes were ripe for gathering: some, after they have observed them to be discoloured and transparent: some also, when they had observed the small twigs and leaves to fall off: all which things are fallacious; because all these same things may happen to unripe grapes, by reason of the excessive heat of the Sun, or intemperateness of the year. Therefore some have attempted to find out when they are ripe by their taste, that whether the taste of the grape was sweet or sour, they might judge accordingly. But even this thing itself has some fallacy: for some kinds of grapes, because of their too great roughness, never contract any sweetness. Therefore it is proper (which we do) to consider the natural maturity itself: and this is the natural maturity, if the kernels or grape-stones, which are hid in the grapes, when you have squeezed them out of them, are of a dusky colour, and some of them almost black: for nothing whatsoever can give a colour to the kernels or grape-stones, except the natural ripeness; especially considering, that they are so placed in the middle part of the grapes, that they are protected both from the violent heat of the Sun, and from the winds; and the moisture itself does not suffer them to be thoroughly ripened, or reduced to a dusky colour, except by their own very nature itself: therefore, when the Bailiff shall be sure of this, let him know, that he must begin his vintage, and gather his grapes.

But, before he begins to gather the fruit, all things must be prepared (if it can be done) in the preceding month; if not, that, at least fifteen days before, the hogshhead be partly pitched, partly rubbed, and carefully washed with sea-water, or salted water, and rightly dried; as also the covers and strainers, and the other things, without which the must cannot be well managed; and that the wine-presses and tubs be carefully cleaned, and washed, and pitched, if the matter so require: and let him have wood prepared, wherewith he may boil the must, either into a third or an half of the first quantity, for making rob of grapes. As also salt, and perfumes, and sweet spices, with which they use to give a relish to, and preserve wines, must be laid up in store a good while before.

Nevertheless, let not this care call him wholly off from the other parts of Husbandry: for, during these days, both navew- and turnep-beds are made in places that are naturally dry. Miscellany also, which will be a great support to cattle during Winter, and also that husk or pod which Rustics call fenugreek, as also tares for fodder, are now
sown.

sown, and not till now. This also shall be the principal time for sowing of lupines, which, some people think, must be forthwith carried directly from the threshing-field into the land. At this time millet and panic are cut down, when the kidney-bean is sown for food: for, in order to gather seed of it, it is better to put it underground the latter end of *October*, about the first of *November*. Wherefore, seeing he ought to transact and execute all these things in the fields, he may delegate the care of those things, which must be done within the Manor-house, to his wife the Housekeeper; yet so, that he himself may examine and consider whether they are rightly done, or not.

The first and second of *October* sometimes forebodes a storm. The iv of *October*, *Auriga* (the Waggoner) sets in the morning: *Virgo* leaves off setting; sometimes it is the sign of a storm. The v of *October* *Corona* (the Crown) begins to rise: it forebodes a storm. The vi of *October* *Hædi* (the Kids) rise in the evening; the middle of *Aries* sets: a north-east wind. The viii of *October*, the bright Star of *Corona* (the Crown) rises. The x of *October*, the *Pleiades* rise in the evening: a west wind, and sometimes a south-west wind, with rain. The xiii and xiv of *October*, the whole Constellation *Corona* rises in the morning: a wintery south wind, and sometimes rain. During these days they usually gather their grapes, and make their vintage, in cold countries, and do the other things which are above-written: and in the same regions they sow their early-ripe corns, and especially red-bearded *husked wheat*. Also, in places not exposed to the Sun, it is now the right time to sow the best common wheat.

And, since we have made mention of the seed-time, it will not be unseasonable, that we give an account, how much seed of every sort a *jugerum* of land may receive. A *jugerum* of land receives four or five *modii* of common wheat, nine or ten *modii* of red-bearded husked wheat, five or six *modii* of barley, four or five *sextarii* of millet or panic, eight or ten *modii* of lupines, four *modii* of kidney-beans, three or four *modii* of pease, six *modii* of beans, one *modius*, or a little more, of lentils, nine or ten *modii* of linseed, three or four *modii* of chichlings, two or three *modii* of chich-pease, four or five *sextarii* of sesame-seed, seven or eight *modii* of vetches for fodder, and five or six *modii* of vetches for seed, four or five *modii* of better vetches, seven or eight *modii* of barley miscellany, six *modii* of fenugreek-seed; in beds ten feet long, and five feet broad, you must sow a *cyathus* of medic, or *St. Foin-seed* each: six grains of hempseed are set in a square foot of ground.

On the xv of *October*, and the two following days, there is sometimes a storm; sometimes there falls a dew. The xx of *October* the Sun passes into *Scorpio* (16). The xx and xxi of *October*, at the rising of the Sun the *Pleiades* begin to set: it is the sign of a storm. The xxii of *October* the tail of *Taurus* sets: a south wind, sometimes rain. The xxv of *October* *Centaurus* ceases to rise in the morning: it forebodes a storm. The xxvi of *October* the forehead of *Scorpio* rises: it is the sign of a storm. The xxviii of *October* the *Pleiades* set: it is stormy weather, with cold and frosts. The xxix of *October* *Arcturus* sets in the evening: a windy day. The xxx and xxxi of *October* *Cassiope* (17) begins to set: it signifies a storm.

During these days it is a right time to set whatever plants ought to be transplanted, and set at a distance from one another, and small trees of all sorts. It is also a proper time to match elms with vines, and to propagate the vines themselves by layers, in places where they are supported by trees, and in vineyards. It is the time to weed and dig nurseries, as also to ablaqueate trees, and vineyards also, and to prune the same; as also to prune such vines as are supported by trees. Nurseries which have not been pampinated in their due time, and small fig-trees, which grow in nurseries, ought to be pruned, and reduced to single stems; which nevertheless, while they are young and tender, are better pampinated while they are putting forth their buds. But, as all things in Husbandry must be done speedily, and with resolution, so especially sowing of seed, and planting. It is an antient proverb among Husbandmen, *That early sowing and planting use often to deceive us, but that that which is late never deceives us, as to its being certainly bad.* Therefore we direct, upon the whole, that, according as every place shall be naturally cold, let that be first sown or planted: and in proportion as every place shall be warm, let it be last.

(16) *Scorpio*, the Scorpion, is the eighth Sign of the Zodiac, and is commonly marked thus ♏. By the antients the Scorpion was drawn larger than at present, so that the claws of it took up that part of the heavens which is now assigned to *Libra*: it is placed under the feet of *Serpentarius*, and seems to touch the Tropic of *Capricorn* with the point of its tail, and is not far from the animal which the *Centaur* is represented as holding in his hand. This Constellation consists of 19 Stars.

(17) *Cassiope*, or *Cassiopea*, as the Mythologists tell us, was wife of *Cepheus* a King of the *Ethiopians*: she by her pride, in preferring her own and her daughter *Andromeda's* beauty to that of the *Nereides*, was the cause of her daughter's being exposed to be devoured by a whale, but was rescued by *Perseus*. She also, as her husband and daughter, gives name to a northern Constellation, and is represented as sitting in a chair next to *Cepheus*, with her feet placed in the *Arctic* circle, and her body reaching to the Tropic of *Cancer*, which she touches with her head and her right-hand, and the *Circulus Lacteus* divides her almost in the middle.

Tares and beans are said to dung land: unless you turn up lupines in the blossom, you will not thereby contribute any thing towards dunging the land: for there is nothing whatsoever that is more commonly either sown or gathered in, when the Labourers have nothing to do; for, in the very beginning of the seed-time, it may be put under-ground before any other seed, and it may be taken off the ground very late in the year, after all the fruits are gathered in. After you have sown your seed, you must harrow in what you have sown. Three Labourers will with ease, in three days, harrow two *jugera*, and ablaqueate the trees that shall be upon the ground: although the antients would have every Labourer sarcle and harrow a *jugerum* a day each; which, whether it can be done rightly or not, I dare not affirm.

At the same time it is proper to cleanse the ditches and rivulets, and make gutters for drains, and water-furrows: at the same times it will be proper that we give the oxen ash-leaves, if we have them; if not, wild ash-leaves; if we have not these neither, evergreen-oak-leaves. It will not be amiss also, to give to each yoke of oxen one *modius* of mast; nevertheless you must not give them more, lest they be sick with it; nor for less time than thirty days: for if you give it them for fewer days (as *Hyginus* says) the oxen become scabby in the Spring; but the mast must be mixed with chaff, and so laid before the oxen. Also, if any man has a mind to make a wilderness, where all sorts of trees grow together wild without order, then is the proper time to plant them with mast, and other seeds or plants. Then also the olive-tree must be stript of its berries, of which you have a mind to make green oil, the best of which is made of the olive-berry which is speckled, when it begins to grow black: for bitter oil ought not to be made but of the white olive-berry.

The first of *November*, and the day after, the head of *Taurus* sets: it is a sign of rain. The iii of *November Fidicula* (the biggest Star in the *Harp*) rises in the morning: it is cold stormy weather, and rains. The vi of *November* this same whole Constellation rises: a south or west wind: it is cold stormy weather. The vii of *November* the bright Star of *Scorpio* rises: it is the sign of a storm: it is cold Winter-weather, or a north-east wind; sometimes there is a dew. The viii of *November* the *Pleiades* set in the morning: it forebodes a storm: it is cold Winter-weather. The ix of *November* the Winter begins: a south or east wind; sometimes there falls a dew. In these days, till the xiiiith, you may yet do tolerably well such things as you could not do the preceding month: but you must observe this particularly,
that

that the day before it is full Moon, if not then, yet without fail upon the very day of the full Moon, you sow, in one day, all the beans you design to sow: but afterwards you may cover them with earth, to defend them from the fowls and the cattle; and, if the course of the Moon shall so fall out, take care to have them harrowed, in the fattest and new ground, before the xiii of *November*; but, if you have not such kind of ground, let it be in ground exceeding well dunged. It will be sufficient to provide eighteen loads of dung for each *jugerum*; but a load of dung contains eighty *modii*: from which you may infer, that you must scatter five *modii* of dung upon ten feet square; which computation teaches us, that MCCCXL *modii* are sufficient for the whole *jugerum*. Then it is also proper to ablaqueate olive-trees, and if they bear but little fruit, or if, upon their tops, their twigs and leaves are shrivelled and withered, to scatter four *modii* of goats-dung round the great trees, and to observe a proportion in the rest, according to their bigness: at the same time, in such vineyards as are ablaqueated, to pour about one *sextarius* of pigeon's dung, or a *congius* of human urine, or four *sextarii* of other dung about each vine. Two Labourers will, in one day, ablaqueate a *jugerum* of vineyards, where the vines are placed at the distance of six feet.

The xiii of *November* an uncertain day; nevertheless it is ofteneft calm and mild. The xv of *November* a north wind, sometimes a south wind with rain. The xvi of *November* *Fidis* (the Harp) rises in the morning: a south wind, sometimes a great north-east wind. The xvii of *November* a south-east wind, sometimes a south wind with rain. The xviii of *November* the Sun passes into *Sagittarius*. The *Hyades* rise in the morning: it forebodes a tempest. The xx of *November* the horns of *Taurus* set in the evening: a cold north-east wind and rain. The xxi of *November* one of the *Hyades* sets in the morning: it is stormy Winter-weather. The xxii of *November* *Lepus* (the Hare) (18) sets in the morning: it forebodes a storm. The xxv of *November* *Canicula* (the Dog-star) sets at the rising of the Sun: it is cold Winter-weather. The xxx of *November* all the *Hyades* set: a west or south wind, sometimes rain.

In these days you must finish such works as were omitted the preceding days; and if we do not sow very much, it will be best to have finished our sowing before the first of *December*. But also, when

(18) *Lepus*, the Hare, a small southern Constellation, consisting, as some say, of six, and as others, of 13 Stars. It is placed under the feet of *Orion*, and has *Sirius* behind, as if he were always in pursuit of it; the Tropic of *Capricorn* divides the lower part of its body: it riseth with *Leo*, and sets when *Sagittarius* riseth.

the nights are long, some part of the night must be added to the day-time: for there are many things which are very well done by candle-light. For, if either we possess vineyards, the stakes and poles, or props round and square, may be hewed smooth, and sharpened; or if the country be fertile of fennel-giant or bark, hives ought to be made for bees; or if it be fruitful in palm-trees, or *Spanish* broom, baskets, frails, and panniers, ought to be made; or if it abounds in young sprigs, then hampers and osier baskets. But not to mention all other things at present, there is no region which does not afford something which may be done by candle-light: for it is the character of a slothful Husbandman, to delay beginning his work till it be day-light, when the days are short, especially in those regions where the shortest days are of nine hours, and the nights of fifteen. Willows also, which have been cut down the day before, may be cleaned by candle-light, and prepared for bindings for the vines, which, if they be naturally not very tough, must be cut down fifteen days before, and, after they are cleaned, covered with dung, that they may become tough and pliant: but if they have been cut down a great while ago, and are grown dry, they must be steeped in a pond. You must also sharpen the iron-tools by candle-light, and make handles for them, or fit to them such as are already made, of which those of evergreen oak are the best, then those of hornbeam, and after these those made of ash.

The first of *December* an uncertain day; nevertheless it is oftener calm and mild. The vi of *December* one half of *Sagittarius* (the Archer) sets: it forebodes a storm. The vii of *December* *Aquila* (the Eagle) (19) rises in the morning: a south-west wind, sometimes a south wind; there falls a dew. The xi of *December* a north-west or north wind; sometimes a south wind with rain. In these days, such works as have been omitted the former month, must be thoroughly done, *viz.* in temperate, or in hot places; for in such places as are cold they cannot now be rightly done. The xiii of *December* the whole Constellation of *Scorpio* rises in the morning: it is cold Winter-weather. The xvii of *December* the Sun passes into *Capri-*

(19) *Aquila*, the Eagle, a Constellation in the northern Hemisphere, consisting, according to some writers, of 32 Stars; but the ancient Astronomers make their number much smaller: with its right wing it is not much distant from the Equinoctial Circle, and with its left wing it is represented as not far from the head of *Serpentarius*: a circle, which is supposed to pass from *Cancer* to *Capricorn*, divides its bill from the rest of its body: it sets when *Leo* rises, and riseth with *Capricorn*.

corn (20): it is the Winter-solstice, as *Hipparchus* will have it; therefore it often is the sign of a storm. The xviii of *December* forebodes a change of the winds. The xxiii of *December Capra* (the Goat) sets in the morning: it is the sign of a storm. The xxiv of *December* is the Winter-solstice (as the *Chaldeans* observe). The xxvii of *December Delphinus* (the Dolphin) begins to rise in the morning: it is the sign of a storm. The xxix of *December Aquila* (the Eagle) sets in the evening: it is cold Winter-weather. The xxx of *December Canicula* (the Dog-star) sets in the evening: it is the sign of a storm. The xxxi of *December* a storm of wind.

They who practise Husbandry with more scrupulous exactness and superstition than ordinary, deny that the earth ought to be moved, in these days, with any iron-tool, except you trench it on account of a vineyard. Therefore whatever may be done besides that kind of work, is by them comprehended in such things as those; *viz.* that olive-berries may be gathered, and oil made; that a vine may be staked, and fastened to the stake as far as its head; that frames may be placed in vineyards, and the stocks of the vines fastened to them as high as their heads: but it is not expedient, at this time, to bind the branches of the vine to the frame, for very many of them would break, because of their stiffness, occasioned by the cold. Also, in these days cherry-trees and *tuberes*, apricock- and almond-trees, and such other trees as blossom first, may be commodiously grafted. Some also sow pulse.

The first of *January* an uncertain day. The iii of *January Cancer* (the Crab) sets: changeable weather. The iv of *January* is the middle of Winter: much wind from the south; sometimes rain. The v of *January Fidis* (the Harp) rises in the morning: variable weather. The viii of *January* a south wind, sometimes a west wind. The ix of *January* a south wind, sometimes a shower. The xii of *January* the state of the weather is uncertain. During these days also the more scrupulous and superstitious Husbandmen abstain from all manner of working whatsoever in the ground; so nevertheless that, for the sake of good luck, they begin every kind of work upon the very

(20) *Capricornus*, the 10th Sign of the Zodiac, marked commonly with this character ♑. When the Sun enters into this Sign, about the 11th of *December*, he is come to his utmost southern declination, and makes the shortest day to them who live in the northern Hemisphere, which is called the *Winter-solstice*, he proceeding no further south, but returns again towards the Equinoctial. He is represented as looking towards the west, and is divided by the middle by the Tropic of *Capricorn*, and is placed under the left-hand of *Aquarius*. They reckon 21 Stars in this Constellation.

first day of *January* : but they defer the moving and labouring of the earth till the ensuing xiiiith day of the month.

But neither ought the Bailiff to be ignorant, of what is sufficient to be given to one yoke of oxen every day throughout every month : wherefore we shall subjoin an account of this care also. In the month of *January* he shall give them straw and chaff with six *sextarii* of steeped bitter vetches, or straw and chaff with half a *modius* of bruised chichlings, or a fodder-basket full of leaves of twenty *modii*, or as much straw and chaff as they will eat, and twenty pound weight of hay, or green leaves from off the evergreen oak or laurel in abundance ; or, which is better than all these, dry barley miscellany. In the month of *February* the same. In *March* the same ; or, if they are going to do their work, fifty pound weight of hay. In *April* he shall give them common oak- and poplar-leaves from the first to the thirteenth, or chaff and straw, or forty pound weight of hay. In *May* he shall give them fodder in abundance. From the first of *June* leaves in abundance. In *July* the same. *August* the same ; or fifty pound weight of straw or chaff out of the field. In *September* leaves and boughs in abundance. In *October* green boughs with leaves, and fig-tree-leaves. In *November*, till the thirteenth day of the month, green boughs with leaves, or fig-tree leaves, as many as one forage-basket will contain ; and from the thirteenth one *modius* of mast mixed with straw or chaff, and one *modius* of steeped lupines mixed with straw or chaff, or ripe miscellany. In the month of *December* he shall give them dry leaves, or straw and chaff, with half a *modius* of bitter vetches steeped in water, or lupines, as many as half a *modius* of them steeped may amount to ; or one *modius* of mast, as is above-written, or mescelin.

C H A P. III.

Of the Culture of Gardens, and of Garden-herbs, in Prose.

FOrasmuch as we have given a particular account of the works incumbent upon the Bailiff to perform throughout the whole year, each in its proper season ; being mindful of our promise, we shall subjoin the culture of gardens, of which he is equally obliged to undertake the care, both that he may lessen the expences of his daily maintenance ; and that, when his Master comes to him, he may, as
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the Poet says, set before him *the country's unbought viands* (1). *Democritus*, in that book which he called *Georgicon*, is of opinion, that they do not act very prudently, who build strong fences round their gardens, because neither can a wall made of brick last many years, it being, for the most part, damaged by rains and storms; nor does the expence, beyond the dignity and worth of the thing, require stones. But, if any person would inclose a large extent of ground, it is necessary, that he have a good estate: therefore I myself will shew you a method, whereby, with no great pains, we secure our garden from the incurfion both of men and of cattle.

The most antient authors preferred a quickset hedge to a built wall, because it would not only require less expences, but last a vast time longer; therefore they have given us this following method of making of hedges, by planting of thorns. The place which you design to inclose with an hedge, must, as soon as the earth shall be moistened with showers, after the autumnal Equinox, be surrounded with two furrows distant, about the space of three feet the one from the other. It is sufficient, that the measure of their depth and breadth be two feet: but we must suffer them to lie open without filling them up throughout the whole Winter, having prepared the seeds to sow them withal: and let them be those of the largest thorns, and especially of bramble, and of white thorn, and of that which the *Greeks* call *κυνόσαλον* we call it *dog's thorn*: but the seeds of these thorns must be chosen as ripe as possible; and you must mix them with the meal of bitter vetches, well ground, which, when sprinkled with water, you must daub upon old ship-ropes, or any other sorts of ropes whatsoever; then the small ropes, being dried, are laid up in a loft. Afterwards, when the Winter-solstice is past, having intermitted forty days, about the time that the swallow comes; now, when the west wind begins to rise, after the thirteenth of *February*, if any water has stood in the furrows during the Winter, you draw it out; and, having loosened the ground which was thrown out of the furrows in Autumn, you replace it again as far as the half of the depth of the furrows: afterwards the aforesaid ropes are taken out of the loft, and uncoiled; and, being stretched to their full length, are laid along both the furrows, and covered with earth, but so, that there not being too much earth thrown upon them, the seeds of the thorns, which stick in the twists of the ropes, may be able to spring up. They creep forth about the thirtieth day; and, after they are advanced somewhat in their growth, they ought to be so formed, that they may

(1) *Virg. Georg. iv. 133.*

lean towards that space which lies between the two furrows : but you must place between them an hedge or row of rods, which the thorns of both furrows may climb up upon, and that it may be as a prop or support whereupon they may lean and rest, till such time as they be grown strong : it is manifest, that this thorn-hedge cannot be destroyed, unless you dig it up by the very roots. Moreover, nobody doubts, but even after it has suffered by fire, it will grow up again the better : and this, indeed, is the way of inclosing a garden, which the ancients approved most.

But it will be proper, if the situation of the land will allow it, that you make choice of a place for it, hard by the manor-house ; especially a place that is fat, and which may be watered with a rivulet running into it ; or, if there be no flowing or running water, with a spring of well-water. But, that you may have an undoubted assurance, that your well will never fail, but flow all the year long, it must be digged when the Sun shall possess the last parts of *Virgo*, and not before, that is, in the month of *September*, before the autumnal Equinox ; because then the strength of springs is most certainly known, and best found out, when the earth, by the long drought of Summer, is deprived of rain-water : but you must order matters so, that the garden be not situated near the threshing-floor, lest the winds, during the threshing-time, carry chaff or dust into it ; for both these are hurtful to all sorts of pot-herbs. Then there are two seasons for trenching and putting the ground into good order, because there are also two seasons for sowing of pot-herbs ; for very many of them are sown both in Autumn and in the Spring : nevertheless it is better to sow them in the Spring, in such places as are well watered, because both the clemency of the growing year does kindly receive and entertain the young plants and seeds when they come forth, and the thirst of Summer is quenched by the fountains and springs of water. But, where the nature of the place neither suffers you to be served with water brought in by hand, nor with that which flows in of its own accord, there is, indeed, no other resource or supply but the Winter-rains. Nevertheless, even in the driest places, your work may be preserved, if the ground be trenched deeper than ordinary : and it is sufficient to dig each gradation of it three feet deep, that so the ridge of the earth, that is thrown out of the trench, may rise to four feet. But where there is the conveniency of watering plentifully, it will be sufficient, that lay-land be turned up with a spade that is not too deep, that is, with an iron-tool less than two feet : but we must take care, that the land, which must be planted in the Spring, be pastinated or
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trenched in Autumn, about the first of *November*: then that which we would institute in Autumn, we must turn it up in the month of *May*, that both the glebe may be loosened, and the roots of the weeds killed, either by the Winter-colds, or the Summer-sun; and we ought to dung it not long before: and, when the time of sowing or planting shall draw near, the place must be cleared from herbs and weeds, and dunged five days before, and so carefully digged a second time, that the earth may be mixed with the dung. But asses dung is the best for this use, because it breeds fewest weeds: the next is either that of the herds, or of sheep, if it be macerated one year; for what men make, altho' it is reckoned most excellent, nevertheless it is not necessary to apply it, except to bare gravel, or to the loofest sand which is without any strength, where, doubtless, a greater strength of nourishment is required. Wherefore we must suffer that ground, which we have destinated to sow or plant in the Spring, to lie digged after the Autumn, in order to be pinched with the Mid-winter-colds, and hoar-frosts: for contrariwise, as the heat of Summer, so the violence of the cold, purges and refines the earth; and, by having fermented it, loosens it. Wherefore, when the Winter-solstice is past, then, at last, dung must be thrown upon it; and, about the xiiiith of *January*, the ground, being digged over again, is divided into beds or quarters; which, nevertheless, must be so contrived and formed, that the hands of the Weeders may easily reach to the middle of their breadth, lest they, who search after the weeds, be forced to trample upon the plants; but rather let them go in by paths, and let them weed the half of the beds by turns. What we have said is abundantly enough, with respect to such things as must be done before the sowing-time.

Now let us direct what must either be cultivated or sown in every season: and first, we must speak of those kinds which can be sown in two seasons, that is, in Autumn and in Spring: and these are the seeds of cabbage and lettuce, of the artichoke, rocket, garden-creffes, coriander, chervil, dill, the parsnep, skirwort, and of poppy; for these are sown either about the first of *September*, or rather in *February*, before the first of *March*: but in dry or warm places, such as those of the sea-coasts of *Calabria* and *Apulia*, they can be committed to the earth about the thirteenth of *January*. Moreover, such things as ought to be planted only in Autumn (provided nevertheless we inhabit a land that either lies upon the sea-coast, or is exposed to the Sun) are commonly those, garlick, the little heads of onions, *African* garlick, mustard.

But now also let us digest, by months, at what time it may be proper, for the most part, that every thing be committed to the earth: therefore presently after the first of *January*, it will be proper to plant dittander or pepperwort. But in the month of *February* rue and asparagus, either in the plant, or in the seed; and sometimes the seed of the onion, and of the leek, may be put into the ground: also you shall put under-ground the seeds of the *Syrian* root, and of the turnep and the navew, if you have a mind to have fruit of them both in the Spring, and in Summer; for common garlick, and *African* garlick, are the last things that are set at this time. But about the first of *March*, in sunny places, you may transplant the leek (if it is now grown big); *Hercules's all-heal* also in the latter part of the month of *March*. Then, about the first of *April*, you may transplant equally the leek, and elecampane, and the lateward plant of rue: also the cucumber, the gourd, and the caper, must be sown, that they may grow up the sooner; for beet-feed is then, at length, best sown, when the pomegranate-tree blossoms: but the head of a leek is as yet tolerably well transplanted about the fifteenth of *May*. After this nothing ought to be put under-ground, when the Summer is coming on, except parsley-feed, provided you fail not to water it well; for so it comes up very well during the Summer. Moreover, in *August* is the third sowing time, about the time when they celebrate the feast of *Vulcan*; and this is the best season for sowing the *Syrian* root, and the turnep, the navew also, and *Isiwort*, and *Alexanders*: and these are the times for sowing.

Now I shall speak of each of these in particular, which require any care; and, as to such of them as I shall pass over, it must be understood, that they require no other pains and labour but that of the Weeder, of which we must say this once for all, that at all times particular care must be taken to exterminate the weeds. That kind of garlick, which some call *Carthaginian* garlick, but the *Greeks* call ἀφροσκέροσον, is of a much greater growth than common garlick: and about the first of *October*, before it is planted, it must be divided from one head into several; for, like common garlick, it has several cloves sticking together; and, when these are divided, they ought to be planted in ridges, that, being placed in raised beds, they may be the less infested by the Winter-rains. But a ridge in a garden is like to that which Husbandmen make where they sow their champagne lands, that they may avoid and carry off the moisture. But in gardens this must be made lesser; and upon the uppermost part of it, that is, upon the back or rising part of it, must the cloves of *Carthaginian* garlick, or
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of common garlick (for this is planted after the same manner) be regularly set at the distance of an hand-breadth, the one from the other: let the furrows of the ridges be half a foot distant from each other. Then, when the cloves have sent forth three blades or leaves, let them be swarded; for the oftener this is done, the greater growth the plants attain to. Then before they make their stalk, it will be proper to twist the uppermost green part of it, and to lay it flat upon the ground, that their heads may grow the larger. But in regions liable to hoar-frosts, neither of these ought to be planted during the Autumn: for when the day is at the shortest they spoil and rot with the cold weather, which commonly grows mild in the month of *January*: and therefore in cold places, the best time for planting either common or *Carthaginian* garlick, is about the thirteenth of the foresaid month. But at what time soever we shall either plant them, or when they are ripe, lay them up in a loft, we must observe, that the Moon be under the earth, with respect to those places where they are either put into the earth, or taken out of it: for, being planted after this manner, and also laid up so, they are reckoned not to be of so very pungent a taste, nor to give such a strong smell to the breath of those that eat them. Nevertheless, many plant them before the first of *January*, in the month of *December*, in the middle of the day, if the warmth of the weather, and the situation of the ground, permit it.

Cabbage ought to be transplanted when it consists of six leaves, so that it be set after its root has been first daubed over with thin dung, and wrapped up in three small fillets of sea-weed; for this thing has this effect, that in the boiling it becomes more quickly soft and tender, and preserves its green colour without nitre. But in cold and rainy countries, the best time for setting it is after the thirteenth of *April*; the plants of which being thrust into the ground, when they have once taken hold, the oftener they are swarded and dunged, as far as the Kitchen-gardener's business and interest will allow, the better they thrive, and the stronger they grow, and of a fuller growth will they make both their stalks and their sprouts. Some people set the same immediately after the first of *March*, in such places as are more exposed to the Sun; but the greater part of it shoots out into sprouts, and a top; and, when it is once cut, it does not afterwards make a large Winter-cabbage. But you may transplant even the greatest cabbage-stalks twice; and if you do this, they say that they yield more seed, and of a greater growth.

Lettuce ought to be transplanted, when it has as many leaves as the cabbage. Indeed, in sunny and maritime places, the best time to plant

it is in Autumn; but in inland and cold places it is otherwise: in Winter it is not so convenient to transplant it. But the root of this also ought to be daubed with dung; and it requires a greater plenty of water, and so it becomes of a tenderer leaf. But there are several kinds of lettuce, which must be sown also each in its own season; and of them that which is of a dark, and, as it were, of a purple, or of a green colour also, and of a curled leaf, as the *Cecilian*, is rightly sown in the month of *January*. But the *Cappadocian*, which grows up with a pale-green smooth and thick leaf, is sown in the month of *February*; then that which is white, with a leaf very much curled, as in the province of *Bætica*, and in the borders of the municipal city of *Cadiz*, is rightly planted in the month of *March*. There is also that of the *Cyprian* kind, of a whitish-red, with a light and very tender leaf, which is very conveniently planted till the thirteenth of *April*: nevertheless, in a climate where the Sun mostly shines, lettuce may be sown almost the whole year in such places where there is plenty of water. And, that it may make its stalk the more slowly, when it has had some growth, let it receive a small brick or tile in the middle of it: being checked, as it were, with this weight, it diffuses itself into breadth.

The same method is to be observed with respect to endive also, excepting that it bears the Winter better; therefore it may be sown in the beginning of Autumn, even in cold countries. We shall plant the slip or sucker of the artichoke, to better advantage, about the autumnal Equinox, and sow the seed of it more commodiously about the first of *March*, and thrust the plant of it into the earth about the first of *November*; and we must dung it with plenty of ashes; for this kind of dung seems the fittest for this pot-herb. Mustard and coriander; as also rocket and basil, abide in their seats, as they are sown, without being removed; nor do they require any other culture, but that they be dunged and weeded: but they may be sown not only in Autumn, but in the Spring also. Also the plants of mustard, transplanted in the beginning of Winter, bring a more bushy top in the Spring. *All-heal* is sown, in both seasons, exceeding thin, upon light and well-manured ground, that it may arrive at a greater growth: nevertheless it is better to sow it in the Spring. If you would make the leek sective, or fit for being often cut, the ancients directed it to be left very thick-sown, and so, when it is grown up, to be cut. But experience has taught us, that it thrives much better if you transplant it, and set it in the same manner as you do the headed leek, at small distances, that is, within four inches the one from the other; and,

when

when it is grown up, cut it. But, as to that which you have a mind to form into a great head, you must take care, before you transplant and set it again, that you cut away all its small roots, and clip off the uppermost parts of its fibres or leaves: then little tiles or shells are put under-ground, and placed, as it were seats, under each of the plants, that so their heads may become of a larger growth. But the culture of the *beaded leek* is continual farcling and dunging: neither is that of the *sective leek* different, except that it ought to be as often watered, dunged, and farcl'd, as it is cut. In warm places its seed is sown in *January*, and in cold in *February*; and, that its growth may become the greater, several grains of it are tied up in a thin linen clout, and so put under-ground. But, after it is sprung up in those places to which water cannot be conveyed, it ought to be transplanted about the time of the autumnal Equinox; but in such places as you can give moisture to, it is rightly transplanted in the month of *May*.

You may raise parsley also both by plants and seed: it chiefly delights in water, and therefore it is most commodiously placed hard by a fountain: and, if any one has a mind to raise it with a broad leaf, let him tie up as much seed of it as his three fingers can hold, in a thin linen rag, and so put it into little beds of earth in a regular manner: or, if he would rather have it grow up with curled leaves, let him put its seed into a mortar, and beat it with a willow pestle, and clear it from its husks; and then, when it is bound up in linnen rags, in the same manner put it under-ground. It may also, without all this pains, be made curled, whatever way it is sown, if, when it is sprung up, he check its growth by rolling it over with a roller. The best time for sowing it is, after the fifteenth of *May* till the Solstice; for it requires warmth.

Also, commonly in these days basil is sown, the seed of which, when it is put into the ground, is carefully thrust into it with a beetle or roller; for if you leave the earth suspended and loose, it corrupts for the most part. The parsnep, skirret-root, and elacampane, thrive exceedingly in a place that is trenched deep and dunged; but they must be set exceeding thin, that they may grow the bigger. But it is proper, that elacampane be planted at the distance of three feet, because it makes vast bushy stalks, and creeps with its roots like the eye of a reed: nor do all these require any other culture, but that the weeds be taken away by frequent farcling. But the most proper time for putting them into the ground will be in the former part of the

month of *September*, or in the latter part of *August*. *Alifander* (2), which some of the *Greeks* call ἰπποσέλινον, some σμύρνον, ought to be sown in seed, in a place that is well trenched, especially hard by a wall; because it both rejoices in a shade, and thrives and grows strong in any place, how indifferent soever: and when you have once sown it, if you do not pull it all up by the roots, but leave, and set apart, stalks of it here-and-there for seed, it will last an age, and requires but the very small culture of farcling. It is sown from the feast of *Vulcan* till the first of *September*, and even in the month of *January* also.

Mint requires a sweet oufy soil, for which reason it is rightly placed near a fountain in the month of *March*; and, if the plants of it should happen to fail, you may gather wild mint from off fallow lands, and plant it with its tops inverted; which thing takes away its wildness, and makes it tame. The rue which you have sown in seed in Autumn, you must transplant in the month of *March* into a sunny place, and heap ashes upon it, and weed it till it grow strong, lest it be killed with weeds: but it ought to be weeded with the hand well covered; for, unless you cover it, pernicious ulcers will breed: if nevertheless, through ignorance, you shall weed it with your naked hand, and an itching and swelling follow upon it, anoint it thoroughly with oil from time to time. Its shrub or stalk continues for many years without suffering any hurt, except a woman in her menses touch it, and it wither and dry up because of that.

Thyme, and garden savory, which comes from beyond sea, and mother of thyme, as I have already related in a former book, are more carefully planted by such as take care of bee-hives, than by Kitchen-gardeners. But we do not think it amiss to have them also in gardens, by reason of their usefulness for seasoning (for they are exceeding proper for some sorts of esculents): they require a place neither fat, nor dunged, but exposed to the Sun; for the most part they grow up of their own accord in the leanest ground: these are raised both from the seed, and from plants, about the time of the vernal Equinox: nevertheless it is better to set young plants of thyme; and, after they have been set in well-manured ground, lest they strike root slowly,

(2) *Olus atrum*, sometimes by our author called *olus pullum*, commonly translated *alifander*, which, as has been said, some think to be a corruption of the *Latin*: it is so called probably from the blackness of its root and seed. The *Greeks* called it Ἴλιπποσελίσιον, i. e. horse loveage or parsley, either because of the bigness of its growth, or because it was given to horses as a remedy: they also called it *Smyrnum* , because the juice that flows from it resembles myrrh in taste or smell. It was called by some ἰππειον σέλινον, of which *hipposelimon* is only an abbreviation.

you must bruise a stalk or brush of dry thyme in a mortar; and, after it is bruised, you must infuse it in water the day before you design to use it; and, after the water has extracted the juice of it, you must pour it upon the stalks which you have set, until it has thoroughly strengthened them, and make them take fast hold: but *Italian* savory is more lively, than that you need to bestow much trouble and pains in taking care of it. When you shall have planted your *dittander* or pepperwort before the first of *March*, you may cut it down as you do festive leeks or chives: nevertheless it must be done seldomer; for it must not be cut after the first of *November*, because, if it be hurt in cold weather, it utterly decays and dies: nevertheless it will hold out for two years, if it be carefully scarfed and dunged: in many places also it prolongs its life even for ten years. The Beet is put under-ground in seed when the pomegranate-tree blossoms; and, if the garden be well watered, it is transplanted in Summer, as the cabbage or colewort, as soon as it consists of five leaves: but, if the garden be naturally dry, it ought to be set in Autumn, some time after the rains are come on.

About the first of *October*, *chervil*, as also the pot-herb *orrach*, which the *Greeks* call ἀτράφαξις (3), must be put under-ground, in a place that is not very cold: for, if the country has very hard winters, the plants must be transplanted from the place where they were sowed close together, and separated to a greater distance the one from the other. The same method is observed in the sowing of poppy and dill, as of chervil and orrach. The seeds of garden asparagus, and of that which the peasants call *corruda* (wild asparagus) are almost two years in preparing: when, in a fat and well-dunged soil, you shall have put them under-ground, so as to place into every little trench you have made for them, as much seed as your three fingers can hold; commonly after the fortieth day they are twisted and interwoven with one another, and make, as it were, an unity, or one united mass; which small roots, thus twisted and connected, the Kitchen-gardeners call *spunges*: and it is proper, that, after twenty-four months, they be transplanted into a sunny place, sufficiently moist, and well dunged: but the trenches or furrows are made at the distance of one foot the one from the other, and not more than three-fourths of a foot in

(3) Ἀτράφαξις, *atriplex*, *orach*. *Pliny* says, that *Pythagoras* blamed this pot-herb as the cause of droptics, jaundice, paleness, &c. and some pretend, that its *Latin* name intimates, that it makes such as eat it pale and discoloured: but, whatever there is in this, its *Greek* name, which some pretend to be made up of two words, ἀθροῖος ἀθροῖον, from its quick growth, seems more expressive of its nature; for it comes forth, as *Pliny* says, the 8th day, and is fit for eating the 15th.

depth, into which the little sponges are so thrust down, that, after the earth is put upon them, they may easily spring up. But, in dry places, the seeds or plants must be placed in the lower parts of the furrows, that they may abide, as it were, in little chanel or troughs: but in such as are oufy, on the contrary, they must be placed in the uppermost back of the ridge, lest they be hurt with too much moisture. 'Then the first year, after they have been thus planted, the asparagus, which they shall send forth, must be broken off short; for if you should pull it up from the bottom, the little roots being as yet tender and weak, the whole little sponge will follow: the rest of the years it must not be cropped, but plucked up by the root; for, unless you do so, the stalks that are broken off short, hurt, and give pain to the eyes of the sponges, and, as it were, blind them, and do not suffer them to put forth the asparagus. Moreover, every stalk, which springs up last in Autumn, must not be intirely taken away, but some of them must be left, and set apart for seed. Then, after it has made its prickle, the seeds themselves being gathered, the haulm must be throughly burnt in its own place, just as it is; and then all the furrows must be scarfed, and raked at the same time, and the weeds taken out of them; and presently after, either dung or ashes thrown into them, that the juice of them, trickling down with the rains the whole Winter, may come to the root. Then in the Spring, before it shall begin to sprout, let the earth be stirred with a forked iron-tool, that the style may the more easily spring up, and shew itself, and become thicker and fuller when the ground is loosened.

The radish root is rightly sown twice in the year; in the month of *February*, when we expect fruit of it in the Spring; and in the month of *August*, about the feast of *Vulcan*, when we expect it earlier: but this time of sowing it is, without doubt, esteemed the best. The care to be taken of it is, that it be sown in ground that is well dunged and manured; and, after it is arrived to some growth, that it be earthed from time to time; for if it emerge, or shoot up above the earth, it will become hard and spungy.

The cucumber and gourd, when there is plenty of water, require less care; for they are very much delighted and helped with moisture. But, if they must be sown in a dry place, where there is not the conveniency of watering them, in the month of *February* furrows, of the depth of one foot and an half, must be made. Then after the fifteenth of *March*, almost the third part of the depth of the furrow must be covered with straw put into it; then well-dunged earth must be thrown into it, till it come up to the middle of the furrow;

furrow ; and, after the seeds are put into them, they must be continually watered, till they spring up ; and, after they have begun to thrive and grow strong, their growth must be promoted and forwarded by adding earth to them, till the furrow be filled up, and made even : the seeds, being thus cultivated, will thrive well enough, and be in a good state the whole Summer, without watering, and will yield fruit of a more delicious taste than such as are watered. But, in watery places, the seed must be put into the ground as soon as possible ; nevertheless not before the first of *March*, that it may be transplanted when the Equinox is past : and take this seed out of the middle of the gourd, and place it in the ground with its top inverted ; that it may be of a vaster growth ; for when they are thoroughly dried, they may be used as vessels, as the *Alexandrian* gourds are. But, if you prepare them for eatable-stuff, you must take the seed out of the neck of the gourd, and set it with its top upright ; by which means its fruit will grow up both longer and smaller, which certainly brings a greater price than the others. But care must be taken, that as seldom as can be, a woman be admitted into that place wherein either the cucumber, or the gourd, is planted : for, commonly, green things languish, and are checked in their growth by her handling of them. But if she be also in her menses, she will kill the young offspring also with her look. A cucumber becomes tender, and exceeding agreeable to the taste, if you soak its seed in milk before you sow it : some also, that it may be the sweeter, do it in mead. But any person that is desirous to have the fruit of the cucumber earlier ripe than ordinary, let him shut up well-dunged earth in a case, or osier-basket, and sow the seed therein, and give it moderate moisture. Then, when the seeds are sprung up, let him place them in the open air, in mild and warm sunny days, hard by the house, that they may be protected from every blast of wind. But in cold and stormy weather, let him bring them back again into the house ; and let him constantly do this till the vernal Equinox be past : afterwards let him put down the whole basket into the ground ; for thus he shall have early fruit. Also, if it be worth the while, little wheels may be put under larger vases, that they may be brought out with less labour, and harboured again in the house : but, notwithstanding, they ought to be covered with glasses (4), that in cold weather also, when the days are clear,

(4) *Specularibus*. Though this word is translated *glasses*, as being agreeable to the modern practice in this thing ; yet by *specularis*, I suppose, the author means a certain transparent stone, which they clove and cut into as small pieces as they pleased, and used them for their windows, to keep out the winds and let in the light, &c. as they did afterwards with glass. This stone, it seems, was first found in *Spain*, and afterwards in several other countries, as *Pliny* says ; and, as *Seneca* says, was not in use before his days.

they may be safely brought forth to the Sun. By this method *Tiberius Cæsar* was provided with cucumbers almost the whole year (5). But we read in *Bolus Mendefius*, an *Egyptian* author, that this is done with much less trouble: he directs us to keep in our gardens, in a place exposed to the Sun, and well-dunged, brambles and fennel-giants planted in rows one after another by turns: then, after the Equinox is past, to cut them a little below the ground; and after having, with a wooden bodkin, loosened the pith either of the fennel-giant or bramble, to put dung into them, and so put the seeds of the cucumber into them, which by their growth may closely unite with the brambles and fennel-giants; for thus they are not nourished by their own, but, as it were, by their maternal root; and the stock, thus ingrafted, will also in cold weather yield the fruit of the cucumber. The second season they observe for sowing this seed, is commonly at the feast of *Minerva*, after the middle of *March*.

The *caper-bush*, in very many provinces, grows of its own accord in fallow lands; but, in such places where there is a scarcity of it, if it must be sown, it will require a dry place; and that ought to be surrounded with a small ditch before-hand, which may be filled with stones and lime, or *Cartthaginian* clay, that it may be, as it were, a certain intrenchment, that the stalks of the foresaid seed may not be able to break through it, which commonly spread themselves almost over the whole land, unless they be hindered by some fence or mound: which thing, nevertheless, is not of itself so great an inconveniency, (for they may be rooted out from time to time) as that they contain an hurtful poison, and with their juice make the ground barren. It is satisfied with very little or no culture; for it is a thing that grows up and thrives even in untilled lands, without any pains of the Husbandman. It is sown at the time of both the Equinoxes.

An onion-bed requires earth that is frequently manured, rather than that which is turned up deeper than ordinary: therefore the ground ought to be cut up from the first of *November*, that it may rot with the Winter colds and frosts; and, after an intermission of forty days, digged a second time; and then, after twenty-one days, digged a third time, and presently dunged; and then, after it is equally and thoroughly digged with spades, divided into beds or quarters, after all the roots

(5) *Pliny*, in his ninth book, *cap. 5.* mentions the great liking that the Emperor *Tiberius* had to cucumbers: perhaps both *Pliny* and *Columella* take the word in its largest signification, as signifying melons also; and then *Tiberius's* fondness for them may be better accounted for, this fruit being extremely delicious in many places of *Italy*, and the *Italians* great eaters of it.

have been pulled up and destroyed. Then, about the first of *February*, it may be proper, that, on a clear bright day, the seeds be scattered; with which some seed of savory must be intermixed, that we may have that also; for it is both agreeable to eat when it is green; and when it is dry, it is not useless for seasoning broth, or any other dainty dishes. An onion-bed ought to be sowed not less than four times at least, or even oftener. If you have a mind to make provision of the seed of it, in the month of *February* set the largest heads of the *Ascalonian* kind (6), which is the best, four or even five inches distant from each other; and when they begin to thrive well, do not sow them less than three times: then, after they have made their stalk, preserve the stiffness of their stalks by placing low rails, as it were, of small stakes among them; for unless you place reeds crosswise among them, very close upon each other, after the manner of frames in a vineyard, the stalks of the onions will be thrown down by the winds, and all the seed will be shaken out; which, indeed, must not be gathered before it begins to grow ripe, and to have a black colour. But you must neither suffer it to grow thoroughly dry and withered, nor to fall all to the ground; but the stalks must be pulled up entire, and dried in the Sun.

There are two seasons for sowing the turnep and the navew; and they require the same culture as the radish: nevertheless, the best time for sowing them is in the month of *August*. A *jugerum* of land requires four *sextarii* of their seed; but so, that, over and above this measure, it may receive a little more than an *hemina* of the seed of the *Syrian* root. Let him who shall sow these seeds in Summer have a care, that the gnat or little fly, by reason of the droughts, do not destroy the yet tender leaves, when they are creeping forth. That this may be also prevented, the dust which is found upon an arched roof, or the soot also which sticks to the roofs above the hearths, ought to be gathered; then the day before the sowing, to be mixed with the seeds, and sprinkled with water, that they may imbibe the juice the whole night; for the seeds being thus soaked, they may be safely sown the next day. Certain antient authors, as *Democritus*, direct us to medicate all seeds with the juice of the herb they call *houfseek*, and to use the same remedy against the little vermin, which experience has taught us to be true. But yet we more frequently make use of the soot, and the dust before-mentioned: because there is but

(6) *Ascalonii generis*. *Pliny*, lib. xix. cap. 6. says, that this sort of onion had its name from *Ascalonia*, a town in *Judea*; and Father *Hardouin* thinks they are what the *French* call *eschalotes*, still retaining something of their former name.

a small quantity of this herb to be had ; and by these we preserve the plants in safety commodiously enough. *Higinius* thinks, that, after the threshing, the turnep-seeds ought to be scattered upon the ground, while the straw and chaff are as yet lying in the threshing-floor ; because their heads become the larger, when the hardness of the ground that lies under them, does not suffer them to descend deep into the earth : we have often tried that without any success ; therefore we think, that the turnep, the radish, and the navew, are better sown in well-manured ground. And the Husbandmen, that are more religious than ordinary, do as yet observe the custom of the antients, who, when they sow them, pray, *That they may grow both for themselves, and for their neighbours*. In cold places, where they are afraid, lest what they sow in Autumn may be chilled with the frosts in Winter, they make low rails with reeds, and place rods across upon them, and throw straw upon the rods, and so defend the seeds from the hoar-frosts. But, in regions exposed to the Sun, where, after the rains, those noxious animals we call *palmer-worms*, but in the *Greek* language are called *καμπαι* (7), fall upon them, they ought either to be gathered by hand, or early in the morning the stalks of the pot-herbs should be shaken ; for thus, if, while they are as yet stiff with the cold of the night, they fall down, they cannot afterwards creep up to the higher part. Nevertheless it is needless to do this, if, as I said before, the seeds be macerated, before they are sown, with the juice of the herb *bees-foot* ; for the palmer-worms do no manner of hurt to them, when they are medicated after this manner. But *Democritus*, in that book which, in *Greek*, is intituled *περὶ ἀντιπαθέων* (8) affirms, that these self-same beasts are killed, if a woman, in her menses, go with her hair loose, and bare-footed, thrice round each bed in the garden ; and that, after this, all the little worms will fall down, and so die.

(7) *Καμπαι*, a palmer-worm, has its name from its many joints, and bending itself in many different parts when it creeps.

(8) *Περὶ ἀντιπαθέων*, some read it *ἀντιπαθέων*. If the first be the true reading, then *ἀντιπαθέων* may signify the same as *αντιπαράστατον*, a remedy in general against any distemper : but, if the second be right, as probably it is, then *ἀντιπαθέων* signifies a repugnancy between two things, because of contrary qualities ; as between fire and water, &c. or the virtue or power that a thing may have of resisting, or relieving from, and assisting against, the hostile quality of some other thing. *Democritus* wrote *περὶ ἀντιπαθέων καὶ ἀντιπαθέων*, of which there is only a fragment remaining, which is published in *Fabronius's Earl. Græc.* wherein there is nothing of this ridiculous story ; only, that in a garden caterpillars will die, if you boil those of another garden in water, and sprinkle the garden therewith.

Thus

Thus far have I thought it proper to give directions concerning the culture of gardens, and the offices of a Bailiff: and, though I have already given it as my opinion, in the first part of this book, that he should be well instructed and learned in all manner of business relating to Husbandry; nevertheless, because it most commonly happens, that our memory of the things we have learned fails us, and that it must be frequently renewed from notes, and abstracts, and memorandums of things, I have subjoined the arguments or contents of all my books, that whatever thing should be sought for, and after what manner every thing should be done, might be easily found out, whenever there should be occasion for it (9).

(9) From this last paragraph there seems to be some reason to think, that *Columella* designed to have finished here; but he changed his mind, and probably forgot to change this paragraph. There is also ground to think, that he composed an index to his work; probably like that of *Pliny* and *Aulus Gellius*: but it is now lost, or torn in pieces and mangled by those who divided his books into chapters, to which they prefixed arguments taken out of the index; and in many places not very judiciously.

L. JUNIUS MODERATUS COLUMELLA

O F

H U S B A N D R Y.

The TWELFTH and Last BOOK.

The Bailiff's Wife.

The P R E F A C E.

XENOPHON the *Athenian*, in that book, *Publius Silvinus*, which is intituled his *Oeconomic* (1), has declared, that the matrimonial union is so wisely ordered and devised by Nature, that not only the most agreeable, but also the most profitable society and partnership in life, might be entered into; which, not long ago, *Cicero* also said: and lest mankind should, in process of time, utterly perish, for this reason a Man and a Woman were joined together: moreover that, from this same society, there might be prepared for mortals not only helps and supports, but also defences for their old age. Yea further, considering that food, clotheing, and other things necessary for mankind, were not to be prepared for them, as for wild beasts, in the open air, and in woods and forests, but at home, under a roof, it was necessary, that one of the two should be abroad, and in the open air, who, by labour and industry, might procure and provide the same; and the other within doors, who might lay them up

(1) *Oeconomicus*. This *Greek* word, though mostly used as an adjective, yet by *Xenophon*, and some others, it is frequently used as a substantive, and signifies one that has skill, prudence, and dexterity in the management of domestic affairs. *Columella* has here given us the substance of what *Xenophon* has said upon this subject, without confining himself to his very words; and, as he takes notice of *Cicero's* having translated this book, it is probable he made use of his words: but this cannot be affirmed for certain, since we have not that translation.

in houses, and watch over and keep them safely; forasmuch as it was necessary for us, either to practise Husbandry, or Navigation, or carry on some other kind of business, that we might acquire some worldly substance. But, when the things acquired were brought together under our roof, it was also necessary that there should be another, who might watch over and keep them, after they were brought in, and do all such other business as ought to be managed and done at home: for both the corns, and the other things, which the earth produces for our sustenance, stood in need of an house to cover them; and it was necessary, that the offspring of sheep, and the increase and produce of other sorts of cattle, should be safely kept in a close and secure place; as also the other things that are useful and necessary for the sustenance, clotheing, accommodation, and conveniency of mankind. Wherefore, since the things we have mentioned did require both pains and diligence, and that such things as it was necessary should be safely kept, and taken care of at home, were not with small care acquired abroad; it was rightly ordered and provided, as I said, by Nature, that domestic diligence should be the business and task of the Woman; and that of the Man, all business transacted abroad and without-doors. Therefore Nature has allotted to Man the suffering of heat and cold, as also journeys, and the labours and fatigues both of peace and war; that is, all the laborious business of Husbandry, and Military Service: moreover, to the Woman, because Nature had made her inhabile for all these things, she committed the care of domestic affairs: and, because she had assigned diligence, and the custody and charge of things, as the proper business of this sex; therefore she made it more timorous than that of the male: for *fear* contributes very much to the diligence that is requisite for the custody and preservation of any thing.

And because it was necessary, that they who seek their living without-doors, and in the open fields, should sometimes repel injuries; therefore she has made the Man more courageous and bolder than the Woman. But because, after they had acquired riches, they stood both equally in need of memory and diligence, she has not given a lesser share of these things to the Woman, than to the Man. Moreover, because simple Nature would not, that any one of them should comprehend all things commodious for them, therefore she willed, that the one should stand in need of the other; because what is wanting to the one, is, for the most part, in the possession of the other. These things did *Xenophon*, and after him *Cicero*, who translated him into *Latin*, not unprofitably discourse of. For both among the *Greeks*, and afterwards among

among the *Romans*, even down to the memory of our fathers, the Matron took all the domestic labour upon herself; the Masters of families, when they laid aside all care of public affairs, and business without-doors, retiring into their own houses, as into a place of rest: for the highest reverence and regard were mixed with concord and diligence, and the beautifullest Woman did burn with emulation to excel in diligence, studying, by her care, to enlarge and make better the affairs and circumstances of her Husband. There was no separate or divided interest seen in the house, nothing that either the Husband or the Wife would properly call their own; but they both conspired together for their common and mutual advantage, that so the diligence and carefulness of the Wife might amount to an equal proportion of industry, with the business and affairs transacted without-doors. Therefore neither the Bailiff, nor his Wife, had much business to do, when their Master and Mistress themselves did daily review, oversee, and manage their own affairs. But now-a-days, when most part of Wives are so dissolved in luxury and idleness, that they do not, indeed, vouchsafe to take upon themselves the care of manufacturing wool for their own cloaths, but disdain and set light by cloaths made at home, and with a perverse desire, by fair words, obtain from their Husbands others that are more costly, which are purchased with great sums of money, and cost almost the whole yearly income of their estates; it is no wonder at all, that these same Ladies think themselves mightily burdened with the care of rural affairs, and of the implements of Husbandry, and esteem it a most sordid and mean business, to stay a few days in their country-houses: for which reason, since that antient custom of the *Sabine* and *Roman* Mistresses of families is not only intirely grown out of fashion, but also quite extinct; the business and office of the Bailiff's Wife, as a Keeper of the Manor-house, is crept in as necessary, that she might perform the offices, and do the business of the Matron: forasmuch as the Bailiffs also have succeeded, and come into the room of their Masters, who, formerly, by antient custom, did not only practise Husbandry, but dwelt in the country also. But, lest I should seem to have unseasonably taken upon me the office of a Censor, in reproving the manners of our own times, I shall now go on to describe the offices of the Bailiff's Wife.

C H A P. I.

Of the Care that the Bailiff's Wife ought to take of the Household-affairs; and of the Precepts she ought to observe.

MOREOVER, (that we may keep to the method we have laid down, which we began in the preceding book) (1) the Bailiff's Wife ought to be a young Woman, that is, not too much of a Girl, for the same reasons we mentioned, when speaking of the age of a Bailiff: she ought also to be of sound health, and in her person neither ugly, nor yet exceeding beautiful and handsome: for a sound and robust constitution will enable her to support both watchings, and other fatigues and labours: ugliness will make her Mate loath and abhor her, and too great beauty will make him lazy and slothful. Therefore we must take care, that we neither have a Bailiff that is unsettled, and always wandering abroad, and has an aversion to be at home with his Wife; nor, on the other hand, one that is lazy, and loiters at home, always lolling in his Wife's arms.

But the things we have mentioned are not the only precautions we must take with respect to the Bailiff's Wife; for, among the first things, it must be considered, whether she be very far from being addicted to wine, delicious fare, superstitions, sleepiness, and drowsiness, and keeping company with men, that she may have a concern and care upon her mind, about what she ought to remember, and what it is she is to make provision for, and to take care of for the future, that, for the most part, she may observe and keep to the same way and manner of acting, as we commanded the Bailiff to observe: because the Husband and the Wife ought to be like to one another in most things; and that she be as ready to avoid what is evil, as to hope for a reward of such things as she has done well: also that she use her utmost endeavours, that the Bailiff employ himself as little, in business within-doors, as possible; his business being to go forth with the servants early in the morning, and to return with them fatigued, in the twilight, after they have finished their work.

Nevertheless, by instructing the Bailiff's Wife, we by no means dispense with the Bailiff's care of household-affairs, but we only alleviate his labour, by giving him an assistant. But the several offices

(1) He means the 11th, wherein he treated of the qualifications of a Bailiff.

and duties, to be performed within-doors, must not be wholly left to the Woman's province; but they must be so delegated to her, that, from time to time, they may be also under the observation and eye of the Bailiff: for thus the Bailiff's Wife will be more diligent, if she remembers, that there is one there, to whom she must frequently give an account.

Moreover, she ought to be fully persuaded of this, that it is incumbent upon her to stay at home, either wholly, or, at least, for the most part; both that she may send such servants out of doors, as have business to do in the fields; and to keep such of them within the walls, as have any thing to do in the manor-house; and to observe, that they do not neglect their business, by sitting long still, and doing nothing; and carefully to examine and inspect such things as are brought into the house, and see if there be no part of them imbezled; and so, after they are examined and found sound and intire, to receive them into her custody; then to set apart such things as are designed for consumption; and to keep carefully such things as can be saved, and that remain over and above the daily expence, that so the provision of the whole year may not be spent in one month.

Moreover, if any one of the family begin to be in a bad state of health, she must see, that he be well tended, and served with every thing convenient for him, as much as is possible: for from this kind of care spring benevolence and obsequiousness. As also they, who have recovered their health, study to serve more faithfully than before, when there is due care taken of them when they are sick.

C H A P. II.

After what Manner she ought to manage the Provisions, or the Store-houses.

AFTER all this, besides these things, she ought to remember what things are brought into the house, that they be laid up in proper and wholesome places, that they may continue there without receiving any damage: for there is nothing that we ought to be more careful of, than to prepare places where every thing may be laid up safely, that it may be brought out, and produced again, when there is occasion for it. What sort of places these ought to be, we have already

already told you, both in the first book, when we gave a plan and description of a manor-house; and in the eleventh, when we discoursed of the office of a Bailiff: but, even at this time, we shall not think it any great trouble, briefly to demonstrate and explain them.

The highest room of the house requires the vessels and the cloaths of the greatest value: moreover, a store-house that is dry, and free from moisture, is reckoned proper for corn; that part of the house which is cold, is most commodious for keeping wine with safety: that part which is well lighted, demands the household-furniture that is brittle, and such sorts of work to be done therein, as stand in need of much light.

Therefore having prepared the receptacles, she must lay up and dispose every thing in its place, according to its kind, and also some things particularly by themselves, that so she may the more easily lay her hand upon them, when there shall be occasion to use them: for it is an old proverb, That it is the most certain poverty, when you stand in need of any thing, not to be able to make use of it, because you know not the place where the thing, which you want, lies carelessly thrown by. Therefore, in the management of family-affairs, negligence is the occasion of more labour than diligence.

For who is he that doubts, that there is nothing more beautiful, in every state and condition of life, than order and regularity? which we have frequent occasion to observe, and take notice of, even in ludicrous shews: for, when the chorus of the Singers does not agree in certain measures and cadences, nor keep time and proportion with the Master that beats the time, and directs them, they seem to them that hear them, to sing something that is dissonant, harsh, confused, and disorderly: but when, as it were, with one consent, they all conspire and agree in certain numbers and measures, and so form a concert; from such an agreement of voices there is formed a certain sound, which is not only pleasant and delightful to the Singers themselves, but also the spectators and hearers are charmed and ravished with the greatest pleasure and delight.

In an army also, neither the General, nor the Soldier, can be able to execute any thing whatsoever, without order, and a right disposition of things; seeing the armed man puts the unarmed into disorder; the horseman the foot-soldier; and the waggons and carriages the cavalry; if they be mixed and jumbled together. This same method, of having every thing in readiness beforehand, and of observing a due order in every thing, is of great use and advantage on ship-

board also: for when a storm comes on, and the ship is in right order as it should be, the tackling, and every other thing belonging to it, being placed in its proper order, and in its own place, the Boatswain, or any other person whose business it is, brings it out without being in a consternation, when the Master of the ship calls for it.

Now if these things are of so great importance, either in theatres, or in armies, or even in ships, there is no doubt, but the business of the Bailiff's Wife requires order, and a due disposition of such things as she lays up: for every particular thing is the more easily viewed and examined, when it is assigned to its own place; and, if any thing happens to be out of its place, the empty place itself puts her in mind to make inquiry after what is wanting: and if there be any thing that should be taken a particular care of, or adjusted, and make fit for use, it is the more easily taken notice of, when it is reviewed and numbered in its own rank or order: concerning all which *M. Cicero*, following the authority of *Xenophon* in his *Oeconomic*, thus introduces *Ischomachus* narrating these things to *Socrates*, who questioned with him concerning the same.

C H A P. III.

Of the Distribution of the Implements of Husbandry, and the Household-furniture.

AFTER we had prepared proper places, we began to distribute the tools, implements of Husbandry, Household-furniture, and every thing belonging to a family: and, first of all, we placed by themselves all those things we are wont to make use of in celebrating divine service; afterwards the Womens apparel, which is provided for holy-days, then the Mens apparel; also their dress for solemn days; as also shoes suitable for both sexes: then also arms, darts, and arrows were laid apart by themselves; and, in another place, all the tools they make use of for manufacturing of wool.

After which things were placed the vessels they are wont to make use of for dressing of victuals; then were set in view the things which belonged to washing and bathing, and what things were necessary for elegant dress and apparel, and what belonged to our daily table, and to feasting and banquetting: afterwards, out of such things as we use daily, we set apart what might suffice for one month; and what might

might suffice for the whole year also we divided into two parts; for thus we cannot be so easily deceived as to the time they will last, and when they will be at an end.

After we had set all these things by themselves, then we disposed and placed them in due order, every thing in its own place: then such things as the servants use daily, and such as belong to the manufacturing of wool, cooking, and dressing of victuals, these very things we delivered to the person who is wont to use them, and pointed out the places where they should put them, and gave them charge to keep them safely.

But such things as we make use of upon holy-days, and when strangers come to our house, and upon other certain occasions, which rarely happen; these we delivered to the Larderer, and pointed out a particular place for every one of them; and we counted over to every one the things they were to take the charge of; and, after we had counted them over, we set them down in writing ourselves; and admonished him, that whatever thing there might be occasion to use, he should know from what place he should give it, and remember, and mark down, what, and when, and to whom he had given it; and that he should put every thing again in its own place, when he received it back again.

These precepts of industry and diligence the antients have delivered to us in the person of *Ischomachus*; and we now explain and point them out to the Bailiff's Wife, who is employed as an Housekeeper. Nor yet must her care be confined to this one thing, to lock up, and keep safely, such things as are brought into the house, and which she shall receive into her custody; but let her review and examine them from time to time, lest either the household-furniture, or the garments that are laid up in the wardrobe, receive damage, and be spoiled, or grow mouldy with moisture, and lying-by; or the fruits of the earth, or any tools and utensils be spoiled and rot through her neglect and laziness.

But in rainy days, or in cold and frosty weather, when a Woman cannot go about any rural work in the open air, in order that she may be put to manufacturing of wool, let the wool be prepared and combed beforehand, that she (the Bailiff's Wife) may the more easily go through with, and exact the usual task of spinning and weaving; for it will do no hurt, if garments fit for servants be made at home, for herself, the Factor or Agent, and others in a more honourable station in the family, that the Master of the family's accounts may be less burdened, and his charges lessened.

Moreover, this also she must constantly watch over, and be particularly careful of, that, when the servants are already gone forth out of the manor-house, she search and look for those whose business it is to be abroad, and employed in works of Husbandry without-doors: and, if any one of them, boggling and sauntering within-doors, (as it happens) has escaped the care of her Mate, that she inquire after the cause of his idleness, and examine and find out whether he has stayed behind, and has been hindered by indisposition, and want of health, or has only skulked through idleness and sloth; and, if she shall find him even counterfeiting feebleness, and want of strength, let her conduct him, without any further delay, into the infirmary; for it is better, that a servant, who is fatigued with his work, should rest a day or two, under custody, than contract a real illness by too much labour.

In fine, she must remain in one place as little as possible, for her's is not a sedentary business; but she ought sometimes to come to the web, and give instruction, if there be any thing she knows better than they; if not, to learn from him who may understand and know more than she does; at other times she ought to come and look over them that are cooking and dressing the victuals for the family: as also to take care, that the kitchen, and the ox-stalls, as also the mangers, be made clean: also to open the infirmaries from time to time, even suppose they have no sick people in them, and to clear and free them from all manner of dirt and nastiness, that, when necessity shall require it, they may be consigned in good order, and in a clean, neat, and wholesome condition, to such as are sick and languishing.

Also she ought to come unawares upon those who have the oversight, and charge, and giving out of the provisions, and are Keepers of the stores, when they are weighing or measuring any thing: as also to be present with the Shepherds, when they are milking the ewes in the folds, or putting the lambs, or the young of other cattle, to the dug: she ought also to be present at the sheep-sheering, and gather up the fleeces carefully, and count the fleeces, and compare them with the number of the sheep: also to insist, and be very pressing, with them that have the care of the porch, that they set out and air the household-furniture; and that the irons and the iron-tools be scoured and made bright, and freed from rust; and that the rest of the things, if they want mending, be delivered out to the proper Workmen to be mended, and make fit for use.

Lastly, after all these things are put into due order, I do not think, that this distribution will be of any advantage, unless, as I have said, the

the Bailiff very frequently, and even the Master and the Mistress of the family, remark and take notice, how the established order and method is observed. Which thing also has been constantly observed in cities, where right policy and good manners have been established, whose chief and principal men did not think it enough to have good laws, unless they created the most diligent citizens Guardians of the same, which the *Greeks* call νομοφύλακας (Guardians of the laws): their office was to bestow praises and commendations, as also honours, upon those who obeyed the laws, but to mulct and punish those who were disobedient: which is now, indeed, the business of the Magistrates, who, by constant administration of justice, preserve and maintain the power of the laws. But let it suffice to have delivered these things in general, as absolutely necessary to the right management and government of a family.

C H A P. IV.

What Kinds of Vessels she ought to prepare for salting and pickling Provisions, and for Conserves.

NOW we shall give directions about the other things which were omitted in the former book, because we reserved them for the offices of the Bailiff's Wife; and, that some order may be preserved, we shall begin with the spring of the year, because both the early and the trimestrian sowings being finished, then there happen vacant times for executing those things we shall hereafter teach.

The historical records of former times inform us, that the *Carthaginian* and *Greek* authors, as also the *Roman*, were not wanting in their care of small things: for both *Mago the Carthaginian* (1), and *Hamilcar* (2), which *Mnasias* and *Paxamus*, no obscure authors of

(1) *Mago the Carthaginian* has been already mentioned, *lib. i. c. i.* as the Father of Husbandry; and, no doubt, the author mentions him again, in this place, to intimate, that, although he was so eminent a person; and whose business, as a rustic writer, was chiefly to teach the art of Agriculture; yet he did not disdain to descend even to the smallest parts of the œconomy of a family.

(2) It is not certain who this *Hamilcar* was; probably he was the Father of *Hannibal*, but neither *Varro* nor *Pliny* mention him as a rustic writer. *Mnasias* is mentioned by *Varro* and *Pliny*, as also by *Athenæus*: he was of *Patara*, a city of *Lycia* in *Lesser Asia*. *Paxamus* is not mentioned neither by *Varro*, nor *Pliny*, nor *M. Ambivius*, nor *Menas Licinius*; but *Caius Matius* is mentioned by *Tacitus*: he lived in the time of the Emperor *Augustus*, whose favourite he seems to have been.

the *Greek* nation, seem to have followed ; as also some of our own country, after they had rest from wars, did not think it below them to contribute, as it were, a sort of tribute for the sustenance of mankind ; as *M. Ambivius* and *Mænas Licinius*, as also *C. Matius*, whose study it was, by their precepts, to instruct and form the diligence of a Baker, and of a Cook, and also of a Butler, or Clerk of the Kitchen.

But all these authors were of the mind, that it was necessary, that he, who undertakes any of these offices, should be chaste and continent, because the whole consisted in this, that neither cups, nor victuals, should be handled, but by one under age ; or, at least, one that most carefully refrained from Venereal affairs, which if either Man or Woman has meddled with, they ought to be washed and cleansed, either in a river, or in constantly running water, before ever they touch the provisions ; for which reason the service of a boy, or a virgin is necessary for these things, by whom such things, as there shall be occasion to use, may be brought out.

After this precept, they order a place, and proper vessels, for powdered provisions, pickles, preserved fruit, &c. to be prepared ; and, that the place ought not to be exposed to the Sun, but the coldest and the driest that can possibly be had, lest the provisions contract mouldiness by the moisture. But these vessels must be either of potters-earth, or of glass, rather more in number than large ; and some of them well pitched ; nevertheless, others of them must be pure without pitch.

These vessels must be made on purpose, with a wide mouth, and equal to the very bottom, not shaped in the manner of a wine-vessel, that so, when the pickles are taken out for use, whatever remains may be pressed down equally to the bottom, with a weight ; for this keeps the provisions from spoiling, when they do not swim upon, but are always sunk under the brine, which can scarcely be done in the belly of a wine-vessel, because of the inequality of its shape : it is very necessary for this to make use of vinegar, and of very strong brine ; both which are made after this manner.

C H A P. V.

How Vinegar may be made of flat Wine.

FOR forty-eight *sextarii* of vapid wine, that it may become acid, bruise a pound of leaven, a quarter of a pound of dry figs, a *sextarius* of salt; and, after they are bruised with a quarter of a pound of honey, dilute them with vinegar, and so put them to the foresaid quantity: some add to the same quantity four *sextarii* of parched barley, and forty burning walnuts, and a pound and an half of green mint: some heat masses of iron in the fire, till they have the appearance of fire itself, and put them into the same quantity of wine: some also, after they have taken out the kernels of five or six pine-apples, set the empty pine-apples themselves on fire, and put them down burning into the wine: others do the same thing with burning pine-fir-tree-nuts.

C H A P. VI.

How strong Brine or Pickle may be made.

MAKE strong brine after this manner: In that part of the manor-house which receives most of the Sun, place a barrel or vase with a very wide mouth; fill this vessel with rain-water, for this is the fittest water for this business; or, if you have no rain-water, be sure that it be spring-water of the sweetest taste: then into this water put a rush- or *Spanish* broom-basket, which must be filled with white salt, that the brine may be the whiter: when you shall see, that the salt continues to melt for some days, you shall thereby understand, that the brine is not as yet ripe.

Therefore you shall still put in more salt from time to time, till it remain in the basket intire, without melting, which when you shall observe, you shall know, that the brine is come to its maturity: and, if you have a mind to make other brine in the same vessel, you shall pour this into vessels that are well pitched, and keep it covered in the Sun; for the strength of the Sun takes away all mustiness, and gives it a sweet smell. There is another way to try if brine be ripe; for,

when you shall have put sweet cheese into it, if it sink down to the bottom, you shall know, that it is not as yet ripe ; if it swim in it, you shall know, that it is ripe.

C H A P. VII.

What Herbs may be pickled throughout the four Seasons of the Year, and after what Manner.

TH E S E things being prepared, about the vernal Equinox herbs must be gathered, and laid up for use, *viz.* sprouts, colewort or cabbage, capers, the small tender stalks of parsley, rue, aliffander with its stalk, before it comes out of its hose: also the tender tops of the stalks of fennel-giant before they begin to spread, and the tenderest flower of the wild and garden parsnep, with its small stalks; the flower of the white bryony, before it begins to spread; and of asparagus, and butchers-broom, and buckthorn, and of the common great housleek, penny-royal, and cat-mint, and of wild colewort, and samphire, and its small stalk, which is called kite's-foot; as also the small tender stalk of fennel.

All these are very safely preserved with one pickling, that is, if you mix two parts of vinegar, and a third part of strong brine: but the white bryony, the butchers-broom, and buckthorn, and asparagus, wild colewort, and the parsnep, and the cat-mint, and samphire are put into trays, according to their kinds; and, when they are sprinkled with salt, they are placed for two days in the shade, till they be all in a sweat: then, if they have thrown out as much moisture, as that they may be washed with their own juice, it is well; if not, they pour strong brine upon them, and wash them therein, and squeeze the liquor out of them by a weight laid upon them; then each of them is put up into its own vessel, and the liquor, as I said above, which is mixed with two parts vinegar, and one of strong brine, is poured upon them, and a stuffing of dry fennel, which was gathered last year during the vintage, is put upon them; so that it may press down the herbs, and that the liquor may come up to the brim of the jar.

When you gather aliffander, fennel-giant, and fennel, expose them within-doors till they grow yellow; then pull the leaves, and all the bark, off the stalks: if the cabbages or colliflowers be thicker than the thumb, cut them with a reed, and divide them into two parts:
also

also the flowers themselves must be laid open and divided, that they may not be too large, and so put up into vessels; then the liquor above-mentioned must be poured upon them, and a few small roots of laser, which the *Greeks* call *σίλφιον*, added to them, and so covered with a stuffing of dry fennel, that the liquor may come up over them.

Sprouts, cabbage or colliflowers, caper-shrub, kite's-foot, penny-royal, the common great housleek, must be dried several days under the roof, till they grow yellow, and then it is proper they should be pickled in the same manner as you did the fennel-giant, rue, favory, and wild marjoram. There are some who pickle rue with strong brine only, without vinegar; then when they have occasion to use it, they wash it with water, or even with wine; and, after they have poured oil upon it, make use of it. With this pickling green garden favory, as also green wild marjoram, may be commodiously preserved.

C H A P. VIII.

How Oxygal, or sour Milk, may be made.

MAKE oxygal, or sour milk, after this manner: Take a new pot, and bore a hole in it, hard by the bottom; then with a sprig stop up the hole you have made, and fill the vessel with the freshest ewe-milk, and to it add small bundles of green seasoning herbs, origany, mint, onion, coriander: put these herbs so far down into the milk, that the strings, wherewith they are tied, may appear on the outside.

After the fifth day, take out the sprig wherewith you stopped the hole, and let out the whey; then, when the milk begins to drop out, stop up the hole with the same sprig; and, after three days intermission, let out the whey in the same manner as has been already said; and take out the small bundles of seasoning herbs, and throw them away; then rub a little dry thyme, and dry wild marjoram, upon the milk; and add to it as much of a sective leek, cut very small, as you shall think fit, and mix them together: after having stayed two days, let out the whey again, and stop up the hole, and put as much brayed salt to it as shall be sufficient, and mix them; then, having put a cover upon it, and daubed it, you shall not open the pot, till you shall have occasion to use it.

There are some, who, after they have gathered garden or even wild dittander, or pepperwort, dry it in the shade; then, having thrown away the stalk, they steep the leaves a day and a night in strong brine; and, after they have squeezed the liquor out of them, they mix them with the milk without the seasoning herbs, and add as much salt to it as they think enough: then they do the other things we directed above. Some mix young fresh leaves of dittander with the sweet milk in the pot, and, after the third day, let out the whey in the manner we have directed: then they find some green savory, as also the dry seeds of coriander, dill, thyme, and parsley; and bray them well into one mass, and add them to it, and mingle the best-made and well-sifted salt throughly with it. The other things above-mentioned they do after the same manner.

C H A P. IX.

Of Pickling of Lettuce.

HAVING cleansed the stalks of the lettuce from the lower part, as far as where the leaves shall seem to be tender, you must salt them in a tray, and let them alone a day and a night, till they have thrown out their brine; then wash them, and take them out of the brine; and, after they are squeezed, spread them upon hurdles, till they grow dry; then spread dry dill and fennel under them, and cut a little rue and leek, and so mix them together: then, when the little stalks are dried, you must put them up in such a manner, that green kidney-beans intire may be placed among them, the which you must steep a day and a night before in strong brine; and, after they are dried in the like manner, they must be put up with the bundles of lettuce, and a liquor made of two parts of vinegar, and one of strong brine poured upon them: then they must be so pressed down with a stuffing of dry fennel, that the liquor may swim above them.

That this may be done effectually, he that has the direction and management of this affair, ought frequently to pour liquor upon them, and not suffer the pickles to grow dry, but wipe the outside of the vessels with a clean sponge, and cool them with the freshest spring-water. After the same manner you must pickle endive, and the tops of the blackberry-bush, as you do lettuce; as also of thyme, and savory, and wild marjoram, and the sprouts of wild radishes: but these things above-mentioned are made up and pickled in the Spring.

C H A P. X.

Of preserving of Onions, Pears, and Apples, and all Fruits of the Apple-kind.

NOW we shall give directions concerning such things as ought to be gathered and laid up in Summer, about the time of harvest, and also after the harvest is over: Choose the *Ascalonian* or *Pompeian* onion, or the single *Marfian* also, which Rustics call *unio*; and it is that which has not put forth any sprouts or shoots, and has not had any offspring or young ones adhering to it (1).

Dry this first in the Sun, and then, having cooled it in the shade, put it up in a jar, having spread thyme, or favory, or wild marjoram, under it; and, having poured a liquor upon it, consisting of three parts vinegar, and one of strong brine, put a small bundle of favory or wild marjoram upon it, so that the onion may be depressed; and when it has drunk up the liquor, let the vessel be filled up again with the like mixture. At the same time the fruit of the cornel-tree or cornel-berries, and onyx-coloured plums, and wild plums, bullaces or sloes; as also the several kinds of pears and apples, are preserved.

The fruit of the cornel-tree, or cornel-berries, which we may use instead of olives, also wild plumbs, or bullaces; or sloes, and onyx-coloured plumbs, must be gathered while they are yet firm and solid, and not when they are very ripe, nor yet must they be too green; then they must be dried one day in the shade; then let vinegar, and must boiled into one half or one third of the first quantity, be mixed together in equal quantities, and poured upon them. But you must add some salt to them, lest maggots, or any other animals, breed in them: but they will keep better, if two parts of sweet must, boiled into one half of the first quantity, be mixed with one part vinegar.

After you have gathered the *Dolabellian*, the *Crustumian*, the royal and *Venus* pears, the warden pears, the *Nævian*, the brick-coloured pears, the huge fair pear, the laurel and musk pears, and the purple plums, before they are thoroughly ripe, nevertheless not very

(1) It has been already observed, that the *Ascalonian* onion had its name from *Ascalonia*, a city in *Judea*, and is, as some think, what we call *shalot*, and the *French eschalotes*. The *Pompeian* has its name from *Pompeii*, a town in the kingdom of *Naples*, mentioned in the tenth book. The *Marfian* was originally from the *Marsi*, a people formerly inhabiting a part of the kingdom of *Naples*; the author himself mentions its distinguishing character.

green, examine them carefully, and see that they be sound, without any blemish, or little worms in them; then put them up in a pitched earthen jar, and fill it either with raisin wine, or with must boiled in to a third of the first quantity, so that all the apples may be below the liquor; and, after you have put the cover upon it, plaster it.

I thought it necessary to give you this direction upon the whole, that there is no kind of apple, which may not be preserved in honey: therefore, since this thing is very salutary to such as are sick, I am of opinion, that a few apples, at least, should be preserved in honey, but kept separate according to their kinds; for, if you mix them together, one kind is corrupted by the other. And, seeing we have very opportunely made mention of honey, at this same time the bee-hives must be castrated, and the honey and the wax made: of which we have already spoken in the ninth book. Nor do we now require, that the House-keeper, the Bailiff's Wife, should take any other care upon her in this matter; but, that she be present with them that have the management of this affair, and take the fruit into her custody.

C H A P. XI.

Of the Composition of a sweet Water, which they use for the preserving of Fruit, &c.

BUT forasmuch as, at the same time, bees-wax-water (1), as also mead, ought to be laid up, in order to be kept till they grow old; you must remember, that, when you have received the secondary honey from the honey-combs, the wax be presently separated and broken into very small pieces, and steeped in spring- or rain-water; and, after the water is squeezed out, let it be strained, and poured into a leaden vessel, and boiled, and let all the filth and nastiness be taken off it with the scum: after it is boiled, when it is as thick as must sodden in to a third part of its first quantity, let it be cooled, and put up in stone bottles well pitched.

Some use this bees-wax- or honey-water instead of mead; some also make use of it, instead of must sodden in to a third of the first

(1) *Mella*. This feminine substantive, though twice mentioned in this chapter, and also *cap.* 47. is not to be found in several Dictionaries: it is a liquor made with water, and the fresh bees-wax steeped in it for a certain time, and afterwards boiled, as here directed.

quantity, for preserving of olives; for which, indeed, I think it is more proper, because it gives a relish, and is savory for eating: and it cannot be a remedy, instead of mead, to such as are in a languishing condition; because, if they drink it, it causes an inflation of the stomach, and the bowels.

C H A P. XII.

Of the Way to make Mead.

Therefore having set apart this bees-wax-water, and destinated it for preserving of fruits, mead must be made by itself of the very best honey; but it is not made after one manner: for some, many years before, put up rain-water in vessels, and set it in the Sun in the open air; then, having emptied it from one vessel to another, and made it very clear, (for, as often as it is poured from one vessel to another, even for a long time, there is found, in the bottom of the vessel, some thick settling like dregs) they mix a *sextarius* of old water with a pound of honey.

Nevertheless some, when they have a mind to make the mead of a rougher taste, mingle a *sextarius* of water with three quarters of a pound of honey; and after they have, according to this proportion, filled a stone bottle, and plaistered it, they suffer it to be forty days in the Sun, during the rising of the Dog-star; then they put it up in a loft, which receives smoak. Some, who have not been at the pains to preserve rain-water till it becomes old, take that which is fresh, and boil it in to a fourth part: then, after it is grown cold, if either they have a mind to make mead sweeter than ordinary, they mix a *sextarius* of honey with two *sextarii* of water; or, if they would have it rougher, they put three quarters of a pound of honey to a *sextarius* of water; and, having made it according to these proportions, they pour it into a stone bottle; and, after they have kept it forty days in the Sun, as I said above, they put it up in a loft, which receives smoak from below.

C H A P. XIII.

Of preserving Cheese, and pickling certain Herbs.

THIS is the fittest time for preparing cheese for domestic uses, when both the cheese sends forth, or throws out, the least whey; and in the latter season, now when there is but little milk, it is not so expedient to take up the Labourers time in carrying the fruits to the market: and, indeed, when they are carried to market during the Summer, they often spoil by turning sour; therefore it is better to make them up for use at this very time. And it belongs to the office of a Shepherd, to see that it be as well done as possible; to whom we gave directions in the seventh book, which he ought to follow.

There are also certain herbs, which you may pickle when the vintage approaches; as *purflain*, and that *lateward pot herb*, which some call *garden samphire*. These herbs are carefully cleansed, and spread in the shade; then, on the fourth day, they spread salt in the bottoms of jars, and each of the herbs is put up apart by itself; and, after they have poured vinegar into the vessels, they again put salt over the herbs; for strong brine is not proper for these herbs.

C H A P. XIV.

Of drying Apples and Pears in the Sun.

AT this same time, or even in the beginning of the month of *August*, they pick out apples and pears of the sweetest taste, and middling ripe; and, when they have divided them into two or three parts, with a reed or a bone-knife, they lay them in the Sun, till they grow dry. If there be great plenty of them, the Peasants preserve them as not the least part of their food during Winter; for they are instead of dainties to them, as figs, which, when they are laid up dry, contribute greatly to the sustenance of country-people during the Winter-time.

C H A P. XV.

Of dry Figs.

TH E S E ought to be gathered when they are neither too ripe, nor too green, and spread abroad in a place which may receive the Sun: and they fasten stakes at the distance of four feet from each other, and couple them together with poles laid across them. Then upon these frames they place canes made for this use, so that they may be at the distance of two feet from the earth, lest they attract the moisture, which the ground commonly sends forth in the night: then they throw the figs upon them; and on each side they place, flat upon the ground, Shepherds hurdles, woven either with haulm, or sedge, or fern, that so, when the Sun is near setting, they may be erected, and, being placed leaning towards each other, may, with their arched roof, in the manner of a shed or lodge, defend the figs, which begin to grow dry, from the dew, and sometimes from the rain; for both these spoil the foresaid fruit.

Then, after the figs are dried, about the middle of the day, while they are warm, you must put them in jars that are well pitched, and tread them down carefully: nevertheless dry fennel must be laid under them, and then put over them, when the vessels are filled: which vessels it is proper forthwith to put covers upon, and to daub them over, and lay them up in the driest store-house you have, that the figs may keep the better all the year long.

Some, after they have gathered the figs, take away their pedicles or stalks, and spread them in the Sun; then, after they are dried a little, before they begin to grow hard, they gather them together into earthen or stone vessels; then with their washed feet they tread them down as they do meal, and mix with them parched sesamum, with *Egyptian* anise, and fennel- and cumin-seeds.

When they have trodden these well together, and mixed the whole mass of the bruised figs thoroughly, they wrap up small lumps of it in fig-tree-leaves; and, having tied the lumps with a rush, or any other herb, they lay them upon hurdles, and suffer them to dry: then, when they are thoroughly dried, they put them up in pitched vessels. Some put up figs, in this very form, in tubs and jars without pitch; and, having daubed the vessels, they toast them either in a small moveable, or great oven, that all the moisture may be dried up

the more speedily : after they are dried, they lay them up in a loft ; and, when they have occasion to use them, they break the earthen vessel ; for otherwise they cannot take out the hardened mass of figs.

Others pick out all the fattest of the green figs, and, having divided them, either with a reed or with their fingers, dilate them, and so suffer them to grow dry in the Sun : then, when they are well dried with the warmth of the middle of the day, and when they are softened with the heat of the Sun, they gather them together : and, as it is the custom with the *Africans* and *Spaniards*, after they have put them into a certain regular position with one another, they squeeze them, and reduce them into the figures of stars, and small flowers, or into the form of bread ; then they dry them again in the Sun, and so put them up in vessels.

C H A P. XVI.

Of making dried Raisins, or Raisins of the Sun, and preserving Sorb-apples.

GRAPES require the like care as *figs* : When the weather is fair and dry, in the decline of the Moon, after the fifth hour of the day, you must gather such of them as are white, of the sweetest taste, with the largest grains, not too thick and close upon one another ; and spread them for a little while upon boards, lest, being laid close upon one another, they be bruised with their own weight : then, having prepared beforehand a lixivium of the ashes of vine-sprays, it is proper, that it be warmed in a kettle, or in a new large earthen pot ; and, when it boils, that a little of the very best oil be added to it, and so mixed thoroughly together ; then, that the grapes, two or three clusters of them being tied together, according to their bigness, be put into the boiling kettle, and kept in it a little while, till they be discoloured : nor must you again suffer them to boil thoroughly ; for here a certain moderation and temperament is necessary. Then, when you shall have taken them out, lay them in order upon an hurdle, and at such a distance, as not to touch one another : then, after three hours, turn each bunch, and do not lay it again in the same place where it lay before, lest it be spoiled by the moisture which runs from it. But, in the night-time, they ought to be covered in the
same

same manner as figs, that they may be defended from the dew, or the rain: then, after they are moderately dried, put them into new vessels, with covers upon them, without any pitch, but plaistered; and lay them up in a dry place.

Some wrap up grapes to be dried in the Sun in fig-leaves, and so dry them; others cover the half-withered grapes with vine- or plane-tree-leaves, and so put them up in amphors. There are some who burn the stalks of beans, and of the ashes thereof make a lixivium; then to three *sextarii* of the lixivium they add ten *cyathi* of salt, and one *cyathus* of oil; then they set it on the fire, and warm it, and so perform the other things in the same manner as before. But if it shall appear, that there is but little oil in the kettle, let as much be added, from time to time, as shall be sufficient, that so the raisins may be the brighter and the fatter.

At the same time gather and pick out the best service-apples, and put them carefully into little pots, and put pitched covers upon them; and daub them with plaster; then after you have made trenches or pits, two feet deep, within the house, place the little pots together therein, so that their mouths, which are daubed over with plaster, may look downward: then gather the earth together, and tread it down softly upon them. But it is better to place fewer vessels, at a distance from each other, in several pits; for in taking them out, while you are taking away one, if you move the rest, the forb-apples will quickly spoil. Some also preserve this same apple very well in must, boiled into one third of the first quantity, putting a stuffing of dry fennel upon them, that thereby the service-apples may be so pressed down, that the liquor may always swim above them; and notwithstanding this, they carefully daub the pitched covers with plaster, that no air may be able to get in.

C H A P. XVII.

Of making Vinegar of Figs.

THERE are certain countries, wherein there is a scarcity of wine, and consequently of vinegar also: therefore at this same time, the freshest figs must be gathered as ripe as possible; yea, even tho' the rains be now come on, and they be fallen upon the ground by reason of the showers; which, when they are picked up, are put

into firkins or barrels, and there left to ferment: then, when they have thrown out their juice, and it is grown acid, whatever vinegar they have yielded is carefully strained, and poured into pitched vessels that have a good smell. This will be as good for use, as the sharpest vinegar of the first note; and will never contract any bad smell, or grow musty, if it is not put in a moist place.

There are some, who, having regard to the quantity, mix water with the figs, and add to them the ripest fresh figs from time to time, and suffer them to consume and dissolve in that liquor, till it have the taste of sharp-enough vinegar: afterwards they strain it through a rush-frail, or a bag made of *Spanish* broom; then, when the vinegar is clear, they boil it till they take away the scum, and all the filth and nastiness from it; then they add a little toasted salt to it, which hinders little worms and other animals to breed in it.

C H A P. XVIII.

Of such Things as must be prepared for the Vintage (1).

ALthough, in the preceding book, which is intituled the *Bailiff*, we have already told what things must be prepared for the vintage; nevertheless, it will not be improper to give directions, to the *Bailiff's Wife*, concerning the same things, that she may understand, that whatever things, relating to the vintage, are transacted within-doors, ought to be under her inspection and care.

If the ground is of a large extent, or if the vineyards, and the plantations of trees for the supporting of vines, be large, vessels, containing three *modii* and ten *modii*, must be made year after year, and

(1) It may be necessary here to observe, that *dolium*, *seria*, and *cadus*, denote no certain determinate measure; these vessels were of different sizes, some larger, some smaller. In this chapter there is mention made of a *dolium sesquiculare*, i. e. of a *culeus* and an half, which contained 214 gallons, 7 pints, and a little more; which, I reckon, was one of their largest sort which they fixed in the ground. And, in the xxviiiith chapter of this book, we read of a *seria* of 7 *amphoræ*, which make about 57 gallons; and he makes mention there of a *cadus* which contained two *urnæ*, which make 7 gallons and one pint, and a little more. All these different vessels cannot well be translated by any *English* words exactly answering, most part of modern wine-vessels being intirely different from those in use among the antient *Romans*; and, being for several ages made mostly of earth, they were, both in their shape and capacity, very different from ours: though afterwards they were made of wood in many places, especially near the *Alps*, which probably at first differed very little from the others, except in the stuff they were made of.

small baskets must be woven and pitched; as also small sickles or bills, and iron-hooks in great number must be prepared, and well whetted, lest the Grape-gatherer strip off the bunches of grapes with his hand, and no small part of the fruit slip out of his hands, and be lost, by scattering the berries upon the ground.

Small cords must be fitted to the little baskets, and leather-strops to the vessels that contain three *modii*; also the wine-vat, and the presses, and the places where the grapes are pressed, and all the vessels, must be thoroughly washed with sea-water, if the sea be near at hand; if not, they must be washed with fresh water, and carefully cleansed and dried, lest they contain any moisture. The wine-cellar also must be cleared from all dung and dirt, and perfumed with good odours, that it may not send forth any stinking savour, or have any sour smell.

Then sacrifices must be offered, with the greatest sanctimony and purity, to *Liber* and *Libera* (2), and to the vessels belonging to the wine-press: nor must the Bailiff's Wife depart from the wine-press, or the wine-cellar, during the vintage, that they who manage and prepare the must, may do all things in a clean and neat manner; and that no opportunity may be given to a thief to lay hands on, and intercept the fruit that is there.

The hogsheds also, and butts, and other vessels, must be pitched forty days before the beginning of the vintage; and such of them as are sunk into the ground, must be done after one manner; and those that stand above-ground, after another: for those that are sunk into the ground, are heated with burning iron-lamps; and the lamp, when it has distilled the pitch into the bottom of the vessel, being removed, the pitch, which has distilled to the bottom, or has stuck to the sides, is spread with a skaling-stick, and a crooked iron-scraper; then it is wiped with a mop, and, after exceeding hot boiling pitch is poured

(2) *Liber* *Liberæque*. It is not very certain whether the author here, by *Liber*, means *Bacchus*; who, indeed, is frequently called by this name; because, as some say, wine cheers the mind, and frees it from anxiety and care: but the difficulty is to tell, who this *Libera* was: *Cicero*, *de Natura Deorum*, mentions one *Liber* different from *Bacchus*, who, with *Libera* and *Ceres*, were religiously worshipped by the Romans. Some by *Ceres* mean the Earth, and by *Liber* and *Libera* the Sun and the Moon: and, both in *Livy* and *Tacitus*, there is mention made of a temple dedicated to *Ceres*, *Liber*, and *Libera*: their sacrificing to these was common enough; but their paying any such respect to the vessels they made use of in pressing their grapes, &c. is not so evident. Perhaps the text is corrupted here, as in some other places, and it ought to be read, as the learned *Gesnerus* conjectures, *e vasis pressoriis*; and so the meaning will be, that they used these vessels, at that time, in the sacrifices they offered when they began their vintage, in order to purify and consecrate them.

into it, the pitch is spread over it with another new skealing-stick, and a small besome.

But such vessels as stand above-ground, are brought out to the Sun several days before they are cured; then, when they have been long enough exposed to the Sun, they are turned upon their brims, and suspended upon three small stones put under them; and so a fire is put under them, and kept so long burning, till such a vehement heat comes up to the bottom of the vessel, that the hand, when it is applied to it, cannot endure it; then the hogshhead being set down upon the ground, and laid upon its side, the hottest boiling pitch is poured into it, and it is rolled up and down, that all the parts of the hogshhead may be daubed with it.

But these things ought to be done in a calm day, when there is no wind, lest the vessels should burst by putting the fire to them, when the wind blows upon them. But twenty-five pound-weight of hard pitch, is enough for pipes that contain a *culeus and an half*: nor is there any doubt, but if a fifth part of *Brutian* pitch (3) be added to the whole quantity that is boiled, it will be of very great advantage to all the vintage.

C H A P. XIX.

Of several Compositions for preserving and strengthening Wine.

CARE also must be taken, that the must, which is squeezed out of the grapes, may keep for a long time, or, at least, that it be durable till it be sold: after what manner this ought to be done, and with what compositions it may be benefited and preserved, we shall next set before you. Of the must which they have thrown into

(3) *Pix Brutia*. *Pliny* tells us, that liquid pitch, which, no doubt, is what we call *tar*, was obtained from the pine-tree, and fir-trees of several sorts, by cutting them into billets, and ranging them into piles, and surrounding them with furnaces, the heat of which made the wood exude the moisture it contained: the first running of this liquor they called *liquid pitch*: the second running was thicker, and was properly what they called *pitch*; this being thrown into caldrons, and boiled to a certain degree, when it was coagulated, took the name of *Brutian pitch*: it was more viscous and glutinous than that other pitch, and of a bright-shining reddish colour; and, when the greatest part of its moisture was exhaled by the heat, it was called *dry pitch*; and, because it was at first made by the *Brutii*, a people in *Calabria*, or, at least, in the greatest perfection, they therefore called it *Brutian pitch*.

leaden vessels, some boil away a fourth part of it, others a third: nor is there any doubt, but, if any should boil it to one half, he would make a better rob of grapes, and so much the more profitable for use, insomuch, indeed, that, instead of must boiled in to one third of the first quantity, this *must*, boiled away into one half, may suffice to preserve the must which is the produce of old vineyards.

Whatever character the wine may be of, which can be kept for years, without any composition or mixture to preserve it, we are of opinion that is the best; nor must any thing at all be mixed with it, whereby its natural taste may be blunted or allayed; for that, which can please by its own natural quality alone, is the most excellent. But when, either through the fault of the country, or of new vineyards, the must labours under any defect, we must make choice of a part of an *Aminean* vineyard (if we have any in our possession); if we have none, then we must make choice of a vineyard, which produces the neatest and the most agreeable wine; and which is neither very antient, nor yet wet and marshy.

Then we must observe when the Moon is decreasing, and when she is under the Earth; and, in a clear and dry day, we must gather the very ripest grapes, which, being trodden out, we must carry from the vat to the vessels wherein we make the rob of grapes, as much of the must which has flowed from the grapes before the stalks and husks are pressed, as we shall have occasion for; and we must heat the furnace, at first, with a gentle fire, and with very small pieces of wood, such as the Peasants call brush-wood, that so the must may boil at leisure.

And let him, who has the charge of boiling it, have ready prepared beforehand rush- or *Spanish* broom-strainers, made of raw *Spanish* broom, that is, which has not been beetled; as also bundles of fennel tied to clubs, which he may put down to the very bottom of the vessels, that he may stir up whatever part of the dregs shall have subsided, and bring them to the top; then let him take away, with the strainers, all the filth that rises up, and swims upon the top in great abundance: nor let him desist from doing this, till the must appear clear and free from all manner of dregs: then let him either put quinces into it, which he must take away when they are thoroughly boiled, or any other agreeable and suitable odours he shall think proper. Nevertheless, let him stir it up thoroughly, from time to time, with the fennel, lest any thing subside which may perforate the leaden vessel.

But

But now, when the vessel shall be able to bear a fiercer fire, that is, when the must, being in some part boiled away, shall now seeth into itself, then let stumps of trees, and larger wood, be put under it, but so as not to touch the bottom of it; for, unless this be avoided, either the vessel itself, which sometimes happens, will be pierced through; or if this is not done, the must will certainly be burnt-to, and, having contracted a bitterness, will be unfit to be used as a preserve for any thing: but, before the must is thrown into the vessels for boiling it in to a certain quantity, it is necessary, that such of them as are made of lead, be soaked and anointed with good oil in the inside, and well rubbed, and so the must put into them: this thing hinders the sodden must to be burnt-to.

C H A P. XX.

Of boiling Must into one half, or into one third of the first Quantity.

BUT even the rob of grapes also, or the sweet must, sodden into one third of the first quantity, though carefully made, uses to grow sour in the same manner as wine; and since it is so, we must remember to preserve our wine with must, sodden into a third part of a year old, the goodness of which we have already had sufficient proof of; for the fruit which we have gathered is corrupted, and spoiled with a bad medicament. But the vessels themselves, wherein the must, which is to be reduced into one half, or one third of the first quantity, is boiled, ought rather to be of lead than of brass; for, in the boiling, the brazen vessels throw out a rust, and corrupt the taste of the medicament.

The odours which are commonly proper for wine, and are boiled with the sodden must, are the *flower-de-luce*, *fenugreek*, *sweet rush*: one pound weight of each of these things ought to be put into a must-caldron, which has received ninety *amphoræ* of must, just after it has left off boiling, and is cleared from all its filth. Then, if the must be of its own nature small, when it is boiled away to a third part, the fire must be withdrawn from it, and the furnace must be forthwith cooled with water: which tho' we have done, nevertheless the sodden must sinks below the third part of the vessel. But, tho' this may be of some detriment, yet it has its advantage; for, the more it is

boiled away, (provided it be not burnt-to) the better and thicker it will be.

But, of this must, boiled after this manner into a third part of the first quantity, it will be sufficient to mix one *sextarius* with one *amphora* of wine: for, when you have boiled ninety *amphoræ* of must in a must-caldron, so that there is but a little over and above the quantity to which it is to be boiled, (that is to say, a third part of the first quantity) then, and not before, add the medicaments to it, which may be either liquid or resinous; that is, ten *sextarii* of liquid *Nemeturican* pitch or tar (1), when you have first carefully washed it with boiled sea-water; also a pound and an half of turpentine resin.

When you shall have added these things to it, you shall shake and stir the leaden vessel thoroughly, that they may not burn-to: then, when the boiling liquor is sunk down to a third part, withdraw the fire; and you must stir the leaden vessel from time to time, that the sodden must and the medicaments may mix together: then, when the must, boiled into a third part of its first quantity, shall seem tolerably warm, you shall, by little and little, sprinkle the rest of the spices into it, after they are bruised and sifted; and you shall order what you have boiled to be stirred with a wooden ladle, till such time as it grows cold: but, if you do not thoroughly mix it, as we direct, the spices will subside, and burn-to.

But, to the foresaid quantity of must those odours ought to be added, the leaf of *spikenard*, the *Illyrian Iris* or *flower-de-luce* (2), *Gallican-spikenard*, *dates*, *costum* (3), *cyperus* (4), *sweet rush*; of which half a pound each will suffice: also five ounces of *myrrh*, a pound-weight of *calamus*, half a pound of *casia*, a quarter of a pound of *amomum*, five ounces of *saffron*, a pound of *melilot*.

These, as I said, dry, bruised, and sifted, ought to be added to it; and with them a certain quantity of crude pitch ought to be mixed: and the older that is, so much the better it is reckoned; for, becoming harder by long keeping, when it is bruised, it is reduced into powder, and mixed with these medicaments: but it is sufficient, that

(1) *Nemeturicæ picis.liquideæ.* Pliny mentions the *Nemeturi* among the people inhabiting the *Alps*: probably they made a sort of liquid pitch or tar, which was reckoned best for preserving wine; and it had its name from the people who made it; as the *Brutian*, *Narycian*, &c.

(2) *Iris Illyrica*, the *Illyrian flower-de-luce*: the best sort of it grew in the inland parts of *Illyrium*, from which country it has its name.

(3) *Costus*, or *costum*, as our author has it, is an *Indian* shrub, greatly esteemed for its root, which has a most fragrant smell; so that they called it commonly, by way of eminence, *radix, the root*, as they did the leaf of *spikenard folium*, the leaf.

(4) *Cyperus*, an angular rush of an agreeable smell, like *spikenard*.

six pounds of this be mixed with the foresaid quantities. It is uncertain, how much of this composition must be put to forty-eight *sextarii* of must; because, according to the nature of the wine, an estimation must be made, how much may be enough: and we must take care, that the taste of the medicaments, used for preserves, be not felt; for that will drive away the buyer.

Nevertheless, if the vintage be wet, I usually mix four ounces of this medicament; if dry, three ounces of it, with two *amphoræ* of must [so that the quantity of *must* be four *urns*, and the *urna* contain twenty-four *sextarii*]. I know, that some Husbandmen have put three ounces of the medicament into each *amphora*; but that they were forced to do this, because of the too great weakness of this sort of wine, which scarcely continued sound for thirty days:

Nevertheless, if there be plenty of wood, it is better to boil this must, and to purge all the scum and dregs out of it; by doing which a tenth part of it will waste, but the rest will keep long: but, if there be a scarcity of wood, you must mix an ounce of what they call the flower of marble, or of bruised stone, for plaster; as also two *sextarii* of rob of grapes, or must sodden in to a third part of the first quantity, with each *amphora* of the wine: this thing, tho' it does not make the wine altogether durable, yet it preserves the taste of it till another vintage.

C H A P. XXI.

Of Rob of Grapes, or Must boiled in to a third Part of its first Quantity, put to Wine to preserve it till it become old.

LET must, of the very sweetest taste, be boiled in to a third part of its first quantity; and, after it is boiled in, as I said above, it is called *defrutum*, (*rob of grapes, or must sodden in to a third part*) which, when it is grown cold, is decanted into vessels, and laid up, that after a year it may be made use of; nevertheless, it may also be put into wine nine days after it is cooled: but it is better, if it rest a year. A *sextarius* of this sodden must is put into two *urns* of must, if the must be of hilly vineyards; but if of champagne vineyards, they put three *heminae* to it.

But

But, when the must is taken out of the vat, we suffer it to leave off fermenting for two days, and to grow cool, and be purged: on the third day, we add to it the rob of grapes (*i. e.* must sodden in to a third part); then, after the space of two days, when that must has, in like manner, left off fermenting with the rob of grapes, and is cooled, we purge it, and so throw into it an heaped *ligula* (1) of toasted and bruised salt, or such a quantity as is a very large 24th part of a *sextarius*. But they throw the whitest salt they can find into an earthen pot without pitch; which pot, after it has received the salt, they carefully daub with clay mixed with straw, and so put it to the fire, and then keep it as long toasting, as the salt makes a noise, and cracks: when it has begun to be silent, they leave off toasting it.

Moreover, they steep fenugreek in old wine for the space of three days; then they take it out, and dry it in an oven, or in the Sun; and, when it is dried, they grind it; and of this, when it is ground, after the must has been salted, they put an heaped spoonful, or such a kind of cupful or *measure*, as is the fourth part of a *cyathus*, into two *urns* of it. Then, when the must has intirely left off fermenting, and has stood still, we mix as great a quantity of the flour of calcined stone with it, as we had put salt into it: and so, the day following, we purge the wine-veffel, and cover up the wine we have preserved, and daub it all over.

My uncle *Columella*, an illustrious Husbandman, was wont to use this sort of preserve, in those lands wherein he had marshy vineyards; but the same illustrious person, when he preserved wines that grew on hills, instead of salt, put salt-water, boiled into one third of the first quantity, to them: this, indeed, without doubt, makes it measure more, and of a better flavour; but it is attended with danger, lest the wine be vitiated, if the water be ill boiled. But this water, as I have already said, is taken up as far from the shore as can be conveniently done; for the further from shore, and the deeper the sea is from whence it is drawn, the clearer and the purer it is.

If any one shall lay it up, and keep it, (as *Columella* did) after the space of three years, when it is strained, and perfectly clear, let him

(1) *Ligula* at first signified a spoon, but afterwards it was used as a measure, and, I believe, the smallest in use among the *Romans*, at least mentioned by our author; it was mostly used for liquids, but here it is put for a dry measure: and *Columella* makes an heaped *ligula* equal to a *semuncia bene plena*; by which, I think, he means not the half of an ounce in weight, but the 24th part of the *sextarius*, which was a measure of dry things as well as of liquid, and was divided in the same manner as the *as*, and its divisions had the same names, and it is translated accordingly: however, I believe there is no great difference between a pound-weight, and a *sextarius* full of salt.

pour it into other vessels; then, after other three years, let him boil it into a third part: thus he will have a much better preserve for his wine, nor will his wines be in any danger of spoiling. But it is enough to put one *sextarius* of salt-water to every two *urns* of must; altho' many also mix two *sextarii* with that quantity, and some three also: and I would not refuse to do this, if the kind of wine has so much strength, as the taste of the salt-water may not be felt.

Therefore a diligent Master of a family, when he has purchased and prepared his ground, will, the first vintage, presently make trial of three or four different sort of preserves upon as many *amphors* of must, that he may have a full proof, how much salt-water the wine, which he has made, will be able to bear, without hurting the taste of it.

C H A P. XXII.

Another Medicament of liquid Pitch (or Tar) wherewith you may preserve Wine.

PUT a firkin of liquid *Nemeturian* pitch into a tub or trough, and pour into the same two *congi* of a lixivium of ashes; then mix them throughly with a wooden spatula: when it is settled, strain off the lixivium; then put a second time the same quantity of lixivium to it; mix it throughly, and strain it off after the same manner: do the same thing a third time also; for the ashes take away the smell of the pitch, and wash the filth out of it. Afterwards, add to the same five pounds of *Brutian* pitch; or, if you have not that, of some other pitch, the cleanest you can find; these divide into small pieces, and mix them with the *Nemeturian* pitch: then put into it two *congi* of the very oldest sea-water, if you have any; if not, two *congi* of sea-water, newly taken out of the sea, boiled in to a third part of the first quantity. Let the tub stand uncovered in the Sun, during the rising of the Dog-star; and mix it very often with the wooden spatula, till such time as the things you shall have put into it dissolve in the pitch, and incorporate with it.

But it will be proper to cover the tub in the night-time, lest the dew fall into it: then, when it shall appear, that the sea-water, which you have put into it, is consumed by the Sun, you must take care to carry the vessel into the house. Some are wont to mix a quarter
of

of a pound of this medicament with XLVIII *sextarii* of wine, and to content themselves with preserving it after this manner. Others put three *cyathi* of it into as many *sextarii* as we have above-mentioned.

C H A P. XXIII.

Of Pitch which the Savoyards use for preserving of pitched Wine.

THE pitch, which the *Savoyards* use for preserving their wines, is called *barky* or *scaly pitch*: it is so made as to be hard; and the older it is, so much the better it is for use; for, having lost all its toughness, it is the more easily reduced into powder, and sifted. Therefore this pitch must be bruised and sifted; then, when the must has twice left off fermenting, which, for the most part, is within the fourth day from the time it is taken out of the vat which is under the wine-press, they carefully cleanse it from filth with their hands; and then put two ounces and an half of the foresaid pitch into fifty-five *sextarii* of it, and mix it thoroughly with a wooden ladle: nor do they afterwards touch it, till it ferment together; which, nevertheless, must not be suffered more than fourteen days, from the time that the preserve has been put into it: for, after this number of days, you must presently cleanse your wine from all manner of filth; and, if any of the dregs have stuck, either to the brim or sides of the vessels, they must be scraped and rubbed off; and, having put on the covers, they must be forthwith daubed over.

But, if you will preserve your whole vintage with this same pitch, so that it may not be known, by the taste of it, that the wine is pitched, it will be sufficient to mix six scruples of the said pitch with forty-five *sextarii* of must, when it has left off fermenting, and the dregs are purged out of it; and not before; but you must put the 24th part of a *sextarius* of toasted and bruised salt into the same quantity of must. Nor must salt be put into wine of this character only, but, if it can be done, all sorts of wine whatsoever, in all countries, ought to be salted with this very same quantity of salt; for this prevents the wine from becoming musty.

C H A P. XXIV.

Of Nemeturian Pitch for the preserving of Wine.

*N*emeturian pitch is made in *Liguria*; but, that it may be made fit for preserving wine, sea-water must be taken out of the deep sea, at as great a distance from the shore as can be done conveniently, and boiled into one half of the first quantity; and, when it is cooled to such a degree, as not to burn the body when it is touched, we mix such a quantity of it with the foresaid pitch, as shall seem sufficient; and we must stir it about carefully with a wooden spatula, or even with our hand, that if there be any blemish in it, or any part of it vitiated, it may be washed out. Then we must suffer the pitch to sink to the bottom, and, when it is settled, strain the water from it; afterwards we must wash it twice or thrice in the remaining part of the boiled water, and work it so long, till it become of a bright-red shining colour; then, having strained the water off it, we must let it stand in the Sun fourteen days, that whatever moisture from the water shall remain in it, may be dried up. But in the night-time the vessel must be covered, that the dew may not fall into it.

When we shall have, in this manner, prepared the pitch, and have a mind to preserve our wines therewith, when they have now twice left off fermenting, we must put two *cyathi* of the foresaid pitch into forty-eight *sextarii* of must, in this manner: We must take two *sextarii* of must out of that quantity we are going to preserve; then, from these two *sextarii*, we must, by little and little, pour the must into the two *cyathi* of pitch, and work it with our hand as it were honey and water, that it may the more easily mix with the must: but, when the whole two *sextarii* of must are mingled with the pitch, and make, as it were, an unity of *substance*, then it will be proper to pour them into the vessel from whence we took them, and to stir it about with a wooden ladle, that the medicament may be thoroughly mixed with it.

C H A P. XXV.

Of salt Water and strong Brine for preserving Wines.

FOrasmuch as some people, yea, even almost all the *Greeks* also, preserve their must with salt-water or strong wine, I thought that that part also of our care was not to be omitted. In the inland country, whither it is not easy to carry salt-water, strong brine must be made for preserves after this manner.

Rain-water is by much the fittest for this purpose; if not this, then that which flows from the clearest spring. Therefore you must take care to place in the Sun, five years before, a great quantity of either the one or the other of these, and put it up in the very best vessels you have; then, when it is putrefied, you must let it stand so long, till it shall return to its former condition; when this is done, provide other vessels, and strain the water by little and little into them, till you come to the dregs; for there is always found some thick settlement in the bottom of water, which you let stand without stirring it.

When the water has been thus managed, it must be boiled into one third of the first quantity, after the manner of rob of grapes; and, into fifty *sextarii* of sweet water they put one *sextarius* of salt, and a *sextarius* of the best honey: these must be boiled all together, and all filthiness purged out of them; and, when the water is cooled, a certain quantity of it must be put into an *amphora* of must.

But, if your land lie near the sea, the water must be taken out of the deep when the winds are silent, and the sea exceeding calm; and it must be boiled into a third part, after you have put, if you think proper, some of those spices into it, which I mentioned above, that so the wine may have a better flavour after it is cured. But, before you take up the must out of the vat which is under the wine-press, suffumigate the vessels with rosemary, or laurel, or myrtle, and fill them up to the brim, that, when the wine ferments, it may purge itself well; afterwards rub the vessels with pine-apples. The wine which you have a mind should be sweeter than ordinary, you must preserve it the day after you have taken it out of the vat; and that which you would have rougher, you must preserve it the fifth day, and so fill up and daub the vessels. Some also, having suffumigated the hog-heads, put the preserve in first, and so pour in the must.

C H A P. XXVI.

Of Remedies for Wine that grows sour.

IN whatever land the wine uses to turn acid, you must take care, that, when you have gathered and trodden out the grapes, before the husks are squeezed in the wine-presses, you pour the must into, and strain it through the twig-basket, and put to it a tenth part of sweet well-water, out of the same ground, and boil it, till that water which you have added to it be boiled away; afterwards, when it is cooled, pour it into vessels, and cover it, and plaster it: thus it will keep the longer, and sustain no damage.

It is better, if you put old water to it, which has been kept a great many years; and it is much better, if you put no water to it at all, and boil away the tenth part of the must, and decant it into a cold vessel; and if, after it is boiled in, and grown cold, you mix an *hemina* of plaster, or calcined stone, with seven *sextarii* of must. The rest of the must, which you have squeezed out of the husks, use as soon as you can, or exchange it for money.

C H A P. XXVII.

Of making sweet Wine.

YOU must make sweet wine in this manner: Gather the grapes, spread them in the Sun during the space of three days; on the fourth day, at noon, tread out the grapes; when they are warm, take up must of the first running, that is, the must which flows into the must-vat, before it is squeezed out of the grapes with the press; when it has left off fermenting, put well-bruised flower-de-luce, but not above an ounce-weight, into fifty *sextarii* of it; strain it off its dregs, and pour it into other vessels. This wine will be sweet, firm, holding, and wholesome for the body.

C H A P. XXVIII.

Of other wholesome Sorts of Preserves.

OTHER kinds of medicaments, very proper for preserving wines, and keeping them very firm, make after this manner: Bruise the very whitest *Iris*, or flower-de-luce, in a mortar; steep fenugreek in old wine; then expose it in the Sun, or in an oven, that it may grow dry; then pound it very small: also mix bruised odoriferous things together into one mass, that is, sifted flower-de-luce, about the quantity of nine ounces, of fenugreek in weight nine ounces, of sweet rush five ounces; then, into each hogshhead or vessel, which may contain seven *amphoræ*, put, of this medicament, the weight of one ounce and eight scruples; of plaster, made of calcined marble, three *hemineæ* into each, when the must is the produce of marshy places; but one *sextarius* only, when it is of new vineyards: when the must is the produce of old vineyards, and dry places, put one *hemina* into each.

The third day, after you have trodden out *the grapes*, pour the preserve into the must; but, before you put the preserve into it, pour a small quantity of the must from one vessel into another, lest, when you put the preserve into it, it ferment with the medicament, and run over: but the plaster, or the calcined marble, and the medicament, being thus prepared, mix thoroughly, in a pan, as much of them as shall be necessary for each wine-vessel, and dilute that medicament with must, and put them into the vessels, and mix them thoroughly; and, when the must has left off fermenting, fill it up presently, and daub it over.

When you preserve any wine whatsoever, do not presently pour it into other vessels, but let it rest in the wine-vessels; afterwards, when you have a mind to pour it out of the barrels or hogshheads into other vessels, having taken it as clear off the dregs as you possibly can, in the Spring, when the rose is blossoming, transfer it into vessels that are well-pitched, and exceeding clean. If you are desirous to keep it till it be old, put a *sextarius* of the very best wine, or three *sextarii* of fresh generous dregs, into a firkin, containing two *urns*; or, if you have fresh vessels, out of which wine has been taken, pour it into them: if you do any one of these things, the wine will be much better and firmer. Also, if you put good odours into it, you will hinder it from contracting any bad smell or taste whatsoever; for

there is nothing that attracts to itself the smell of other things more quickly than wine.

C H A P. XXIX.

After what Manner Must may be kept always sweet, as if it were new.

THAT must may continue always sweet, as if it were new, manage it thus: Before the husks of the grapes are put under the press, take the very freshest must out of the wine-fat, and put it into a new *amphora*, and daub it, and pitch it carefully, that no water at all may enter into it; then sink the whole *amphora* into a pond of cold and sweet water, so that no part of it may stand out of it; then, after forty days, take it out of the pond: thus it will continue sweet for a whole year.

C H A P. XXX.

Of the best Way of curing Wine, and of Remedies for Wine that is upon the Decay.

FROM that time, when you shall have first put the covers upon the wine-vessels, till the vernal Equinox, it is sufficient to cure the wine once in xxxvi days, and after the vernal Equinox twice; or, if the wine begins to flower, you must cure it oftener, lest its flower fall to the bottom, and vitiate the taste of the wine: the greater the heat is, the oftener is it proper that wine be nourished, cooled, refreshed, and vent given to it; for, as long as it is kept abundantly cold, so long will it continue in good condition.

The brims and chops of the vessels must always be rubbed with pine-apples, as often as the wine is cured: if your wines be rougher, or not so good as you could wish, which may be occasioned by the bad quality of the ground, or by the weather, take the dregs of good wine, and make it into cakes, and dry them in the Sun, and toast them at the fire; afterwards bruise them small, and rub a quarter of a pound of them into each *amphora*, and plaster it, and the wine will become good.

C H A P. XXXI.

Of Remedies, in case any living Creature fall into the Must, and perish in it.

IF any living creature shall fall into the must, and perish in it, as a serpent, or a mouse, or a rat; lest it make the wine of a bad smell, if the body be found, let it be burnt in the fire, and the ashes of it poured in cold into the vessel into which it did fall; and let it be thoroughly mixed with a wooden ladle: this thing will be a remedy for it.

C H A P. XXXII.

Of Horehound-wine.

MANY think, that horehound-wine is useful for all diseases of the bowels, and especially for the cough. When you make your vintage, gather tender stalks of horehound, chiefly from uncultivated and lean places, and dry them in the Sun; then make them into bundles, and bind them with a palm- or rush-rope, and put them into a hoghead, so that the band may be on the outside: put VIII ponnds of horehound into cc *sextarii* of sweet must, that so it may continue in it, till the must leave off fermenting; afterwards take out the horehound, and, when the wine is well cleansed, daub it carefully.

C H A P. XXXIII.

Of Squil-wine.

YOU must in this manner prepare and preserve Squil-wine, for promoting digestion, and repairing the body; and also for an old cough, and for the benefit of the stomach. Forty days before you design to gather grapes for wine, first gather the Squil, and cut it exceeding small, like the root of a radish, and hang up the small

cuttings of it in the shade, that they may dry; then, when they are dry, put a pound-weight of the dry squil into XLVIII *sextarii* of *Aminean* must, and let it remain in it for xxx days; afterwards take it out, and, after you have separated the wine from the dregs, put it up into two *amphors*. Others write, that a pound-weight and a quarter of dry squil must be put into forty-eight *sextarii* of must: and this very thing I do not disapprove.

C H A P. XXXIV.

Of Squil-vinegar.

THEY who have a mind to make Squil-vinegar for sauce, put this very weight of squil, which I have mentioned above, into two *urns* of vinegar, and suffer it to remain forty days in it: into three *amphoræ* of must you put a *congius* of sharp vinegar, or two *congi*, if it is not sharp; and in a pot, which contains four *amphoræ*, you boil it in one fourth part; or, if the must is not sweet, one third part; let it be scummed. But let the must be of the middle sort, and very clear.

C H A P. XXXV.

How you must make Wormwood-wine, Hyssop-wine, Southern-wood- and other Sorts of Wine.

YOU must make up and prepare wormwood- hyssop- southern- wood- thyme- pennyroyal- and fennel-wines, after this manner: Boil one pound-weight of *Pontic* wormwood, with four *sextarii* of must, till one fourth part of it be boiled away; what remains of it, put it cold into an *urn* of *Aminean* must: do the same with the other things above-mentioned. Also three pounds of dry pennyroyal may be boiled with a *congius* of must, till a third part of it be boiled away; and, when the liquor is cooled, and the pennyroyal taken out of it, it may be put into an *urna* of must; and this is very proper to be given presently, to such as are affected with the cough during the Winter; and this is called pennyroyal-wine.

C H A P. XXXVI.

Of Must of the last Pressing, or squeezed Must.

Squeezed must is that which is pressed out, when the mass of the husks of the grapes is cut after the first pressing: You shall throw that must into a new vessel, and fill it up to the brim; then you shall put to it small branches of dry rosemary, tied together with flax, and suffer them to ferment together for seven days; then you shall take out the bundle of small branches, and, when the wine is carefully purged, plaster it up: but it will be sufficient to put a pound and an half of rosemary into two *urns* of must. After two months you may use this wine for a remedy.

C H A P. XXXVII.

To make Wine like to Greek Wine.

Gather the very ripest early-ripe grapes, and dry them three days in the Sun; tread them out the fourth day, and throw the must, which has none of the last pressing in it, into a hoghead, and take diligent care, that, when it has left off fermenting, the dregs be purged out of it; then the fifth day, when you have purged the must, put two *sextarii* of toasted and sifted salt; or, which is the least quantity, one *sextarius* to XLIX *sextarii* of must. Some also mix a *sextarius* of rob of grapes, (must sodden in to one third of the first quantity) with it. Some also add two *sextarii* to it, if they think, that the wine is not of a very firm and holding kind.

C H A P. XXXVIII.

How you may make Myrtle-wine.

MAKE myrtle-wine for gripings of the guts, and a looseness, and for a weak stomach, after this manner: There are two kinds of myrtle-trees, of which the one is black, and the other white; the

berries of the black kind are gathered when they are ripe, and their seeds taken out; and the berries themselves, without the seeds, are dried in the Sun, and laid up in a dry place, in an earthen jar.

Then, in the time of the vintage, when the Sun is hot, they gather *Aminean* grapes, that are throughly ripe, off old vines that are supported with trees; or, if they have no such vines, they gather them from the oldest vineyards they have; and the must that they have from these they put into a wine-vessel; and presently, the first day, before it ferments, they carefully bruise the myrtle-berries, that they have laid up; and they weigh as many pounds of them, after they are bruised, as they design to prepare amphors of wine: then we take a little must out of that vessel which we are going to put the berries into, and sprinkle it upon that which we have bruised and weighed, as it were, upon meal. Afterwards we make up several small masses of it, and so let them down by the sides of the vessel into the must, lest one of the lumps should fall upon the other.

Then, when the must has twice left off fermenting, and has been twice cured, they bruise again the same quantity of berries, and in the same manner as I said above: but they do not make them into small masses or lumps, as before; but they take must out of the same vessel, and put it into a pan, and mix it throughly with the foresaid quantity of bruised berries, so as it may be like thick broth; and, when it is throughly mixed, they pour it all together into the same wine-vessel, and stir it throughly with a wooden slice. Then, nine days after they have done this, they purge the wine, and rub the vessel with small bruthes of dry myrtle, and put the cover upon it, that nothing may fall into it: this being done, after the seventh day they purify the wine a second time, and pour it into firkins that are well-pitched, and have a good smell. But you must take care, when you pour it into vessels, that you pour it into them clear, and without dregs.

Another kind of myrtle-wine mingle after this manner: Boil *Attic* honey thrice, and scum it as often; or, if you have no *Attic* honey, choose the very best you can find, and scum it four or five times; for the worse it is, the more filth it has in it: then, when the honey is cooled again, gather the very ripest berries of the white kind of myrtle, and break them, so as not to bruise with them the seeds that are within them; and, having presently shut them up in a wooden basket, press the juice out of them, and mix about six *sextarii* of their juice with one *sextarius* of boiled honey; and, after you have poured it into a little stone bottle, plaster it over. But this ought to be done in the
month

month of *December*, at which time commonly the seeds of the myrtle are ripe: and you must observe, that the weather be fair and clear seven days before the berries are gathered, if it can be done; but, if not, that it be fair weather not less than three days before, or, at least, that it has not rained; and you must take care, that they be not gathered with the dew upon them.

Many gather the black or white myrtle-berry after it is fully ripe; and, having exposed it for two hours, and dried it a little in the shade, they bruise it so, that the seeds it contains may, as much as possible, remain intire; then they squeeze the juice out of what they have bruised, through a flaxen frail, and, having strained it very clear through a rush-strainer, they put it up in small stone bottles, well-pitched, without mixing honey, or any other thing with it. This liquor is not so durable; but, as long as it keeps without spoiling, it is of greater benefit to health, than that other sort of composition made with the juice of myrtle-berries.

There are some, who, having squeezed out this very juice, if they have a larger quantity of it, boil it in to a third part, and, when it is cooled, put it up in well-pitched small stone bottles. When it is prepared after this manner, it keeps longer; but that which you shall not have boiled, may keep sound, without sustaining any hurt, for two years, provided you make it very clean, and with great care.

C H A P. XXXIX.

After what Manner Wine may be made of Grapes dried in the Sun.

MAGO directs the best raisin-wine to be made in this manner, as I myself also have made it; *viz.* To gather the early-ripe grapes when they are very ripe, and to reject such of the berries as are withered or spoiled; to fasten in the ground forks or stakes, at the distance of four feet the one from the other, for supporting reeds, and to couple them together with poles; then to put reeds upon them, and to spread the grapes in the Sun, and cover them during the night, lest they be wet with the dew; then, when they are thoroughly dried, to pluck off the berries, and throw them into a barrel or hoghead, and to put the very best must to them, till all the grapes are covered with it: when the grapes shall have drunk it up, and filled themselves

selves with it, to put them all together into a frail the sixth day, and press them in the wine-press, and take the dried raisin-wine from them; afterwards to tread the husks, after the very freshest must, which has been made of other grapes, which you have exposed to the Sun for the space of three days, has been put to them; then, to mix all together, and put the whole kneaded mass of bruised grapes under the press, and presently to put up this secondary raisin-wine, in plastered vessels, that it may not become too rough: then, after twenty or thirty days, when it has left off fermenting, to pour it very clear into other vessels; and presently to plaster the covers, and cover them with skin.

If you would make raisin-wine of the *Apian* grape, gather the *Apian* grape sound and intire; purge them of such grains as are rotten and spoiled, and put them apart by themselves; afterwards hang them up on poles, and order it so, that the poles may be always in the Sun. After the berries are shrivelled enough, pull them off, and throw them into a tub without the stalks, and tread them well with your feet. When you have made one floor or story of them, sprinkle old wine upon it; afterwards tread down another upon it, and also sprinkle wine on it. In the same manner tread a third story, and continue to pour wine upon them, so that it may swim above them, and let them alone for five days; afterwards tread them with your feet, and press the grapes in a new wicker-basket.

Some prepare old rain-water for this use, and boil it in one third; then, having dried the grapes in the Sun, in the manner above described, they put boiled water instead of wine, and manage the rest after the same manner. This wine, where there is plenty of wood, is made with very little charge, and comes very cheap; and, when it is used, it is even sweeter than the other sorts of raisin-wine above-mentioned.

C H A P. XL.

How the best small thin Wine may be made.

T H E best small thin wine is made in this manner: Consider how many firkins the tenth part of the quantity of wine, which you have made in one day, may amount to; and put as many firkins of fresh water to the husks of the grapes; but let them be such as wine of one day old has been pressed from: pour likewise, into the
same

same place, the scum of the must that has been sodden in to one third, or one half of the first quantity for making rob of grapes, and the dregs out of the wine-vat, and mix them thoroughly together; and let this mixed mass soak for one night: the day after tread it with your feet; and, when it is thus thoroughly mixed, put it under the wine-press; then put up that which flows from it, either in hogsheds or *amphors*; and, when it has left off fermenting, stop them up: but it is more commodiously kept in *amphors*. *M. Columella* made this self-same thin small wine of old water; and sometimes he kept it above two years without spoiling.

C H A P. XLI.

How to make the best Honey-wine (1).

MAKE the best honey-wine thus: Take up presently, out of the wine-vat, the purest must which distils from the grapes, before they are too much trodden: but make it of the must of grapes of that kind of vine which grows upon trees, and which you have gathered in dry weather. Into an urn of must you shall put ten pound-weight of the best honey; and, having mixed it carefully with the must, you shall put it up in a stone bottle, and immediately plaster it, and order it to be laid up in a loft: if you have a mind to make a greater quantity of it, you shall put honey to it in the proportion above-mentioned. After thirty-two days you must open the bottle; and, after you have strained the must, and put it very clear into another vessel, plaster it, and set it into an oven.

A preserve, or syrup of quinces, is made in this manner: They boil an urn of *Aminean* must of the grapes of vines, supported by trees, in a new earthen or tin pot, and twenty large quince-apples well cleansed, and sound sweet pomegranates, which they call *Carthaginian* apples, and sorb-apples not thoroughly ripe, divided, and their seeds taken out, which may be of about the quantity of three *sextarii*: these are so boiled, that all the apples may dissolve in the

(1) The title of this chapter, in all the editions I have seen, is by no means agreeable to the design of it; which, among other things, is to direct how to make honey-wine, but says nothing of making what they call *mustum lixivum*, by which is understood that must which drops from the grapes of its own accord, before they are pressed: therefore I have made the first words of the chapter the title of it.

must; and let there be a boy to stir and mix the apples thoroughly with a wooden slice or reed, that they may not be burnt-to. Then, after they are boiled, so that there is not much of the liquor remaining, they set them to cool, and strain them; and such of them as subside in the strainer, they carefully bruise and smooth, and boil a second time in their own juice, upon a slow fire of charcoal, that they may not burn-to, till the liquor that settles to the bottom appears like dregs. Nevertheless, before the medicament is taken off the fire, they add to it, over-and-above all, three *heminae* of *rhus Syriacus*, bruised and sifted; and mix it thoroughly with a wooden spatula, that it may incorporate with the rest: then, when the medicament is cooled, they put it into a new-pitched earthen vessel; and, when they have plastered it, they hang it up high, that it may not contract a paleness.

C H A P. XLII.

Of preserving Cheese.

WE must preserve cheese in this manner: Cut large pieces of dry ewe-milk-cheese of the last year, and stow them in a pitched vessel; then fill it with the best kind of must, so that it may cover the cheese; and let there be a larger quantity of liquor, than of cheese; for the cheese drinks it up, and spoils, unless the must always swim above it. But, when you have filled the vessel, you must platter it immediately; then after twenty days you may open it, and use it with any kind of sauce or seasoning you please; and by itself also it is not unpleasant.

C H A P. XLIII.

After what Manner potted Grapes may be put up and kept.

WHEN you have cut off from the vine the *Bumast* grapes, or such as have hard and thick skins, or such as are of a purple colour, pitch their pedicles or stalks immediately with hard pitch; then fill a small new earthen pan with the very driest sifted chaff, that it may be without any dust in it; and so place the clusters of grapes upon

upon it; then cover it with another earthen pan, and daub it all round with clay mixt with straw; and so, after you have stowed the pans in a very dry loft, cover them all over with dry chaff.

And all sorts of grapes whatsoever may be kept without spoiling, if they be plucked off the vine in the decrease of the Moon, and in fair weather, after the fourth hour of the day, and when they have already had the Sun for some time upon them, and have no dew upon them. But let a fire be made in the next large cross-way, that the pitch may be boiling hot, into which the stalks of the clusters may be presently dipt; throw a firkin of the rob of grapes, or must boiled in to a third part of the first quantity, into a well-pitched barrel; then thrust in cross-pieces of wood very close, so as they may not touch the sodden must; then place new earthen dishes upon them, and in them so dispose the bunches of grapes, that one of them may not touch the other; then put covers upon the dishes, and daub them over. Then build a second story after the same manner, and a third, and as long as the bigness of the barrel will allow, and stow the bunches after the same manner; then having pitched the cover of the barrel, anoint it thoroughly with sodden must; and, when you have put it on, stop it up close with ashes.

Some, after they have put the sodden must into the barrel, content themselvee with thrusting in transverse pieces of wood very close, and hanging the bunches of grapes upon them, so as not to touch the sodden must; then having put on the cover, daub it all over. Others, after they have gathered the grapes, in the manner as I said above, dry new small barrels in the Sun, without any pitch; then, when they have cooled them in the shade, put barley-bran into them, and place the bunches of grapes so upon it, as one of them may not press upon another; then they pour in the same kind of bran upon them, and place another row of bunches in the same manner; and this they do, till they fill the barrel with bran and bunches of grapes by turns; and, when they have put the cover upon it, they daub it over, and lay up the grapes in a very dry and cold loft.

Some, after the same method, preserve green grapes with dry poplar- or evergreen-oak-saw-dust. Others cover over, with dry parget-flower, the bunches of grapes which they have plucked off the vines before they are too ripe. Others, when they have gathered the grapes, if there are any of the grapes spoiled, cut them off with a pair of sheers, and so hang them up in a barn, where there is wheat placed under them. But this method makes the berries to shrivel, and become wrinkly, and almost as sweet as raisins dried in the Sun.

Marcus Columella, my uncle, ordered broad vessels, after the manner of dishes, to be made of that sort of clay wherewith they make the *amphoræ*, and to be pitched very thick, both on the inside and outside; and after he had prepared them, he ordered the purple-coloured, and the bumast grapes, and the *Numisian*, and the thick and hard-skinned grapes to be gathered, and their stalks, without delay, to be dipt into boiling pitch, and every kind to be put up separately by itself, so that the bunches might not touch each other: after this he ordered covers to be put upon them, and that they should be daubed with thick plaster; then, after all, to be pitched with hard pitch, which was melted upon the fire, so that no moisture whatsoever might be able to pass through; then he ordered the whole vessels to be sunk in spring- or cistern-water, with weights laid upon them, and that no part of them should be suffered to appear above the water. Thus grapes are exceedingly well preserved: but, when they are taken out of the water, unless they be eaten that very day, they grow sour.

Nevertheless, there is nothing surer than to make earthen vessels, which may contain one single bunch of grapes each, with room sufficient: these vessels ought to have four handles, wherewith they may hang tied to the vine; also their covers ought to be so formed, as to be divided in the middle, that so, when the vessels are hung up, and have received a bunch of grapes into each of them, the two parts or divisions of the covers, being applied on both sides, may join together, and cover the bunches of grapes: and both the vessels and their covers ought to be carefully pitched, both on the inside and on the outside; then, when they have covered the grapes, they ought to be covered over with abundance of clay mixed with straw: but the clusters of grapes, which hang upon the mother vine, ought to be put up into the pipkins, so as no parts of them may touch the vessels.

But the time when they ought to be shut up in the vases, is commonly when the weather is as yet very dry and fair, and the berries or grains of the clusters plump, and of divers colours. This, upon the whole, we strictly injoin, above all things, that apples and grapes be not laid up together in the same place, nor in any place near to one another, from whence the smell of the apples may reach them: for, with this kind of steam, the grains of the clusters quickly spoil and rot. Nevertheless, the methods of keeping and preserving apples or grapes, which we have mentioned, are not all proper for all regions; but some of them agree with one, and some with another, according to the nature of the places, and the qualities of the grapes.

The antients, for the most part, put up in vessels the *Scircitulan*, the *Venuculan*, and the larger *Aminean* and *Gallican* grapes, and such as were of large, and hard, and thin berries: but now, in and about the city, the *Numisian* grapes are most approved for this use; they gather the choicest of these when they are moderately ripe, in fair weather, after the Sun has removed the dew, about the fourth or fifth hour of the day, provided the Moon be decreasing, and under the earth; then they place them upon hurdles, so that the bunches may not bruise one another; then, afterwards, they bring them into the house, and, with a pair of sheers, cut off the dry, withered, and rotten berries; and, after they are cooled a little in the shade, they put three or four bunches of them into the pots, according to the largeness of the vessels, and stop up the covers carefully with pitch, that they may not let the moisture pass through: then they take out the mass of the husks of the grapes, which have been well squeezed in the wine-press, and, having separated the stalks pretty well from them, and loosened the bruised mass of the husks, they spread them in the bottom of the barrel, and stow the pots therein with their mouths downward, at such a distance from each other, that the husks and grape-stones may be trodden in between them; and when, with these pressed close together, they have made the first story; they stow other pots in the same manner, and fill up the second story, then, after the same manner, the barrel is filled up with rows or stories of pots, one above another, which are made fast with the husks and grape-stones, trodden in close about them; then they presently fill up the vessel to the brim with husks, and press them close together; and, after they have put the cover upon it, they immediately daub the barrel with ashes, tempered after the manner of plaster. Nevertheless, it is necessary to caution him, who is about to buy these vessels, that he do not buy the pots which imbibe the moisture, or are not well baked; for both these things spoil the grapes, by letting the water pass through. Moreover, when the pots are brought out for use, a whole row or story of them must be pulled down at once; for the husks and grape-stones, which are pressed close together, if they are once moved, quickly grow sour, and spoil the grapes.

C H A P. XLIV.

After what Manner Pomegranates may be preserved.

AFTER the vintage follow the compositions of autumnal things, which of themselves very much enlarge the care and business of the Bailiff's Wife: nor am I ignorant, that there are many things, which *Caius Matius* has most carefully treated of, which I have not brought together, and put into this book. For what he proposed to himself was, to give directions about furnishing, preparing, and setting in order plentiful tables, and making magnificent entertainments in town. He published three books: the one he called the *Cook*, the other the *Fishmonger*, and the third the *Oilman*. Nevertheless, we are abundantly satisfied with such things, as may fall to the share of rural simplicity, and are easily attainable, and without any great expence; as, in the first place, all sorts of apples.

And, that I may begin with the pomegranates, some twist their pedicles or stalks as they grow upon the tree, that the apples may not burst with the rains, or, chapping, utterly perish; and they tie the apples to the larger branches, that they may remain unmoved: then they inclose the tree with nets made of *Spanish* broom, lest the apples be torn, either by crows, or rooks, or other fowls. Some fit small earthen pots to the apples, as they hang on the trees; and, having daubed them over with clay mixed with straw, suffer them to stick to the trees: others wrap them up, one by one, in hay or straw; and, moreover, daub them over very thick with clay mixed with straw, and so bind them to the larger branches, that they may not, as I said, be moved with the wind.

But all these things ought to be carefully done, as I said, in fair weather, and when there is no dew upon them; which, nevertheless, ought either not to be done at all, because the small trees are hurt thereby; or, at least, it ought not to be put in practice every year, especially considering, that we may keep the apples very safely, even when they are pulled off the trees, without sustaining any damage: for, even within-doors, you may make small trenches of three feet dimension, in a very dry place; and, after you have put a small quantity of very small earth into them, you fasten small branches of the elder-tree therein; then, when the weather is fair, you gather the pomegranates with their pedicles, and insert them into the elder-

tree-branches [for the elder-tree has its pith so loose and open, that it may easily receive the pedicles of the apples]. But you must take care, that the apples be not less than four inches distant from the earth, and that they do not touch one another. Then you put a cover upon the ditch you have made, and daub it all round with clay mixed with straw, and heap the earth upon it, that was digged out of it.

This same thing may be done in a tub or barrel, if any one shall have a mind to fill a vessel half-full, either with small, loose earth, or, which some like better, with river-sand; and to do all the other things after the same manner. Indeed, *Mago* the *Carthaginian* orders sea-water to be made exceeding hot, and the pomegranates to be tied with flax or rushes, and let down into it for a little while, till they be discoloured; and, after they are taken out, to be dried three days in the Sun, and afterwards to be hung up in a cold place; and, when there is occasion to use them, to steep them in cold fresh water one night, and the day following, till the hour when they are to be used. But the same author also directs us, to daub the fresh apples all over, very thick, with well-wrought potters-clay; and, when the clay is dried, to hang them up in a cold place; afterwards, when there is occasion to use them, to put them into water, and soften the clay. This method preserves the apple as fresh, as if it were newly gathered.

The same *Mago* commands us to spread poplar- or evergreen-oak-saw-dust, in the bottom of a new earthen pot, and to stow the apples so, that the saw-dust may be trodden in between them; then, after the first story is finished, to spread saw-dust a second time, and stow the apples after the same manner, till the pot be filled; and, when it is full, to put a cover upon it, and daub it over carefully with thick clay.

But all sorts of apples whatsoever, that are laid up in order to be kept for a long time, ought to be gathered with their pedicles, and even with their small branches also, provided it can be done without any injury to the tree; for this contributes very much towards preserving them for a long time. Many pull them off the trees with their small boughs; and, when they have carefully covered the apples over with potters-clay, dry them in the Sun: then, if the potters-clay chap in any place, they daub it over with common clay; and, when they are dried, hang them up in a cold place.

C H A P. XLV.

How Globe-apples, or Pome-paradises, Honey-apples, Sestian Apples, and other Kinds, may be preserved.

MANY preserve and keep quinces in pits, or trenches, or in barrels, in the same manner as they do pomegranates. Some bind them up in fig-tree-leaves; then they knead potters-clay with lees of oil, and daub the apples with it; and, after they are dry, lay them up in a loft, in a cold and dry place. Others put up these same apples into pans, and cover them all over with dry parget, so that they may not touch one another.

Nevertheless, we have not experienced any thing surer or better, than, in fair weather, and in the wane of the Moon, to gather the ripest quinces, that are found, and without any blemish; and after the down, which is upon the apples, is wiped off, to put them up lightly, and very loose, that they may not be bruised the one against the other, in a new stone bottle with a very wide mouth; then, when they are stowed up to the neck of the bottle, to thrust them down close to one another, with willow-twigs laid cross them in such a manner, as gently to compress the apples, and not suffer them to be lifted up with the liquor, when it is poured in upon them; then to fill the vessel to the brim with the best and the most liquid honey, so that the apples may be intirely covered with it. This method not only preserves the apples themselves safely, but also affords a liquor of an honey-wine taste, which sometimes may be given, without any hurt, to such as are sick of a fever; and it is called *syrup of quinces and honey*.

But you must take care, that the apples, which you would preserve with honey, be not gathered, and put up, before they are ripe; because, if they be gathered green, they grow so hard, that they are of no use. But that which many do, *viz.* dividing them with an ivory knife, and taking out the seeds, because they think they spoil the apple, is intirely superfluous: but the method which I have now taught, is, indeed, so sure, that, altho' there even be a little worm in them, yet the apples spoil no further, after they have received the foresaid liquor; for, such is the nature of honey, that it puts a stop to any blemish or corruption, and suffers them not to spread any further;

ther; for which reason, it preserves also a dead human body sound and intire for very many years.

Other kinds of apples therefore, such as the *orbicular*, or *pome-paradises*, or *Sestian*, *Matian*, and honey-apples, may be safely kept and preserved in this liquor; but because, preserved after this manner, they seem to grow sweeter in the honey, and not to retain their own natural taste, small chests of beech, or of lime-tree also, such as Senators or Judges robes are laid up in, but somewhat larger, ought to be prepared for this purpose, and placed in a very cold loft, and in a very dry place, where neither smoak, nor noisom smell, may come; then, having spread the forementioned saw-dust under them, the apples ought to be so ranged, that their fleurets (1) may look upwards, and their pedicles or stalks downwards, after the same manner as they grew upon the tree, and so as not to touch one another.

Also particular care must be taken, that each kind be put up separately in their own little chests; for, when different kinds are shut up together, they disagree one with another, and are more speedily corrupted and spoiled: for which reason also the wine of such vineyards, as are planted with different sorts of plants, is not so firm, as if you should put up pure unmixed *Aminean*, or *Apian*, or even dreggy wine by itself. But when the apples, as I said before, are thus carefully packed up, let them be covered with the lids of the chests, and let the lids be daubed all over with clay mixed with straw, that the air may not be able to get in. And these very apples some people keep very safely, as they do other sorts of apples, as we said above, by putting poplar-saw-dust, and others also fir-saw-dust between them: nevertheless, these apples ought to be gathered, not ripe, but very bitter.

C H A P. XLVI.

Of Pickling of Elecampane.

THE pickling of Elecampane shall be performed in this manner: After you have digged up the root of it out of the earth, in the month of *October*, when it is come to its greatest maturity, wipe

(1) *Flosculi*, *fleurets*: that part of the apple, opposite to the pedicle, is called *flosculus*, it being the place where the blossom was. It is sometimes called *umbilicus*, the navel of the apple.

off, with a coarse rough linen cloth, or even with a hair-cloth, whatever sand shall stick to it; then scrape it slightly with a very sharp knife; and where the small root is fullest, in proportion to its thickness cleave it into two or more parts of a finger's length; then boil them moderately with vinegar, in a brass pot, so that the slices may not be burnt-to: after all this let them be dried three days in the shade, and so put up into a pitched jar; and wine, made of raisins dried in the Sun, or must boiled into a third part of its first quantity, added to them, till it swim above them; and, having put a stuffing of savory, or wild marjoram, upon them, let the vessel be shut up, and covered with leather.

There is another way of pickling Elecampane: When you have scraped the roots of it, cut them into slices, as above, and dry them in the shade for the space of three, or even four days; then, when they are dried, having put wild marjoram among them, throw them into vessels without any pitch; and, having also put wild marjoram upon them, with six parts of vinegar, let one part of must, sodden into one half of its first quantity, be mixed with an *hemina* of toasted salt, that the slices may be soaked in this liquor, till they have very little of a bitterish taste: afterwards, being taken out, let them be dried a second time, for the space of five days, in the shade; then pour together, into a pot, the sediment of dreggy wine, and of honey-wine also, if you have it, and the fourth part of both these of good must sodden into a third part; and, when it has boiled, put the slices of Elecampane to it, and remove it presently from the fire, and stir them thoroughly with a wooden spatula, till they grow perfectly cold; after which pour them into a pitched jar, cover them with its lids, and then put a cover of leather upon it.

There is a third way to pickle the same Elecampane: When you have carefully scraped the small roots, cut them into small pieces, and steep them in strong brine, till they lose their bitterness; then, having poured out the brine, bruise the very best and ripest service-apples, after you have taken out the seed, and mix them with the Elecampane; then add to it either wine made of raisins dried in the Sun, or the very best must sodden into one third, and stop up the vessel. Some, after they have pickled the Elecampane, and soaked it in strong brine, dry it, and mix it with bruised quinces, which they have boiled before in honey, or in must sodden into one third; and so pour raisin-wine, or must sodden in to one third, upon them; and, when they have put the lid upon the vessel, cover it with leather.

C H A P. XLVII.

Of pickling of Olives.

IN the months of *September* or *October*, while it is yet vintage, bruise the bitter *Pausian* olive; and, having steeped it a little in warm water, squeeze it; and, after you have mixed it with a moderate quantity of toasted salt, put it up in a jar with the seeds of fennel, and of the mastich-tree, and pour the very freshest must into it; then put a small bundle of green fennel upon them, and press it down into the liquor, that the olives may be pressed down, and the liquor appear above them: having thus managed your olives, you may use them the third day.

When you bruise the white *Pausian*, or the large and round, or the long *shuttle-olive*, or the royal olive; first plunge each of them into cold strong brine, that they may not lose their colour; and, when you have such a quantity of any of them ready as may be sufficient to fill a jar, spread a bundle of dry fennel in the bottom of it; then take care to have, in a little pot, the seeds of green fennel, and of the mastich-tree, stript off their stalks, and cleansed; then take the olives out of the brine, and squeeze them; and, when you have mixed them with the foresaid seeds, put them into the vessel; and then, when they come up to the neck of the vessel, put bundles of dry fennel upon them, and mix two parts of fresh must, and one of strong brine together, and put it to them. You may use olives very agreeably the whole year, when you put them up in this sort of pickle.

Some do not bruise the olive, but cut it with a sharp reed: this, indeed, requires more labour; but it is much better; for this olive is fairer and whiter than that which contracts a blueness from contusion. Others, whether they bruise or cut the olives, mix them with a little toasted salt, and the foresaid seeds; then they pour in must sodden in to one half of the first quantity, or raisin-wine, or a liquor made with fresh bees-wax and water, if they can have it. We gave directions a little before, in this self-same book, how this liquor may be made; all the rest of the things they manage after the same manner.

Chuse the very fairest and whitest *Pausian* or *royal olives*; which have been stript off the tree by hand, and are without a spot upon them; then throw them into an *amphora*, after you have spread dry

fennel under them, and mixed mastich- and fennel-seeds with them; and, when you have filled the vessel to the neck, put strong brine to them; then make a stuffing of the leaves of reeds, and press down the olives therewith, that they may be sunk below the liquor; and pour in strong brine a second time, till it come to the brim of the *amphora*. But this olive is not very agreeable in itself, but it is exceeding proper for those pickles and sauces which are used at more sumptuous and plentiful tables; for, when occasion requires, it is taken out of the *amphora*, and, when bruised, admits of any other seasoning or pickle you shall please to join with it; and you may make it up any way you think proper. Nevertheless, most people cut the sective leek and rue, with young parsley and mint, very small together, and mix them with the bruised olives; then they add to them a little peppered vinegar, and a little more honey or honey-wine; and bedew them with green oil, and so cover them up together with a bundle of green parsley.

Some, with each *modius* of olives, gathered and pickled after this manner, mix three *beminæ* of salt; and, having added the seeds of the mastich-tree to them, and spread fennel under them, fill up the *amphora*, as far as the neck, with olives; then they pour vinegar, that is not very sharp, into it; and, when they have almost filled the *amphora*, they press down the berry with a stuffing of fennel; and then add more vinegar, till it come up to the very brim of the vessel: afterwards, on the fortieth day, they pour out all the liquor, and mix three parts of must, sodden into one half, or one third of the first quantity, with one part vinegar, and fill the *amphora* again. There is also that other way of pickling them, which is approved; *viz.* That, when the white *Pausian* has been ripened with strong brine, all the liquor be poured out, and the *amphora* filled again with two parts of must, and one of vinegar, mixed together. The *royal*, or the *orchita* olive may be also put up and preserved in this pickle.

Some mix one part wine and two parts vinegar, and, with that liquor, make the *Pausian* olives become so light, as to swim in the liquor (1); which if any have a mind to use by themselves, they shall find them agreeable enough; although even these, when they come out of the brine, may be made up in any other manner, and joined with any other pickle or seasoning whatsoever.—*Pausian* olives,

(1) *Colymbades*. These olives were so called, ὡς τὸ κολυμβᾶν, because they swim upon the brine wherewith they were pickled, as *Athenæus* says: they were also called ἀλμάδες, from the brine wherewith they were prepared; and νικτείδες, from their swimming.

after they are discoloured, and before they grow ripe and mellow, are gathered with their stalks, and kept in the very best oil: this sort, above all others, even a whole year after, have the taste of fresh green olives. Some also, after they have taken them out of the oil, and sprinkled them with bruised salt, serve them up for new olives.

There is also that kind of pickle, which is commonly made use of in the cities of *Greece*, and they call it *epityrum* (2); as soon as the *Pausian*, or the large round olive, changes its colour from white, and becomes a little yellowish, they gather them off the trees by hand, when the weather is fair, and spread them in winnowing fans under a shade, for one day; and, if any pedicles or stalks, leaves or twigs, stick to them, they gather and pick them; the next day they sift them, and shut them up in a new frail, and put them under the press, and press them very strongly, that they may exsude all the lees they have in them. But we suffer sometimes the berry to continue one whole night and the next day under the press, and to be pressed with the weight, and emptied, as it were, of all its filth and corruption; then, when the thin rind is broken and opened, we take it out of the press; and, upon each *modius* of olives, we pour a single *sextarius* of bruised toasted salt; also we mix mastich-seed with them, and fennel- and rue-leaves dried under a shade, after they seem to be cut small enough; and we let them stand three hours, till the berry, in some measure, drink up the salt. Then we pour oil of a good taste upon them, so that it may cover the olive; and we press down a bundle of dry fennel upon them, so that the liquor may swim above them. But, for this sort of pickle, new earthen vessels, without any pitch, are prepared; and, that they may not sip up the oil, they are soaked with melted tallow, or the like, as oil-jars are; and then afterwards they are dried.

(2) *Epityrum*. Some think, that this kind of preparation was so called from *πιτυρον*, which signifies *bran*, or the small skins which come off the wheat in grinding; and these olives were called *πιτυρίδες*, because they were thus bruised like bran: but this account of them is not very satisfying. Some conjecture it was so called, because it was served up with cheese, *quasi ἐπὶ τὸν τυρόν*, which seems more probable.

C H A P. XLVIII.

Of the Way to pickle black Olives.

BUT after this comes the cold of Winter, during which the gathering of the olives, and the making of the oil, call again for the care of the Bailiff's Wife, as the vintage did before. We shall therefore, in the first place, (since we have already begun it) give directions about pickling of olives, and presently after subjoin an account of the method of making oil. They prepare the *Pausan* or the *Orchitan* olives, and, in some countries, the *Nævian* also, for great banquets and feasts: therefore it is proper, when the weather is fair, to gather these off the trees by hand, as soon as they are grown black, but are not as yet thoroughly ripe; and to pick and sift them, and put apart such of them as shall seem spotted or spoiled, and of a lesser growth: then to every *modius* of olives to put three *hemincæ* of unbruised salt, and to pour them together into willow-baskets, and put plenty of salt upon them, so that it may cover the olives, and so leave them to sweat together for thirty days, and drop out all their lees; afterwards to pour them out into a tub or tray, and, with a clean sponge, wipe off all the salt, so as none of it may remain upon them; then to put them into a vessel, and fill up the *amphora* with must sodden in to one half, or one third of its first quantity; and put a stuffing of dry fennel upon them, to press down the olives. Nevertheless, most people mix three parts of must boiled in to one third of its first quantity, and one part of vinegar. Some mix two parts of must and one of vinegar, and pickle them with this liquor.

Some, when they have gathered the black olives, salt them with the same quantity of salt as above, and so place them in baskets, that, after they have mixed mastich-seeds with them, they may make one layer of olives, and another of salt by turns, till they come to the top; then, after forty days, when the olives have exsuded all the lees they had in them, they pour them out into a tray or trough; and, having sifted them, they separate them from the mastich-seeds, and wipe them with a sponge, that none of the salt may stick to them; then they throw them into an *amphora*, and add to them must boiled in to one third, or one half of its first quantity, or even honey, if they have plenty of it.

To every *modius* of olives must be added one *sextarius* of ripe anise- and mastich-seeds, and three *cyathi* of fennel-seed; and if you have not this, the fennel itself cut small, as much as shall seem sufficient; and, with every *modius* of olives, three *heminae* of toasted salt, but not ground, must be mixed; and so they must be put up in *amphors*, and these must be stopped close up with bundles of fennel, and daily rolled up and down upon the ground; and then every third or fourth day, whatever lees may be in them, must be let out. After forty days, the olives must be poured into a trough, and only separated from the salt; but let them not be wiped with a sponge, but put up into the *ampbor* just as they are taken out of it, with small lumps of salt mixed with them; and, after you have put stuffings upon them to keep them close, let them be laid up in the cellar for use.

The olive which was gathered when it was ripe, and which, by lying in the brine, is become light, and swims above the liquor, take out of the brine, and wipe it with a sponge; then cut it in two or three places with a green reed, and keep it three days in vinegar; the fourth day wipe it clean with a sponge, and put it up into a new pot or jar, after you have spread parsley and a little rue under it. Then, when the vessel is full of the cut olives, put must boiled in to one third of its first quantity into it, till it come to the mouth of the vessel; put the tender tops of young branches of laurel upon the olives that are pickled after this manner, to press them down: after twenty days make use of them.

C H A P. XLIX.

How a Marmelad of Olives may be made.

THEY gather black olives exceeding ripe, when the weather is fair; and spread them upon reeds for one day, under a shade, and separate all the damaged berries from them. Also, if there be any pedicles or stalks sticking to them, they take them away, and take out from among them all the leaves and twigs that are mixed with them: the next day they sift them carefully, that, if there be any dirt among them, it may be separated from them; then the unbruised olive is shut up in a new frail, and put under the press, that it may be squeezed the whole night. The day following they throw
it

it into a very clean suspended mill, that its kernel may not be broken : and, when they are reduced to a mash, then with their hand they mix with them toasted and bruised salt, with the other dry seasonings ; and these are fenugreek, cumin, fennel-seed, and *Egyptian* anise-seed. But it will be sufficient to put as many *heminae* of salt to them, as there are *modii* of olives ; and to pour oil upon them, lest they wither ; and that ought to be done as often as they shall seem to be dried.

Nor is there any doubt but the marmelad, which is made of the *Pausian* olive, has the best taste ; but its taste does not continue sound above two months : but other kinds of olives, such as the *Licinian* and *Culminian*, are fitter for this thing. Nevertheless the *Calabrian* olive-tree, which some call the *wild-shrub olive*, because of its likeness to it, is reckoned the best for these uses.

C H A P. L.

After what Manner Oil may be made.

THE beginning of *December*, for the most part, is the middle season for gathering of olives, and making oil ; for, before this time, the bitter oil, which is called *Summer-oil*, is made ; and about this month they press the green oil, then afterwards the ripe oil. But it is not for the interest of a Master of a family to make bitter oil, because the olives yield but very little of it, except the berry fall to the ground by tempestuous weather, and it be necessary to gather it up, lest it be eaten up and destroyed by tame cattle or wild beasts. But it is of very great advantage to him to make of the green sort, because the olives both yield enough of it, and by its price it almost doubles the income of the Owner : but, if the olive-yards are very large, it is necessary, that some part of them be reserved for ripe fruit.

But the place, wherein the oil ought to be made, has been already described in the first book ; nevertheless there are a few things relating to this affair, which I had before omitted, which must be mentioned. A loft to carry the olives into is very necessary, though we have already given directions, that the fruit, of every day's gathering, be presently put under the millstones and the press. Nevertheless, because sometimes the immoderate multitude of berries overcomes the labour of them that attend the press, and are more than they can manage, there must

must be a store-room in the upper-part of the house, where the fruits may be put : and this loft ought to be like a granary, and to have as many small bings, or distinct partitions, as the quantity of olives shall require, that so the gathering of each day may be put apart, and laid up by itself.

The floor or bottom of these small partitions must be paved with stone or tiles, and made so sloping, that all the moisture may run quickly out of them by gutters or pipes ; for the lees are very hurtful to the oil, which, if they remain in the berry, corrupt and spoil the taste of the oil. Therefore, when you have built the partitions in the manner we have said, place upon the floor small boards, half a foot distant from each other ; and lay reeds upon them, that are carefully and closely woven, so that they may not let so much as a berry pass through, and be able to support the weight of the olives. But hard by all these small partitions, in that part where the lees run out of them, under the very pipes, the floor must be concave, after the manner of little trenches ; or there must be a hollow stone, wherein may stand whatever liquor shall flow out of them, and from whence it may be drawn out. Moreover you must have fats or barrels ready prepared within-doors, which may receive the lees of every kind of olives apart by themselves, whether they be such as flow from the olives pure without any mixture, or such also as have received salt ; for both of them are fit for many uses.

But mills are more useful than the *press*, for the making of oil ; and the *press* than the *canalis*, and the *solea* (1). The mills are very easily managed ; for, according to the bigness of the berries, the mill-stones may be either lowered or raised, that so the kernel, which spoils the taste of the oil, may not be broken : moreover, the *press* dispatches more work, and more easily, than the *solea* and *canalis*. There is also a machine like an erect threshing instrument, which is called a *beetle* ; and that does the work not incommodiouly, except that it is frequently spoiled, and out of order ; and, if you throw a

(1) *Columella* mentions here several machines, wherewith the oil was squeezed out of the olive-berries ; but gives no particular description of any of them, so that it is not easy to form any distinct idea of them. *Cato* indeed, in his 22d chapter, gives a particular description of the *trapetum* : but it is not very intelligible, perhaps because of the incorrectness of the text ; and learned men differ in their opinions about it. *Varro* says, that the *trapeta* were oil-mills made of hard rough stones ; and *Columella* seems to make the *mola* and the *trapetum* two distinct things : perhaps by the last he means a press for squeezing the olives, which had its name from the turning of the screws. We have no account at all, that I can find, of the *canalis* and *solea* : nor is it any great satisfaction to be told by Antiquarians, that they were certain machines, used by the ancients for making oil, since they give us no account of their structure.

little too many berries into it, you stop it. Nevertheless, the foresaid machines are made use of according to the state, and condition, and custom of the countries: but that of mills, as also of the turning press, is the best. I thought it necessary to premise these things, before I discoursed of making the oil.

Now we must come to the thing itself, altho' we have omitted many things, which, as before the vintage, so, before the gathering of the olives, and making the oil, must be all ready prepared; such as plenty of wood, which must be brought home a long time before, that so, when the thing is wanted, the Labourers may not be called away from their business: ladders also, small baskets, and sowers baskets, of ten *modii* and three *modii* each, wherein the berries, which are gathered off the trees, are received; frails, hempen- and *Spanish*-broom-ropes, iron-ladles, wherewith the oil is emptied from one vessel to another; covers or lids, wherewith the oil-vessels are covered; sponges, greater and smaller; pitchers, in which the oil is carried out; cane- or reed-mats, into which the olives are gathered; and, if there are any other things which now escape my memory. All these ought to be in great number, because they perish with the using, and become fewer; of which if any one thing be wanting, when there is occasion to use it, the work is at a stand. But now I shall perform what I promised.

As soon as the berries shall begin to be of different colours, and some of them are already black, yet more of them white, the olive must be gathered by hand, when the weather is fair, and sifted and cleansed upon mats or reeds spread under them: then, after they are cleansed, they must be presently carried to the place where the presses stand, and shut up intire in new frails, and put under the presses, that they may be squeezed as little a while as can be. Afterward, when their thin rinds are opened, they ought to be softened, by adding two *sextarii* of whole salt to each *modius* of olives; and the mass of bruised olives ought to be squeezed out, either in oblong square boards, if it be the custom of the country, or in new frails at least: then that which shall first flow from the press into a round vat, (for that is better than a square leaden vessel, or a receiver made of stone or brick, with two divisions in it) let the Lader empty it presently, and pour it into great earthen pans prepared for this use.

But, in the oil-cellar, let there be three rows of pans, that one of them may receive the oil of the first note, that is, of the first pressing; the second, that of the second; and the third row, that of the
2
third;

third ; for it is of great importance not to mix that of the second, and much less that of the third pressing, with that of the first ; because that is of a much better taste which flows from the olives with least force of the press, as if it dropped from them of its own accord. When therefore the oil has stood a little in the first pans, the Lader ought to strain and empty it into the second, and then into the next, till he come to the last ; for the oftener it is ventilated, and worked, as it were, by emptying it from one vessel into another, the clearer it becomes, and the more it is freed from its dregs. But it will be sufficient to place thirty large pans in each row, except the olive-yards be very large, and require a greater number.

But if, with the colds, the oil shall be congealed with the lees, you must, in that case, certainly use a little more toasted salt ; that thing resolves and loosens the oil, and separates it from every thing that may hurt or corrupt it. Nor is there any reason to fear, that the oil will become salt or brackish ; for, whatever quantity of salt you shall put to it, yet the oil does not receive the taste of it. But, even thus the oil usually does not dissolve, when greater colds than ordinary come on suddenly ; therefore they toast nitre, and bruise it and sprinkle it upon the oil, and mix it with it : this liquifies the lees. There are some, tho' very careful Oilmen, who do not put the berry under the press whole, without breaking it, because they think, that some part of the oil is lost by so doing ; for, when the berry receives the weight of the press, the lees alone are not pressed out of it, but they attract something of the fatness of the oil with themselves.

But I have this direction to give you upon the whole, That neither smoak nor soot be admitted into the place where the oil-press stands, or into the oil-cellar, as long as the green oil is making there ; for both these are very prejudicial to this affair, and the skilfullest Oilmen scarcely suffer their work to be done at the light of one single lamp ; wherefore both the place where the oil-press stands, and the oil-cellar, must be situated towards that quarter of the heavens which is most sheltered from cold winds, because the heat of the fire is not at all required. Moreover, the barrels and jars, into which the oil is put, must not only be carefully cleansed, and put in order, at the time when the necessity of bestowing the fruit forces to do it, but, when they are emptied by the Merchant, the Bailiff's Wife ought presently to take care, that, if any dregs or lees have fallen to the bottom of the vessels, they be immediately cleaned out, and washed with a lye of ashes, not very hot, lest the vessels throw off and lose their wax ; and let it be done once and again : then let them be gently rubbed

with the hand with lukewarm water, and often rinsed, and so let all the moisture be dried up with a sponge.

There are some who dissolve potters-clay in water like liquid dregs, and, after they have washed the vessels, daub them on the inside with this sort of gruel, as you may call it, and suffer it to dry upon them: afterwards, when they have occasion to use them, they rinse them with pure water. Some wash the vessels thoroughly all over with lees of oil first; then they wash them with water, and dry them: then they examine whether the barrels want new wax; for the antients said, that it was necessary to wax them almost every sixth year, at the time of making the oil, which I do not understand how it can be done: for, as new vessels, if they be heated, easily receive the melted wax, so I cannot believe, that such as are old will bear waxing, because of the juice of the oil; which very waxing, nevertheless, the Husbandmen of our times have wholly laid aside, and have been of opinion, that it was better to wash the new barrels all over with liquid gum, and to suffumigate them with white wax when they are dried, that they may not lose their good colour, and tarnish: and they judge, that this fumigation ought to be done, as often as either the new or old vessels are cured and seasoned, and prepared for the new oil. Many, when they have daubed their new barrels or jars with gross fat gum, are satisfied with one gumming for ever: and, indeed, a vessel which has once imbibed the oil, does not admit of a second gumming; for the fatness of the oil refuses any such matter as that of gum is.

After the month of *December*, about the beginning of *January*, the olive-berry must be gathered in the same manner as above, and the oil presently pressed out of it; for, if it be laid up in a loft, it quickly grows hot; for, with the Winter-rains, it breeds a greater quantity of lees, which are very hurtful to oil. Therefore, you must beware of making oil for eating of this kind of berry, which may, by this one way, be avoided; if, as soon as the berry is brought out of the field, it be ground, and put into the press, and the oil pressed out of it, and managed, as we have said above. All Husbandmen, for the most part, have believed, that, if the berry be laid up within the house, the oil will grow in the loft; which is as false, as that corn of any sort grows in the threshing-floor: and this falsehood that antient author, *Porcius Cato*, refutes thus; for he says, that the olive grows wrinkled in the loft, and becomes smaller: for which reason, when the Husbandman has laid up such a quantity in the house, as is sufficient for one making; and, after many days, has a mind to
grind

grind it, having forgotten the first quantity that he had brought in, he supplies out of another heap, which he had in like manner placed apart by itself, as much as is wanting to each quantity; and, by this one making, the berry, that has rested for some time, seems to yield more oil than that which is fresh, and newly gathered, whereas he has taken many more *modii* of olives to it. Yet, suppose that were exceeding true, nevertheless there is more money raised by the price of green fresh oil, than by the great quantity of that which is bad: which thing *Cato* also said. And thus, indeed, whatever addition of weight or measure is made to the oil, if you would compute the quantity of berries, added to that which you reckoned to one making, you would think it not an increase and advantage, but a real loss: wherefore we ought not to hesitate to grind the olives, and put them under the press, as soon as possible, after we have gathered them.

Nor am I ignorant, that a secondary oil, for common eating, must also be made; for, when the olive, which is gnawed by the little worms, falls off the tree, or has, by storms and rains, fallen into the dirt, they have recourse to warm water for a remedy; and the caldron ought to be made hot, that the dirty berries may be washed. But this must not be done with exceeding hot water, but with that which is moderately warm, that the taste of the oil may become the more agreeable; for, if the agreeable taste be boiled out of it, it attracts the taste of the little worms, and of any other sorts of nastiness whatsoever: but, when the olive has been thoroughly washed, the other things ought to be done, as I directed above. But the purest and best oil, and that of the secondary sort for common use, must not be pressed in the same frails; for old frails ought to be set apart for such olives as fall off the trees of their own accord; and those that are new, for the oil of the first note; and, when they have served for pressing out the oil of every particular making, they ought always to be presently washed, twice or thrice, in exceeding hot water: then, if there be any brook, or running water, they must be sunk in it by having stones put into them, that they may be pressed down and detained by the weight thereof: or, if there be no river, they ought to be soaked in a lake, or pond, of the purest water you can find, and afterwards beaten with rods, that the dirt and dregs may fall off them, and then they must be washed a second time, and dried.

C H A P. LI.

Of Gleucine Oil (1).

ALthough the composition of *Gleucine* oil does not belong to this season of the year, nevertheless it is reserved for this part of the book, lest it should be inserted not very properly among the rules laid down for making wine; but it ought to be made in this manner: You must prepare an oil-vessel, of the largest size, either new, or, at least, very sound and strong; then, in the time of vintage, you must pour into it, and mingle together, sixty *sextarii* of the very freshest and of the best kind of must, with eighty pound-weight of oil; then you must put spices that are not sifted, yea, not so much as bruised small, but slightly broken, into a small rush- or flaxen-net, and let them down with the small weight of a stone, into a part of the must and oil: but, let the spices be weighed in the proportions we have here subjoined; of *calamus*, *sweet-smelling rush*, *cardamom*, the wood of the *balsam-tree*, *palm-tree-bark*, *fenugreek* steeped in old wine, and afterward dried, and also toasted; *bulrush-root*, as also *Greek flower-de-luce*, and *Egyptian anise*, of equal weight; that is, of each one pound and a quarter, as we said above: shut them up in a small net, and let them down into the must and oil, and daub the firkin or jar: after the seventh or the ninth day, if any dregs or filth shall stick by itself to the chops of the jar, take it away with your hand, and wipe it; then strain off the oil, and put it up in new vessels.

Presently after take out the small net, and bruise the spices, as clean as possible, in a mortar; when you have bruised them, put them again into the same jar, and pour in as much oil as you did at first, and stop it up, and place it in the Sun: after the seventh day decant the oil; and what remains of the must, put it up in a pitched barrel: and, if you do not consume all this medicament, you shall give it to weak oxen, and the rest of the cattle, to drink. But this secondary oil, which is not of a disagreeable smell, may serve for a daily ointment for such as are affected with a pain of the nerves.

(1) *Oleum gleucinum* was a composition made of oil and must: this last the Greeks called γλεῦκος, which, being mixed with the oil, gave it this denomination.

C H A P. LII.

After what Manner you may make Oil for Ointments.

MAKE oil for ointments thus: Before the olive-berry grows black, when it first begins to be discoloured, but not as yet spotted, and of various colours, gather by hand the *Licinian* especially, if you have any; if not, the *royal*; if you have not this neither, then the *Culminian berry*; and, when you have cleansed it, put it presently under the press whole, and squeeze the lees out of it; then break the olive in a suspended mill, and put it either into frames made of oblong square pieces of wood, or a new large frail; and, having put it under the press, press it in such a manner, as you may not writh the vessels, but only suffer it to be squeezed as little as can be, with the weight of the press. Then, when the oil has flowed from them in this manner, let the Lader separate it forthwith from the lees, and remove it into new pans, apart by itself, till it grow clear. The rest of the oil, that shall be squeezed out afterward, may be approved for food, either when it is mixed with that of another sort, or by itself.

C H A P. LIII.

Of salting of Swine's Flesh.

THUS far we have said enough of oil; now let us return to lesser things. You must restrain all kinds of cattle, and especially swine, from drinking, the day before they are killed, that their flesh may be the drier; for, if they drink, their flesh, when it is salted, will have the more water in it: therefore, having killed them when they are thirsty, bone them well; for this makes the salted flesh less liable to corrupt, and more durable: then, after you have boned it, salt it carefully with toasted salt, which is not too small, but broken in a suspended mill; and stuff in a large quantity of salt, into those parts especially, wherein the bones are left; and, having laid the flitches or pieces in due order, upon boards, place huge weights upon them, that the blood may be pressed out of them. The third day

remove

remove the weights, and rub the salted flesh carefully with your hands; and, when you have a mind to put it into the same place again, sprinkle it with small bruised salt, and so replace it: nor shall you cease to rub the salt daily into it, till it be completely salted; but, if it be fair and clear weather, during these days, wherein the flesh is rubbed with salt, you shall let it lie in the salt nine days; but, if it be cloudy weather, or rain, the salted flesh must be carried to a pond on the eleventh or twelfth day, and the salt first shaken off it; then it must be carefully washed with fresh sweet water, and let not the salt stick any-where upon it; and, when it is dried a little, it must be hung up in the larder, where a moderate smoak may come, which may dry it, if there be any water as yet contained in it. The proper time for salting flesh after this manner, will be when the Moon is in her wane, especially about the middle of Winter, and also in the month of *February*, before the thirteenth day.

There is another way of salting flesh, which may be put in practice even in hot countries, at all times of the year; and it is such as this: When the swine are kept from water the day before, they are killed the day following; and they take off their hair, either with scalding hot water, or with a small flame of brushwood (for their hair is pulled off both ways). They cut their flesh into pieces of a pound-weight; then they spread toasted salt in the bottom of a barrel or tub, but moderately bruised (as we said above); then they lay the small pieces of flesh very close to one another, and in good order; and throw in salt by turns: but, when they come almost to the brim of the barrel, they fill the rest of it with salt, and press it down into the barrel with weights laid upon it: and this flesh is always preserved and kept without spoiling, and remains in its own brine, as any other salted thing whatsoever.

C H A P. LIV.

After what Manner you may pickle Turneps and Navews.

TAKE the roundest turneps you can find, and wipe them, if they be dirty; and, with a sharp knife, pare off the outer skin; then (as the Oilmen use to do) make an incision upon them cross-wise, with an iron-tool in form of a crescent: but beware you do not cut the turnep through to the bottom. Then sprinkle salt, that

is not too small, between the incisions of the turneps, and lay them in order in a tray or tub; and, having sprinkled them with a little more salt, let them alone for three days, till they exude their moisture. After the third day, taste the middle fibre of the turnep, if it has taken the salt; then, when it shall seem to have taken enough of it, after you have taken them all out, wash them, one by one, in their own liquor; or, if there be not much liquor, put strong brine to it, and so wash them: then put up the turneps into a square willow chest, which is not woven too closely, but yet very firmly, with large willows; then put a board upon them, so fitted, that it may be pressed down within the chest to the very bottom, if there be occasion for it: and, after you have thus fitted the board, put heavy weights upon it, and let them dry one whole night and a day; then put them up in a pitched earthen jar, or in a large glass bottle; and so pour in mustard and vinegar, that they may be covered with liquor.

Navevs also may be pickled with the same liquor as turneps; but, if they be small, they must be pickled whole; if large, they must be cut. But you must take care, that both these be pickled, and put up, while they are young and tender, before they form their stalk, or put forth any sprouts or shoots. Throw the small navevs into the vessel whole, and the large ones divided into three or four parts, and infuse them in vinegar; and also put one *sextarius* of toasted salt into a *congius* of vinegar. After the thirtieth day you may use them.

C H A P. LV.

How you may make Mustard.

CLEANSE and sift mustard-seed carefully; then wash it with cold water; and, when it has been well-washed, let it lie two hours in water; afterwards take it out; and, having squeezed the water out of it with your hands, throw it into a new mortar, or into one that is made very clean, and bruise it small with pestils: when you have bruised it, draw the whole mash together to the middle of the mortar, and press it down with your flat open hand; and, after you have compressed it, scarify it; and, having placed a few live coals upon it, pour nitred water upon it, that it may free it from all its bitterness and paleness; then raise the mortar, that all the moisture may be drained out of it; after this put white sharp vinegar to it,

and mix it thoroughly with the pestil, and strain it: this liquor does exceeding well for pickling of turneps. But, if you would prepare mustard for the use of great entertainments, when you have squeezed all the noxious juice of it, add the freshest pine-apples you can find, and almonds to it; and bruise them carefully together, and pour in vinegar upon them: do the other things as I said above. When you come to use this mustard, it will not only be very fit for sawce, but very beautiful and pleasing to the eye; for it is of an exquisite whiteness, if it be made with care.

C H A P. LVI.

*After what Manner you may preserve and pickle the Alif-
sander- and the Skirret-Roots.*

BEFORE the aliffander puts forth its stalk, take its root out of the ground in the month of *January*, or even in *February*; and rub it carefully, that nothing of earth may stick to it, and lay it in vinegar and salt; then, after the thirtieth day, take it out, and pare the bark off it, and throw it away: but, having cut the heart of it into small pieces, put them up into a small glass bottle, or a new earthen pot; and put liquor to them, which ought to be made as is directed below: Take mint and raisins of the Sun, and a small dry onion; and bruise it small with parched red-bearded wheat, and a little honey; and, when it is well bruised, mix with it two parts of must boiled in to one half, or a third part of its first quantity, and one part vinegar; and so pour them all together into the same earthen pot, and, having put its cover close upon it, cover it over with leather: then, when you have a mind to use it, bring out the small roots, that are cut into pieces, with their own liquor, and put oil to them. At this very time you may pickle the skirret-root, in the same manner as above; but, when you shall have occasion to use it, you shall take it out of the jar, and pour oxymel, with a little oil, upon it.

C H A P. LVII.

How to make up a Sallet of easy and quick Digestion (1); or, as others will have it, a Sallet or Sawce with a Mixture of Garum and Vinegar.

PUT into a mortar savory, mint, rue, coriander, parsley, the sective leek, or, if you have none, a green onion, the leaves of lettuce and of rocket, green thyme, or cat-mint, as also green pennyroyal, and salted new-cheese; bruise all these equally together, and mix a little peppered vinegar with them: when you have made up all this mixture together, in a small dish, pour oil upon it. When you have bruised the foresaid greens all together, join with them as many well-cleaned walnuts as you shall think sufficient; and mix a little peppered vinegar thoroughly with them, and pour oil upon them: bruise sesamum, slightly parched, with these greens above-mentioned: also mix a little peppered vinegar with them, upon which pour a little oil.

Cut *Gallican* cheese, or of any other sort whatsoever, very small, and bruise it, and the kernels of pine-apples, if you have plenty of them, if not, toasted filberts, after you have taken off their skin, or almonds; and mix them in equal quantities upon the foresaid seasoning herbs; and add a little peppered vinegar to them, and mix them thoroughly; and pour oil upon the whole composition,

If you have none of these green seasoning- or sallet-herbs, bruise dry pennyroyal, or thyme, or marjoram, or dry savory, with cheese, all together, and put peppered vinegar and oil to them. Nevertheless, any one of these herbs, when they are dry, if you have not the rest, may also by itself be mixed with cheese.---Take of white pepper, if you have any, if not, of black pepper, three ounces; of parsley-seed, two ounces; of laser-root, which the *Greeks* call *silphium*, an ounce and an half; of cheese, two ounces; after you have bruised

(1) *Moretum* may signify any kind of hash, and is the same as *τείμμα*, or *intritum*: it was commonly made up of different sorts of herbs, and some other ingredients, and diversified according to every one's fancy, by the addition of something new, as we see in this chapter. It is called here *moretum oxyporum*, either because it was of itself of easy and quick digestion, or contributed to the quick digestion of other things, and so may be translated, *a sallet or sawce of quick digestion*, or *that passeth easily*, as opposed to *βραδύπορον*, which passeth with difficulty. When it had *garum* and *vinegar* mixed with it, they called it *moretum oxygarum*.

and sifted them, mix them with honey, and keep them in a new pot: then, when you shall have occasion to use them, dilute what quantity you shall think proper with vinegar, and *garum*.----Take an ounce of lovage, two ounces of raisins of the Sun, after you have taken out their stones; three ounces of black or white pepper: these, if you avoid greater expences, you may mix thoroughly with honey, and so keep them. But, if you have a mind to make a more costly and valuable sallet, for easy and quick digestion, you shall mix these same things with the composition above-described, and so lay it up for use. But also, if you have no laser, instead of the *silphium*, you shall put half an ounce of hony to it.

I do not think it improper, *Publius Silvius*, as a conclusion of the work I have finished, to declare to my Readers, (if so be there shall be any who may vouchsafe to take cognizance of these things) that I did not at all doubt, that there are things almost infinite, which might have been ingrafted into this subject; but that I judged it proper to publish only such as seemed the most necessary. However, Nature has not bestowed, even upon grey hairs, knowledge and prudence in all things; for, even whosoever have been esteemed the wisest of mortals, are said to have known many things, but not all.

L. JUNIUS MODERATUS COLUMELLA,

H I S

B O O K

O F

T R E E S (I).

FOrasmuch as we seem to have given abundance of precepts in the first book, concerning the culture of lands; the care of trees and shrubs, which is even reckoned the greatest part of Husbandry, will not now be unseasonable. Therefore we also think it proper, as *Virgil* did, to distinguish plants of trees into two kinds; one of which grows up of its own accord, the other proceeds from human industry and care. That kind, which does not come forth by human assistance, is more proper for timber: this, upon which labour

is

(1) In all, or most of the oldest editions of *Columella*, this small treatise upon trees was placed as the third book of his system of Agriculture: but learned men, who had carefully considered this work, soon found, that this small book made no part of it; therefore *Aldus*, and other learned Editors after him, threw it out of the place wherein it had been inconsiderately placed, and printed it separately by itself. There are many reasons which may convince any attentive person, that this book is not at all a part of that work inscribed by *Columella* to *Publius Silvinus*, but a part of a different treatise; for the very beginning of that book, which, by inserting this, was dispossessed of its rank, and placed as the fourth in order, proves, that not *this book of trees*, but one, which treats of the culture of land, did immediately precede: for the author says, *Hitherto we have treated of the culture of land; now follows the care of trees*: and it cannot be supposed, that, if he had treated of trees in the book immediately preceding, he would have said in the next following, *that he then began to treat of that subject*: and it would be an inexcusable want of method, diligence, and attention, in an author, if, after having treated of several things in a preceding book, he should treat of the same things over again, and in the same words, in the very next book; which would be exactly the case, if this book were reckoned the *third* in *Columella's* system of Husbandry: moreover, by so doing, the whole order and numbers of the books, mentioned by *Columella* himself in several places, would be inverted; and really different from what he himself asserts it to be; and when he says, in the beginning of the eighth book, that he had finished such and such things in *seven books*, he ought to have said *eight*, and that which he calls his *eleventh*, he ought to have called the *twelfth*; and in several other instances, which it is needless to mention. It is also to be observed, that in all the other books he mentions *Silvinus*, but in this there is no mention of him at all: from all which it is reasonable to think, that this book is the second of two, which he formerly wrote upon Husbandry, as appears by the very first sentence; and that the first, which treated of the culture of the ground, is lost, and this other, concerning trees, has been preserved. And it seems very probable, that these

is bestowed, is fit for fruit; therefore this one is the chief: and this kind itself is divided into three different sorts; for, from a young plant, slip, or shoot, either a *tree* arises, as the *olive-tree*, the *fig-tree*; or a *shrub*, as *rose-bushes*, *reeds*; or a certain third thing, which we cannot properly call either a tree, or a shrub, as is the *vine*: we shall teach you the culture of trees and shrubs, when we shall have first given precepts and directions concerning vines.

Whoever shall have a mind to plant a vineyard, or to make a plantation of trees for the supporting of vines, ought first to make nurseries; for then he will know what kind of vine he is about to plant; for that which is purchased with money, and is set in its place, has no certain characters of excellency, and of noble qualities, to be depended on; because it is doubtful, whether he who sold it did use diligence in choosing the plants: moreover, that which is brought from far distant parts, does not easily familiarize itself with our soil; for which reason, that which is foreign, and of a distant county, does, with greater difficulty, take root, and grow up. It is best therefore to make a nursery in the same ground, where you are about to plant the vine, or, at least, in the neighbourhood: and the nature of the place is of great importance with respect to this; for, if you are about to lay out your hills and rising grounds in vineyards, and in plantations of trees for supporting vines, you must use this precaution, to make your nursery in the driest place you can find; and that the vine may, from its infancy, as it were, accustom itself to little moisture: otherwise, where you have transplanted it from a moist to a dry place, being deprived of its former nourishment, it will decay and fail. But, if you have champagne wet and oufy lands in your possession, it will be of advantage to make a nursery also in a like place, and to accustom the vine to a large quantity of moisture; for a slender dry vine, when transplanted into a watery ground, does certainly rot. But it will be sufficient to turn up the plain, even, and juicy land itself, which you destinate for a nursery, with that spade of two feet and an half, which Rustics call *sestertium*. This repastination, or trenching and opening the ground for planting, has more depth than one foot and an half, but less than two feet: with this kind of spade, a *jugerum* of land is turned up, by fifty Labourers, in one day. But

were his first essays upon this subject, which, no doubt, being well received, his friends engaged him to revise and enlarge the same; so that having afterwards composed a new work, much more complete than the former upon the same subject, and added several other books, for the improvement of Husbandry and domestic oeconomy, his first essay was neglected as less perfect, and afterwards a part of it perished.

you may trench an hill or rising ground, of the compass of one *jugerum*, with sixty Labourers, if you do not trench it less than two feet deep: or, if you have a mind to make a nursery in the same place, when you design to plant a regular vineyard, you may trench, or prepare for planting, a *jugerum* of ground, three feet deep, with eighty Labourers, in one day; provided nevertheless, that neither stone, nor gravel-stones, or other more difficult stuff intervene: in which case, how many Labourers it may require, is very uncertain. But we speak of ground where there is nothing but earth.

C H A P. II.

What Sorts of Plants or Shoots you ought to gather; and when.

HAVING finished the trenching or the digging of the ground; in the month of *February*, or in the first part of *March*, gather your plants: but those are the best, which are gathered off vines that have been marked; for he that has it much at heart, to make good nurseries, about the time of vintage, marks with ochre mixed with vinegar (that it may not be washed off by the rains) the vines which have brought to maturity fruit, that is both sound and incorrupted, and in great quantity. And he does not do this only for one year, but he carefully views the same vines for three or more vintages successively, to see whether they continue and persevere to be fruitful; for so it is manifest, that the fruit proceeds from the generous qualities of the vines, and not from the plenty of the year.

If the vines keep the same constant course for several vintages, shoots gathered from such vines as these will yield good wine; and in great quantity: for grapes, of whatever kind they may be, which come to maturity sound, and without spoiling, make wine of a far better taste, than such as are easily damaged, or over-hastily ripened by the great heat, or by any other cause.

C H A P. III.

After what Manner you may choose your Shoots ; and of the Quality and Condition of the Ground.

BUT chuse shoots *from vines* of a large berry, a thin husk, few and small grape-stones, and of a sweet taste. Those gathered from the loins of the vine are reckoned the best ; those from the shoulders are next to them ; and the third are those gathered from the uppermost part of the vine, which very quickly take root and grow, and are more fertile than the others ; but they likewise speedily grow old. I do not approve the setting of shoots or sprays, that grow out of the stock of the vine, because they are barren.

In fat, and level, and moist places, plant the early-ripe vines, and such as are weak, with thin berries, and short joints ; for this kind of land is fit for such kind of vines. In thirsty, lean, and dry places, plant a vine that is naturally fertile and strong, with the grapes close and thick set : for, if you plant strong vines in fat land, they will be the more luxuriant in shoots and leaves ; and whatever sort of fruit they bring forth, they will not bring it to maturity : on the other hand, vines that are weak will quickly fail and decay in poor, lean land, and will yield very little fruit. Plant every kind of vine apart by itself : so you will prune and gather the grapes of every sort in its own proper season.

Young shoots, planted with a piece of the old spray, soon take root, and grow strongly ; but they quickly grow old : but those that are set without any part of the old branch, take root, and grow up more slowly ; but then they fail, and decay more slowly. It is proper to commit the shoots to the earth, as fresh and newly gathered as possible : nevertheless, if any delay or hinderance shall happen, which may prevent their being planted presently, they must be, as carefully as possible, covered all over with earth, in a place where they can feel neither winds nor rains. Make your nurseries and plantations at the time of the New Moon, and about the tenth and the twentieth day. This is the best time for the planting of vines : but, when you plant, avoid cold winds.

Plant the *malleolus* or mallet-shoot in this manner : It is proper, that the mallet-shoot-rod should not be of more than six eyes ; provided nevertheless, that they have but short spaces between the knots,

with a very sharp bill cut off, with a round cut, the lower part of the shoot you are about to set in the ground, hard by the knob or joint, but so, that you may not hurt the eye; and presently smear it over with ox's dung: then fasten the sprig straight into earth that has been well pastinated and dunged, so that no less than four eyes of it be hid. It will be sufficient, that the space of one foot every way be left between the plants. When they have taken root, and grow well, let them be pampinated, or freed from their superfluous twigs and leaves, that they may not nourish more twigs than they ought; also let them be digged as often as can be: let them not be touched with an iron-tool. In the twenty-fourth month let them be cut: after the thirty-sixth month let them be transplanted.

Place your vineyard in land that has rested and lain fallow; for where there has been a vineyard, whatever you plant sooner than the tenth year will, with more difficulty, take root and grow, and will never recover strength. Before you plant land with vines, examine carefully, and try what taste it is of; for such a taste will it communicate to the wine. But the taste of it (as we taught in the first book) will be perceived and found out, if you soak the earth in water; and, when you have strained it, then you may taste the water. Sandy earth, under which there is constantly a sweet moisture, is fittest for vines; land like to this, under which there are soft crumbling gravel-stones, is also very good: earth that is gathered together, and moved from any other place, is equally useful *for this purpose*. Gravel also, under which there lies sweet white clay, or potters-earth, is proper for vines: but all land whatsoever, that cleaves and chaps during the Summer, is useless for vines and trees. The lower earth nourishes the vines and the tree, and that which is uppermost guards and preserves them.

Rocks, upon the uppermost part of the earth, hurt both vines and trees; in the lower part they cool and refresh them: and ground of a middling thinness is best for vines; but that which transmits, or presently drinks up the showers, or, on the other hand, retains them long upon its surface, must be avoided: but that which is tolerably thin on the upper part, and thick and close about the roots, is the most useful and proper. On mountains, and rising grounds, and sides of hills, vineyards have difficulty to take firm root and grow; but they yield wine of a firm and excellent taste. In moist, even, and level places, vineyards are exceeding strong; but they produce wine of a weak flat taste, and which does not keep long. And since we have given directions concerning the plants, and the quality and condition

dition of the soil, we shall now treat of the different kinds of vineyards.

C H A P. IV.

Of the several Kinds of Vineyards.

VINES rejoice most, and thrive best, on trees, because they naturally tend aloft, and grow to a great height; also upon trees they produce more firm-wood, and larger boughs; and they throughly concoct their fruit, and ripen it equally. This kind of vines we call arbustive- or arbour-vines; of which we shall speak at greater length in their due place. But, commonly, there are three kinds of vineyards in use: vineyards, where the vines grow upon frames; vineyards, where the vines lie at their full length upon the ground; and then a third sort, where the vines grow upright from the ground, supporting and standing by themselves, after the manner of trees: this kind, compared with that which grows upon frames, has, in some things, the disadvantage, and is inferior to it, and in other things excels it. A vineyard laid upon frames receives more air, and bears fruit higher, and concocts and ripens it more equally; but the culture of it is more difficult: but this, that grows upright, is so constituted, that it may be plowed also; and thereby attains to greater fruitfulness, because it is oftener cultivated, and with less expences. But that which is immediately laid at its full length, and thrown flat upon the ground, produces much wine, but not of a good quality.

A vineyard is best planted in land that is well pastinated or trenched: nevertheless, sometimes vines are even better committed to furrows in some places; sometimes also they set them in trenches; but, as I said, a *jugerum* of ground may be pastinated three feet deep, by eighty Labourers, in one day: but one Labourer digs a furrow in the earth two feet deep and seventy feet long, in one day. One Labourer makes eighteen three feet trenches, that is, three feet every way, in one day: or, if any body has a mind to plant the vines wider, and at a greater distance, from one another, one Labourer makes twelve trenches, four feet every way, in one day; or one Labourer digs twenty trenches, two feet every way, in one day. But you must take care, that the
vines

vines be set deeper in places that are dry and sloping, than in such as are moist and level.

In a vineyard that is planted exceeding close, they set the vines at the distance of five feet from each other; but, in such vineyards as are planted wider, they put the space of seven or eight feet between the vines; but in such as are planted the thinnest, (that they may be easily plowed also) they place the vines ten feet distant from each other. This way of planting a vineyard takes up, without doubt, a greater extent of ground; but the vines thrive the best, grow exceeding strong, and become the most fruitful. When you set the plants, dig the bottom of the furrow or trench with hoes, and make it soft: see that the vine, which you plant, look towards the East when it is tied to the prop: in the bottom of the trench place stones about five pound-weight, so that they may not press upon the vine; but yet let them be hard by its roots. Moreover, after you have done these things, put an *hemina* of the husks and stones of white grapes to the root of a black vine, and of black grapes to the root of a white vine, and so fill up the trench or furrow to the middle with dunged earth: then the next three years fill up the trench or the furrow gradually, till you fill it up to the top, so the vines will accustom themselves to strike their roots downwards. But the stones give room to the roots where they may creep and spread themselves, and they repel the water in Winter; and the husks of the grapes afford them moisture in Summer, and force them to put forth their roots. Forasmuch as we have directed you, after what manner vines must be planted; we shall now teach you how to cultivate them.

C H A P. V.

After what Manner Vines ought to be cultivated.

SUFFER the vineyard that is newly planted to put forth all its buds; and, as soon as the young twig or shoot shall be about four inches, then, at length, pampinate them, and leave two of them for firm-wood; the one, which you may set apart to grow to its full length, for forming and constituting the vine; and the other, which you may have for a subsidiary shoot, if, peradventure, that which is designed for the row should perish: this the Husbandmen call the *Keeper*, or the *Guardian*. Then the next year, when you prune the

vine, leave one rod, which is the best. The third year model and adjust the vine, while it is tender, into what form you please. If you design to form it for a frame, set apart one firm young bough for growth, so as you may pare off, with a sharp pruning hook, the two eyes that are next to the ground, that they may not bud; then leave the three following eyes, and cut off the remaining part of the rod. But, if you desire, that the vine should stand by itself, without any support, you must suffer its arms, or boughs, to grow and extend themselves as you do those of a tree; and you must endeavour, that it be formed into an orbicular shape, as exactly as possible: for, besides that it has a beautiful appearance when it is so trimmed, it is also in less danger, and labours less, when, being stablished and secured, as it were, by an equilibrium on every side, it rests upon itself. But it will be sufficient, when the arms of the vine shall be first set apart for growth, that one single eye be left on each single twig, that it may not forthwith be oppressed with their burden and weight. After this pruning, when you have gathered the sprays, dig the vineyard deep, and equally, with hoes; or plow it, if it be laid out so wide, as that it can be done.

From the fifteenth of *October*, begin to ablaqueate your vineyard; and see that you have it completely ablaqueated before the middle of *Winter*. Do not dress the vine during the shortest days of *Winter*, unless you have a mind to trace and follow those roots that shall appear in the ablaqueation; for then, at length, it will be very proper to ampute them; but to do it in such a manner, as not to hurt the stock, but rather leave about one inch of it from the mother, and so cut away the root. For, when the root is pared away nearer, besides that it gives a wound to the vine, and thereby hurts it, there is this farther inconveniency, that from the very scar itself more roots creep forth: therefore it is best, that a small part of the root be left, and so to cut away the uppermost parts, which Rustics call *Summer-roots*; which being cut away after this manner, perish, and do not hurt the vines any further. Suckers also may be cut during the shortest days; so much the rather, because when they are extirpated, during the colds, others do not so easily spring out in their room.

After the ablaqueation is finished, it will be proper, every third year, before the *Winter-solstice*, to put no less than two *sextarii* of soaked dung to the roots of the vines, except pigeons-dung, of which if you put more than an *hemina*, it will hurt the vine: then, after the *Winter-solstice*, dig all round the pit you have made in ablaqueating, or laying open the roots of the vine, and the earth you

have thrown out of it. Before the vernal Equinox, which is on the twenty-fifth of *March*, level or fill up the hollow you have made by laying open the roots of the vine. After the thirteenth of *April* heap up the earth to the vine: then in Summer harrow it as often as you possibly can. Five Labourers ablaqueate a *jugerum* of vineyard in one day; five dig it, and three harrow it. Four Labourers prune a *jugerum* of strong, thriving, finished, and already constituted, vineyard in one day; and six bind it to the frames or props. As to vines that grow upon, and are supported by trees, nothing of this nature can be exactly determined, because the inequality of the trees does not allow us to apprehend exactly what may be a reasonable task for Labourers. Some think fit not to prune the next year a vine that is transplanted; then the following year to lop and purge it, and to cut one rod of it to the third eye, which we may set apart for growth, and bearing fruit: then the third year, if the vine grows strong, and thrives well, to allow one eye more to the rod we set apart for growth: the fourth year, to add two eyes more to the next pruning; and so the fifth year at furthest, to place the vine upon the frame. This same order and method of culture we ourselves also have approved, after having made a trial of it.

C H A P. VI.

Of cutting and propagating an old Vineyard.

I Would not advise you to cut an old vineyard, if it has its roots upon the surface of the ground; otherwise the new vineyard also, which shall spring up out of the cutting, will never have strength so as to turn to any account, its roots swimming upon the surface of the ground; for which reason you shall not reap any great plenty of fruit; and, notwithstanding all your pains, it will quickly grow old, and decay. Therefore this sort of vineyard, if the trunks and bodies of the vines are not dried, and if it can be bended, is easily laid flat in furrows made for that purpose, and so renewed and restored. But if it is dried and withered to such a degree, that it cannot be bended, the first year ablaqueate it, not too deep, but only towards the surface of the ground, so that you may not dig up or hurt the roots; and put dung to the roots of the vines, and prune them, so as to leave but few firm-wood-branches upon them, on which you

may depend ; and dig it carefully, and pampinate it frequently, that it may by no means nourish any superfluous and useles sprays. When it is thus throughly cultivated, it will produce firm and long woody-branches, which the following year you must propagate and make layers of, after you have made trenches for them between the rows of the vines : and then, during the space of three years afterwards, you must frequently dig it, till it take firm root, and grow strong ; and you must kill the mother vine, taking no care of, and making no provision for, the support of her which you design to remove and take out of the way. The last year of the three, you must intirely extirpate and take away the mother vine, and so reduce the young vineyard into regular rows.

But if an old vineyard, which has nothing left but that the vines are of a good kind, shall have its roots situated deep in the earth, so that they are not seen when they are ablaqueated, ablaqueate that vineyard about the beginning of *March*, before you cut it ; and, when you have ablaqueated it very deep, cut it immediately. Leave the stock four inches from the roots, and, if it can be done, cut it off with a little saw, hard by some knot, and smooth the wound with a very sharp knife ; then put small earth, tolerably well dunged, upon it, so that when the stock is covered over with it, there may not be less than three inches of earth upon the wound, or place, where it was cut. The reason for doing this is, that it may not dry and wither with the Sun, and that, from attracting and receiving the moisture which the earth affords, it may the better yield, and put forth, firm-wood. But a vineyard that is of a bad kind, and also unfruitful, and has its uppermost parts both mouldy, hollow, and consumed, if the roots of the vines are placed deep enough in the earth, it will be very proper to ingraft them ; provided that, when they are ablaqueated, their lower part, which is laid bare, be amputed so exactly even with the ground, that it may not appear above it, when the earth is heaped upon it.

C H A P. VII.

Of propagating Vines.

TH E R E are three kinds of propagations most in use: one, whereby a rod sprung from its mother is committed to a furrow; a second, whereby the mother herself is laid flat, and all her young branches divided and distributed among several props; a third kind, whereby the vine is cloven into two or three parts, if it is to be divided and carried into different rows on each side. This kind of propagation gathers strength, and grows up very slowly, because the vine, being divided, loses its pith. And, since we have mentioned the several ways of propagating, let us demonstrate after what manner each of them must be performed.

When you have a mind to depress, or force down, a young branch from its mother into the earth, make a trench of four feet every way, so that the layer may not be hurt by the other's roots. Then leave four eyes, which may reach to the bottom of the trench, that out of them the roots may spring; pare away the eyes of the other part that adjoins to the mother, that it may not procreate superfluous and useless sprays: but, as to that part which is next to the ground, and is not next to the mother, you must not suffer it to have more than two, or, at most, three eyes, which ought to appear above-ground. See that you pare away the rest, which are hid underground, except the four lowermost, lest the vine put forth roots upon the surface of the ground. A vine, propagated after this manner, will quickly strike root, and grow strong; and the third year it must be severed from its mother.

But, if you have a mind to lay the vine itself flat, dig very cautiously hard by its roots, so as you may not hurt the same; and supplant the vine, so as you may not break it off from the root. When you have laid it flat at its full length, and shall see how far it can reach, you shall make one furrow, into which you may let down the whole vine: then, from that furrow, you shall make, as it were, branches of trenches, by which the vine may be propagated, as each of its young branches shall require; and so you shall cover them all over with earth.

But, if the vine has but very little firm-wood, and is to be divided and carried into different rows, and cannot otherwise reach to the
props

props to which it is carried, but by spreading and dividing it, you must take care that you cleave it, with the sharpest bill you can find, in that part where it is forked; and with the same iron mend the cut, if it shall seem any where to be unequally cloven: being thus divided, it may be distributed into several rows.

Also that way of propagating vines, which we have found out, is not unprofitable: If at any time a vine be wanting in a row, and the young branch, which is laid in the bottom of the trench, is not so long, as that it can be wreathed back again, and raised up above the ground, be not at all concerned at its shortness; but depress any young branch whatsoever, whose top reaches to the bottom of the trench; and cover it over with earth: then preserve, and set apart for growth, the eyes which are next to the mother herself, that they may put forth firm-wood-branches from the upper part. Then, at length, after the space of three years, ampute it, and reduce that part, which you have cut off from its mother, to its own prop, and make it the head of the vine: fill up, by little and little, the trench where the layer is, but not in less than three years time: cut away the uppermost roots, and dig it frequently.

C H A P. VIII.

Of Ingraftments from Fruit-bearing Vines, in order to make Vines fruitful.

WHEN you have a mind to ingraft a vine, cut off from their mother fruit-bearing sprays of the best kind, at the time when they begin to bud, and when the wind is South. Let the spray, which you use as a graff, be taken from the top of the vine, and let it be round, with good and frequent knots: then leave three of the soundest knots; below the third eye pare, with a sharp knife, the space of two inches, very thin on both sides, after the manner of a wedge, so as you may not hurt the pith: then cut the vine which you design to ingraft, and smooth the cut, and so cleave it; and put the cyons, which you have prepared, into the cleft, as far as they are pared, so that the bark of the graff may touch the bark of the vine equally. Whatever you have ingrafted, bind it carefully with a willow, or the bark of an elm; and daub it over with well-wrought clay mixed with straw, and cover the cut, and wrap it up, and bind it so close,
that

that neither wind nor water may be able to enter ; then put moss over the clay, and so bind it again : this thing affords it moisture, and does not suffer it to grow dry, and wither. Below the ingraftment and the binding, wound the vine slightly, on both sides, with a sharp bill, that the moisture may rather flow out of these wounds, than out of the ingraftment itself ; for too much moisture is hurtful, and does not suffer the cyons, that are ingrafted into the stock, to take hold of it.

Some of the antients thought proper to bore the vine, and so put the cyons into it, after they had pared them slightly : but we have done this same thing after a better manner. For, the antiënt augre makes a powder like saw-dust, and, by reason of this, burns that part which it perforates ; but the burnt part very rarely takes hold of, and unites with the cyons, that are ingrafted into it. We, on the contrary, have adapted, to this sort of grafting, that which we call the *Gallican* wimble : this makes an hole, but does not burn, because it does not make, as it were, a saw-dust, but shavings or parings : therefore, when we have cleansed the hole which we have bored, we ingraft into it the cyons which are pared on all sides, and so daub it all round : such an ingraftment unites and takes hold very easily ; therefore see that you have the ingraftment of your vines finished about the time of the Equinox. Ingraft your moist places from the white grape, and the dry from the black.

Make your unfruitful vines fruitful after this manner : Water vines, which yield very little fruit, with sharp vinegar mixed with ashes, and daub the stock itself with the same ashes. But, if any of your vines do not bring to maturity the fruit which they make a shew of, but wither and dry up before the grapes grow mellow and ripe, you may cure them, and set them to rights after this manner : When the berries upon the grape-stalks are come to their natural bigness, cut down the vine to the very root, and daub the cut with earth, mixed throughly with an equal quantity of sharp vinegar, and old urine, and water their roots with the same ; and dig them frequently. These things make them quickly put forth firm-wood-branches, and convey juice to the grapes.

C H A P. IX.

How a Cluster of Grapes may have Berries of several Kinds.

TH E R E is also a kind of ingraftment, which produces such clusters of grapes, wherein there are found berries of different kinds and colours; and this is effected in such a manner as this: Take four or five, or more rods, if you have a mind, of different kinds; and, after you have carefully compacted them, so as to be equal to each other, bind them all together; then insert them very close into an earthen tube, or into an horn, so as they may stand out a little at both ends, and loosen and open those parts which shall stand out; then put them into a trench, and cover them all over with well-dunged earth, and water them till they put forth buds. When the rods shall have cohered with one another, and now, after the space of two or three years, have formed an unity, or are united into one, you shall break the small tube, and cut the vine with a saw, almost about the middle of the stock, where they shall appear to have united themselves most with one another, and grown the closest together; and smooth the cut, and heap up small earth about it, so that it may cover the wound three inches deep: when, out of this stock, it shall have put forth shoots, set apart for growth the two best, pull off the rest: so such grapes will be produced, as we proposed.

But, that grapes may be produced without grape-stones, cut a shoot of a vine so, as the eyes upon it may not be hurt, and scrape out all the pith; then afterwards put the parts exactly together again, as they were before, and bind them together, so as you may not bruise the eyes; and so set it in dunged earth, and water it: after it has begun to put forth shoots, dig it frequently over and over again, and very deep. When the vine is come to full age, it will produce such grapes without grape-stones.

C H A P. X.

How you may prune the Vines after you have gathered the Grapes.

WHEN you have finished the vintage, begin presently to prune with the very best and sharpest iron-tools; so the cuts will be made smooth: nor will the water be able to remain, and rest in the vine, which, as soon as it stops, and abides long upon it, spoils and rots the vine, and breeds worms, and other animals, which gnaw and consume the wood: but make the cuts round; for they the more quickly form a cicatrice. The sprays that are broad, old, ill-shaped, ugly, and crooked, cut all these clean away; such sprays as are young, and bear fruit, and sometimes their offspring, which you shall think fit for your purpose, set them apart for growth, if the uppermost part of the vine is not now in a very strong and thriving condition; and preserve the arms of the vine: finish the pruning as quickly as possibly you can. Such sprays as are dry and old, which cannot be amputated with the pruning-hook, pare away with a sharp chip-ax.

Prune a weak vineyard, in lean and dry land, immediately after the Winter-solstice; and what part you shall not have pruned, return to it again about the first of *February*: it is not proper, that a vine or a tree be touched with an iron-tool, from the 13th of *December* to the 13th of *January*. When you prune a vine, make the cut between two eyes; for, if you cut it hard by the eye itself, it will receive injury, and will not put forth any firm-wood. But let the cicatrice always look downward: so it will not receive any hurt, either from the water, or from the Sun; and it will receive the moisture rightly. In fat land, and in a strong well-thriving vineyard, leave more eyes and fruit-bearing shoots; in that which is poor, leave fewer. Where-ever you shall find an arm wanting in a vine, wound it once or twice in that place, about the depth of one inch, with the point of a sharp bill. Beware you do not take away the whole arm, altho' it be long, except it be all withered and dried up.

See that you have your new vineyard ablaqueated before the Winter-solstice, that it may receive all the showers, and the slime: the sooner you ablaqueate vines and trees, the stronger they will be, and the better will they thrive. But all such vines and trees, as are planted on the sides of hills, and rising grounds, must be so ablaqueated, that the little ditches may be made towards the uppermost part, hard by

the stock; but that, on the lower part, small banks be raised higher than these, that they may contain the more water and slime.

An old vineyard must neither be ablaqueated, lest the roots, which it has towards the surface of the ground, wither and dry up; nor plowed, lest the roots of the vines be torn up, and broken off. Dig it often, and equally, with hoes, and dig it deep; and, before the Winter-solstice, strew the ground with dung and chaff; or, when you have ablaqueated only towards the surface all round the vine itself, lay dung upon it.

C H A P. XI.

Of pampinating a Vineyard, or pulling off its superfluous Shoots and Leaves.

IT is as profitable to pampinate a vineyard carefully, as to prune it well; for the firm-wood-branches, which have fruit upon them, both gather strength, and thrive the better, and the pruning of the following year is done more expeditiously, and the vine also becomes not so full of scars; because, when that which is green and tender is plucked off the vine, it forthwith recovers, and the part grows whole again: besides these things, the grapes also ripen the better. See that you have your vineyard pampinated ten days before it begins to blossom: take away whatever superfluous thing is sprung out of it; pluck off whatever is grown out of the top or arms of the vine, provided it has no fruit upon it: cut off the tops of the young branches or rods, lest they become luxuriant: cover the grapes, that shall look towards the South, or the West, with their own peculiar twigs and leaves, that they may not be scorched and burnt up with the heat.

C H A P. XII.

Of digging of Vineyards.

AS soon as the cluster of grapes shall begin to be of different colours, dig the third digging; and now, when it shall have begun to ripen, dig before noon, before it shall begin to grow hot, and in the afternoon, when the heat is over; and raise the dust: this thing very much preserves and defends the grapes, both from the Sun, and from fogs. You must neither plow nor dig clayey ground, because

it

it grows exceeding hard, and cleaves when it is plowed or digged. It is more advantageous to turn up the ground with hoes, than with a plough; the hoe turns up all the ground equally: for besides that, the plough makes baulks in the ground: the oxen also, which plow, break some parts of the young branches, and sometimes whole vines. But there is no end of digging a vineyard; for by how much the oftener you shall dig it, by so much the greater plenty of fruit you shall find.

C H A P. XIII.

To preserve the Vines from being hurt by Mildew.

IN the spring-time, see that you have heaps of chaff and straw placed among the rows in the vineyard. When you shall feel the cold contrary to what is usual in that season of the year, set all the heaps of chaff and straw on fire: so the smoak will remove the fog, and the mildew.

C H A P. XIV.

To prevent the Ants from climbing up upon the Vines.

BRUISE lupins, and mix them with the mash of pressed olives, and therewith daub all round the lower-part of the vine: or boil bitumen with oil; with this also touch the lower-part of the vine, the ants will not pass over it.

C H A P. XV.

How to prevent Rats and Vine-fretters from vexing the Vine.

VINES which are contiguous to buildings, are infested by rats and mice. To prevent this, we must observe, when the Moon is full, and when she is in the sign of the Lion, or of the Scorpion, or of the Archer, or of the Bull; and we must prune them in the night-time with Moon-light. There is a kind of animal, which is called a *vine-fretter*; this commonly gnaws the sprigs and leaves, while they are yet young and tender: to prevent which, after you have finished the pruning, anoint the pruning-hooks, with which you

have pruned the vineyard, with the blood of a bear; or, if you have a beaver's skin, as often as you shall whet the pruning-hook, during the time you are pruning them, wipe the edge of it with this skin, and so begin to prune. Seeing we have spoken abundantly of vines, let us now give directions concerning plantations of trees for supporting them.

C H A P. XVI.

Of Plantations of Trees for supporting Vines.

THE poplar-tree especially nourishes the vine, next to this the elm-tree, and then the ash-tree. The poplar-tree is rejected by most people, because it has not a leaf proper for it: but that which Rustics call the *Atinian* elm is the noblest, and thrives the best, and has great plenty of leaves. This must be chiefly planted in fat lands, or even in such as are indifferent: but, if rugged and thirsty places must be planted with trees, neither the poplar- nor the elm-tree are so fit for this purpose as mountain-ashes: these are the wild-ashes, nevertheless with somewhat broader leaves than the other ash-trees: nor do they yield a worse leaf than elms. Goats indeed, and sheep, seek after this leaf also with greater liking *than any other*. Therefore let them, who have a mind to form a plantation of trees for supporting vines, make trenches four feet every way, a year before they set the trees: then, about the first of *March*, let them set, into the same trench, an elm, and a poplar-tree, or an ash-tree, that, if the elm shall fail, the poplar, or the ash-tree, may supply its place: but, if they both shall live, let one of them be taken out, and planted in another place.

It is proper, that trees, for supporting vines, should be planted at the distance of twenty feet from each other; for thus both the trees themselves, and the vines that are joined to them, will thrive and gather strength the better, and yield better fruit; the corns also, which shall be in the place where the trees are planted, will suffer less injury by their shade. Dig frequently all round the tree which you shall have planted, that it may grow up the more speedily; and see you touch it not with an iron-tool for about the space of three years: at the end of thirty-six months, you shall form it for receiving the vine, and cut off its superfluous branches, leaving every other bough
by

by turns, after the manner of steps or ladders. Every other year * (1). The sixth year, if it shall then appear to be strong enough, you must match it to a vine after this manner: Leave about the space of one foot from the very stock of the tree; then having made a furrow four feet long, and three deep, and two feet and an half broad, you must suffer it, for two months at least, to be beaten with the storms; then at length, about the first of *March*, take up a vine out of the nursery, not less than ten feet long; and prop it, and join it to the tree: do not prune it the next year; but the third year reduce it to one young branch or rod; and leave a few eyes upon it, that it may not creep to a great height, before it grow strong: then, after it has had a large growth, distribute and range all its firm-wood-branches over all the stories of the tree; so nevertheless, as you may not burden the vine, but set apart for bearing fruit such shoots as you may depend upon never fail, and are the strongest.

You must be as careful to bind as to prune an arbutive- or arbour-vine; for in this the strength of the fruit principally consists; and a vine, which is tied to the tree with fast bindings, and in proper places, holds out more years, and lives longer: therefore it is proper, that somebody should follow after the pruning, and observe that the bindings be renewed, and the vine ranged and placed in due order, upon proper branches.

C H A P. XVII.

Of Olive-yards.

THE olive-tree rejoices most in dry hills, that are full of white clay; but, in moist and fat fields, it produces great plenty of boughs and leaves without fruit: but an olive-yard is better formed from truncions than from plants. But *Mago* was of opinion, that the olive-tree should be planted in dry places, either immediately after the Equinox, or before the Winter-solstice. The Husbandmen of our age keep to the spring of the year, for the most part, about the first

(1) *Alternis annis* *. After these words there seems something to be wanting in this sentence: no doubt, the author directed something to be done every other year; and if we look to the fifth book, *cap. 6.* when treating of the same thing, he says, that whatever leaves shall spring out of it, ought, every other year, either to be cut away with a knife, or bound up to the tree, or pulled off.

of *May* (1). But the trench for an olive-tree must be four feet wide every way; and you must throw stones and gravel into the bottom of the trench, and then throw in earth four inches deep upon them, and then set the little tree so straight and upright into it, that that part of it which stands out of, and appears above the trench, may be exactly in the middle. But you must carefully defend the little tree from storms by propping it, and mixing dung with the earth which is replaced in the trench. It is proper, that olive-trees be planted at the distance of sixty feet from each other, that they may have room to grow and extend themselves in breadth; for such of them as shoot up in height, decay, and come to nothing presently, and bear little fruit.

The *Licinian* olive is the best, the *Pausian* is the second for oil, and the *Orchis* for food: there are also the royal, and the shuttle-like olives, which neither for oil, nor for their beautiful appearance, are so acceptable as those I first mentioned. If you plant an olive-tree in the place from whence you have digged up an oak, it will die; because there are certain worms, which breed, and are brought up, in the root of the oak; and these especially consume the olive-plants. If, in an olive-tree, one branch thrives somewhat better than the rest, unless you cut it off, the whole tree will wither, and dry up. It is convenient to mark all the little trees with oker, before they be transplanted, that, when they are planted, they may look to the same parts of the heavens, which they also looked to when they were in the nursery; otherwise they will suffer, either by the cold, or the heat, in those parts, which they shall have exposed in a different place and situation, contrary to what they have been accustomed to.

C H A P. XVIII.

Of constituting an Orchard.

BEFORE you constitute and form an orchard, inclose, with a wall, or a ditch, as great an extent of ground as you shall have a mind to make use of for that purpose, so that there may be no passage, not only for cattle, but even not for a Man, except by the door, till the plants grow up; for if the tops of them be either broken with the hand, or the cattle browse them, they are spoiled for ever.

(1) *Calendas Maias*. *Pontedera* observes here very justly, that the true reading seems to be *Calendas Martias*; for *Palladius* directs to plant olive-yards in the month of *February*, in temperate places: and *Columella* himself clearly enough expresses the same thing, *lib. v. cap. 9. viz.* that, in rich and moist land, olives ought to be planted in the spring of the year, before they begin to bud, which they do long before the month of *May*.

But it turns to better account, to dispose the trees according to their several kinds; especially, that the weak may not be oppressed by the stronger, which are neither equal to them in strength, nor in bigness, nor grow up equally. The earth that is fit for vines, is also good for trees.

C H A P. XIX.

Of making Trenches.

DIG the trenches one year before you intend to plant your orchards: so they will be macerated with the Sun and the rain; and what you shall set in them will soon strike root. But, if you have a mind to set your plants also the same year you make the trenches, dig the trenches at least two months before; afterwards fill them with straw, and set them on fire. The broader and the more open you make the trenches, the better, and the greater plenty of fruit you shall have. The trench ought to be like a small moveable oven, the lower-part wider than the upper, that the roots may spread and extend themselves the wider; and that they may admit, through the narrow mouth of the earth, less cold in Winter, and less heat in Summer: as also the earth, that is gathered together into them in steep places in rising grounds, is not washed away with the rains. Plant the trees very thin, at considerable distances from each other, that, when they grow up, they may have room where they may extend their branches; for if you set them thick, you can neither sow any thing under them, nor even so will they themselves be fruitful, unless you cut off some of the intermediate branches: therefore I am of opinion, that forty feet, and, at least, thirty, be left between the rows.

C H A P. XX.

How you may choose the Plants for an Orchard.

CHOOSE and gather plants that are not less thick than the helve of an hoe, straight, smooth, tall, without botches or gashes, and with intire sound bark; these strike root well, and very quickly. If you take the plants off trees, take them chiefly from those which bear good fruit every year, and in great plenty: but you must observe to pluck the same off the shoulders of the trees that are opposite to the

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the Sun-rising. If you set a plant with the root, it will have an equal growth with the other trees which you set after you have ingrafted them; but an ingrafted tree is more fruitful than that which is not ingrafted, that is, than that which is set in branches or plants *before they are ingrafted* (1).

Before you transplant the little trees, mark them with oker, or any other thing you please, that you may place them exposed to the same winds, to which they stood exposed before: and take care that you transplant them from an higher, drier, and poorer land, into that which is lower and flatter, moister and fatter. Set such plants especially as are three-forked; let them stand out and appear three feet above the earth. If you have a mind to set two or three little trees in the same trench, take care that they do not touch one another; for so they are consumed and killed by the worms. When you set the plants, put down, on the right and left of each of them, into the very bottom of the trench, bundles of sprays, of the thickness of a Man's arm, so as they may appear and stand out a little above the earth, by which you may, with very little labour, convey water in Summer to their roots. Plant trees, or plants with roots, in Autumn, about the 15th of *October*: set cuttings and branches in the Spring, before the trees begin to bud. But, lest the moth be troublesome to fig-tree-plants, cover with earth, in the bottom of the trench, a cutting of the mastich-tree, so that the top of it may look downward.

C H A P. XXI.

When the Fig-tree must be planted.

PLANT not the fig-tree during the colds; it loves places exposed to the Sun, and such as abound in pebbles, gravel, and sometimes rocky ground: it soon takes root and grows up in this kind of land, if you make the trenches large and fit for them. The several kinds of fig-trees, altho' they differ in the taste, shape, and quality of their fruit, yet they are planted after one and the same manner, but in lands of a different quality. In places that are cold, and that are watery during the Autumn, plant the early-ripe fig-trees, that you may gather their fruit before the rains begin: in warm places plant

(1) *Si cum radice plantam posueris*: this sentence does not seem very plain; but, if it is not corrupted, the meaning of it seems to be, That the plant of a fruit-tree, set with a root, will grow equally well with such as have been ingrafted before they were set in the orchard; but they will not be equally fruitful.

Winter-figs. But, if you have a mind to make a fig-tree to be late in ripening, which is not naturally late, when the unripe figs are very small, shake the fruit off the tree; it will again produce a second fruit, and will defer to bring it to maturity till the Winter is far advanced. Sometimes also it is an advantage, when the trees have begun to put forth their leaves, to cut off the uppermost tops of the fig-tree with a very sharp iron-tool; so the trees will both be firmer, and bear more fruit. It will always be of great advantage, as soon as the fig-tree shall begin to put forth her leaves, to dilute oker with the lees of oil, and to pour it, with human dung, to the root of it: this thing makes greater plenty of fruit, and makes the fig plumper and fuller, and of a more beautiful appearance.

C H A P. XXII.

Of planting Nuts.

ABOUT the time that the Star *Arcturus* riseth, or about the first of *February*, plant the almond, which begins to bud the first of any: it requires warm, hard, and dry land; for if you set this kind of nut in places of a different nature, it will presently rot. Before you set the nut, steep it in water and honey sodden together, but not too sweet: so it will yield fruit of a sweeter taste when it is grown up; and, in the mean time, it will grow the better, and the more speedily. Place three nuts in a triangle, and let the sharper part of the nut be undermost, because from thence it puts forth its roots; and let one nut be, at least, an hand-breadth distant from the other; and let it incline somewhat towards the West. Every nut puts forth one root, and creeps forth with a single stalk; when the root comes to the bottom of the trench, being checked by the hardness of the ground, it is bended back again; and, extending itself, sends forth other roots after the manner of branches.

You may make an almond and a filbert become a *Tarentinian* nut, after this manner: In the trench wherein you design to plant the nut, place small earth, about half a foot deep, and there set a shoot of fennel-giant; when the fennel-giant is grown up, cleave it, and hide the almond, or the filbert, without a shell in the pith of the same, and cover it over with earth: do this before the first of *March*, or between the seventh and the fifteenth of *March*. You may plant the walnut, the pine-apple, and the chefnut, at this same time.

C H A P. XXIII.

Of planting the Pomegranate.

THE pomegranate is rightly planted in the Spring, always till the first of *April*; and, if it shall bring forth acid fruit, or not so sweet as you would have it, you shall cure and make it better in this manner: Moisten the roots of it with stale human urine, human dung, and hogs dung. This thing will both make the tree fertile, and, for the first years, makes the fruit have a winy taste and flavour; and afterwards makes it sweet also, and tender, and without any woody substance in it. We have mixed a very little *Cyrenian* lafer with wine, and so have anointed the uppermost tops of the tree with it: this thing corrected the tartness of the apples. If you place three stones at the very root of the tree when you plant it, they will be a remedy to prevent the apples from bursting upon the tree. But if you have a tree that is already planted, sow squills at the root of the tree. You may prevent this another way: When the apples are already ripe, before they burst, twist the stalks on which they hang; by this method you may also keep them the whole year.

C H A P. XXIV.

Of the Pear-tree.

PLANT pear-trees in Autumn, before the middle of Winter, so that there may remain at least twenty-five days to the Winter-solstice; and, that they may be fertile, ablaqueate them very deep, when they are already grown up to their full growth, and cleave the trunk hard by the very root, and into the cleft drive a wedge, made of the heart of pine-wood, and there leave it; then, after you have filled up the ablaqueation, scatter ashes upon the earth.

C H A P. XXV.

Of planting Apples.

PLANT Summer-apples, quinces, service-apples, plums, after the middle of Winter till the 13th of *February*. You will be in the right to plant the mulberry, from the 13th of *February* till the
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vernal Equinox. Plant the carob, which some call *κεράτιον*, and then the peach, before the middle of Winter, during the time of Autumn. If almond-trees bear but very little fruit, bore the tree, and drive a stone through it, and so let the bark of the tree grow over it. But it is proper, about the first of *March*, to place, in a regular manner, branches of all those kinds in your orchards, all in beds raised in the different quarters thereof, where the earth is both well manured and dunged; then, when they are grown up, care must be taken, that, while their little branches are tender and young, they be, as it were, pampinated; and let the plants be reduced to one stem the first year; and, when the Autumn comes on, it will be expedient to pluck off all their leaves, before the cold nips and dries up their tops; and so put, as it were, bonnets upon them, with thick reeds, which have their knots intire at one end; and so defend the rods, that are yet young and tender, from the cold, and the frosts: then, after the twenty-fourth month, whether you shall have a mind to transplant them, and set them regularly in rows, or whether you design to ingraft them, you may do either the one or the other safely enough.

C H A P. XXVI.

Of ingrafting Trees.

EVERY kind of cyon may be ingrafted into every kind of tree, if it is not unlike, in its bark, to that into which it is ingrafted: but, if it brings forth fruit also at the same time, it may be ingrafted very safely, without any scruple. The antients have taught us three kinds of ingraftments: one, which, after the tree is cut and cloven, receives the cyons which are inserted into it; a second, which, after the tree is cut, admits the graffs between the bark and the wood; both which kinds are proper for the Spring season: the third, which Husbandmen call *emplastration*, receives the buds themselves, with a little bark, into a part of itself, from which the bark is pulled off; this kind is proper for the Summer. When we come to explain the method of performing these ingraftments, we shall also teach you another invented by us.

Ingraft all trees as soon as they shall begin to put forth their buds, when the Moon is increasing; but ingraft the olive-tree about the vernal Equinox, till the 13th of *April*. Whatever tree you have a

mind to ingraft from, and from which you are about to take cyons for ingrafting, see that it be young and fruitful, and with frequent knots and joints; and, when the buds shall first swell; choose them from off small branches of one year old, which shall look to the Sun-rising, and are sound: let the grafts be forked, and of the thickness of the little finger. Cut the tree you shall have a mind to ingraft very carefully, with a saw, in that part which is fairest and smoothest, and without any scar; and you must take care, that you hurt not the bark: then, when you shall have cut the stock, smooth the cut with a sharp iron-tool; then put an iron- or ivory-wedge down between the bark and the wood three inches at least; but do it very gently, lest you hurt or break the bark: afterwards pare the cyons, which you design to ingraft, on one side, with a sharp pruning-hook, as low as you have put down the wedge; but so as you may not hurt the pith, nor the bark, on the other side of it: when you have prepared the cyons, pull out the wedge, and presently put down the grafts into those holes, which are made by the wedge driven in between the bark and the wood. But put down the grafts by that end where you have pared them, so that they may stand out six inches from the tree: but fasten two or three small branches in one tree, provided there be no less a space than of four inches between them: do these things according to the bigness of the tree, and the goodness of the bark. When you have put down all the cyons which the tree will suffer, bind up the tree fast with the bark of an elm- or a willow-tree: afterward daub all the wound over with well-wrought clay mixed with straw, and fill up the space which is between the cyons so far, that the grafts may stand out two inches: put moss over the clay, and bind it so fast to it, that it may not be wasted and consumed by the rain.

If you have a mind to ingraft a very small tree, cut it off near to the earth, so that it may stand one foot and an half out of the ground: then, when you have made the amputation, smooth the wound carefully, and cleave the middle of the stock a little way, with a sharp bill or paring-knife, so that there may be a cleft of three inches; then thrust a wedge into it, as far as it will bear it; and put down cyons into it, pared on both sides, so as you may make the bark of the graft even with the bark of the tree. When you have carefully fitted the cyons, pull out the wedge; then bind up the tree, as I said above, and daub it; then heap up the earth about the tree, as high as the graft itself: this thing will very much defend it from the wind and the heat.

The third kind of ingraftment, since it is very nice and delicate, is not proper for every kind of tree; and, for the most part, those trees admit of such an ingraftment, which have a moist, juicy, and strong bark, as the fig-tree; for it both yields great plenty of milk, and has a strong bark; therefore it admits exceeding well of being ingrafted in such a manner. From whatever tree you design to take the grafts, in it seek out for the young, fair, and smooth branches; then, in these, observe the eye which shall have a godly appearance, and a certain hope of producing a bud: mark it all round two inches square; that the eye may be in the middle, and so make an incision round it with a sharp penknife; and take off the bark carefully, that you may not hurt the eye: then, into whatever tree you have a mind to ingraft it, choose the fairest and the smoothest branch of the same; and make a round incision in the bark of the same bigness, and unbark the wood; and, into that part which you have laid bare, fit, and join exactly, that eye which you have taken from the other tree, so that the scutcheon may agree to; and fit the part where you have made the roundest incision. When you have done these things, bind it well all round, so as you may not hurt it; then daub the joinings and the bands with clay, leaving a space by which the eye may freely put forth its bud. If the tree you have grafted have any shoots or upper branches, cut all away, that there may be nothing whereby the juice may be diverted and withdrawn, or to which it may be more serviceable, than to the graft itself; after one-and-twenty days unbind the scutcheon: the olive-tree succeeds very well with this kind of ingraftment. We have already taught you that fourth kind of ingraftment, when we treated of vines; therefore it is superfluous to repeat, in this place, the method of terebration, which we have already described.

C H A P. XXVII.

That Cyons of all Kinds may be grafted upon all Sorts of Trees whatsoever.

BUT seeing the antients denied, that all kinds of cyons might be grafted upon any tree whatsoever, and established, as it were, into a certain law that limitation and determination of this matter, which we made use of a little before, *viz.* That those cyons only could coalesce, which in their bark, and rind, and fruit, are like to those

those trees upon which they are grafted, we thought it necessary to inquire into, and confute this erroneous opinion, and to deliver to posterity a method, whereby all kinds of cyons may be grafted upon all sorts of trees whatsoever. And, that we may not weary our readers with too long a discourse, we shall subjoin one example, as it were, by following which, every body may graff any kind of cyon they please upon all sorts of trees.

Dig a trench, of four feet every way, at such a distance from an olive-tree, that the utmost branches of the olive-tree may reach to it; then set in the trench a young small fig-tree, and take great care, that it may grow strong, and smooth, and be of a goodly appearance. After the space of three or five years, when it has had a large-enough growth, bend down that branch of the olive-tree that shall appear to be the goodliest and the smoothest of any, and bind it to the stock of the fig-tree; and so, having cut away the rest of the small branches, leave only these tops which you design to graff: then cut the fig-tree, and smooth the wound, and cleave it in the middle with a wedge; then pare the tops of the olive-tree on both sides, as they join to, and grow on their mother, and so fit them exactly to the cleft of the fig-tree; and take out the wedge, and bind them carefully together, that they may not be pulled away by any force whatsoever: so, in the space of three years after this, the fig-tree will coalesce with the olive: and then at length, in the fourth year, when they are well united together, you must cut off the small olive-branches from their mother, as if they were layers. After this manner all kinds of cyons are grafted upon all sorts of trees.

C H A P. XXVIII.

Of the Cythisus, or Shrub-trefoil.

IT is very necessary to have great plenty of *cythisus*, or shrub-trefoil, (which the *Greeks* call ζέα, or καρνικη, or τρυφερή) because it is exceeding useful for hens, bees, sheep, goats also, and all sorts of cattle whatsoever, which grow soon fat with it; and it makes the ewes yield abundance of milk: as also, because you may use this fodder green for eight months, and afterward you may use it dry. Moreover, it quickly takes and grows in any kind of land, tho' exceeding lean; and bears with any ill usage, without sustaining any hurt. Yea, if women are afflicted with scarcity or want of milk, this shrub-trefoil must be dried and steeped in water, when it has

soaked throughly the whole night; the day following, three *heminae* of the juice that is squeezed out of it, must be mixed with a little wine, and so given them to drink: thus they themselves shall enjoy a good state of health, and their children thrive and grow strong with plenty of milk.

But the *cythifus*, or shrub-trefoil, may be sown either in Autumn, about the 15th of *October*, or in the Spring. After you have manured the earth well, make it into quarters or beds, in the manner of a garden; and there sow the seed of your shrub-trefoil in Autumn, as if it were garden-basil-feed: then in the Spring set the plants regularly, that they may be the space of four feet every way, distant one from another. If you have no seed, set the tops of the shrub-trefoil regularly in the Spring: heap up dunged earth about them: if it does not rain soon, water them during the next fifteen days; then, after the space of three years, cut it, and give it to the cattle. Fifteen pound-weight of it, green, is abundantly enough for an horse, and twenty pounds for an ox; and for other cattle, in proportion to their strength [it may also be planted in branches about the month of *September*]. If you give it dry, give a less quantity of it, because it has greater strength; and steep it first in water, and, when you have taken it out, mix it with straw or chaff. Cut down the shrub-trefoil, which you design for dry forage, about the month of *September*, when its seed begins to grow big; then keep it a few hours in the Sun, till it fade; then dry it in the shade, and so lay it up safe.

C H A P. XXIX.

Of the Willow-tree, of Broom, and of the Reed.

PLANT the willow-tree and broom in the Spring, about the first of *March*, when the Moon is in her increase. The willow-tree requires moist places, but broom such as are dry: nevertheless, it is very convenient to sow them both about a vineyard, because they yield bands proper for the young branches of vines. The best way of planting reeds is by setting their roots, which some call *bulbs*, and others call *eyes*. As soon as you have pastinated the ground with the two-foot-deep-spade, having cut the root of the reed with a sharp bill, set it when it is just going to rain. There are some, who lay the intire reeds flat in the ground, because, being thus planted, they put forth reeds from all their joints. But, commonly, this kind produces a reed that

that is slender and low, and which soon decays: therefore that way of planting them, which we first pointed out and explained to you, is the best. But my opinion is, that every year, as soon as you have cut down the reeds, you should dig the place deep and equally, and so water it.

C H A P. XXX.

Of the Violet, and the Rose.

Whoever is about to raise the violet, let him reduce into beds, or borders, ground that is well dunged, and pastinated at least one foot deep; and so let him have his plants, of one year's growth, set in small trenches, of one foot dimension, before the first of *March*. But the seed of the violet is sown, like that of potherbs, in beds, at two different seasons, in the Spring, or in Autumn; and it is cultivated after the same manner as the other potherbs are, that it be weeded, that it be farclod, and that sometimes it be watered also. It is proper that the rose-bush be set at the same time as the violet, either in shrubs, or suckers, or in shoots, or cuttings (1), all along furrows of one foot dimension; but it must be digged every year before the first of *March*, and pruned here-and-there. When cultivated after this manner, it lasts for many years.

(1) *Rosam fruticibus ac surculis*; in the oldest editions we read *fructibus & surculis*: and *Palladius*, speaking of the same thing, has *virgultis & semine*; so that, considering that *Palladius* has always his eye upon *Columella*, it may seem probable, that the true reading here ought to be *fructibus*, which will answer to *semine*, as *surculis* to *virgultis*. But, as *Columella* is not treating here so much of the different ways of propagating the rose-bush, as of the way and manner of setting and disposing it, probably he only means what is expressed in the translation; and there seems no occasion to alter the-text as it now stands.

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OMISSA.

Lib. 5. cap. I. page 207. the title omitted,
viz. *After what manner you ought to measure
the given forms of land.*

Lib. 7. cap. I. page 303. the title omitted,
viz. Chap. I. *Of the small he-afs.*

Page 571. the title omitted, *viz.* Chap. I.
Of a nursery of vines.

ERRATA.

Page 16. Line 42. add *commends him.*

ib. l. 43. read *places.*

130. l. 8. read *kinds.*

137. l. 36. read *whether.*

238. l. 11. add *are.*

253. last line, read *pound-weight.*

292. l. 30. dele *comma* after *and.*

318. l. 3. instead of *for* read *thus.*

339. l. 28. after *word* add *is.*

347. l. 25. dele *s* in *Fowls.*

382. l. 11. for *wherein* read *when.*

Page 382. l. 35. for *those* read *these.*

412. l. 18. for *make* read *made.*

423. l. 25. adde *s* to *vomit.*

506. l. 13. for *make* read *made.*

527. l. 23. for *those* read *these.*

554. l. 6. for *in* read *by.*

572. l. 16. for *county* read *country.*

573. l. 4. for *when* read *where.*

590. last line, add *year.*

597. l. 18. read *round* incision.

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778

