

SILVA OR A DISCOURSE
OF FOREST TREES
BY JOHN EVELYN



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SYLVA: OR A DISCOURSE

OF FOREST TREES & THE

PROPAGATION OF TIMBER

V O L U M E O N E





John Evelyn.
 From the engraving by N. Nanteuil

EVLVA

A COURSE OF FOREST
BY JOHN EVELYN F.R.S.
AN ESSAY ON THE LIFE
WORKS OF THE AUTHOR
JOHN NISBET D. Ec.

PRINT OF THE FOURTH
EDITION IN TWO VOLUMES
VOLUME ONE

PRINTED AND BOUND BY ARTHUR
CLAY AND COMPANY LIMITED
NEW BUILDINGS ADELPHI



Miss Boston
1860

S Y L V A

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TREES: BY JOHN EVELYN F.R.S.
WITH AN ESSAY ON THE LIFE
AND WORKS OF THE AUTHOR
BY JOHN NISBET D.Œc.*

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SYLVIA

ON A DISCOVERY OF THE
TRACES OF THE GREAT
WALL IN THE MOUNTAINS OF THE
AND WORKS OF THE
BY JOHN G. BURTON

A HISTORY OF THE
MOUNTAINS OF THE GREAT
WALL IN THE MOUNTAINS OF THE

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THE HISTORY OF THE
MOUNTAINS OF THE GREAT
WALL IN THE MOUNTAINS OF THE

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INTRODUCTION.

I

*Evelyn & his literary contemporaries Isaac Walton
& Samuel Pepys.*

Among the prose writers of the second half of the seventeenth century John Evelyn holds a very distinguished position. The age of the Restoration and the Revolution is indeed rich in many names that have won for themselves an enduring place in the history of English literature. South, Tillotson, and Barrow among theologians, Newton in mathematical science, Locke and Bentley in philosophy and classical learning, Clarendon and Burnet in history, L'Estrange, Butler, Marvell and Dryden in miscellaneous prose, and Temple as an essayist, have all made their mark by prose writings which will endure for all time. But the names which stand out most prominently in popular estimation as authors of great masterpieces in the prose of this period are certainly those of John Bunyan, John Evelyn, and Izaak Walton. And along with them Samuel Pepys is also well entitled to be ranked as a great contemporary writer, though he was at pains to try and ensure his being permitted to remain free from the publicity of authorship, for such time at least as the curious might allow his Diary to remain hidden in the cipher he employed.

With the great though untrained genius of Bunyan none of these other three celebrated prose authors of this time has anything in common. He stands apart from them in his fervently religious and romantic temperament, in his richness of

representation and ingenuity of analogy, and in his forcible quaintness of style, as completely as he did in social status and in personal surroundings. In complete contrast to the romantic productions of the self-educated tinker of Bedford, the works of Walton and Evelyn were at any rate influenced by, though they can hardly be said to have been moulded upon, the style of the preceding age of old English prose writers ending with Milton. The influence of the latter is, indeed, plainly noticeable both in the diction and in the general sentiment of these two great masters of the pure, nervous English of their period.

It would serve no good purpose to make any attempt here to trace the points of resemblance between the works of Walton and Evelyn, and then to note their differences in style. Each has contributed a masterpiece towards our national literature, and it would be a mere waste of time to make comparisons between their chief productions. This much, however, may be remarked, that the conditions under which each worked were completely different from those surrounding the other. Izaak Walton, the author of many singularly interesting biographies, and of the quaint half-poetical *Compleat Angler or the Contemplative Man's Recreation*, the great classic "Discourse of Fish and Fishing," was a London tradesman, while his equally celebrated contemporary John Evelyn, author of *Sylva, or a Discourse of Forest Trees*, the classic of British Forestry, was a more highly cultured man, who wrote, in the leisure of official duties and amid the surroundings of easy refinement, many useful and tasteful works both in prose and poetry, ranging over a wide variety of subjects. Judging from the number of editions which appeared of their principal works, they were both held in great favour by the reading public, though on the whole the advantage in some respects lay with Evelyn. But during the present century the taste of the public, judged by this same rough and ready, practical standard, has undoubtedly awarded the prize of popularity to Izaak Walton.

So far as the circumstances of their early life were concerned there was greater similarity between Walton and Pepys, than between either of them and Evelyn. Born in the lower middle class, the son of a tailor in London, and himself

afterwards a member of the Clothworkers' guild, Pepys was a true Londoner. His tastes were centred entirely in the town, and his pleasures were never sought either among woods or green fields, or by the banks of trout streams and rivers. His thoughts seem often tainted with the fumes of the wine-bowl and the reek of the tavern ; and even when he swore off drink, as he frequently did, he soon relapsed into his customary habits. Educated in London and then at Cambridge, where his love of a too flowing bowl already got him into trouble more than once, he was imprudent enough to incur the responsibilities of matrimony at the early age of twenty-three, with a beautiful girl only fifteen years old. Trouble soon stared this rash and improvident young couple in the face, but they were spared the pangs of permanent poverty through the aid and influence of Sir Edward Montagu, afterwards Earl of Sandwich, who was a distant relative of Pepys. Acting probably as Montagu's secretary for some time, he was first appointed to a clerkship in the Army pay office, and then soon afterwards became clerk of the Acts of the Navy. Later on, like Evelyn, he held various more important posts under the Crown, as well as being greatly distinguished by promotion to non-official positions of the highest honour. His official career was a very brilliant one, and deservedly so from the integrity of his work, from his application, despite frequent immoderation in partaking of wine, and from his business-like methods of work. As Commissioner for the Affairs of Tangier and Treasurer, he visited Tangier officially. He twice became Secretary to the Admiralty, and was twice elected to represent Harwich in Parliament, after having previously sat for Castle Rising. He was also twice chosen as Master of the Trinity House, and was twice committed to prison, once on a charge of high treason, and the other time (1690) on the charge of being affected to King James II., upon whose flight from England Pepys had laid down his office and withdrawn himself into retirement. Elected a Fellow of the Royal Society in 1665, he attained the distinction of being its President in 1684. He was Master of the Clothworkers' Company, Treasurer and Vice-President of Christ's Hospital, and one of the Barons of the Cinque Ports. In 1699, four

years before he succumbed to a long and painful disease borne with fortitude under the depression of reduced circumstances, he received the freedom of the City of London, principally for his services in connection with Christ's Hospital.

From the hasty sketch drafted in the above outlines, it will be seen that throughout all Pepys' manhood the circumstances of his daily life and environment were much more similar to those of Evelyn than to those of Walton, who may well be ranked as their senior by almost one generation. Like Evelyn, Izaak Walton was rather the child of the country than a boy of the town. Born in Stafford in 1593, he only came to settle in London after he had attained early manhood. Thus, though a citizen exposing his linen drapery and mens' millinery for sale first in the Gresham Exchange on the Cornhill, then in Fleet Street, and latterly in Chancery Lane, the Bond Street of that time, he ever cherished a longing for more rural surroundings and a desire to exchange life in the city for residence in a smaller provincial town. On the civil war breaking out in Charles the 1st's time, he retired from business and went to live near his birth place, Stafford, where he had previously bought some land. Here the last forty years of his long life were spent in ease and recreation. When not angling or visiting friends, mostly brethren of the angle, he engaged in the light literary work of compiling biographies and in collecting material for the enrichment of his *Compleat Angler*. Published in 1653, this ran through five editions in 23 years, besides a reprint in 1664 of the third edition (1661).

In spite of the many similarities between Evelyn and Pepys as to university education, official position, political partisanship, and social and scientific status in London, there are yet such essential differences between what has been bequeathed to us by these two friends that comparison between them is almost impossible. They are both authors: but it was by chance rather than by design that Pepys ultimately acquired repute as an author, whereas Evelyn at once achieved the literary fame he desired and wrote for. Neither of the two works published by Pepys, *The Portugal History* (1677) and the *Memories of the Royal Navy* (1690), procured

for him the gratification of revising them for a second edition, and it is indeed open to question if the *Diary* upon which his undying fame rests was ever intended by him to be published after his death. This is a point that is never likely to be settled satisfactorily. The fact of its having been written in cipher looks as if it had been compiled solely for private amusement, and not with any intention of posthumous publication; and this view is greatly strengthened by the unblushing and complete manner in which he lays aside the mask of outward propriety and records his too frequent quaffing of the wine-cup, his household bickerings, his improprieties with fair women, and his graver conjugal infidelities. The improprieties of other persons, and especially those of higher social rank than himself, might very intelligibly have been written in cipher intended to have been transcribed and printed after his death; but it would be at variance with human nature to believe that he could so unreservedly have reduced to writing all the faults and follies of his life had even posthumous publication of his *Diary* been contemplated by him at the time of writing it. For it is hardly capable of argument that, next to the instincts of self-preservation and of the maintenance of family ties, the desire to preserve outward appearances is undoubtedly one of the strongest of human feelings; and this great natural law, often the last remnant or the substitute of conscience, character, and self-respect, is even more fully operative in a highly civilised than in a savage or a semi-savage state of society. Of a truth, every human being is more or less of a Pharisee with regard to certain conventionalities of life. Complete disregard for the maintenance of some sort of standard of outward appearances is the absolute vanishing point of self-respect. Till that has been reached by any individual the hope of his reformation is not lost, though at the same time successful dissimulation makes the prospect of a turning point in a vicious career but remote. Still, "it is a long lane that has no turning." It is therefore most probable that the leaving behind of the key to the cipher was rather due to inadvertence than to intention and design. And if this view be correct, then Pepys' charming *Diary* was the purely natural outpouring of his mind without

ever a thought being bestowed on authorship and ultimate publication.

With Evelyn's *Diary*, however, it was different. Although it was not published until 1818, and though it may never have been intended by its writer to have been given to the world in book form, yet it was very clearly intended to be an autobiographical legacy to his family. Hence it is no mere outpouring of the spirit upon pages meant only for the subsequent perusal of him who thus rendered in indelible characters his passing thoughts of the moment. And this being the case, comparison between the two Diaries would be just as unfair as it is unnecessary. The one is the fruit of unrestrained freedom and a mirthful mind, while the other is the product of cultured leisure and a refined literary method. When Evelyn was Commissioner for the maintenance of the Dutch prisoners (1664-70) he had frequent communications with Pepys, then of the Navy, and there are special references to him in Evelyn's memoirs. That an intimate friendship existed there is no doubt, and that they each held the other in great respect as a man of intellect, as well as of good business capacity, is equally clear. Thus, in June, 1669, he encouraged Pepys to be operated on 'when exceedingly afflicted with the stone;' and on 19 February, 1671, 'This day din'd with me Mr. Surveyor, Dr. Christopher Wren, and Mr. Pepys, Cleark of the Acts, two extraordinary ingenious and knowing persons, and other friends. I carried them to see the piece of carving which I had recommended to the King.' This was a masterpiece of Grinling Gibbon's work, which Charles admired but did not purchase; so Gibbon not long after sold it for £80, though 'well worth £100, without the frame, to Sir George Viner.' Evelyn at this time got Wren, however, to promise faithfully to employ Gibbon to do the choir carving in the new St. Paul's Cathedral.

Each of their Diaries teems with reference to the other. Pepys asked Evelyn to sit to Kneller for his portrait which he desired for 'reasons I had (founded upon gratitude, affection, and esteeme) to covet that in effigie which I most truly value in the original.' This refers to the well-known portrait, now at Wotton, that has been copied and engraved.

It appears to have been begun in October, 1685, but it was not till July, 1689, that the commission was actually completed. The portrait exhibits the face of an elderly man distinctly of a high-strung and nervous temperament, though not quite to the extent of being 'sicklied oer with the pale caste of thought.' His right hand, too, which grasps his *Sylva* is one very characteristic of the nervous disposition. A bright, shrewd intellect, lofty thoughts, high motives, good resolves, and—last, tho' by no means least—a serene mind, the *mens conscia recti* which Pepys bluntly called 'a little conceitedness,' are all stamped upon his well-marked and not unshapely features. It is eminently the face of a philosopher, an enthusiast, a studious scholar, and a gentleman.

No one can ever know Evelyn so well as Pepys did ; and here is his opinion of John Evelyn, expressed in the secret pages of his cipher Diary on November, 1665 :—'In fine, a most excellent person he is, and must be allowed a little for a little conceitedness ; but he may well be so, being a man so much above others.' And this just exactly bears out the rough general impression conveyed by the perusal of Evelyn's Diary and his other literary works. The long friendship of these two was only terminated by the death of Pepys on 26th May, 1703, not long before Evelyn had himself to depart from this life. 'This day died Mr. Sam. Pepys, a very courtly, industrious and curious person, none in England exceeding him in knowledge of the navy, in which he had passed through all the most considerable offices, Clerk of the Acts and Secretary of the Admiralty, all which he performed with great integrity. When King James II., went out of England, he laid down his office and would serve no more..... He was universally belov'd, hospitable, generous, learned in many things, skilled in music, a very great cherisher of learned men of whom he had the conversation..... Mr. Pepys had been for near 40 yeares so much my particular friend, that Mr. Jackson sent me compleat mourning, desiring me to be one to hold up the pall at his magnificent obsequies, but my indisposition hinder'd me from doing him this last office.'

II

Evelyn's Childhood, Early Education, and Youth.

The essential facts of Evelyn's life, as he himself would have us know them, are set forth at full length in autobiographical form, chronologically arranged in what is always spoken of as his *Diary*, although evidently this was (much of it, at any rate) merely a subsequent personal compilation from an actual diary, kept in imitation of his father, from the age of 11 years onwards and down even to within one month of his death in 1706.

The second son and the fourth child of Richard Evelyn of Wotton in Surrey, and of his wife Eleanor, daughter of John Stansfield 'of an ancient honorable family (though now extinct) in Shropshire,' he was born at Wotton on 31st. October, 1620. His father, 'was of a sanguine complexion, mixed with a dash of choler; his haire inclining to light, which tho' exceeding thick became hoary by the time he was 30 years of age; it was somewhat curled towards the extremity; his beard, which he wore a little picked, as the mode was, of a brownish colour, and so continued to the last, save that it was somewhat mingled with grey haire about his cheekes: which, with his countenance, was cleare, and fresh colour'd, his eyes quick and piercing, an ample forehead, manly aspect; low of stature, but very strong. He was for his life so exact and temperate, that I have heard he had never been surprised by excesse, being ascetic and sparing. His wisdom was greate, and judgment most acute; of solid discourse, affable, humble and in nothing affected; of a thriving, neat, silent and methodical genius; discretely severe, yet liberal on all just occasions to his children, strangers, and servants; a lover of hospitality; of a singular and Christian moderation in all his actions; a Justice of the Peace and of the Quorum; he served his country as High Sheriff for Surrey and Sussex together. He was a studious decliner of honours and titles, being already in that esteem with his country that they could have added little to him besides their burden. He was a person of that rare conver-

sation, that upon frequent recollection, and calling to mind passages of his life and discourse, I could never charge him with the least passion or inadvertence. His estate was esteem'd about £ 4,000 per ann. well wooded and full of timber.' As for his mother, 'She was of proper personage ; of a brown complexion ; her eyes and haire of a lovely black ; of constitution inclyned to a religious melancholy, or pious sadness ; of a rare memory and most exemplary life ; for œconomie and prudence esteemed one of the most conspicuous in her Country. '

Apparently John Evelyn thought he had made a very judicious choice of his father and mother when he wrote 'Thus much in brief touching my parents; nor was it reasonable I should speake lesse to them to whom I owe so much. '

These passages, occurring in the first two pages of his *Diary* serve at once to illustrate a very characteristic feature of Evelyn's mind, and one that is everywhere discernible in his writings. He was a man with a highly cultured and a very well balanced mind, but he was somewhat inclined to exaggerate ; and he certainly had the rather enviable gift of considering everything pertaining to him, or approved or advocated by him, as very superior indeed. All his eggs had two yolks, and all his geese were swans. What he liked, he *loved* ; and what he did not like, he *hated*. There was no golden mean with him ; he was either very optimistic or else intensely pessimistic. Hence, naturally, he gave hard knocks to those who differed from him in opinion, and particularly after the Restoration ; for he was one of the most expressive among King Charles II's courtiers. Direct evidence of this special temperament was characteristic of Evelyn throughout all his life, and was of course particularly noticeable in his writings, as we shall subsequently see. It is therefore only to be expected that he prized his father's little estate of Wotton in Surrey as one of the finest in the kingdom. 'Wotton, the mansion house of my Father, left him by my Grandfather, (now my eldest Brother's), is situated in the most Southern part of the Shire, and though in a valley, yet really upon part of Lyth Hill one of the most eminent in England for the prodigious prospect to be seen from its summit, tho' of few observed. From it may be

discerned 12 or 13 Counties, with part of the Sea on the Coast of Sussex, in a serene day. The house is large and ancient, suitable to those hospitable times, and so sweetly environed with those delicious streams and venerable woods, as in the judgment of Strangers as well as Englishmen it may be compared to one of the most tempting and pleasant Seats in the Nation, and most tempting for a great person and a wanton purse to render it conspicuous. It has rising grounds, meadows, woods, and water in abundance. The distance from London (is) little more than 20 miles, and yet (it is) so securely placed as if it were 100 ; three miles from Dorking, which serves it abundantly with provisions as well of land as sea ; 6 from Guildford, 12 from Kingston. I will say nothing of the ayre, because the praeeminence is universally given to Surrey, the soil being dry and sandy : but I should speak much of the gardens, fountains, and groves that adorne it, were they not as generally knowne to be amongst the most natural, and (till this later and universal luxury of the whole nation, since abounding in such expenses) the most magnificent that England afforded, and which indeed gave one of the first examples to that elegancy since so much in vogue, and followed in the managing of their waters, and other ornaments of that nature. Let me add, the contiguity of five or six Mannors, the patronage of the livings about it, and, what is none of the least advantages, a good neighbourhood. All which conspire to render it fit for the present possessor, my worthy Brother, and his noble lady, whose constant liberality give them title both to the place and the affections of all that know them. Thus, with the poet,

Nescio quâ natale solum dulcedine cunctos
Ducit, et im' emores non sinit esse sui !'

This is a very good specimen of Evelyn's style, for it shews the optimistic quality which, along with refinement and a love of classical quotations, is ever present in his writings. Lythe Hill, from the summit of which the 'prodigious prospect' is so eminently belauded, attains a height of less than a thousand feet above the sea-level.

At the early age of four John Evelyn was initiated into the rudiments of education by one Frier, who taught children at the church porch of Wotton ; but soon after that he was sent to Lewes in Sussex, to be with his grandfather Standsfield, while a plague was raging in London. There he remained, after Standsfield's death in 1627, till 1630, when he was sent to the free school at Southover near Lewes and kept there until he went up to Balliol College, Oxford, as a fellow-commoner in 1637, being then 16 years of age. It was his father's intention to have placed him at Eton 'but I was so terrefied at the report of the severe discipline there that I was sent back to Lewes, which perverseness of mine I have since a thousand times deplored.' In that same year (1637) Evelyn had the misfortune to lose his mother, then only in the 37th year of her age. Having been 'extremely remisse' in his studies at school, he made no great mark during his University career. His application was not assiduous, while his tutor, Bradshaw, whom he disliked, was negligent ; and he appears to have been subject to frequent attacks of ague, disposing him to casual recreation rather than to close study. He had also apparently the desire to acquire a smattering of many different things rather than to study hard at a few special subjects. 'I began to look on the rudiments of musick, in which I afterwards arriv'd to some formal knowledge though to small perfection of hand, because I was so frequently diverted by inclinations to newer trifles.'

Completing his Oxford studies early in 1639, without taking any degree, he went into residence at the Middle Temple in April, and soon arrived at the conclusion that his 'being at the University in regard of these avocations, was of very small benefit.' Here he and his brother lodged in 'a very handsome apartment just over against the Halt Court, but four payre of stayres high, which gave us the advantage of fairer prospect, but did not much contribute to the love of that unpolish'd study, to which (I suppose,) my Father had design'd me !' While thus a law student, on 30th October, he saw 'his Majestie (coming from his Northern Expedition) ride in pomp, and a kind of ovation, with all the markes of a happy peace, restor'd to the affect-

ions of his people, being conducted through London with a most splendid cavalcade ; and on 3rd November, following (a day never to be mentioned without a curse) to that long, ungratefull, foolish, and fatall Parliament, the beginning of all our sorrows for twenty years after, and the period of the most happy Monarch in the world : *Quis talia fando !*

In the closing days of 1640 Evelyn lost his father, when he abandoned the study of the law and betook himself abroad in preference to being mixed up in the disorders of the time. His resolutions were 'to absent myselfe from this ill face of things at home, which gave umbrage to wiser than myselfe, that the medaill was reversing, and our calamities but yet in their infancy.' Shortly before that he had 'beheld on Tower Hill the fatal stroake which sever'd the wisest head in England from the shoulders of the Earl of Strafford.'

Landing at Flushing in July, 1641, Evelyn passed, accompanied by his tutor Mr. Caryll, through Midelbrogh, Der Veer, Dort, Rotterdam, and Delft, to the Hague, where he presented himself to the Queen of Bohemia's Court. Thence he went on to Leyden, Utrecht, Rynen, and Nimeguen, to where the Dutch army was encamped about Genep, a strong fortress on the Wahale river. Here he enrolled himself and served for a few days as a volunteer in the Queen's army 'according to the compliment,' being attached to the English company of Captain Apsley : and in this capacity he 'received many civilities.' Even when thus playing at soldering, he did not like the roughness of a soldier's life, 'for the sun piercing the canvass of the tent, it was, during the day, unsufferable, and at night not seldom infested with mists and fogs, which ascended from the river.' However, during the few days he took his fair share in the work. 'As the turn came about, I watched on a horne work neere our quarters, and trailed a pike, being the next morning relieved by a company of French. This was our continual duty till the Castle was re-fortified, and all danger of quitting that station secured.' Retracing his steps to Rotterdam, Delft, the Hague and Leyden, he also visited Haerlem, Amsterdam, Antwerp, Brussels and various other towns before returning by way of Ostend, Dunkirk and Dover to Wotton, where he celebrated his 21st birthday.

Although his *Diary* does not contain any details on such matters as Pepys would have been free to record in his cipher, John Evelyn was probably rather a gay and pleasure-loving youth about this time. A suspicion of this seems justified by the fact that he 'was elected one of the Comptrolers of the Middle Temple-revellers, as the fashion of ye young Students and Gentlemen was, the Christmas being kept this year (1641) with great solemnity; but being desirous to passe it in the Country, I got leave to resign my staffe of office, and went with my brother Richard to Wotton.' From January till March he was back in London 'studying a little, but dancing and fooling more.'

III

*Evelyn's Early Manhood, Continental Travels ana Studies,
Voluntary Exile, and Return to England 1647.*

It was hardly possible that anyone situated as Evelyn was could hold aloof from the party strife when civil war broke out during the course of this year. And, of course, he was on the Royalist side. But he did not serve long with the troops. Here is his own record of that military service, — 'Oct. 3rd. To Chichester, and hence the next day to see the siege of Portsmouth; for now was that bloody difference betweene the King and Parliament broken out, which ended in the fatal tragedy so many years after. It was on the day of its being render'd to Sir William Waller, which gave me an opportunity of taking my leave of Colonel Goring the Governor, now embarqueing for France. This day was fought that signal Battaile at Edgehill. Thence I went to Southampton and Winchester, where I visited the Castle, Schole, Church, and King Arthur's Round Table, but especially the Church, and its Saxon Kings' Monuments, which I esteemed a worthy antiquity. 12th. November, was the Battle of Braineferd surprisingly fought, and to the greate consternation of the Citty had his Majesty (as twas believed he would) pursu'd his advantage. I came in with my horse and armes just at the retreat, but was not per-

mitted to stay longer than the 15th. by reason of the Army's marching to Gloucester, which would have left both me and my brother expos'd to ruine, without any advantage to his Majestie. Dec. 7th. I went from Wotton to London to see the so much celebrated line of com'unication, and on the 10th. returned to Wotton, nobody knowing of my having been in his Majestie's Army.'

During the first half of 1643 Evelyn employed himself entirely in rural occupations, visiting the garden and vineyard of Hatfield and similar places. From time to time, however, he made many journeys to and from London. What he sometimes saw there gave him much food for ample reflection. 'May 2nd. I went from Wotton to London, where I saw the furious and zelous people demolish that stately Crosse in Cheapside. On the 4th. I returned with no little regrett for the confusion that threatened us. Resolving to possess myself in some quiet if it might be, in a time of so great jealousy, I built by my Brother's permission a study, made a fishpond, an island, and some other solitudes and retirements, at Wotton, which gave the first occasion of improving them to those water-works and gardens which afterwards succeeded them, and became at that tyme the most famous of England.' But, willy nilly, he was bound to become dragged into action on the King's behalf. 'July 12th. I sent my black manege horse and furniture with a friend to his Majestie then at Oxford. 23rd. The Covenant being pressed, I absented myselfe; but finding it impossible to evade the doing very unhandsome things, and which had been a greate cause of my perpetual motions hitherto between Wotton and London, Oct. 2nd. I obtayned a lycence of his Majestie, dated at Oxford and sign'd by the King, to travell againe.' Accordingly, on 7th. November, he took boat at the Tower wharf for Sittingbourne, 'being only a payre of oares, expos'd to a hideous storm, thence posting to Dover accompanied by an Oxford friend, Mr. Thicknesse, and crossing the Channel to Calais.'

Proceeding by Boulogne, Monstreuil, Abbeville, Beauvais, Beaumont, and St. Denys to Paris, of which he gives a very interesting account, he threw himself into the social life of that gay capital. His first step was to make his duty to

Sir Richard Browne, afterwards his father-in-law, then in charge of British affairs pending the arrival of the Earl of Norwich, who came immediately after that as Ambassador Extraordinary. That Evelyn's purse was fairly well lined the Parisian passages in his *Diary* distinctly show. He appears to have taken part in many gay excursions and junkettings, though he sometimes reckoned the cost. 'At an inn in this village (St. Germain en Lay) is an host who treats all the greate persons in princely lodgings for furniture and plate, but they pay well for it, as I have don. Indeede the entertainment is very splendid, and not unreasonable, considering the excellent manner of dressing their meate, and of the service. Here are many debauches and excessive revellings, as being out of all noise and observance.' Wherever he visited the royal gardens and villas, or those of the great nobles and other magnates, he writes rapturously of what he saw. Sometimes, though, his joyous optimism rather leads one to doubt the quality of his taste, as when, writing of Richelieu's villa at Ruell, he says 'This leads to the Citroniere, which is a noble conserve of all those rarities; and at the end of it is the Arch of Constantine, painted on a wall in oyle, as large as the real one at Rome, so well don that even a man skilled in painting may mistake it for stone and sculpture. The skie and hills which seem to be between the arches are so naturall that swallows and other birds, thinking to fly through, have dashed themselves against the wall. I was infinitely taken with this agreeable cheate.' But he was certainly gradually acquiring the materials which were afterwards to be so well used by him in his great works on gardening. After a tour made in Normandy with Sir John Cotton, a Cambridgeshire knight, he quitted Paris in April, 1644. Marching across by Chartres and Estamps to Orleans, the party of which he formed one had an encounter with brigands, 'for no sooner were we entred two or three leagues into ye Forest of Orleans (which extends itself many miles), but the company behind us were set on by rogues, who, shooting from ye hedges and frequent covert, slew fowre upon the spot... I had greate cause to give God thanks for this escape.' Taking boat, he went down the Loire to St. Dieu, and thence rode to Blois and on to Tours,

where he stayed till the autumn. 'Here I took a master of the language and studied the tongue very diligently, recreating myself sometimes at the maill, and sometymes about the towne.' Here, too, he paid his duty to the Queen of England, 'having newly arrived, and going for Paris.' In the latter part of September, still accompanied by his friend Thicknesse, he left Tours and 'travelled towards the more southerne part of France, minding now to shape my course so as I might winter in Italy.' Journeying southward, partly by road and partly by river, he visited Lyons, Avignon, and Marseilles, whither he wended his way deliciously 'thro' a country sweetely declining to the South and Mediterranean coasts, full of vineyards and oliveyards, orange-trees, myrtils, pomegranads, and the like sweete plantations, to which belong pleasantly-situated villas as if they were so many heapes of snow dropp'd out of the clouds amongst these perennial greenes.' Taking mules to Cannes, he went by sea to Genoa 'having procur'd a bill of health (without which there is no admission at any towne in Italy).' On reaching 'Mongus, now cal'd Monaco' on the route, 'we were hastened away, having no time permitted us by our avaricious master to go up and see this strong and considerable place.'

On Oct. 16th., after 'much ado and greate perill' he landed on Italian soil. He was fully prepared to have the most delicious pleasure in this classical land, having already, even during the stormy weather off the coast, 'smelt the peculiar joys of Italy in the perfumes of orange, citron, and jassmine flowers for divers leagues seaward.'

It would be pleasant to ramble through Italy in Evelyn's company, and to share with him the many enjoyments recorded in his *Diary*: but space forbids. From Genoa he went to Leghorn and Pisa, from Pisa to Florence, thence to Sienna, and on to Rome. 'I came to Rome on the 4th November, 1644, about 5 at night, and being perplexed for a convenient lodging, wandered up and down on horseback, till at last one conducted us to Monsieur Petits, a Frenchman, near the Piazza Spagnola. Here I alighted, and having bargained with my host for 20 crownes a moneth, I

caused a good fire to be made in my chamber and went to bed, being so very wet. The next morning (for I was resolved to spend no time idly here) I got acquainted with several persons who had long lived at Rome.'

Evelyn's description of the interesting sights he saw in Rome is so good that it might well be perused in place of modern guide-books by those visiting the city. There is a delightful attractiveness about it, in which these up-to-date works are sometimes wanting. But even his youthful energy began to tire, and his keen appetite to become sated with continuous sightseeing. After more than six months of it 'we now determined to desist from visiting any more curiosities, except what should happen to come in our way, when my companion Mr. Henshaw or myself should go out to take the aire.' Then, however, as now for some people, the crowning event of a visit to Rome was to receive the Papal blessing. This Evelyn desired and obtained, although the event is not recorded in his diary with any great enthusiasm. 'May, 4th. Having seen the entrie of ye ambassador of Lucca, I went to the Vatican, where, by favour of our Cardinal Protector, Frair Barberini, I was admitted into the consistorie, heard the ambassador make his ovation in Latine to the Pope, sitting on an elevated state or throne, and changing two pontifical miters; after which I was presented to kisse his toe, that is, his embroder'd slipper, two Cardinals holding up his vest and surplice, and then being sufficiently bless'd with his thumb and two fingers for that day, I return'd home to dinner.'

He quitted Rome about the middle of May after a sojourn there of seven months, which had occasioned him so small an outlay that he remarked thereon in his Diary. 'The bills of exchange I took up from my first entering Italy till I went from Rome amounted but to 616 *ducanti di banco*, though I purchas'd many books, pictures, and curiosities.' Going northwards by Sienna, Leghorn, Lucca, Florence, Bologna, and Ferrara, he reached Venice early in June. Arriving 'extreamly weary and beaten' with the journey, he went and enjoyed the new luxury of a Turkish bath. 'This bath did so open my pores that it cost me one of the greatest colds I ever had in my life, for want of necessary caution

in keeping myselfe warme for some time after ; for coming out, I immediately began to visit the famous places of the city ; and travellers who come in to Italy do nothing but run up and down to see sights. ’

Evelyn had the good fortune to see Venice *en fête*, and in those days that must have been a sight well worth seeing. He saw the Doge espouse the Adriatic by casting a gold ring into it on Ascension day with very great pomp and ceremony. ‘ It was now Ascension Weeke, and the greate mart or faire of ye whole yeare was kept, every body at liberty and jollie. The noblemen stalking with their ladys on *choppines* ; these are high-heel’d shoes, particularly affected by these proude dames, or, as some say, invented to keepe them at home, it being very difficult to walke with them ; whence one being asked how he liked the Venetian dames, replied, they were *mezzo carne, mezzo ligno*, half flesh, half wood, and he would have none of them. The truth is, their garb is very odd, as seeming always in masquerade ; their other habits also totaly different from all nations. ’

In Venice Evelyn made arrangements for visiting the Holy Land and parts of Syria, Egypt, and Turkey ; but they fell through owing to the vessel, in which he would have sailed, being requisitioned to carry provisions to Candia, then under attack from the Turks. Forced to abandon this project, he remained in Venice ‘ being resolved to spend some moneths here in study, especially physic and anatomie, of both which there was now the most famous professors in Europe. ’ But in the autumn Mr. Thicknesse, ‘ my dear friend, and till now my constant fellow traveller, ’ was obliged to return to England on private affairs ; so Evelyn was left alone in Venice. Very shortly after that he had an illness which seems to have at one time threatened a fatal termination. ‘ Using to drink my wine cool’d with snow and ice, as the manner here is, I was so afflicted with the angina and soare-throat, that it had almost cost me my life. After all the remedies Cavalier Veslingius, cheife professor here, could apply, old Salvatico (that famous physician) being call’d made me be cupp’d and scarified in the back in foure places, which began to give me breath, and consequently life, for I

was in ye utmost danger : but God being mercifull to me, I was after a fortnight abroad againe ; when changing my lodging I went over against Pozzo Pinto, where I bought for winter provisions 3000 weight of excellent grapes, and pressed my owne wine, which proved incomparable liquor. ' Its goodness, indeed, seems to have been the death of it. ' Oct. 31st. Being my birth-day, the nuns of St. Catherine's sent me flowers of silk-work. We were very studious all this winter till Christmas, when on twelfth day we invited all the English and Scotts in towne to feast, which sunk our excellent wine considerably. ' In explanation of this passage, it needs to be said that he had soon again changed his lodging and gone to reside with three English friends ' neere St. Catherine's over against the monasterie of nunnes, where we hired the whole house and lived very nobly. Here I learned to play on ye theorbo, taught by Sig. Dominico Bassano. '

After ' the folly and madnesse of the Carnevall ' was over, Evelyn left Venice for Padua in January, 1646, but went back in March to take leave of his friends there, and at Easter set out on his return journey to England in company with the poet Waller, who had been glad to go abroad after being much worried by the Puritan party. They travelled by way of Vicenza, Verona, Brescia, Milan, the Lago Maggiore, the Simplon Pass, Sion, and St. Maurice to Geneva. Here again Evelyn became sick nigh unto death, from small-pox contracted at Beveretta, the night before reaching Geneva. ' Being extremely weary and complaining of my head, and finding little accomodation in the house, I caus'd one of our hostesses daughters to be removed out of her bed and went immediately into it whilst it was yet warme, being so heavy with pain and drowsinesse that I would not stay to have the sheets chang'd ; but I shortly after payd dearly for my impatience, falling sick of the small-pox so soon as I came to Geneva, for by the smell of frankincense and ye tale of ye good woman told me of her daughter having had an ague, I afterwards concluded she had been newly recovered of the small-pox. ' Becoming very ill he was bled of the physican ' a very learned old man..... He afterwards acknowledged that he should not have bled me had he suspected ye

small-pox, which brake out a day after.' As nurse he had a Swiss matron afflicted with gôitre, 'whose monstrous throat, when I sometimes awak'd out of unquiet slumbers, would affright me.' But again he was spared for the work he was destined to do. 'By God's mercy after five weeks keeping my chamber I went abroad.'

Leaving Geneva on the 5th July 1646, Evelyn's party went by way of Lyons, La Charite, and Orleans to Paris, arriving 'rejoic'd that after so many disasters and accidents in a tedious peregrination, I was gotten so neere home, and here I resolv'd to rest myselfe before I went further. It was now October, and the onely time that in my whole life I spent most idly, tempted from my more profitable recesses ; but I soon recover'd my better resolutions and fell to my study, learning the High Dutch and Spanish tongues, and now and then refreshing my danceing, and such exercises as I had long omitted, and which are not in much reputation amongst the sober Italians.'

During the course of the following winter and spring he saw much of 'Sir Richard Browne, his Majesty's Resident at the Court of France, and with whose lady and family I had contracted a greate friendship (and particularly set my affections on a daughter).' To this young girl, Mary, the only child of Sir Richard Browne by a daughter of Sir John Pretyman, he was married on 27th June, 1647, by Dr. Earle, chaplain to the young Charles, then Prince of Wales, who was holding his court at St. Germain. In October he returned by Rouen, Dieppe, and Calais, and 'got safe to Dover, for which I heartily put up my thanks to God who had conducted me safe to my owne country, and been mercifull to me through so many aberrations' during a period extending over four years. He returned alone, 'leaving my wife, yet very young, under the care of an excellent lady and prudent mother.' Indeed, she was a mere child, being then not more than twelve years of age, and her father was only Evelyn's senior by fifteen years.

IV

Evelyn's Attitude during the Commonwealth 1647-1660.

Arrived at Wotton, he at once went to kiss his Majesty's hand at Hampton Court and convey tidings from Paris, King Charles 'being now in the power of those execrable villains who not long after murder'd him.' Thence he betook himself to Sayes Court, near Deptford in Kent, the estate belonging to his father-in-law, where he 'had a lodging and some bookes.' It was here that he was living when his first literary work was published, *Of Liberty and Servitude*, a translation from the French of Le Vayer, in January, 1649, though the dedication of it to his brother George bears date 25th January, 1647. He was very near getting into trouble about the preface to this, because in his own copy he noted that 'I was like to be call'd in question by the Rebels for this booke, being published a few days before his Majesty's decollation.' Although he took no prominent part in politics at this particular time, yet he could hardly help playing with the fire. Thus, on 11th December, 'I got privately into the council of ye rebell army at Whitehall, where I heard horrid villanies.' Having money in hand, either from savings during the four years' sojourn abroad, where his expenses (including all purchases of objects of art and vertu) did not amount to more than £300 a year, or else from his child-wife's dowry, he dabbled in land speculation with the fairly satisfactory result that on the whole he does not appear to have lost much by it.

On 17th January, 1649, he 'heard the rebell Peters incite the rebell powers met in the Painted Chamber to destroy his Majesty, and saw that archtraytor Bradshaw, who not long after condemn'd him.' But his loyalty kept him from being present at the death-scene. 'The villanie of the rebells proceeding now so far as to trie, condemne and murder our excellent King on the 30th of this month, struck me with such horror that I kept the day of his martyrdom a fast, and would not be present at that execrable wickednesse, receiving the sad account of it from my Brother George and Mr. Owen,

who came to visite me this afternoone, and recounted all the circumstances.'

While he 'went through a course of chymestrie at Sayes Court,' and otherwise engaged in study and in the examination of works of art, he became disquieted about the condition of affairs in Paris. Communications with his wife appear to have been very few and far between, although with his father-in-law he 'kept up a political correspondence' in cipher 'with no small danger of being discovered.' In April he touched 'suddaine resolutions' of going to France, before he received the news that Condé's siege of Paris had ended by peace being concluded. The immediate carrying out of this intention was hindered by a rush of blood to the brain. 'I fell dangerously ill of my head: was blistered and let blood behind ye ears and forehead: on the 23rd. began to have ease by using the fumes of a cammomile on embers applied to my eares after all the physicians had don their best.' On 17th June, however, he 'got a passe from the rebell Bradshaw, then in greate power,' and on 12th July went viâ Gravesend to Dover and Calais, arriving at Paris on 1st. August. Curiously enough his Diary makes no mention of the child-wife, from whom he had 'been absent.... about a yeare and a halfe,' save that on 'Sept. 7th. Went with my Wife and dear cosin to St. Germaines, and kissed the Queene-mother's hand.' He remained in Paris till the end of June, 1650, when he made a flying visit to England, and again obtained a pass from Bradshaw to proceed to France. On 30th August, he was back again in Paris, where he stayed till his final return to England in February 1652. His life in Paris at this time was that of a cultured *dilletante*. He studied, or at any rate dabbled in, chemistry, philosophy, theology, and music; and he found amusement in examining gardens and collections of all sorts of virtuositities and antiquities. He had 'much discourse of chymical matters' with Sir Kenelm Digby; 'but the truth is, Sir Kenelm was an arrant mountebank.' Here, too, he wrote his second literary composition, *The State of France, as it stood in the IXth yeer of this present monarch Lewis XIII*, which was published in England in 1652. Apart from these occupations, his time was chiefly spent in the pleasures and

amusements common to the court of France and to the throng of exiles from Britain who formed the Court of the uncrowned monarch, Charles II.

Evelyn longed for settlement in England, because he saw that the Royalist cause was hopelessly lost for the time being. His father-in-law's estate of Sayes Court had been seized and sold by the rebels, but 'by the advice and endeavour of my friends I was advis'd to reside in it, and compound with the soldiers. This I was besides authoriz'd by his Majesty to do, and encourag'd with promise that what was in lease from the Crowne, if ever it pleased God to restore him, he would secure to us in fee-ferme.¹ I had also addresses and cyfers to correspond with his Majesty and Ministers abroad: upon all which inducements I was persuaded to settle henceforth in England, having now run about the world, most part out of my owne country, neere ten yeares. I therefore now likewise meditated sending over for my Wife, whom as yet I had left at Paris.' She arrived on 11th. June with her Mother; and as small-pox was then raging in and about London they sojourned for some time at Tunbridge Wells, drinking the waters. About the end of that month Evelyn went to Sayes Court to prepare for their reception, but was waylaid by footpads near Bromley and came near meeting his death from them. Fortunately, however, 'did God deliver me from these villains, and not onely so, but restor'd what they tooke, as twice before he had graciously don, both at sea and land;... for which, and many signal preservations, I am extreamly oblig'd to give thanks to God my Saviour.'

On 24th July, 1652, Mrs. Evelyn presented her husband with their first child, their son, John, who predeceased his father in 1698. He now busied himself in acquiring full possession of his father-in-law's and the rebels' interests in Sayes Court, which he effected at a cost of £3,500 early in 1653.

Then he began gardening and planting on a large scale, transforming the almost bare fields around the house into fine specimens of the art of horticulture, as then practised.

¹ This promise Charles afterwards failed to keep as, in 1672, he merely renewed the lease of the pastures for 99 years.

Sayes Court was afterwards the temporary residence of Peter the Great, who committed great havoc in the gardens and hedges during his rough orgies. Here Evelyn lived quietly till the time of the Restoration, spending his days in gardening and in cultivating the acquaintance of men of cultured tastes like his own, with occasional journeys to different parts of England. Thus he visited Windsor, Marlborough, Bath, Oxford, Salisbury, Devizes, Gloucester, Worcester, Warwick, Leicester, Doncaster, York, Cambridge, and many other places, so that he probably saw a great deal more of England than the majority of men in his position. Thus, too, he learned much about the country and about all branches of rural economy. He had not yet seriously given himself to literature, although his third work was published in 1656, *An Essay on the First Book of T. Lucretius Cereus de Rerum Natura. Interpreted and made English Verse.*

In January, 1658, heavy sorrow fell upon Evelyn by the death of his younger son, an infant prodigy, and a sad and wonderful example of a young brain being terribly overtaxed. 'After six fits of a quartan ague with which it pleased God to visite him, died my dear Son Richard, to our inexpressible grief and affliction, 5 yeares and 3 days old onely, but at that tender age a prodigy for witt and understanding; for beauty of body a very angel; for endowment of mind of incredible and rare hopes. To give onely a little taste of them, and thereby glory to God, he had learn'd all this catechisme who out of the mouths of babes and infants does sometimes perfect his praises: at 2 yeares and a halfe old he could perfectly read any of ye English, Latine, French, or Gothic letters, pronouncing the first three languages exactly. He had before the 5th yeare, or in that yeare, not onely skill to reade most written hands, but to decline all the nouns, conjugate the verbs regular, and most of ye irregular; learn'd out "Puerilis," got by heart almost ye entire vocabularie of Latine and French primitives and words, could make congruous syntax, turne English into Latine, and *vice versâ*, construe and prove what he read, and did the government and use of relatives, verbs, substantives, elipses, and many figures and tropes, and made a considerable progress in Comenius's *Janua*; began himselfe to write

legibly, and had a stronge passion for Greeke. The number of verses he could recite was prodigious, and what he remembered of the parts of playes, which he would also act ; and when seeing a Plautus in one's hand, he ask'd what booke it was, and being told it was comedy, and too difficult for him, he wept for sorrow. Strange was his apt and ingenious application of fables and morals, for he had read *Æsop* ; he had a wonderful disposition to mathematics, having by heart divers propositions of *Euclid* that were read to him in play, and he would make lines and demonstrate them. As to his piety, astonishing were his applications of Scripture upon occasion, and thus early, he understood ye historical part of ye Bible and New Testament to a wonder, how Christ came to redeeme mankind, and how comprehending these necessarys himselfe, his godfathers were discharg'd of their promise. These and like illuminations, far exceeding his age and experience, considering the prettinesse of his adresse and behaviour, cannot but leave impressions in me at the memory of him. When one told him how many days a Quaker had fasted, he replied that was no wonder, for Christ had said that man should not live by bread alone, but by ye Word of God. He would of himselfe select ye most pathetic psalms, and chapters out of *Job*, to reade to his mayde during his sicknesse, telling her when she pitied him, that all God's children must suffer affliction. He declaim'd against ye vanities of the world before he had seene any..... How thankfully would he receive admonition, how soone be reconciled ! how indifferent, yet continually chereful ! He would give grave advice to his Brother John, beare with his impertinencies, and say he was but a child !' Even allowing for *Evelyn's* tendency to exaggeration, this is surely one of the very saddest stories about a child of tender years, reared in a wrong manner, that has ever been written in the English language. This loss was no doubt the occasion of his writing his fourth work, *The Golden Book of St. John Chrysostom, concerning the Education of Children. Translated out of the Greek*, which was published in September, 1658. A further relief from grief was also found in the translation of *The French Gardiner : instructing how to cultivate all sorts of Fruit-trees and Herbs for the Garden; together with directions to*

dry and conserve them in their natural; six times printed in France and once in Holland. An accomplished piece, first written by N. de Bonnefons, and now transplanted into English by Philocephos.

It must have gratified his royalist feelings when, on 22 Oct. 1658, he 'saw ye superb funerall of ye Protector.' He remarks that 'it was the joyfullest funerall I ever saw, for there were none that cried but dogs, which the soldiers hooted away with a barbarous noise, drinking and taking tobacco in the streets as they went.' Not long after this, on 25 April 1659, he notices 'a wonderfull and suddaine change in ye face of ye publiq: ye new Protector Richard slighted, several pretenders and parties strive for the government: all anarchy and confusion; Lord have mercy on us!' For six months things drifted on, till on 11 Oct. 'the Armie now turn'd out the Parliament. We had now no government in the nation; all in confusion; no magistrate either own'd or pretended, but ye soldiers, and they not agreed. God almighty have mercy on and settle us!'

Evelyn apparently now thought the time ripe for him to venture; hence, during 1659, he published *A Character of England as it was lately presented in a Letter to a Noble Man of France*, and also *An Apology for the Royal Party, written in a Letter to a person of the late Council of State, by a Lover of Peace and of his Country. With a Touch at the Pretended "Plea for the Army."* Of the latter he remarks in his Diary: 'Nov. 7th. was publish'd my bold "Apoligie for the King" in this time of danger, when it was capital to speake or write in favour of him. It was twice printed, so universaly it took.' Encouraged by the success of this work, he began to intrigue with Colonel Morley, Lieutenant of the Tower, and Fay, Governor of Portsmouth, in the interest of the exiled Charles; but Morley shrank from declaring for the King, and General Monk returning from Scotland to London, broke down the gates of the city, 'marches to White-hall, dissipates that nest of robbers, and convenes the old Parliament, the Rump Parliament (so called as retaining some few rotten members of ye other) being dissolv'd; and for joy whereoff were many thousands of rumps roasted publiqly in ye streets at the bonfires this night, with

ringing of bells and universal jubilee. This was the first good omen.'

From the February till the April following thereon Evelyn was confined to bed with ague and its after effects, but found strength to write and publish a pamphlet, *The late News from Brussels unmasked, and His Majesty vindicated from the base calumny and scandal therein fixed on him*, 'in defence of his Majesty, against a wicked forg'd paper, pretended to be sent from Bruxells to defame his Majesties person and vertues, and render him odious, now when everybody was in hope and expectation of the General and Parliament recalling him, and establishing ye government on its antient and right basis.' Early in May came the tidings that the King's application for restoration had been accepted and acknowledged by the Parliament 'after a most bloody and unreasonable rebellion of neare 20 years,' and before the end of the month Evelyn was an eye-witness of the triumphal entry of the new king into his capital. '29th. This day his Majestie Charles the Second came to London after a sad and long exile and calamitous suffering both of the King and Church, being 17 years. This was also his birthday, and with a triumph of above 20,000 horse and foote, brandishing their swords and shouting with inexpressible joy; the wayes strew'd with flowers, the bells ringing, the streets hung with tapissry, fountaines running with wine; the Maior, Aldermen, and all the Companies in their liveries, chaines of gold, and banners; Lords and Nobles clad in cloth of silver, gold, and velvet; the windowes and balconies all set with ladies; trumpets, music, and myriads of people flocking, even so far as from Rochester, so as they were seven houres in passing the citty, even from 2 in ye afternoone till 9 at night. I stood in the Strand and beheld it, and bless'd God. And all this was don without one drop of bloud shed, and by that very army which rebell'd against him; but it was ye Lord's doing, for such a restoration was never mention'd in any history antient or modern, since the returne of the Jews from the Babylonish captivity; nor so joyfull a day and so bright ever seene in this nation, this hapning when to expect or effect it was past all human policy.'

Despite his diletantism and dabbling in science, philoso-

phy and letters, Evelyn had for years past felt the desirability of having some sort of fixed employment. Previous to this, during 1659, he had communicated to the Hon. Robert Boyle, son of the Earl of Cork, a scheme for founding a philosophic and mathematical college or fraternity, and had even arranged with his wife that they should live asunder, in two separate apartments. The Restoration, however, put a stop to this scheme, which then evolved itself, soon afterwards, into the foundation of the Royal Society, Boyle and Evelyn being two of the most prominent original Fellows.

V

Evelyn's Career after the Restoration. (1660-1685).

Evelyn was about forty years of age when the Restoration changed the whole prospects of his still long life. He had been a devoted Royalist, though it can not be denied that his zeal in this respect was ever tempered with a vast amount of caution and prudence. In addition to what interest he had earned by his own actions, he had the far more powerful influence of his father-in-law who had, like Charles himself, been exiled for nineteen years. Mrs. Evelyn was promised the appointment of lady of the jewels to the future Queen, which she never received; and Evelyn might have had the honour of knighthood of the Bath, but declined it. He was present at the Coronation in Westminster Abbey on St. George's Day, 1661, and had prepared and printed a *Panegyric* poem on the occasion, a screed of bombastic doggerel in fulsome praise of the King. He was a frequent visitor at the Court, and loved to sun himself in the royal presence. One of the finest examples of this feature of Evelyn's character is his *Fumifugium*, published in 1661, which will be more particularly referred to later on, a work which marks the real commencement of his literary career.

In 1661, also, Evelyn wrote a pamphlet entitled *Tyrannus or the Mode*, an invective against 'our so much affecting the French' in dress, and he was pleased with the idea that

afterwards, in 1666, a change in costume then adopted by the King and court was due to this cause. He, too, donned and went to office in 'the vest and surcoat and tunic as 'twas call'd, after his Majesty had brought the whole Court to it. It was a comely and manly habit, too good to hold, it being impossible for us in good earnest to leave ye Monsieurs vanities long.'

At length employment, at first unpaid, in the public service fell to Evelyn in May, 1662, when along with 'divers gentlemen of quality,' he was appointed one of the Commissioners 'for reforming the buildings, wayes, streetes, and incumbrances, and regulating the hackney coaches in the Citty of London.' About this same time he was also on the Commission appointed 'about Charitable uses, and particularly to enquire how the Citty had dispos'd of the revenues of Gressham College,' and in the original grant of the Charter of the Royal Society he was nominated by the King to be on its Council. Among the other Commissions upon which he shortly sat were those on Sewers, and on the regulation of the Mint at the Tower; but it was not till 27 Oct. 1664 that he received a paid appointment as one of the four Commissioners for the care of the sick and wounded prisoners to be made in the war declared against Holland. For this the remuneration was 'a Salary £1,200 a year amongst us, besides extraordinaries for our care and attention in time of station, each of us being appointed to a particular district, mine falling out to be Kent and Sussex.'

Before this, however, an event had occurred which must have given intense gratification to Evelyn, when on 30th April, 1663, 'Came his Majesty to honour my poore villa with his presence, viewing the gardens and even every roome of the house, and was pleas'd to take a small refreshment. There were with him the Duke of Richmond, E. of St. Albans, Lord Lauderdale, and several persons of Quality.'

The year 1664 was a busy one for Evelyn, as he then brought out his two great masterpieces *Sylva* and the *Kalendarium Hortense*, of which more anon, as well as the translation of a French work on Architecture. His official duties in connection with the maintainance of the Dutch prisoners also became so heavy that the charges came to

£1,000 a week. The Savoy Hospital was filled with them, and a privy seal grant of £20,000 was made to carry on the work ; but the expenses increasing reached £7,000 a week, and Evelyn had hard work to get money from the treasury. Harassed with anxieties of this sort, he frequently went ' to ye Royal Society to refreshe among ye philosophers ' where he found solace in serving along with Dryden, Waller, and others on a Committee for the improvement of the English language.

In the following year the dreadful plague broke out, when he and one other Commissioner were left to deal with the task of providing for the sick and wounded prisoners. From 1,000 deaths in a week in the middle of July, the mortality increased to near 10,000 by the beginning of September, so he sent his wife and family to his brother at Wotton, and remained at work, ' being resolved to stay at my house myselfe ; and to looke after my charge, trusting in the providence and goodnesse of God. ' Prisoners poured in in larger numbers than he could receive and guard in fit places, and he was continually forced to importune for money lest the prisoners should starve. It was then, perhaps, that Evelyn was thrown most in contact with his intimate friend Pepys, for both of them remained steadfast when others had fled. And they had their reward in coming safely through their trial of faithfulness to official duty. ' Now blessed be God, ' he writes on 31 Dec. 1665, ' for his extraordinary mercies and preservation of me this yeare, when thousands and ten thousands perish'd and were swept away on each side of me. '

This hard work was a source of loss to Evelyn, as from time to time he advanced monies of his own to supply provisions for the needy committed to his care : and subsequent petitions for reimbursement were only partially successful. But he was rewarded by the sunny warmth of that royal favour which cost nothing, because when the King returned from Oxford to Hampton Court and Evelyn went to wait upon his Majesty there at the end of January, 1666, he duly records how ' he ran towards me, and in a most gracious manner gave me his hand to kisse, with many thanks for my care and faithfulness in his service in a time of such

greate danger, when every body fled their employments.' Poor Evelyn seems to have been rather easily duped in this sort of way. 'Then the Duke (of Albemarle) came towards me and embrac'd me with much kindnesse, telling me if he had thought my danger would have been so greate, he would not have suffer'd his Majesty to employ me in that station.' And so on, 'after which I got home, not being very well in health.' It certainly was such ridiculously insincere treatment that it might well have caused immediate sickening in one of robust health.

It was, forsooth, only in very minor matters that Evelyn profited by the royal favour or by his courtiership. In April, 1666, Charles informed him that he must now be sworn for a Justice of the Peace, ('the office in the world I had most industriously avoided, in regard of the perpetual trouble thereoff in these numerous parishes'), and he only escaped this infliction by humbly desiring to be excused from fresh duties inconsistent with the other service he was engaged in. So excused he was, by royal favour, for which he 'rendered his Majesty many thanks.' And on that same day he declined re-election to the Council of the Royal Society for the following year on 'earnest suite' of other affairs; for he had to be consistent in such different matters that would have engaged a portion of his time.

Besides his work in connection with prisoners and the Mint he was shortly afterwards nominated one of the Commissioners for regulating the farming and making of saltpetre and gunpowder throughout Britain, an appointment which was all the more appropriate from the fact that his grandfather, George Evelyn of Long Ditton and Wotton (1530-1603), had been the first to introduce the manufacture of gunpowder into England, when he established mills on both of his properties. He was also appointed one of the three Surveyors of the repairs of St. Paul's Cathedral, 'and to consider of a model for the new building, or, if it might be, repairing of the steeple, which was most decay'd.'

With hands and head fully occupied with business affairs he found time for other work of a useful nature, while still having plenty of leisure for social duties and enjoyments. In this respect he forms a good example of the well-known

truth that it is always the busiest men who can spare most time for matters lying outside of their special grooves of work. Thus in September, 1665, he drew up a scheme for erecting an infirmary at Chatham, in which he was supported by his friend Pepys, then a high official in the Navy Department and like himself a shrewd man of business and method, and therefore finding time for other than purely routine official work; while in August, 1666, he entreated the Lord Chancellor 'to visite the Hospital of the Savoy, and reduce it (after ye greate abuse that had been continu'd) to its original institution for ye benefit of the poore, which he promis'd to do.'

But nothing came from either of these schemes, for on 2nd. Sept. 'this fatal night about ten, began the deplorable fire neere Fish Streete in London.' It raged by day and by night,—' (if I may call that night which was light as day for 10 miles round about, after a dreadful manner). ' Nothing could be done to stay its progress, and the citizens were awe-stricken and paralyzed by fear. 'The conflagration was so universal, and the people so astonish'd, that from the beginning, I know not by what despondency or fate, they hardly stirr'd to quench it, so that there was nothing heard or seene but crying out and lamentation, running about like distracted creatures without at all attempting to save even their goods; such a strange consternation there was upon them, so as it burned both in breadth and length, the churches, publics halls, Exchange, hospitals, monuments, and ornaments, leaping after a prodigious manner, from house to house and streete to streete, at great distances one from ye other; for ye heate with a long set of faire and warm weather had even ignited the aire and prepar'd the materials to conceive the fire, which devour'd after an incredible manner houses, furniture, and every thing. Here we saw the Thames cover'd with goods floating, all the barges and boats laden with what some had time and courage to save, as, on ye other, ye carts etc., carrying out to the fields, which for many miles were strew'd with moveables of all sorts, and tents erecting to shelter both people and what goods they could get away. Oh the miserable and calamitous spectacle! such as happily the world had not seene since the foundation

of it, nor be outdon till the universal conflagration thereof. All the skie was of a fiery aspect, like the top of a burning oven, and the light scene above 40 miles round about for many nights. God grant mine eyes may never behold the like, who now saw above 10,000 houses all in one flame; the noise and cracking and thunder of the impetuous flames, ye shreiking of women and children, the hurry of people, the fall of towers, houses, and churches, was like an hideous storme, and the aire all about so hot and inflam'd that at the last one was not able to approach it, so that they were forc'd to stand and let ye flames burn on, which they did for neere two miles in lenth and one in breadh. The cloudes also of smoke were dismall and reach'd upon computation neere 50 miles in length. Thus I left it this afternoone burning, a resemblance of Sodom, or the last day. It forcibly call'd to my mind that passage—*non enim hic habemus stabilem civitatem*: the ruines resembling the picture of Troy. London was, but is no more! Thus I returned.'

For days the conflagration raged, although the whole situation might probably have been saved if the advice of seamen, then as now amongst the bravest and most practical of Britain's sons, had been followed. When the court suburb of Whitehall began to be threatened,—'but oh, the confusion there was then at the Court!'—the gentlemen, 'who hitherto had stood as men intoxicated, with their hands acrossed,... began to consider that nothing was likely to put a stop but the blowing up of so many houses as might make a wider gap than any had yet been made by the ordinary method of pulling them downe with engines; this some stout seamen propos'd early enough to have sav'd neere ye whole citty, but this some tenacious and avaritious men, aldermen, etc., would not permitt, because their houses must have been of the first.' At length, however, the fire died out, the houseless citizens finding refuge in tents and miserable huts and hovels hastily erected about St. George's fields and Moorfields as far as Highgate. But Evelyn's abode had remained untouched. From reviewing the now poverty-stricken people 'in this calamitous condition I return'd with a sad heart to my house, blessing and adoring the distinguishing mercy of God to me and mine, who in the

midst of all this ruine was like Lot, in my little Zoar, safe and sound.'

The plague and the fire were held to be the visitation of God's anger, and Evelyn evidently thought the heavy punishment richly merited. 'Oct. 10th. This day was order'd a generall fast thro' the Nation, to humble us on ye late dreadfull conflagration, added to the plague and warr, the most dismall judgments that could be inflicted, but whiche indeed we highly deserv'd for our prodigious ingratitude, burning lusts, dissolute Court, profane and abominable lives, under such dispensations of God's continu'd favour in restoring Church, Prince, and People from our late intestine calamities, of which we were altogether unmindfull, even to astonishment.'

Like Wren and Hooke, Evelyn submitted a scheme for the rebuilding of London upon an improved plan, but the new city was formed mainly upon the old lines.

Meanwhile the Dutch fleet was lying off the mouth of the Thames. Though England then happily produced all the food she required, yet the city became 'exceedingly distress'd for want of fuell' because of the traffic up and down the estuary being interrupted. Hence Evelyn was appointed one of a Committee to search the environs of London and find if any peat or turf were fit for use. Experiments were made with *boullies* or briquettes of charcoal dust and loam in the Dutch manner, and Evelyn shewed to many proof of his 'new fuell, which was very glowing and without smoke or ill smell'. But the process never caught on, and was abandoned as giving no promise of commercial success.

Evelyn's account against the Treasury now amounted to above £34,000, and he continued to urge for payment of it, or for the settlement of unpaid portions of it, as late as 1702, about three years before his death. Whether this straitened his means or not, he was at any rate eager to make money by speculation. So in 1667 he joined Sir John Kiviet, a Dutch Orangeman who had come over to England for protection and had been knighted by King Charles, in a scheme for making bricks on a large scale. Perhaps as a sort of advertisement of this commercial enterprise he subscribed 50,000 bricks towards building a college for the

Royal Society. It was a big scheme, including the embankment of the river from the Tower to the Temple, and if successful it would have brought much gain to the partners.

Evelyn says nothing about the ultimate results of his undertaking, but Pepys furnishes the necessary clue in his diary for September, 1668—'23d. At noon comes Mr Evelyn to me, about some business with the office, and there in discourse tell me of his loss, to the value of £500, which he hath met with in a late attempt of making of bricks upon an adventure with others, by which he presumed to have got a great deal of money; so that I see the most ingenious man may sometimes be mistaken'. Kiviet a year or two later on had a fresh scheme for draining marshy lands 'with the hopes of a rich harvest of hemp and cole seed', but Evelyn took no share in this new adventure.

In July 1669 his University, Oxford, bestowed upon him the honorary degree of Doctor of Civil Law, but he had still no permanent official appointment, his Commissionerships now being completed. Early in May 1670 he went 'to London concerning the office of Latine Secretary to his Majesty, a place of more honor than dignitie and profit, the reversion of which he had promised me', though the promise was not fulfilled.

Early in 1669, it had been proposed to Evelyn by Lord Arlington that he should write a history of the Dutch War, but he declined. Towards the middle of the following year, however, pressure was brought on him to undertake the work. 'After dinner Lord (Arlington) communicated to me his Majesty's desire that I would engage to write the History of our late War with the Hollanders, which I had hitherto declin'd; this I found was ill-taken, and that I should disoblige his Majesty, who had made choice of me to do him this service, and if I would undertake it, I should have all the assistance the Secretary's office and others could give me, with other encouragements, which I could not decently refuse'. This work was never completed, so much as was written by way of introduction being subsequently published in 1674 as *Navigation and Commerce, their Original and Progress*.

Evelyn was, however, not to have much longer to wait

for regular official employment, as on 28 February, 1671, 'The Treasurer acquainted me that his Majesty was graciously pleas'd to nominate me one of the Council of Forraine Plantations, and give me a salary of £500 per ann. to encourage me'. He was pleased with his appointment in connection with our Colonies, 'a considerable honour, the others in the Council being chiefly Noblemen, and Officers of State'. In the following year the scope of this department was increased by adding the Council of Trade to its duties. He at once went to thank the Treasurer and Lord Arlington, Secretary of State, whose favour he possessed though he 'cultivated neither of their friendships by any meane submissions'. And he failed not, of course, to kiss the King's hand on being made one of that newly established Council. But Royalist though he was, he could not be blind to the profligacy of the Court and of the King, to whose Majesty his works were so grandiloquently dedicated.

On one occasion after submitting progress of his History to the King, he says 'thence walk'd with him thro' St. James's Parke to the garden, where I both saw and heard a very familiar discourse between... and Mrs. Nellie as they cal'd an impudent comedian, she looking out of her garden on a terrace at the top of the wall, and... standing on ye greene walke under it. I was heartily sorry at the scene. Thence the King walked to the Dutchess of Cleaveland, another lady of pleasure, and curse of our nation'. Evelyn is usually so strict about any reference to the proprieties that it is hard to understand why this particular interview between King Charles and Nell Gwynne should be mentioned so circumstantially. As for the Court, when it went abroad, say to Newmarket, one might have 'found ye jolly blades racing, dauncing, feasting, and revelling, more resembling a luxurious and abandon'd rout, than a Christian Court.'

Early in 1672 his father-in-law, Sir Richard Browne, resigned office as Clerk of the Council, a place which his Majesty had years before promised to Evelyn; but he was induced to give up this lien on renewal of the lease of Sayes Court for 99 years, although the King's written engagement to grant the estate in fee-farme is still extant at Wotton.

In 1673 Browne became Master of the Trinity House, and Evelyn was sworn in as a younger Brother, having in the previous autumn been chosen Secretary to the Royal Society : and two months later his son John, now 18 years of age, was also made a younger brother of Trinity House. Evelyn's life seems now to have glided on very quietly. Much of his time was taken up with the colonial and commercial work controlled by the Council of Plantations and Trade, though he still found leisure for literary work, scientific recreation, and other affairs. His mind apparently about this time became greatly attracted towards religious subjects, and it seems more than probable that this may (in part, at any rate) have been due to a very strong though purely platonic attachment he now formed to Miss Blagg, one of the Queen's Maids of Honour, who married Mr. Sydney, afterwards Lord Godolphin, in 1675 and died in childbed in 1678 at the early age of twenty five. His *Life of Mrs Godolphin*, never published till 1847, was 'design'd to consecrate her worthy life to posterity.' In February 1680 his son John, now 23 years of age and imitating his father's literary beginning as a translator, was married to Martha Spencer, step-daughter of Sir John Stonehouse. That Evelyn was now fairly well off is evident from the terms of the jointure and marriage contracts then made. 'The lady was to bring £5,000 in consideration of a settlement of £500 a yeare present maintainence, which was likewise to be her jointure, and £500 a yeare after myne and my Wife's decease. But with God's blessing it will be at the least £1000 a yeare more in a few yeares.' Always of business habits, Evelyn particularly records how, in the following month, he went 'To London, to receive £3,000 of my daughter-in-law's portion, which was paid in gold.'

The deeply religious caste of thought above alluded to as now becoming very noticeable in Evelyn shewed itself strongly in the autumn of 1680. 'I went to London to be private, my birthday being ye next day, and I now arriv'd at my sixtieth year, on which I began a more solemn survey of my whole life, in order to the making and confirming my peace with God, by an accurate scrutinie of all my actions past, as far as I was able to call them to mind. How difficult

and uncertaine, yet how necessary a work! The Lord be mercifull to me and accept me! Who can tell how oft he offendeth? . . . I began and spent the whole weeke in examining my life, begging pardon for my faults, assistance and blessing for the future, that I might in some sort be prepar'd for the time that now drew neere, and not have the greater work to begin when one can worke no longer. The Lord Jesus help and assist me! I therefore stirr'd little abroad till the 5 November I participated of ye blessed communion, finishing and confirming my resolutions of giving myselfe up more intirely to God, to whom I had now most solemnly devoted the rest of the poore remainder of life in this world; the Lord enabling me, who am an unprofitable servant, a miserable sinner, yet depending on his infinite goodnesse and mercy accepting my endeavours.'

It were well if all men, even before attaining 60 years of age, could bring themselves to such periods of reflection on past and present acts, and even though all the good resolves may not have been quite rigidly acted up to. And even in Evelyn's case, at any rate so far as his diary shews, he appears afterwards to have continued just as much a man of the world as he was before these solemn resolutions, although the glamour of being a courtier seems perhaps to have henceforth become less rose-coloured. A trivial incident happening while he was supping one night at Lady Arlington's, in June 1683, gave rise to the reflection that 'By this one may take an estimate of the extream slavery and subjection that courtiers live in, who have not time to eate and drink at their pleasure. It put me in mind of Horace's Mouse, and to blesse God for my owne private condition.' Twenty years previously he would not have thought or said this.

Evelyn took a leading part in the negociations for the repurchase of Chelsea College for £1,300 from the Royal Society to whom it had been recently presented by the King, and for the establishment of a hospital for old soldiers there at a cost of £20,000 with an endowment of £5,000 a year.

Several violent fits of ague having afflicted him during the winter of 1681-82, to cure which 'recourse was had to bathing my legs in milk up to ye knees, made as hot as I

could endure it', Evelyn made his will and put all his affairs in order 'that now growing in yeares, I might have none of the secular things and concerns to distract me when it should please Almighty God to call me from this transitory life.' In November 1682 he was asked by many friends to stand for election as president of the Royal Society, in succession to Sir Christopher Wren, but pleading 'remote dwelling, and now frequent infirmities' he declined the proffered honour. Subsequently, in 1690, he had actually, 'been chosen President of the Royal Society', but desired to decline it 'and with greate difficulty devolv'd the election on Sir Robert Southwell, Secretary of State to King William in Ireland.' For a third time, in November 1693, the honour was again offered—'Much importun'd to take the office of President of the Royal Society, but I againe declin'd it.'

On 12th February 1683 his father-in-law, Sir Richard Browne, who had been created a baronet in 1649, and to whose influence he owed much, died at his house at Sayes Court, leaving Mrs. Evelyn as his sole heiress. Meanwhile grandchildren had been born to Evelyn, some of whom soon died in infancy. His appointment on the Council of Plantations and Trade seems to have lapsed before this time, for no further mention is made in his diary of Council meetings, and he seems to have resided chiefly at Sayes Court, gardening and spending his time in scholarly leisure and recreation. This surmise is borne out by what he says in 1683, 'Oct. 4th. I went to London, on receiving a note from the Countesse of Arlington, of some considerable charge or advantage I might obtaine by applying myselfe to his Majesty on this signal conjuncture of his Majesty entering up judgment against the City charter; the proposal made me I wholly declin'd, not being well satisfied with these violent transactions, and not a little sorry that his Majesty was so often put upon things of this nature against so great a Citty, the consequence wheroff may be so much to his prejudice; so I return'd home.'

On 6th February 1685 King Charles II. died after an apoplectic fit, and his brother James, Duke of York, ascended the throne. Evelyn comments fully on the virtues and

vices of the late monarch. 'He would doubtless have been an excellent Prince had he been less addicted to women, who made him uneasy, and allways in want to supply their immeasurable profusion, to ye detriment of many indigent persons who had signally serv'd both him and his father..... He was ever kind to me, and very gracious upon all occasions, and therefore I cannot, without ingratitude, but deplore his loss, which for many respects, as well as duty, I do with all my soul.'

VI

Evelyn's Declining Years (1685-1706).

With the accession of James II., Evelyn was again to feel the sunny warmth of royal favour in the form of an official appointment. But previous to this he had to suffer a heavy loss by the death from small-pox of his eldest daughter Mary, in the 19th year of her age, who had been born at Wotton in the same room as her father had first seen the light.

In September 1685 Evelyn was informed that on Lord Clarendon, Lord Privy Seal, going to assume the Lord Lieutenancy of Ireland the King had nominated him as one of the Commissioners to execute the office of Privy Seal during such appointment; and early in December he was 'put into the new Commission of Sewers.' It was nearly Christmas before he kissed hands on receiving the patent for executing this office and entered on its duties along with the two other Commissioners. They performed these till the 10th March 1687, when the King relieved them with compliments on their 'faithfull and loyal service, with many gracious expressions to this effect', and bestowed the seal on Lord Arundel of Wardour, a zealous Roman Catholic.

In the early days of James II's reign the patronage which seemed to be coming in Evelyn's direction appears to have, not unnaturally perhaps, somewhat coloured his opinion as to the new monarch's capacity and disposition. After a journey undertaken with Pepys to Windsor, Winchester,

and Portsmouth in September 1685, whither the King went to view the state of the fortifications, he recorded that 'what I observ'd in this journey, is that infinite industry, sedulity, gravity, and greate understanding and experience of affairs, in his Majesty, that I cannot but predict much happiness to ye nation, as to its political government ; and if he so persist, there could be nothing more desir'd to accomplish our prosperity, but that he was of the national church.' Biassed and prejudiced in the royal favour as he then temporarily was, this account of King James proved so totally incorrect that it is a wonder Evelyn retained it in the compilation which he left as his *Diary*. The only explanation seems to be that he wished to record his prevision as regards Roman Catholicism proving the main rock upon which the King might come to grief, as he afterwards did.

Titus Oates' conspiracy and the Duke of Monmouth's invasion and insurrection went by without affecting Evelyn much. He was in the latter case called upon to supply a mounted trooper, which he did rather grudgingly. 'The two horsemen which my son and my selfe sent into the county troopes, were now come home, after a moneth's being out to our greate charge.' But what concerned him much more was that matters frequently came before the Commission of the Privy Seal to which he could not, on religious grounds principally, give his assent. On such occasions he would sometimes go to his house in the country, 'refusing to be present at what was to passe at the Privy Seale the next day', because any two out of the three Commissioners formed a quorum. At other times, however, he had to face his responsibility properly, by refusing to put his seal to the papers in question, while noting his objections to the course of action proposed. The Papistry which was spreading over the country under the King's influence seemed to darken the land and to obscure the future. 'Popish Justices of the Peace establish'd in all counties, of the meanest of the people ; Judges ignorant of the law, and perverting it—so furiously do the Jesuits drive, and even compel Princes to violent courses, and destruction of an excellent government both in Church and State. God of his infinite mercy open our eyes and turn our hearts, and establish his

truth with peace ! 'The Lord Jesus defend his little flock, and preserve this threaten'd Church and Nation.'

A staunch Protestant, Evelyn no longer possessed the King's favour, and henceforth he received no further appointment or token of royal approval although he still frequented the Court at Whitehall. In August 1688 he was secretly informed by the Rev. Dr. Tenison, afterwards Bishop of Lincoln, of the impending invasion of the Prince of Orange, and, while regularly paying his duty as a courtier, he informed the lately imprisoned Archbishop and Bishops of the intrigues on which the Jesuits were hard at work. And subsequently 'My Lord of Canterbury gave me great thanks for the advertisement I sent him in October, and assured me they took my counsell in that particular, and that it came very seasonably.' On 18th December, he 'saw the King take barge to Gravesend at 12 o'clock—a sad sight,' on the very day that the Prince of Orange came to St. James and filled Whitehall with Dutch guards. All the world at once went to pay court to the Prince whose star was now in the ascendant : and, of course, Evelyn went too. A couple of months later he 'saw *the new Queene and King* proclaim'd the very next day after her coming to Whitehall, Wednesday 13 Feb., with greate acclamations and generall good reception. . . . It was believ'd that both, especially the Princesse, would have shew'd some (seeming) reluctance at least, of assuming her father's Crown, and some apology, testifying her regret that he should by his mismanagement necessitate the Nation to so extraordinary a proceeding, which would have shew'd very handsomely to the world, and according to the character given by her piety ; consonant also to her husband's first declaration, that there was no intention of deposing the King, but of succouring the Nation ; but nothing of all this appear'd ; she came into White-hall laughing and jolly, as to a wedding, so as to seem quite transported. . . . This carriage was censured by many.'

After the Restoration Evelyn's life as a courtier was practically at an end, as he never quite approved the enforced abdication of King James. So henceforth he spent his time, without further attendance at Court or seeking after office

or appointment, in study, literary work, and retirement. He did not like the new régime, with its 'Court offices distributed amongst Parliament men. . . . Things far from settled as was expected, by reason of the slothfull, sickly temper of the new King, and the Parliament's unmindfulness of Ireland, which is likely to prove a sad omission.' He even seems to have regretted that his son was in March 1692 made 'one of the Commissioners of the Revenue and Treasury of Ireland, to which employment he had a mind far from my wishes.' This son contracted serious illness in Ireland, and died 'after a tedious languishing sickness' early in 1699, aged 44 years, leaving one son, then a student at Oxford.

Some time before this his elder brother, George, having lost his last son and heir, had settled the Wotton estate upon John Evelyn. In May 1694, yielding to the request to make Wotton his home, he went to Wotton, leaving Sayes Court in charge of his daughter Susanna and her husband William Draper, whose marriage had been celebrated about a year previously. In 1696 it was let for three years to Admiral Benbow, who sublet it in 1698 to Peter the Great, then visiting the Deptford Dockyards for three months as his Majesty's guest. So great was the destruction done to the gardens, trees, and holly-hedges, that Wren was asked to report on the compensation suitable, and £162-7-0 were paid to Evelyn for damage to the house and garden.

Early in 1695 Evelyn accepted the offer of the Treasurership of Greenwich Hospital, then about to be rebuilt and endowed for the maintainence of decayed seamen, which was made to him by Lord Godolphin, who had been the husband of his former friend Miss Blagg. During the days of Charles II. some such transformation of the Palace had been under consideration, but it was the 30th June 1696 before Evelyn and Sir Christopher Wren 'laid the first stone of the intended foundation, precisely at 5 o'clock in the evening, after we had din'd together.' This appointment carried with it 'the salary of £200 per ann. of which I have never yet receiv'd one penny of the tallies assign'd for it, now two years at Lady-day; my son-in-law Draper is my substitute.' When the new Commission for Greenwich Hospital was

sealed in August 1703 Evelyn resigned his office of Treasurer in favour of Draper.

His brother George dying in October 1699, Evelyn then became the owner of Wotton, and looked to his grandson, the Oxford Student, to 'be the support of the Wotton family.' The lad had a bad attack of small-pox in the autumn of 1700, a malady that had caused many gaps in the family circle; but, coming safely through this illness, he was in July 1701, by the patronage of Lord Godolphin, made one of the Commissioners of the Prizes, with a salary of £500 a year, while he was still an undergraduate at Oxford. And in January 1704 the same noble patron appointed him Treasurer of the Stamp Duties, with a salary of £300 a year. He afterwards married Ann, daughter of Hugh Boscawen (afterwards Lord Falmouth), Lord Godolphin's niece, and was created a baronet in 1713. It was through him that the present family of Evelyn of Wotton directly descend, though the baronetcy lapsed on the death of his grandson Frederick in 1812.

As he had done twenty years before, so also on now attaining his 80th birthday on 31st. October 1700 Evelyn rendered thanks for mercies with his characteristic religious feeling. 'I with my soul render thanks to God, who of his infinite mercy, not only brought me out of many troubles, but this yeare restor'd me to health, after an ague and other infirmities of so greate an age, my sight, hearing and other senses and faculties tolerable, which I implore him to continue, with the pardon of my sins past, and grace to acknowledge by my improvement of his goodnesse the ensuing yeare, if it be his pleasure to protract my life, that I may be the better prepar'd for my last day, through the infinite merits of my blessed Saviour, the Lord Jesus, Amen.'

Five times more was he to be privileged to record his thanks and prayers on successive returns of this anniversary. One of the very last entries in his memoirs is that on 31st. October 1705 'I am this day arriv'd to the 85th year of my age. Lord teach me so to number my days to come that I may apply them to wisdom'. And numbered, indeed, they then were; for on the 27th of February 1706 he passed quietly and peacefully away, retaining his faculties to the last. And he was laid at rest in the Chancel of Wotton Church.

During the course of his long and distinguished life he had seen many stirring events, had taken part in many important affairs, had achieved much, and had suffered much. He had outlived four reigns, two of which were terminated by a natural death, one by public execution, and one by abdication. He had served many public and other distinguished offices with zeal, ability, integrity, and success. He had given to English literature some of the classic works that are among the treasures of our literature of the Restoration period. He had outlived all of his six sons, most of whom had died in childhood, as well as his eldest and favourite daughter. Of all his nine children, the sole survivors were his daughter Elizabeth, who was soon afterwards married to a son of Sir John Tippet, and Susanna, wife of William Draper, afterwards of Adscumb near Croydon. After nearly 60 years of pure domestic wedded life, in marked contrast to the prevailing dissoluteness of the time, Evelyn was survived for nearly three years by his widow, who died in 1709, aged 74 years, cherishing to the last her love and affection for him to whom her destiny had been committed whilst she was still a mere child. 'His care of my education', she wrote in her last Will and Testament, 'was such as might become a father, a lover, a friend, and a husband; for instruction, tenderness, affection and fidelity to the last moment of his life; which obligation I mention with a gratitude to his memory ever dear to me; and I must not omit to own the sense I have of my parents' care and goodness in placing me in such worthy hands.' Surely no husband ever had a nobler epitaph.

In an age of fierce political and ecclesiastical conflict, Evelyn, often, no doubt, strongly tempted to partisanship, managed to steer his course with prudence and great worldly judgment. But for that, his industry and business talent would probably have brought him more prominently into office under Charles II. In a corrupt and profligate age, however, his character stands out as that of one unsullied by excesses, impurities, or vices. And it is not the least of his merits that, in an age of bigotry and narrow-mindedness, he was not intolerant towards those whose religious views happened to differ from his own.

VII

Evelyn's Literary Works.

Evelyn's earliest publications, some of which have already been referred to, consisted mostly in translations from the French, Latin, and Greek, that of the first book of Lucretius' *De Rerum Natura* being in verse. Their authorship was usually veiled either under Greek pseudonyms or else more thinly under the initials 'J.E.' That on *A Character of England* (1659), a tract purporting to have been written by a foreigner, appeared anonymously.

Of all these seven publications appearing before the Restoration, the only one of any importance was *The French Gardener*, the translation of a work by N. de Bonnefons, which appeared at the end of 1658 and was thus referred to in the diary,—'Dec. 6th. Now was publish'd my "French Gardener," the first and best of the kind that introduc'd ye use of the Olitorie garden to any purpose'. Subsequent editions of it appeared in 1669, 1672, 1691, bearing Evelyn's name on the titlepage in place of the *Philocepos* on its first publication.

With the Restoration, bringing to him greater personal freedom of thought and speech, came the most active period of Evelyn's literary production. His loyalty at once found opportunity to answer a libel on King Charles (entitled *News from Brussels*) in *The late News from Brussels unmasked*, a long vindication of his Majesty from the calumnies and scandal therein fixed on him. From a literary and antiquarian point of view, however, far greater interest attaches to a much shorter treatise entitled *Fumifugium: or the Inconvenience of the Aer and Smoak of London Dissipated, together with some Remedies humbly proposed*. As this is the earliest reference to the great London Smoke Nuisance, which, like the poor, we have always with us, it is of more than passing interest to know how large this difficult problem of curing it loomed about two and a half centuries ago. Moreover, this short work affords a very typical example of Evelyn's literary style, while at the same time well exemplifying his profusely

enthusiastic outbursts of devoted and loyal attachment to the King's person and interests.

In the dull days of autumn and winter, when the heavy, damp air wafted inwards from the sea shrouds London with a dirty pall of fog thickened and discoloured with the smoke belched forth skywards from the long throats of thousands of tall factory chimneys and emitted from hundreds of thousands of household and workshop fires, the dweller in this vast overgrown city is tempted to range himself for the moment among the belauders of better times in the past. Almost groping his way along the streets in semi-darkness, and half choked with the sulphurous surcharge in the atmosphere, this latter-day growler may perhaps be astonished to learn that his complaint is of very old standing, and that long before the days of his great-great-grandfather, in fact more than seven generations ago, this poisoning of the atmosphere with the impurities given off from 'sea-coal' and other combustibles had already come to be looked on by some as a public nuisance. It will, therefore, interest Londoners in general, and will delight the hearts of Sir William Richmond R.A. and the County Council in particular, to know that their great precursor in this matter of reform nearly 250 years ago considered the question even then one of urgency, admitting of no delay. How graphic, and how refreshing, is the pithy point thus neatly scored—

‘ I propose therefore, that by an *Act* of this present *Parliament*, this infernal *Nuisance* be removed.’

There is no beating about the bush here, and no mincing of phrases. The matter is at once probed with the needle.

Evelyn was not merely a rather notable person in the London society of that period. As a man of science he was one of the most prominent pillars of the then recently founded Royal Society. As an official he was His Majesty's Commissioner for improving the streets and buildings of London, in addition to various other particular duties. But finally,—and, at the same time, first of all, if it be permissible to emphasise the fact in so paradoxical a manner—he was a courtier; and that at a time when expressions of loyalty

to His Gracious Majesty, King Charles II., were somewhat too highly coloured, too servile and sycophantic, to suit our modern taste.

This short work *Fumifugium*, really only a pamphlet, was therefore dedicated to the King in language of the period extravagant in the highest degree, though eminently typical of the Royalists during the early days of the Restoration. The treatise was thus occasioned:— ‘It was one day, as I was Walking in Your Majesty’s Palace at White-Hall (where I have sometimes the honour to refresh myself with the Sight of Your Illustrious Presence, which is the Joy of Your Peoples hearts) that a presumptuous Smoak issuing from one or two tunnels near *Northumberland House*, and not far from *Scotland-yard* did so invade the Court; that all the Rooms, Galleries, and Places about it were fill’d and infested with it; and that to such a degree, as Men could hardly discern one another from the Clowd, and none could support, without manifest Inconveniency. It was not this which did first suggest to me what I had long since conceived against this pernicious Accident, upon frequent observation; But it was this alone, and the trouble that it must needs procure to Your Sacred Majesty, as well as hazzard to Your Health, which kindled this Indignation of mine against it, and was the occasion of what it has produc’d in these Papers.

Sir, I prepare in this short Discourse an expedient how this pernicious *Nuisance* may be reformed; and offer at another also, by which the *Aer* may not only be freed from the present Inconveniency; but (that remov’d) to render not only Your Majesties Palace, but the whole City likewise, one of the sweetest, and most delicious Habitations in the World; and this, with little or no expence; but by improving those Plantations which Your Majesty so laudably affects, in the moyst, depressed and marshy grounds about the Town, to the Culture and production of such things, as upon every gentle emission through the *Aer*, should so perfume the adjacent places with their breath; as if, by a certain charm, or innocent *Magick*, they were transferred to that part of *Arabia*, which is therefore styled the *Happy*, because it is amongst the Gums and precious spices.’

Objectionable cottages had thus apparently only recently,

probably during the democratic Commonwealth, been erected to the east of Whitehall, and were surrounded by fields. These fields were to be divided into blocks of about 20 to 40 acres, and palisades or fences of shrubs were to enclose belts of 150 feet or more between the various fields. The fences were to be formed or filled with sweetbriar, pericymena, woodbine, jessamine, syringa, guelder-rose, musk and other roses, broom, juniper, lavender, and so on,—‘ but above all *Rosemary*, the *Flowers* whereof are credibly reported to give their sent above thirty Leagues off at Sea, upon the coasts of Spain. Those who take notice of the Sent of the *Orange-flowers* from the Rivage of Genöa, and *St. Pietro dell’ Arena*; the *Blosomes* of *Rosemary* from the Coasts of *Spain* many leagues off at Sea; or the manifest and odoriferous wafts which flow from *Fontenoy* and *Vaugirard*, even to *Paris* in the season of *Roses*, with the contrary Effects of those less pleasing smells from other accidents, will easily consent to what I suggest: And, I am able to enumerate a Catalogue of native *Plants*, and such as are familiar to our Country and Clime, whose redolent and agreeable Emissions would even ravish our senses, as well as perfectly improve the *Aer* about *London*; and that, without the least prejudice to the Owners and Proprietors of the Land to be employ’d about it.’ Evelyn further recommended ‘ That the *Spaces*, or *Area* between these *Pallisads*, and *Fences*, be employ’d in Beds and Bordures of *Pinks*, *Carnations*, *Clove*, *Stock-gilly-flower*, *Prim-roses*, *Auriculas*, *Violets*, not forgetting the *White*, which are in flower twice a year, *April* and *August*; *Cowslips*, *Lillies*, *Narcissus*, *Strawberries*, whose very leaves as well as fruit, emit a *Cardiague*, and most refreshing *Halitus*: also *Parietria Lutea*, *Musk*, *Lemmon*, and *Mastick*: *Thyme*, *Spike*, *Cammomile*, *Balm*, *Mint*, *Marjoram*, *Pimpernel*, *Serpillum*, etc., which upon the least pressure and cutting, breathe out and betray their ravishing Odors.’ Plantations of trees were also to be made and nurseries formed, which would have the additional advantage, besides mere beauty and ornament, of providing for the fields—‘ better Shelter, and Pasture for Sheep and Cattel then now; that they lie bleak, expos’d and abandon’d to the winds, which perpetually invade them.’ It is said that the planting of Lime trees in St. James’ Park was due

to these suggestions. Evelyn's recommendations concluded with the exhorting that 'the further exorbitant encrease of *Tenements*, poor and nasty *Cottages* near the City, be prohibited, which disgrace and take off from the sweetness and amoenity of the Environs of *London*, and are already become a great *Eye-sore* in the grounds opposite to *His Majesty's Palace* of *White-hall*; which being converted to this use, might yield a diversion inferior to none that could be imagin'd for *Health*, *Profit*, and *Beauty*, which are the three *Transcendencies* that render a place without all exception. And *this* is what (in short) I had to offer, for the *Improvement* and *Melioration* of the *Aer* about *London*, and with which I shall conclude this discourse.'

Besides dedicating his pamphlet especially to the King, as well as proposing, on the title-page, the remedy "To His Sacred Majestie, and To the Parliament now Assembled", Evelyn likewise addresses himself "To the Reader" by way of a second introduction; and he does so in these plainer and rather contemptuous terms:— 'I have little here to add to implore thy good opinion and approbation, after I have submitted this Essay to his Sacred Majesty: But as it is of universal benefit that I propound it; so I expect a civil entertainment and reception....' Confessing himself 'frequently displeas'd at the small advance and improvement of Publick Works in this nation,' he further expresses himself as 'extremely amaz'd, that where there is so great affluence of all things which may render the People of this vast City the most happy upon Earth; the sordid and accursed Avarice of some few Particular Persons should be suffer'd to prejudice the health and felicity of so many: That any Profit (besides what is absolute necessity) should render men regardlesse of what chiefly imports them, when it may be purchased upon so easie conditions, and with so great advantages: For it is not happiness to possesse Gold, but to enjoy the Effects of it and to know how to live cheerfully and in health, *Non est vivere, sed valere vita*. That men whose very Being is *Aer*, should not breath it freely when they may; but (as that *Tyrant* us'd his Vassals) condemn themselves to this misery and *Fumo præfocari*, is strange stupidity: yet thus we see them walk

and converse in *London*, pursu'd and haunted by that infernal Smoake, and the funest accidents which accompany it wheresoever they retire.'

Surely, if John Evelyn could in spirit revisit the metropolis he loved so well and was so much at home in, he would, while lamenting the continuation and the now much more acute form of the "infernal *Nuisance*", to a certainty find ample cause for rejoicing at the admirable work of late years carried out in the London Royal Parks and Pleasure Grounds, and in the Parks and Open Spaces under the administration of the County Council.

It was in 1664, however, that Evelyn achieved his greatest literary triumph by the publication of his three masterpieces, *Sylva: or a Discourse of Forest Trees, and the Propagation of Timber in His Majesty's Dominions*; *Pomona: or an Appendix concerning Fruit Trees in relation to Cider, the Making and several ways of Ordering it*; and *Kalendarium Hortense: or the Gard'ners Almanack, directing what he is to do Monthly throughout the Year*.

The manner in which the idea of the *Sylva* originated is clearly shewn by what is noted in his Diary on 15th October, 1662.—'I this day deliver'd my "Discourse concerning Forest Trees" to the Society, upon occasion of certain queries sent to us by the Commissioners of his Majesties Navy, being the first booke that was printed by order of the Society, and by their printer, since it was a Corporation.' This latter reference evidently anticipates events, as one often had reason to note in this so-called diary, because *Sylva* was not actually published until the beginning of 1664, when along with it were included *Pomona*, and the *Kalendarium Hortense*. In February, 1664, '16th. I presented my "*Sylva*" to the Society; and next day to his Majesty, to whom it was dedicated; also to the Lord Treasurer and the Lord Chancellor.'

There is no doubt that *Sylva* was a work of national importance. Then, as now, England was dependent on her Navy. But the stock of Oak timber suitable for the requirements of the naval dockyards had become almost exhausted. From a tonnage of 17,110 tons in 1603, our fleet had risen to 57,463 tons in 1660, and during the 25 years of Charles II's

reign it increased to 103,556 tons. To supply these rapidly expanding requirements the stock of timber in the country was feared to be inadequate. From 197,405, loads of timber fit for the Navy in the New Forest in 1608, the stock sank later to 19,873 in 1707; and in the royal forests in Gloucestershire a similar state of affairs obtained. At a meeting of the Council of the Royal Society in November 1662, Evelyn followed up his recent *Sylva* by suggesting a discourse 'concerning planting his Majesty's Forest of Deane with oake, now so much exhausted, of ye choicest ship-timber in the world.' This was before the days of steam or even of macadamized roads, when we had to grow our own supplies of food and Navy timber. True, oak for wainscoting and the like had long been imported from the Continent; but if we had been anything like dependent on foreign oak, the Dutch War which shortly afterwards broke out would probably have cut off the same entirely from reaching our ports.

It is unnecessary to say much about this charming classic of Forestry, of whose various excellences the reader can herein judge for himself. Gracefully written in nervous English and in a cultured style, ornately embellished according to the then prevailing custom by apt quotations from the Latin poets, it contains an enormous amount of information in the shape of legends and of facts ascertained by travel, of observation, and of experience. No man of his time could possibly have been better qualified than Evelyn for undertaking the special duty laid upon him; and he carried out his task in a brilliant manner. *Sylva* soon ran into several editions. The fourth edition appeared in the year of his death (1706) and a fifth in 1729. From 1776 to 1812 other four editions were published, with notes by Dr. A. Hunter of York, the last of which served as the text for the celebrated forestry article in the *Quarterly Review* for March, 1813. A later issue of Hunter's editions appeared in 1825; but in 1827 ignorant and wanton hands were with much bombastic language and buffoonry laid on this great classic, when James Mitchell, an agriculturist, published *Dendrologia; or a Treatise of Forest Trees, with Evelyn's Silva, revised, corrected, and abridged by a Professional Planter and Collector of practical Notes forty years*. Since then no other edition of *Sylva* has appeared until the

present reprint of the 4th edition, making the 12th edition of this classic work.

The publication of *Sylva* gave an enormous stimulus to planting in Britain, the benefits from which were subsequently reaped at the end of the XVIII and the beginning of the XIX century, when during our war with France the supply of oak timber for shipbuilding almost entirely ran out. Dr. Hunter's editions did much to revive the ardour for planting, which was further stimulated by the *Quarterly Review* article and by the advice which Sir Walter Scott put into the mouth of the Laird o' Dumbiedykes to his son: 'Jock, when ye hae naething else to do, ye may be aye sticking in a tree; it will be growing, Jock, when ye're sleeping.' To the impetus then given to planting, many of the woods now growing in different parts of Britain, and especially in Scotland, owe their origin.

As Evelyn had given the copyright to Allestry, the Royal Society's printer, *Sylva* brought no pecuniary profit to its author; and indirectly it was the cause of disappointment to him. How this came about may be seen from the following extract from a letter, dated 4th August 1690, to his friend the Countess of Sunderland, which is further of interest as giving Evelyn's own account of the origin of *Sylva*—'when many yeares ago I came from rambling abroad, observ'd a little time there, and a greate deale more since I came home than gave me much satisfaction, and (as events have prov'd) scarce worth one's pursuite, I cast about how I should employ the time which hangs on most young men's hands, to the best advantage; and when books and severer studies grew tedious, and other impertinence would be pressing, by which innocent diversions I might sometime relieve my selfe without compliance to recreations I took no felicity in, because they did not contribute to any improvement of the mind. This set me upon planting of trees, and brought forth my "Sylva," which booke, infinitely beyond my expectation, is now also calling for a fourth impression, and has been the occasion of propagating many millions of usefull timber trees thro'out this nation, as I may justifie (without im'odesty) from ye many letters of acknowledgement receiv'd from gentlemen of the first quality, and others altogether strangers to me. His late Majesty Charles the 2nd. was sometimes graciously

pleas'd to take notice of it to me, and that I had by that booke alone incited a world of planters to repaire their broken estates and woodes, which the greedy rebels had wasted and made much havock of. Upon this encouragement I was once speaking to a mighty man, then in despotic power, to mention the greate inclination I had to serve his Majesty in a little office then newly vacant (the salary I think hardly £300) whose province was to inspect the timber trees in his Majesties Forests, etc., and take care of their culture and improvement; but this was conferr'd upon another who, I believe, had seldom been out of the smoake of London, where though there was a greate deale of timber, there were not many trees. I confesse I had an inclination to the imployment upon a publique account as well as its being suitable to my rural genius, borne as I was at Wotton, among the woods.

A still greater success was achieved by the *Kalendarium Hortense*, which reached its tenth edition (1706) during Evelyn's lifetime, and of which two reprints have subsequently been made. This small work was the forerunner of the more modern books on English gardening, the names of which are now almost legion.

Previous to this, *Sculptura: or the History and Art of Chalcography and Engraving in Copper and Mezzo-tinto*, had been published in 1662, being the first work on this subject that had appeared in England. But it was a poor production, and ran into no second edition while the author lived. His chief subsequent literary successes were *Terra: a Philosophical Discourse of Earth relating to the Culture and Improvement of it for Vegetation, and for the Propagation of Plants*, (1676), which was first read before the Royal Society on 29th April 1675, and of which the third edition was printed in 1706, and *The Compleat Gardiner, or Directions for cultivating and right ordering of Fruit Gardens and Kitchen Gardens; with divers Reflections on several parts of Husbandry*, (1693), which went into five editions by 1710. His *History of the Dutch War*, already referred to (page xliii) would have been by far his most important work in point of length had its completion been allowed, but only the introductory portion saw the light as *Navigation and Commerce; their Original and Progress, Contain-*

ing a succinct account of Traffick in general ; etc. etc..... to the beginning of our late differences with Holland ; in which his Majesties title to the Dominion of the Sea is asserted against the Novel and later Pretenders. (1674). His own account of the stoppage of the work is given in the diary for 19th August 1674,—‘His Majesty told me how exceedingly the Dutch were displeas’d at my treatise of the “*Historie of Commerce* ;” that the Holland Ambassador had complain’d to him of what I had touch’d of the Flags and Fishery, etc., and desired the booke might be call’d in ; whilst on the other side he assur’d me he was exceedingly pleas’d with what I had done, and gave me many thanks. However, it being just upon conclusion of the treaty of Breda (indeed it was design’d to have been publish’d some moneths before and when we were at defiance), his Majesty told me he must recall it formally, but gave order that what copies should be publiqly seiz’d to pacifie the Ambassador, should immediately be restor’d to the printer, and that neither he nor the vendor should be molested. The truth is, that which touch’d the Hollander was much lesse than what the King himself furnish’d me with, and oblig’d me to publish, having caus’d it to be read to him before it went to the presse ; but the error was, it should have been publish’d before the peace was proclaim’d. The noise of this book’s suppression made it presently be bought up, and turn’d much to the stationer’s advantage. It was no other than the Preface prepar’d to be prefix’d to my *History of the whole Warr* ; which I now pursued no further.’ Years afterwards, however, he wrote somewhat bitterly on this subject to his intimate friend Pepys, in a letter dated 28th April 1682, in which he says, ‘In sum, I had no thanks for what I had done, and have been accounted since, I suppose, an useless fop, and fit only to plant coleworts, and I cannot bend to mean submissions ; and this, Sir, is the history of the *Historian*. I confess to you, I had once the vanity to hope, had my patron continued in his station, for some, at least, honorary title that might have animated my progress, as seeing then some amongst them whose talents I did not envy : but it was not my fortune to succeed.’ This certainly seems as if Evelyn had been hoping for knighthood from King Charles. If his desire lay this way, it is difficult to reconcile such private

admission with the definite statement made in the diary of 19th April, 1661, that 'he might have receiv'd this honour,' of Knighthood of the Bath 'but declined it.'

Evelyn's other publications, works of considerably less importance, include *Tyrannus or the Mode, in a Discourse of Sumptuary Laws* (1661); *A Parallel of the Ancient Architecture with the Modern* (1664), and *An Idea of the Perfection of Painting, Demonstrated from the Principles of Art* (1668), both translated from the French of Roland Freart; *Another Part of the Mystery of Jesuitism*, also from the French (1665); *Publick Employment, and an Active Life preferr'd to Solitude* (1667: a reply to Sir George Mackenzie's *Work on Solitude*); *The History of three late famous Imposters* (Padre Ottomano, Mahomed Bei, and Sabatei Sevi: 1669); *Mundus Muliebris: or the Ladies' Dressing-room Unlock'd and her Toilette spread* (1690: a burlesque poem, 'A voyage to Marryland,' cataloguing female follies of the time, by his daughter Mary, who died in 1685); *Numismata: a Discourse of Medals, Antient and Modern: &c.* (1697); and *Acetaria: a Discourse of Sallets* (1699), which was merely a chapter, written many years previously, of an extensive work he intended writing under the comprehensive title of *Elysium Britannicum*. There is no doubt that, but for his immersion in public affairs in middle life, Evelyn would have been a much larger producer of literary work than he actually was. But it seems very questionable if this would in any substantial way have added to the enduring reputation he won for himself by *Sylva*.

In addition to his published works, however, he left numerous manuscripts, which he had noted as 'Things I would write out faire aud reform if I had leisure,' comprising poems, mathematical papers, religious meditations, and biographies. The most ambitious of his poems is *Thyrander, a Tragy-Comedy*, which is probably one of those referred to by Pepys in his *Diary* for 5th Novr. 1665, when, visiting Evelyn at Sayes Court, he says that 'He read me part of a play or two of his making, very good, but not as he conceits them, I think, to be.' Some of these, including *My own Ephemeris or Diarie*, an autobiographical memoir based on the journal or common-place book kept by him ever since being eleven years of age, and his correspondence, were published

posthumously as *Memoirs illustrative of the Life and Writings of John Evelyn Esqre. F.R.S.* in 1818. This has gone through nine editions and reprints; and it affords, along with Pepys' diary, one of the best views of the life of those times. Each is the complement of the other, and the only matter of regret is that the original manuscript of Evelyn's actual diary has not hitherto been forthcoming, as it would be infinitely preferable to the compilation he made therefrom, which often refers to future events. Other of his MSS. appeared as *Miscellaneous Writings of John Evelyn Esq. F.R.S.* in 1825, *The Life of Mrs. Godolphin* (see page xlv) in 1847, and subsequently in five or six editions and reprints, and *The History of Religion: A Rational Account of the True Religion* in 1850. Of these the so-called *Diary* is by far the most interesting and important, and it is on it and on the *Sylva* that his literary reputation rests and has a sure and abiding foundation.

VIII

Evelyn's Influence on British Arboriculture.

There can be no doubt that John Evelyn, both during his own lifetime and throughout the two centuries which have elapsed since his death in 1706, has exerted more individual influence, through his charming *Sylva, or a Discourse of Forest Trees and the Propagation of Timber in His Majesty's Dominion* (first published in 1664) than can be ascribed to any other individual. The attention drawn to the subject of Arboriculture by Dr. Hunter towards the end of the eighteenth and the beginning of the nineteenth centuries was in connection with several new editions of that classic work, while the impulse given to the formation of large plantations between 1800 and 1830 by Sir Walter Scott and the celebrated *Quarterly Review* articles was connected very closely indeed with the appearance of fresh editions of *Sylva*.

It is easy to understand the success of Evelyn's work and the influence he exerted on British Arboriculture. First and foremost, he held the brief in an excellent cause, because the maintenance of adequate supplies of oak timber

for shipbuilding ever remained a question of very serious national importance right down to the time when this pressure was removed by the introduction of steam communication and the use of Indian Teak and subsequently of iron for purposes of construction. Then again, his position as a courtier and a country gentleman, and as one of the most prominent members of the recently established Royal Society, gave him a much higher degree of prominence than such adventitious aids would ensure in our present far more democratic days. Finally, he had no small confidence in his own ability ('conceit' his friend Mr. Samuel Pepys calls it in his diary); and this has been recognised in the numerous editions of *Sylva* that have from time to time been found worthy of publication.

Although by far the most celebrated of English writers on Arboriculture, Evelyn was by no means the first who wrote on this subject. That honour belongs to Master Fitzherbert, whose *Boke of Husbandrie* was published in 1534. But it is a curious fact that the most important previous contribution towards the propagation of timber—leaving Manwood's *Treatise of the Forrest Lawes* (1598) out of consideration—is apparently never mentioned by Evelyn. This was a small booklet of 34 pages, a mere pamphlet in size, published in 1613 by Arthur Standish and entitled *New Directions of Experience . . . for the Increasing of Timber and Firewood*. In this, Standish strongly urged sowing and planting on an extensive scale; and the pamphlet was so highly approved by King James I., that in 1615 a second edition was issued. This included, among the prefatory matters, a royal proclamation 'By the King, To all Noblemen, Gentlemen, and other our loving Subjects, to whom it may appertaine,' which set forth the 'severall good projects for the increasing of Woods' and recommended them to 'be willingly received and put in practise' with a view to restore the decay of timber 'universally complained of' within the realm.

Although exhortations and royal proclamations had previously been issued more than once by James I. relative to the 'storing' of timber trees when falls were being made in copsewoods, and generally to ensure better effect being given to the intentions of Henry VIII's *Statute of Woods* of 1543,

as amended during Queen Elizabeth's reign (in 1570), yet Standish's treatise was the first occasion (so far as I have been able to discover) on which a private subject had endeavoured to stimulate the progress of British Forestry by means of the publication of his views in the form of a small book. His aims and objects are thus described on the title-page of the second or royal edition of 1615:—"NEW DIRECTIONS OF EXPERIENCE AUTHORIZED BY THE King's most excellent Majesty, as may appeare, for the increasing of Timber and Fire-wood, with the least waste and losse of ground. WITH A NEARE ESTIMATION, what millions of acres the Kingdome doth containe; what acres is waste ground, wherever little profit for this purpose will arise—which waste being deducted, the remaine is twenty-five millions; forth of which millions, if two hundred and forty thousand Acres be planted and preserved according to the directions following, which is but the hundred part of the twenty-five millions, there may be as much timber raised, as will maintaine the Kingdome for all uses for ever. And how as great store of Fire-wood may be raised, forth of hedges, as may plentifully mainetaine the Kingdome for all purposes, without losse of ground; so as within thirty years all Spring-woods¹ may be converted to Tillage and Pasture. By Arthur Standish. Anno Domini MDCXV."

This was the only work of the sort which had been published up to the time of Evelyn's *Sylva* appearing about fifty years later, in 1662. It is curious that he made no reference to this work written with similar objects to those he himself had in view. Another work, however, he does mention, evidently that of a practical horticulturist and arboriculturist, probably belonging to a lower status of society than himself. Writing of the *New Orchard and Garden* (1597, 2nd. edit. 1623), he patronises the author by calling him 'our countryman honest Lawson'; and after giving a long quotation from it with regard to pruning, he complacently concludes by adding 'Thus far the good man out of his eight and forty years experience concerning timber-trees.'

Evelyn had the satisfaction of seeing his work bear much fruit during his own life-time, and this must have occasioned

¹ Coppices.

a quite exceptionally keen pleasure to a man of his disposition. In his preface, dated 5 December 1678, to the fourth edition of *Sylva*, he writes in 'The Epistle Dedicatory' to the King that 'I need not acquaint your Majesty how many millions of timber-trees, besides infinite others, have been propagated and planted throughout your vast dominions, at the instigation, and by the sole directions of this work ; because your gracious Majesty had been pleased to own it publicly for my encouragement, who in all that I here pretend to say, deliver only those precepts which your Majesty has put in practise; as having, like another Cyrus, by your own royal example, exceeded all your predecessors in the plantations you have made, beyond, I dare assert it, all the Monarchs of this nation, since the conquest of it.'

Apart from the planting done in the royal woods and forests, details of Evelyn's diary shew that he was frequently called upon to give advice with regard to laying out private plantations,—as well as of ornamental gardens, on which subject he was also considered one of the leading authorities of the time.

More than a century after Evelyn's death, during the time of our wars with France, the demand for timber and the serious outlook with regard to future supplies once more drew marked attention to the propagation of timber throughout Britain, and many plantations of oak were then made which have not yet been entirely cleared to make way for other and now more profitable crops of wood. A very decided impetus was given in this direction by the re-publication of the text of the fourth edition of *Sylva* (as finally revised by the author in 1678), with copious notes by Dr. A. Hunter F.R.S. in 1812. A most appreciative and favourable review of this work is contained in the *Quarterly Review* for March 1813 (Vol. ix), which was of much assistance in drawing the attention of our great landowners to the advantages of growing timber. Plantations could then be made at about one-fourth to one-third (and often less than that) of what it now costs to make them, while the market for timber and wood of all sorts was then favourable, with a steady demand likely to increase as time rolled on and the national commerce and industries expanded,—because in those days the

economic revolution, accomplished through the subsequent discoveries of the great uses to which steam and iron are now put, were not then dreamed of.

This *Quarterly Review* article was an appreciation of Evelyn,—and not the only one made by that celebrated periodical, as we shall see presently. It traced the history of the work, showing how Charles II. ‘was too sensible a man to think of compelling his subjects to plant, by fines and forfeitures for the omission. Example he knew would do something, and he had scope enough for the purpose in his own wasted forests ; but an animated exhortation from the press, in an age when the nobility and gentry began to read and to reflect, he knew would do more. A proper person for the purpose therefore was sought and found ; a man of family, fortune, and learning ; an experienced planter ; a virtuoso, and not a little of an enthusiast in his own walk. Such was Mr. Evelyn : and to this occasion we are indebted for the *Sylva*, which has therefore a title to be regarded as a national work... It sounded the trumpet of alarm to the nation on the condition of their woods and forests.’

The re-publication of the *Sylva* by Dr. Hunter, coming at an appropriate moment, revived the ardour which the work had excited about 60 years previously, and ‘while forests were laid prostrate to protect our shores from the insults of the enemy, the nobility and gentry began once more to sow the seeds of future navies.’

Previous to 1812, planting on any large scale whether for profit or ornament seems to have been confined chiefly to great estates, and ‘if a private gentleman, in the century preceding, planted an hedg-row of an hundred oaks, it was recorded, for the benefit of posterity, in his diary.’ The trade in the supply of plants had previously been in the hands of a few nurserymen, but on the appearance of Dr. Hunter’s new edition many private nurseries were established. This was more especially the case in Scotland, where the Scottish nobility took the lead ‘in this national and patriotic work,’—which promised to be very profitable, owing to the recent introduction of the larch. The well-deserved eulogy given in the *Quarterly Review* article to the rapid growth of fine timber of this valuable forest tree was the direct cause of

larch plantations being largely extended, because it was said that 'a tree which, if the oak should fail, would build navies, and if the forests of Livonia or Norway or Canada were exhausted, would build cities, is an acquisition to this island almost without a parallel.' And it still is one of the most valuable of our woodland trees, despite the cankerous fungus-disease which has certainly been (indirectly) due in no small degree to injudicious planting in pure woods on unsuitable soils and situations.

This *Quarterly Review* article of 1813 probably did quite as much to stimulate planting throughout Great Britain as the *Sylva* itself had previously done ; but as Evelyn's classic formed the text for the exhortation, the beneficial effects must of course in great part be ascribed to his influence.

A few years later, the *Quarterly Review* in an article on Evelyn's *Memoirs* (April, 1818), again sings the well-deserved praise of his influence on British Arboriculture. 'The greater part of the woods, which were raised in consequence of Evelyn's writings, have been cut down : the oaks have borne the British flag to seas and countries which were undiscovered when they were planted, and generation after generation has been confined in the elms. The trees of his age, which may yet be standing, are verging fast toward their decay and dissolution : but his name is fresh in the land, and his reputation, like the trees of an Indian Paradise, exists and will continue to exist in full strength and beauty, uninjured by the course of time.

Thrones fall and Dynasties are changed :
 Empires decay and sink
 Beneath their own unwieldy weight ;
 Dominion passeth like a cloud away.
 The imperishable mind
 Survives all meaner things.

No change of fashion, no alteration of taste, no revolutions of science have impaired or can impair his celebrity.'

Another of the celebrated *Quarterly Review* articles on Forestry is that *On Planting Waste Lands* (October, 1827) ; and even though it was Robert Montearth's *Forester's Guide and Profitable Planter* which furnished the peg for a discourse

on this occasion, still the spirit breathing throughout the exhortation was the revivification of Evelyn's influence. And the same must also be said about the article on *Loudon's 'Trees and Shrubs'* (*Quarterly Review*; October, 1838), which opens with a eulogy of our great English enthusiast of Arboriculture. 'The good and peaceful John Evelyn was a great benefactor to England. He was a country gentleman of independent fortune; he held an office under Government; and was personally familiar with Charles II. and James II; yet, in spite of the influence which he then possessed, his example effected little for his favourite object till the publication of the *Sylva*. Half the charm of this work lies in his contriving to make us feel interested about his trees; he gossips about them, he tells us where they came from and what they are used for, and has a few marvels—not of his own—but told with such perfect good faith that we can hardly help believing them with him. This was the secret by which he managed to attract the attention of even the wits and gallants of 'the gay court;' and thus it was that he gave an impulse to planting those 'goodly woods and forests,' the absence of which, in his own time, he so feelingly laments, and which now crown our hills and enrich our valleys. Mr. Loudon has followed Evelyn's track. Tradition—history—poetry—anecdote enliven his pages; the reader soon feels as if his instructor were a good natured and entertaining friend. He has also not contented himself with merely recalling old favourites to our memory, but has introduced to us numerous agreeable foreigners whose acquaintance we ought to rejoice to make, since by their aid we may hope, in the course of another half century, to see our woods and plantations presenting the richness and variety of the American autumns, the trees which produce those 'lovely tints of scarlet and of gold,' of which travellers tell us, are all to be obtained at moderate cost in every nursery; and that they will thrive perfectly in this country Fonthill and White Knights bear ample testimony.'

Hardly anything can well be added to the above testimony regarding Evelyn's influence on Arboriculture throughout the British Isles. Economic conditions have changed entirely since his time, but the spirit living and breathing in *Sylva* is

still that which is found influencing many of our great land-owners. And it is an influence which cannot be indicated in any mere enumeration of the number of trees planted or of acres enclosed as woodlands either for purposes of profit or of ornament.

Far more is, of course, now known with regard to the physiology and the natural requirements of our forest trees—e.g. with reference to soil and situation, demand for light and capacity of enduring shade, etc.,—than was known in Evelyn's time. Many of his arguments could easily be shown to be wrong, and many of his recommendations could equally easily be proved to be inefficacious and inexpedient, just as old works on Agriculture can no longer be accepted as trustworthy text-books for the teaching of modern farming; because Vegetable Physiology forms the true and scientific basis of both the arts relating to the cultivation of the soil, Agriculture and Forestry; and Vegetable Physiology is a branch of botanical science which is only of comparatively recent growth.

Many works on Sylviculture or Forestry, on business principles, have appeared in England and Scotland within the last fifteen years, but this new edition of *Sylva* makes no pretence to belong to such an up-to-date class of works. It is merely a reprint of the last edition that was revised by Evelyn himself; and no notes of any description have been added, such as those to be found in the several editions published by Dr. Hunter. The present reprint is intended for those who love our forests and woodlands and the old trees surviving in parks and chases as links with the distant past; and it will also, for its own sake, appeal no less strongly to those who love to peruse a classic work, written in the very highly polished and ornate style affected by writers of distinction in the seventeenth century.

JOHN NISBET.

SILVA,
Or a DISCOURSE of
FOREST-TREES,
AND THE
PROPAGATION of TIMBER

In His MAJESTY'S DOMINIONS.

As it was Deliver'd in the ROYAL SOCIETY the xvth of October, MDCLXII
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By the AUTHOR

JOHN EVELYN, Esq; Fellow of the ROYAL SOCIETY

.....*Tibi res antiquæ laudis & artis*
Ingredior, tantos ausus recludere fontes. Virg.

LONDON:

Printed for Robert Scott in *Little-Britain*; Richard Chiswell in *St. Paul's Church-yard*; George Sawbridge in *Little-Britain*; and Benj. Tooke in *Fleetstreet*. MDCCVI.

TO THE
K I N G.

FOR to whom, Sir, with so just and Equal Right should I present the Fruits of my Labours, as to the Patron of that SOCIETY, under whose Influence, as it was produced; so to whose Auspices alone it owes the Favourable Acceptance which it has receiv'd in the World? To You then (Royal Sir) does this Third Edition continue its Humble Addresses, Tanquam MEMORUM VINDICI; as of old, they paid their Devotions,¹ HERCULI & SILVANO; since You are our θεὸς ὑλικός Nemorensis Rex; as having once Your Temple, and Court too, under that Sacred Oak which You Consecrated with Your Presence, and we Celebrate, with just Acknowledgment to God for Your Preservation.

I need not Acquaint Your Majesty, how many Millions of Timber-Trees (beside infinite others) have been Propagated and Planted throughout Your vast Dominions, at the Instigation, and by the sole Direction of this Work; because Your Gracious Majesty, has been pleas'd to own it Publicly for my Encouragement, who, in all that I here pretend to say, deliver only those Precepts which Your Majesty has put into Practice; as having (like another Cyrus) by Your own Royal Example, exceeded all your Predecessors in the Plantations You have made, beyond (I dare assert it) all the Monarchs of this Nation, since the Conquest of it. And, indeed what more August, what

¹ Cato de R. R. cap. 73. Aurel. Vict. Class. Phil. apud. Tranquill. And so Nemes-tinus Deus Nemorum. Arnob. l. 4.

more Worthy Your Majesty, or more becoming our Imitation ? than whilst You are thus solicitous for the Publick Good, we pursue Your Majesty's Great Example ; and by cultivating our decaying Woods, contribute to Your Power, as to Your greatest Wealth and Safety ; since whilst Your Majesty is furnish'd to send forth those Argo's and Trojan Horses,¹ about this Happy Island, we are to fear nothing from without it ; and whilst we remain Obedient to Your just Commands, nothing from within it.

'Tis now some Years past that Your Majesty was pleas'd to declare Your Favourable Acceptance of a Treatise of Architecture which I then presented to You, with many Gracious Expressions, and that it was a most useful Piece. Sir, that Encouragement (together with the Success of the Book it self, and of the former Editions of this) has animated me still to continue my Oblation to Your Majesty of these Improvements : Nor was it certainly without some Provident Conduct, that we have been thus solicitous to begin, as it were, with Materials for Building, and Directions to Builders ; if due Reflection be made on that Deploable Calamity, the Conflagration of Your Imperial City ; which nevertheless, by the Blessing of God, and Your Majesty's Gracious Influence, we have seen Rise again, a New, and much more Glorious PHOENIX.

This TRIBUTE I now once more lay at the Feet of our ROYAL FOUNDER.

May Your Majesty be pleas'd to be Invok'd by that no Inglorious TITLE, in the profoundest Submission of

Gracious Sir,

Your Majesty's

Ever *Loyal*, most *Obedient* and

Faithful Subject and *Servant*,

J. EVELYN.

Sayes-Court,
5 Decemb.
1678.

¹ Argon. lib. i. That Famous Ship built of the Dodonaean Oak.

TO THE
READER.

AFTER what the *Frontispiece* and *Porch* of this *Wooden Edifice* presents you, I shall need no farther to repeat the *Occasion* of this following *Discourse*; I am only to acquaint you, That as it was delivered to the *Royal Society* by an unworthy *Member* thereof, in Obedience to their *Commands*; by the *same* it is now *Re-publish'd* without any farther Prospect: And the *Reader* is to know, That if these dry *sticks* afford him any *Sap*, it is one of the *least* and *meanest* of those *Pieces* which are every day produc'd by that *Illustrious Assembly*, and which enrich their *Collections*, as so many *Monuments* of their accurate *Experiments*, and publick Endeavours, in order to the production of *real* and *useful Theories*, the Propagation and Improvement of *Natural Science*, and the honour of their *Institution*. If to *this* there be any thing subjoyned *here*, which may a while bespeak the Patience of the *Reader*, it is only for the encouragement of an *Industry*, and worthy *Labour*, much in our days *neglected*, as haply reputed a *Consideration* of too sordid and vulgar a nature for *Noble Persons*, and *Gentlemen* to busie themselves withal, and who oftner find out occasions to *Fell-down*, and Destroy their *Woods* and *Plantations*, than either to *repair* or *improve* them.

But we are not without hopes of taking off these *Prejudices*, and of reconciling them to a *Subject* and an *Industry* which has been *consecrated* (as I may say) by as *good*, and as *great*

Persons, as any the World has produced; and whose Names we find mingl'd amongst *Kings* and *Philosophers*, grave *Senators*, and *Patriots* of their Country: For such of old were *Solomon*, *Cyrus*, and *Numa*, *Licinius* surnamed *Stolo*, *Cato*, and *Cincinnatus*; the *Piso's*, *Fabii*, *Cicero*, the *Plinies*, and thousands more whom I might enumerate, that disdained not to cultivate these *Rusticities* even with their own hands, and to esteem it no small *Accession*, to dignifie their *Titles*, and adorn their *purple* with these *Rural Characters* of their affections to *Planting*, and love of this part of *Agriculture*, which has transmitted to us their venerable *Names* through so many *Ages* and *Vicissitudes* of the World.

That famous *Answer* alone which the *Persian Monarch* gave to *Lysander*, will sufficiently justifie that which I have said; besides what we might add, out of the *Writings* and *Examples* of the rest: But since *these* may suffice after due reproofs of the late impolitique *Wast*, and universal *sloth* amongst us; we should now turn our *Indignation* into *Prayers*, and address our selves to our better-natur'd *Countrymen*; ¹ that such *Woods* as do yet remain intire, might be carefully *preserved*, and such as are *destroy'd*, sedulously *repaired*: It is what all Persons who are *Owners* of *Land* may contribute to, and with infinite *delight*, as well as *profit*, who are touch'd with that laudable *Ambition* of imitating their *Illustrious Ancestors*, and of worthily serving their *Generation*. To these my earnest and humble *Advice* should be, That at their very first coming to their *Estates*, and as soon as they get *Children*, they would seriously think of *this Work* of *Propagation* also: For I observe there is no part of *Husbandry*, which Men commonly more *fail* in, *neglect*, and have cause to *repent* of, than that they did not begin *Planting* *betimes*, without which, they can expect neither *Fruit*, *Ornament*, or *Delight* from their *Labours*: Men seldom plant *Trees* till they begin to be *Wise*,

¹ See *Petrarch de Remed. utriusque fortunæ* L. I. Dial. 57.

that is, till they grow *Old*, and find by *Experience* the *Prudence* and *Necessity* of it. When *Ulysses*, after a ten-years Absence, was return'd from *Troy*, and coming home, found his aged *Father* in the Field planting of *Trees*, He asked him, why (being now so far advanc'd in Years) he would put himself to the Fatigue and Labour of Planting, *that* which he was never likely to enjoy the Fruits of? The good old Man (taking him for a Stranger) gently reply'd; *I plant* (says he) *against my Son Ulysses comes home*. The *Application* is Obvious and Instructive for both *Old* and *Young*. And we have a more modern Instance, almost alike that of the good old *Laertes*. Here then upon the Complaint of learned Persons and great Travellers, deploring the loss of many rare and precious Things, *Trees* and *Plants*, especially instancing the *Balsam-Tree* of *Gilead* (now almost, if not altogether failing, and no more to be found where it grew in great plenty.) He applies himself to young *Eperous*, to consider it seriously, and to fall a planting while time is before them, with this encouraging Exclamation, *Agite, ô Adolescentes, & antequam canities vobis obrepit, stirpes jam alueritis, quae vobis cum insigni utilitate, delectationem etiam adferent: Nam quemadmodum canities temporis successu, vobis insciis, sensim obrepit: Sic natura vobis inserviens educabit quod telluri vestrae concredetis, modo prima initia illi dederitis, &c.* Pet. Bellonius *De neglecta stirpium Cultura. Problema ix.*

My next *Advice* is, that they do not easily commit themselves to the *Dictates* of their ignorant *Hinds* and *Servants*,¹ who are (generally speaking) more fit to Learn than to Instruct. *Male agitur cum Domino quem Villicus docet*, was an Observation of old *Cato's*; and 'twas *Ischomachus* who told *Socrates* (discoursing one day upon a like subject) *That it was far easier to Make, than to Find a good Husband-man*: I have often prov'd it so in *Gardeners*; and I believe it will

¹ Vide & Curtium, 1. 7. &c.

hold in most of our *Country* Employments : Country People universally know that all Trees consist of *Roots, Stems, Boughs, Leaves, &c.* but can give no account of the *Species, Virtues,* or farther Culture, besides the making of a Pit or Hole ; casting, and treading in the Earth, &c. which require a deeper search, than they are capable of : We are then to exact *Labour,* not *Conduct* and *Reason,* from the greatest part of them ; and the business of *Planting* is an *Art* or *Science* (for so *Varro* has solemnly defined it ;¹) and that exceedingly wide of Truth, which (it seems) many in his time accounted of it ; *facillimam esse, nec ullius acuminis Rusticationem,* namely that it was an easie and insipid Study. It was the simple *Culture* only, with so much difficulty retrieved from the late confusion of an intestine and bloody *War,* like that of *Ours,* and now put in *Reputation* again, which made the noble *Poet* write,

.....How hard it was
 Low Subjects with illustrious words to grace.
*Verbis ea vincere magnum*
Quam sit, & angustis hunc addere rebus honorem.

Georg. 3.

Seeing, as the *Orator* does himself express it, *Nihil est homine libero dignius* ; there is nothing more becoming and worthy of a *Gentleman,* no, not the Majesty of a ² *Consul.* In ancient and best Times, Men were not honour'd and esteem'd for the only Learned, who were great *Linguists,* profound *Criticks,* Reader and Devourers of Books : But such whose Studies consisted of the Discourses, Documents and Observations of their *Fore-Fathers,* ancient and venerable Persons ; who,

¹ *De R. R.*

² *In agris erant tunc Senatores. Cic. de Senect.*

³ *Silvae sunt Consule dignae. See this of the Poet Interpreted, Scaliger I. I. c. I. Poet. P. Nennius, Sueton. Jul. in Lipsium. Tacit. iv. Annal. 27. concerning the Quæstor's Office.*

(as the excellent Author of the *Rites* of the *Israelites*, *cap.* xv, &c. acquaints us,) were oblig'd to Instruct, and Inform their Children of the wonderful Things God had done for their Ancestors ; together with the Precepts of the *Moral Law*, *Feasts*, and Religious Ceremonies : But taught them likewise all that concern'd *Agriculture* ; joyn'd with Lessons of perpetual practice ; in which they were, doubtless, exceedingly knowing ; whilst during so many Ages, they employ'd themselves almost continually in it : And tho' now adays this *noble Art* be for the most part, left to be exercis'd amongst us, by People of grosser and unthinking Souls ; yet there is no *Science* whatever, which contains a vaster Compass of Knowledge, infinitely more useful and beneficial to Mankind, than the fruitless and empty Notions of the greatest part of *Speculatists* ; counted to be the only *Eruditi* and learned Men. An *Israelite*, who from *Tradition* of his Fore-fathers, his own *Experience*, and some modern Reading, had inform'd himself of the *Religion* and *Laws* which were to regulate his Life ; and knew how to procure Things necessary : Who perfectly understood the several qualities of the *Earth*, *Plants*, and *Places* agreeable to each sort, and to cultivate, propagate, defend them from Accidents, and bring them to Maturity : That also was skill'd in the nature of *Cattel*, their Food, Diseases, Remedies, &c. which those who amongst us pass for the most learned and accomplish'd *Gentlemen*, and *Scholars*, are, for the most part, grosly ignorant of, look upon as *base*, *rustick*, and things below them : is (in this learned Author's Opinion) infinitely more to be valued, than a Man brought up either in wrangling at the *Bar* ; or the noisie, and ridiculous Disputes of our *Schools*, &c. To this Sense the learn'd *Modena*. And 'tis remarkable, that after all that wise *Solomon* had said, that *All was vanity and vexation of Spirit* (among so many *particulars* he reckons up,) he should be altogether *silent*, and say nothing concerning

Husbandry; as, doubtless, considering it the most useful, innocent and laudable Employment of our Life, requiring those who cultivate the Ground to live in the Country, remote from *City-Luxury*, and the temptation to the Vices he condemns. It was indeed a plain Man¹ (a *Potter* by Trade) but let no body despise him because a *Potter* (*Agathocles*, and a *King* was of that *Craft*) who in my Opinion has given us the true reason why *Husbandry*, and particularly *Planting*, is no more improved in this Age of ours; especially, where Persons are *Lords* and Owners of much *Land*. The truth is, says he, when Men have acquired any considerable *Fortune* by their good *Husbandry*, and *experience* (forgetting that the greatest *Patriarchs*, *Princes*, their *Sons* and *Daughters*, belonged to the *Plough*, and the *Flock*) they account it a *shame* to breed up their *Children* in the same Calling which they themselves were educated in, but presently design them *Gentlemen*: They must forsooth, have a *Coat of Arms*, and live upon their *Estates*; So as by the time his *Sons* Beard is grown, he begins to be ashamed of his *Father*, and would be ready to defie him, that should upon any occasion mind him of his *honest Extraction*: And if it chance that the good Man have other *Children* to provide for; *This* must be the Darling, be bred at *School*, and the *University*, whilst the rest must to *Cart* and *Plow* with the *Father*, &c. This is the *Cause*, says my *Author*, that our *Lands* are so ill *Cultivated* and neglected. Every body will subsist upon their own *Revenue*, and take their *Pleasure*, whilst they resign their *Estates* to be manag'd by the most *Ignorant*, which are the *Children* whom they leave at home, or the *Hinds* to whom they commit them. When as in *truth*, and in *reason*, the more *Learning*, the better *Philosophers*, and the greater *Abilities* they possess, the *more*, and the *better* are they *qualified*, to *Cultivate*, and improve their *Estates*: Methinks this is well and rationally argued.

¹ *Palissy, le Moyen de devenir Riche.*

And now you have in part what I had to produce in extenuation of this *Adventure*; that *Animated* with a *Command*, and Assisted by divers *Worthy Persons* (whose *Names* I am prone to *celebrate* with all just *Respects*) I have presumed to cast in my *Symbol*; which, with the rest that are to follow, may (I hope) be in some degree serviceable to *him* (who ere the happy *Person* be) that shall oblige the *World* with that compleat *Systeme* of *Agriculture*, which as yet seems a *desideratum*, and wanting to its full perfection. It is (I assure you) what is one of the Principal designs of the *ROYAL SOCIETY*, not in this *Particular* only, but through all the *Liberal* and more useful *Arts*; and for which (in the estimation of all equal *Judges*) it will merit the greatest of *Encouragements*; that so, at last, what the Learned *Columella* has wittily reproached, and complained of, as a defect in that *Age* of *his*, concerning *Agriculture* in general, and is applicable *here*, may attain its desired *Remedy* and *Consummation* in *This* of *Ours*.

Sola enim Res Rustica, quae sine dubitatione proxima, & quasi consanguinea Sapientiae est, tam discentibus eget, quam magistris: Adhuc enim Scholas Rhetorum, & Geometrarum, Musicorumque, vel quod magis mirandum est, contemptissimorum vitiorum officinas, gulosius condiendi cibos, & luxuriosius fercula struendi, capitumque & capillorum concinnatores, non solum esse audivi, sed & ipse vidi; Agricolationis neque Doctores qui se profiterentur, neque Discipulos cognovi. But this I leave for our *Peruk'd Gallants* to interpret, and should now apply my self to the *Directive* Part, which I am all this while bespeaking, if after what I have said in the several *Paragraphs* of the ensuing *Discourse* upon the *Argument* of *Wood*, (and which in this *Fourth* Edition coming *Abroad* with innumerable *Improve-*

¹ *Praefat ad P. Silvinum*; which I earnestly recommend to the serious perusal of our *Gentry*. *Et mihi ad sapientis vitam proximè videtur accedere.* Cic. *de Senectute*.

ments, and *Advantages* (so furnished, as I hope shall neither reproach the *Author*, or repent the *Reader*) it might not seem superfluous to have *promised* any thing *here* for the Encouragement of so becoming an *Industry*. There are divers *Learned*, and judicious *Men* who have *preceded* Me in this *Argument*; as many, at least, as have undertaken to Write and Compile vast *Herbals*, and *Theaters* of *Plants*; of which we have some of our own *Country-men*, (especially, the most Industrious and Learned Mr. Ray) who have (boldly I dare affirm it) surpass'd *any*, if not all the *Foreigners* that are extant: In *those* it is you meet with the *Description* of the several *Plants*, by *Discourses*, *Figures*, *Names*, *Places* of *Growth*; time of *Flourishing*, and their *Medicinal Virtues*; which may supply any *deficiency* of mine as to those *Particulars*; if forbearing the *Repetition*, it should by any be imputed for a *defect*, though it were indeed none of my *design*: I say, these things are long since performed to our hands: But there is none of these (that I at least know of, and are come to my perusal) who have taken any considerable pains how to *Direct*, and *Encourage* us in the *Culture* of *Forest-Trees* (the grand *defect* of this *Nation*) besides some small sprinklings to be met withal in *Gervas Markham*, old *Tusser*, and of *Foreigners*, the *Country-Farm* long since translated out of French, and by no means suitable to our *Clime* and *Country*: Neither have any of these proceeded after my *Method*, and particularly, in *Raising*, *Planting*, *Dressing*, and *Governing*, &c. or so sedulously made it their business, to *specifie* the *Mechanical Uses* of the *several kinds*, as I have done, which was hitherto a great *desideratum*, and in which the *Reader* will likewise find some things altogether *New* and *Instructive*; and both *Directions* and *Encouragements* for the Propagation of some *Foreign Curiosities* of *Ornament* and *Use*, which were hitherto neglected. If I have upon occasion presumed to say any thing concerning their *Medicinal* pro-

perties, it has been *Modestly* and *Frugally*, and with chief, if not only respect to the poor *Wood-man*, whom none I presume will envy, that living far from the *Physician*, he should in case of *Necessity*, consult the reverend *Druid*, his ¹ *Oaks* and his *Elm*, *Birch*, or *Elder*, for a short *Breath*, a *Green Wound*, or a sore *Leg*; Casualties incident to this hard *Labour*. These are the chief *Particulars* of this ensuing *Work*, and what it pretends hitherto of *Singular*, in which let me be permitted to say, There is sufficient for *Instruction*, and more than is extant in any *Collection* whatsoever (*absit verbo invidia*) in this way and upon this *Subject*; abstracting things *Practicable*, of solid *use* and *material*, from the *Ostentation* and *Impertinences* of divers *Writers*; who receiving all that came to hand on trust, to swell their monstrous *Volumes*, have hitherto impos'd upon the credulous *World*, without *conscience* or *honesty*. I will not exasperate the *Adorers* of our ancient and late *Naturalists*, by repeating of what our *Verulam* has justly pronounced concerning their *Rhapsodies* (because I likewise honour their painful *Endeavours*, and am obliged to them for much of that I know,) nor will I (with some) reproach *Pliny*, *Porta*, *Cardan*, *Mizaldus*, *Cursius*, and many others of great *Names* (whose *Writings* I have diligently consulted) for the *Knowledge* they have imparted to me on this *Occasion*; but I must deplore the time which is (for the most part) so miserably lost in pursuit of their *Speculations*, where they treat upon this *Argument*: But the *World* is now advis'd, and (blessed be *God*) infinitely redeem'd from that base and servile submission of our noblest *Faculties* to their blind *Traditions*. This you will be apt to say, is a haughty *Period*; but whilst I affirm it of

¹ *Ne silvae quidem, horridiorque naturae facies medicinis carent, sacra illa parente rerum omnium, nusquam non remedia disponente homini ut Medicina, fieret etiam solitudo ipsa, &c. Hinc nata Medicina, &c. Haec sola naturae placuerat esse remedia parata vulgo, inventu facilia, ac sine impendio, ex quibus vivimus, &c. Plin. l. 24. c. 1.*

the *Past*, it *justifies*, and does *honour* to the *Present* Industry of our *Age*, and of which there cannot be a *greater* and more emulous *Instance*, than the *Passion* of His *Majesty* to encourage his *Subjects*, and of the *Royal Society*, (His *Majesty's* *Foundation*) who receive and promote His *Dictates*, in all that is laudable and truly *emolumental* of this Nature.

It is not therefore that I here presume to instruct *Him* in the management of that great and august *Enterprise* of resolving to *Plant* and repair His ample *Forests*, and other *Magazines* of *Timber*, for the benefit of His *Royal Navy*, and the glory of His *Kingdoms*; but to present to His *Sacred Majesty*, and to the *World*, what *Advices* I have received from *others*, observed my self, and most industriously *collected* from a studious Propensity to serve as one of the least *Intelligences* in the ampler *Orb* of our *Illustrious Society*, and in a *Work* so necessary and important.

And now since I mention'd the *Society*, give me leave (Worthy Reader) as a *Member* of that *Body*, which has been the chief *Promoter* of this ensuing *Work*, (and, as I stand oblig'd) to *vindicate* that *Assembly*, and consequently, the *Honour* of his *Majesty* and the *Nation*, in a *Particular* which concerns it, though (in appearance) a little *forreign* to the present *Subject*.

I will not say that *all* which I have written in the several *Paragraphs* of this *Treatise*, is *New*; but that there are very many *New*, and *useful* things, and *Observations* (without insisting on the *Methods* only) not hitherto deliver'd by any *Author*, and so freely communicated, I hope will sufficiently appear: It is not therefore in behalf of any *Particular* which concerns *my self*, that I have been induced to enlarge this *Preface*; but, by taking this *Occasion*, to encounter the *unfufferable Boldness*, or *Ambition* of some *Persons* (as well *Strangers*, as others) *arrogating* to themselves the being *Inventors* of

divers *New* and useful *Experiments*, justly attributable to several *Members* of the *Royal Society*.¹

So far has that *Assembly* been from affecting *Glory*, that they seem rather to have declin'd their due ; not as asham'd of so numerous and fair an *Off-spring* ; but as abundantly satisfied, that after all the hard measure, and virulent *Reproaches* they had sustain'd, for endeavouring by *united Attempts*, and at their own *Charges*, to improve *Real Philosophy* ; they had from time to time, cultivated that *Province* in so many *useful* and profitable *Instances*, as are already *published* to the *World*, and will be easily *asserted* to their *Authors* before all *equitable Judges*.

This being the sole inducement of publishing this *Apology* ; it may not perhaps seem unseasonable to *disabuse* some (otherwise) *well-meaning* People, who *led away* and *perverted* by the *Noise* of a few *Ignorant* and *Comical Buffoons*, (whose *Malevolence*, or *Impertinencies* intitle them to nothing that is truly *Great* and *Venerable*) are with an *Insolence* suitable to their *Understanding*, still crying out, and asking, *What have the Society done ?*

Now, as nothing less than *Miracles* (and unless *God* should every day *repeat* them at the *Call* of these *Extravagants*) will *convince* some Persons, of the most *Rational* and *Divine*

¹ Consult *Hist. Roy. Soc.* and their *Registers*.

The *Laws of Motion*, and the Geometrical streightning of *Curve Lines* were first found out by Sir *Christopher Wren* and Mr. *Thomas Neile*.

The *equated isocrone Motion* of the weight of a *Circular Pendulum* in a *Paraboloid*, for the regulating of *Clocks* ; and the improving *Pocket-Watches* by *Springs* applied to the *Ballance*, were first invented and demonstrated to this Society by Dr. *Hooke* ; together with all those *New* and useful *Instruments*, *Contrivances* and *Experiments*, *Mathematical* and *Physical*, publish'd in his *Posthumous Works* by the most accomplish'd Mr. *Waller*, *Secretary* to the *R. Society*. And since those the incomparably learned Sir *Isaac Newton*, now *President* of the *Royal Society* ; Mr. *Haly*, the *Worthy Professor* of *Geometry* in the *University of Oxford* ; Dr. *Grew*, and several more, whose *Works* and useful *Inventions* sufficiently celebrate their *Merits* : I did mention the *Barometer*, to which might be added the prodigious effects of the *Speculum Ustorium*, surpassing what the *French* pretend to, as confidently, or rather *audaciously*, they do, and to other admirable *Inventions*, injuriously *arrogated* by *Strangers*, tho' due of right to *Englishmen*, and *Members* of this Society ; but 'tis not the business of this *Preface* to enumerate all, tho' 'twas necessary to touch on some *Instances*.

Truths, (already so often and extraordinarily establish'd;) so, nor will any thing *satisfie* these *unreasonable* Men, but the production of the *Philosophers-stone*, and *Great-Elixir*; which yet were they *Possessors* of, they would *consume* upon their *Lux* and *Vanity*.

It is not therefore to gratifie these *magnificent Fops*, whose *Talents* reach but to the adjusting of their *Peruques*, courting a *Miss*, or at the farthest writing a smutty, or scurrilous *Libel*, (which they would have to pass for *genuine Wit*) that I *concern* my self in these *papers*; but, as well in *Honour* of our *Royal Founder*, as the *Nation*, to *Assert* what of other *Countries* has been surreptitiously *Arrogated*, and by which, they not only value themselves *abroad*; but (prevailing on the Modesty of that *Industrious Assembly*) seek the *deference* of *those*, who whilst it remains still *silent*, do not so clearly discern this glorious *Plumage* to be purely *ascititious*, and not a *Feather* of their own. —But still, *What have they done?*

Those who perfectly comprehend the *Scope*, and *End* of that noble *Institution*; which is to *improve Natural Knowledge*, and inlarge the *Empire* of *Operative Philosophy*; not by an *Abolition* of the *Old*, but by the *Real Effects* of the *Experimental*; *Collecting*, *Examining*, and *Improving* their scatter'd *Phænomena*, to establish even the *Received Methods* and *Principles* of the *Schools* (as far as were consistent with *Truth*, and *matter of Fact*) thought it long enough, that the *World* had been *impos'd* upon by that *Notional*, and *Formal* way of delivering divers *Systems* and *Bodies* of *Philosophie* (falsely so call'd) beyond which there was no more *Country* to discover; which being brought to the *Test* and *Tryal*, vapours all away in *Fume*, and empty *Sound*.

This *Structure* then being thus *Ruinous* and *Crazy*; 'tis obvious what they were to do; even the same which skilful *Architects* do every day before us; by *pulling down* the decay'd and sinking *Wall* to erect a *better*, and more

substantial in its place : They not only take down the *old*, reject the useless and decay'd ; but sever such *Materials* as are *solid*, and will serve again ; bring *new-ones* in, prepare and frame a *Model* suitable to so *magnificent* a *Design* : This *Solomon* did in order to the *Building* of the *Material Temple* ; and *this* is here to be pursued in the *Intellectual* : Nay, here was abundance of *Rubbish* to be clear'd, that the *Area* might be free ; and then was the *Foundation* to be deeply searched, the *Materials* accurately *examined*, *squared*, and *adjusted*, before it could be laid : Nor was this the *Labour* of a *Few* ; less than a much longer time, more *Cost* and *Encouragement* than any which the *Society* has yet met withal, could in reason be sufficient effectually to go through so chargeable a *Work*, and highly necessary.

A long time it was they had been surveying the *Decays*, of what was ready now to drop in pieces, whatever shew the out-side made with a noise of *Elements* and *Qualities*, *Occult* and *Evident* ; abhorrence of *Vacuum*, *Sympathies*, *Antipathies* ; *Substantial Forms*, and *Prime matter* courting *Form* ; *Epicycles*, *Ptolemæan Hypotheses*, magisterial *Definitions*, peremptory *Maximes*, *Speculative*, and *Positive Doctrines*, and *alti-sonant Phrases*, with a thousand other *precarious* and unintelligible *Notions*, &c. all which they have been turning over, to see if they could find any thing of *sincere* and *useful* among this *Pedantick Rubbish*, but all in *vain* ; here was nothing *material*, nothing of moment *Mathematical*, or *Mechanical*, and which had not been miserably *sophisticated*, on which to lay the stress, ; nothing in a manner whereby any farther *Progress* could be made, for the *raising* and *ennobling* the *Dignity* of *Mankind* in the *Sublimest Operations* of the *Rational Faculty*, by *clearing* the *Obscurities*, and *healing* the *Defects* of most of the *Physiological Hypotheses*, repugnant, as they hitherto seemed to be, to the *Principles* of real *Knowledge* and *Experience*.

Now although it neither were their *Hopes*, or in their prospect to *consummate* a *Design* requiring so *mighty Aids*, (invirion'd as they have been with these *Prejudices*) yet have they not at all *desisted* from the *Enterprize* ; but rather than so *Noble* and *Illustrious* an *Undertaking* should not proceed for want of some *generous* and *industrious Spirits* to promote the *Work* ; they have *themselves* submitted to those mean *Employments*, of *digging* in the very *Quarry* ; yea even and of making *Brick* where there was no *Straw*, but what they gleaned, and lay dispersed up and down : Nor did they think their *Pains* yet *ill bestow'd*, if through the assiduous *Labour*, and a *Train* of continual *Experiments*, they might at last furnish, and leave solid and uncorrupt *Materials* to a *succeeding*, and more *grateful Age*, for the *building up* a *Body* of *real* and *substantial Philosophy*, which should never *succumb* to *Time*, but with the *Ruines* of *Nature*, and the *World* it self.

In order to *this*, how many, and almost *innumerable* have been their *Tryals* and *Experiments*, through the large and ample *Field* both of *Art* and *Nature* ? We call our *Journals*, *Registers*, *Correspondence*, and *Transactions*, to witness ; and may with modesty provoke all our *Systematical Methodists*, *Natural Histories*, and *Pretenders* hitherto extant from the *beginning* of *Letters*, to this *period*, to shew us so *ample*, so *worthy* and so *useful* a *Collection*. 'Tis a *Fatality* and an *Injury* to be deplored, that those who give us *hard words*, will not first vouchsafe *impartially* to *examine* these *particulars* ; since all *Ingenuous Spirits* could not but be abundantly *satisfied*, that this *Illustrious Assembly* has not met so many *Years* purely for *Speculation* only ; though I take even *that* to be no ignoble *Culture* of the *Mind*, or time mispent for *Persons* who have so few *Friends*, and slender *Obligations*, to those who should *Patronize* and *Encourage* them : But they have aimed at *greater things*, and

greater things produc'd, namely, by *Emancipating*, and freeing themselves from the *Tyranny of Opinion*, *delusory* and fallacious shews, to receive nothing upon *Trust*, but bring it to the *Lydian Touch*, make it pass the *Fire*, the *Anvil* and the *File*, till it come forth perfectly *repurged*, and of consistence. They are not hasty in *concluding* from a *single*, or *incompetent* number of *Experiments*, to pronounce the *Ecstatic Heureka*, and offer *Hecatombs*; but, after the most diligent *Scrutiny*, and by degrees, and wary *Inductions* *honestly* and *faithfully* made, to *record* the *Truth*, and event of *Tryals*, and transmit them to *Posterity*. They resort not immediately to *general Propositions*, upon every *specious appearance*; but stay for *Light*, and Information from *Particulars*, and make Report *de Facto*, and as *Sense* informs them. They reject no *Sect of Philosophers*, no *Mechanic Helps*, *except* no *Persons* of Men; but chearfully embracing *all*, cull out of *all*, and alone retain what abides the *Test*; that from a plentiful and well furnish'd *Magazine* of true *Experiments*, they may in time advance to solemn and established *Axiomes*, *General Rules* and *Maximes*; and a *Structure* may indeed lift up its head, such as may stand the shock of *Time*, and render a solid accompt of the *Phænomena*, and *Effects of Nature*, the *Aspectable Works of God*, and their *Combinations*; so as by *Causes* and *Effects*, *certain* and *useful* Consequences may be deduced. Therefore they do not fill their *Papers* with *Transcripts* out of *Rhapsodists*, *Mountebancs*, and *Compilers of Receipts* and *Secrets*, to the loss of *Oil* and *Labour*; but as it were, *eviscerating* Nature, disclosing the *Ressorts*, and *Springs of Motion*, have collected innumerable *Experiments*, *Histories* and *Discourses*; and brought in *Specimens* for the Improvement of *Astronomy*, *Geography*, *Navigation*, *Optics*; all the *Parts of Agriculture*, the *Garden* and the *Forest*; *Anatomy of Plants*, and *Animals*; *Mines* and *Ores*; *Measures* and *Æquations of Time* by accurate *Pendulums*, and other *Motions*, *Hydro-* and

Hygrostatics, divers *Engines*, Powers and *Automata*, with innumerable more *luciferous* particulars, subservient to human life, of which Dr. *Glanvil* has given an ample and ingenious *Accompt* in his learned Essay: And since in the *Posthumous Works* of Dr. *Hooke*, lately publish'd by the most obliging Mr. *Waller*, already mention'd.

This is (*Reader*) what they have done; and they are but *part* of the *Materials* which the *Society* have hitherto *amassed*, and prepared for this great and *Illustrious Work*; not to pass over an infinity of *solitary*, and loose *Experiments* subsidiary to it, gathered at no small Pains and Cost: For so have they hitherto born the *Burden and Heat of the day alone*; *Sapping* and *Mining* to lay the *Foundation* deep, and raise a *Superstructure* to be one day perfected, by the joint *Endeavours* of those who shall in a *kinder Age* have little else to do, but the *putting* and *cementing* of the *Parts* together, which to *collect* and *fit*, have cost them so much *Solicitude* and *Care*. *Solomon* indeed built the glorious *Temple*; but 'twas *David* provided the *Materials*: Did Men in those days insolently ask, *What he had done*, in all the time of that tedious preparation? I beseech you what *Obligation* has the *R. Society* to render an *Accompt* of their *Proceedings* to *any* who are not of the *Body*, and that carry on the *Work* at their own *expence* amidst so many *Contradictions*? It is an *Evil Spirit*, and an *Evil Age*, which having sadly *debauch'd* the *Minds* of Men; seeks with *Industry* to blast and undermine all *Attempts* and *Endeavours* that signifie to the *Illustration* of *Truth*, the discovery of *Impostors*, and shake their sandy *Foundations*.

Those who come (says the noble *Verulam*) *to enquire after Knowledge*, with a *mind* to *scorn*, shall be sure to find matter for their *Humor*; but none for their *Instruction*: Would Men bring light of *Invention*, and not *fire-brands* of *Contradiction*, *Knowledge* would infinitely increase. But these are the *San-*

ballats and *Horonites* who disturb our Men upon the Wall ¹: But, *let us rise up and build*, and be no more discourag'd. 'Tis impossible to conceive, how so honest, and worthy a *Design* should have found so few *Promoters*, and cold a welcome in a *Nation* whose *Eyes* are so wide open: We see how greedily the *French*, and other *Strangers* embrace and cultivate the *Design*: What sumptuous *Buildings*, well furnish'd *Observatories*, ample *Appointments*, *Salaries*, and *Accommodations*, they have erected to carry on the Work; whilst we live *precariously*, and spin the *Web* out of our own *Bowels*. Indeed we have had the Honour to be the *first* who led the way, given the *Ferment*, which like a *Train* has taken *Fire*, and warm'd the *Regions* all about us. *This Glory*, doubtless, *shall none take from us*: But whilst they flourish so *abroad*, we want the *Spirit* should diffuse it here at *home*, and give progress to so hopeful a *beginning*: But as we said, the *Enemy of Mankind* has done us this despite; it is his Interest to impeach (in any sort) what e're opposes his *Dominion*; which is to lead, and settle Men in *Errors* as well in *Arts* and *Natural Knowledge*, as in *Religion*; and therefore would be glad, the World should still be *groping* after *both*. 'Tis *he* that sets the *Buffoons*, and empty *Sycophants*, to turn all that's *Great* and *Virtuous* into *Raillery* and *Derision*: 'Tis therefore to encounter *these*, that like those resolute *Builders*,² whilst we employ one hand in the Work, *we*, with the *other* are oblig'd to hold our *Weapon*, till some bold, and *Gallant Genius* deliver us, and raise the *Siege*. How gloriously would such a *Benefactor* shine! What a *Constellation* would he make! How great a *Name* establish! For mine own part (*Religiously* I *profess* it) were I not a *Person*, who (whilst I stood expecting when others more worthy, and able than my self, should have snatch'd the Opportunity of *signalizing*

¹ Neh. 2. 19.

² Neh. 4. 17.

a Work worthy of *Immortality*) had long since given *Hostages* to *Fortune*, and so put my self out of a Capacity of shewing my *Affection* to a *Design* so glorious ; I would not only most chearfully have *contributed* towards the freeing it from the *Straits* it has so long struggl'd under ; but *sacrific'd* all my *Secular Interests* in their Service : But, as I said, this is reserv'd for that Gallant *Hero* (whoe'er it be) that truly weighing the noble and universal *Consequence* of so high an *Enterprize*, shall at last free it of these *Reproaches* ; and either set it above the reach of *Envy*, or convert it to *Emulation*. This were indeed to consult an honest *Fame*, and to *embalm* the *Memory* of a *Greater Name* than any has yet appear'd amongst all the *Benefactors* of the *Disputing Sects* : Let it suffice to affirm, that next the *Propagation* of our most *Holy Faith*, and its *Appendants*, (nor can His Majesty or the *Nation* build their *Fame* on a more *lasting*, a more *Glorious Monument* ;) The *Propagation* of *Learning*, and *useful Arts*, having always surviv'd the *Triumphs* of the proudest *Conquerors*, and *Spillers* of humane *Blood*;) *Princes* have been more *Renown'd* for their *Civility* to *Arts* and *Letters*, than to all their *Sanguinary Victories*, subduing *Provinces*, and making those brutish *Desolations* in the World, to feed a *salvage* and vile *Ambition*. Witness you *Great Alexander*, and you the *Ptolemees*, *Cæsars*, *Charemain*, *Francis the First* ; the *Cosimo's*, *Frederic's*, *Alphon-sus's*, and the rest of *Learned Princes* : Since when all the *Pomp* and *Noise* is ended ; They are those *little things* in *black* (whom now in scorn they term *Philosophers* and *Fopps*) to whom they must be oblig'd, for making their *Names* outlast the *Pyramids* whose *Founders* are as unknown as the *Heads of Nile* ; because they either deserv'd no *Memory* for their *Vertues*, or had none to transmit them, or their *Actions* to *Posterity*.

Is not our *R. Founder* already *Panegyriz'd* by all the *Universities*, *Academists*, *Learned Persons*, divers *Princes Am-*

bassadors, and *Illustrious Men from abroad*? Witness besides, the many accurate *Treatises* and *Volumes* of the most *curious* and *useful* Subjects, *Medicinal*, *Mathematical*, and *Mechanical*, dedicated to *His Majesty* as *Founder*; to its *President*, and to the *Society*, by the greatest *Wits*, and most profoundly knowing of the *European World*, celebrating their *Institution* and *Proceedings*: Witness, the daily *Submissions* and solemn *Appeals* of the most learned *Strangers* to its *Suffrages*, as to the most able, candid and impartial *Judges*: Witness, the *Letters*, and *Correspondencies* from most parts of the *habitable Earth*, *East*, and *West Indies*, and almost from *Pole to Pole*; besides what they have receiv'd from the very *Mouths* of divers *Professors*, *Publique Ministers*, great *Travellers*, *Noblemen*, and *Persons* of highest *Quality*; who have not only frequented the *Assembly*, but desir'd to be *Incorporated* and *ascrib'd* into their *Number*; so little has his *Majesty*, or the *Kingdom* been diminish'd in their *Reputation*, by the *Royal Society*, to the reproach of our sordid *Adversaries*: Never had the *Republique* of *Letters* so learned and universal a *Correspondence* as has been procur'd and promoted by this *Society* alone; as not only the casual *Transactions* of several *Years* (filled with *Instances* of the most *curious* and *useful Observations*) make appear; but (as I said) the many *Nuncupatory Epistles* to be seen in the *Fronts* of so many *learned Volumes*: There it is you will find *CHARLES* the *II.* plac'd among the *Heroes* and *Demi-Gods*, for his *Patrociny* and *Protection*: There you will see the numerous *Congratulations* of the most learned *Foreigners*, celebrating the *Happiness* of their *Institution*; and that whilst other *Nations* are still *benighted* under the dusky *Cloud*, such a refulgent *Beam* should give day to this *blessed Isle*: And certainly, it is not to be supposed that *all* these *Learned Persons*, of so many, and divers *Interests*, as well as *Countries*, should *speak*, and *write* thus out of *Flattery*, much less of *Ignorance*; being *Men* of the most

refin'd *Universal Knowledge*, as well as *Ingenuity* : But I should never *end*, were I to pursue this fruitful *Topic*. I have but one word more to add, to conciliate the *Favour* and *Esteem* of our own *Universities*, to an *Assembly* of *Gentlemen*, who *from them* acknowledge to have derived all their *Abilities* for these laudable *Undertakings* ; and what above all is most *shining* in them of most *Christian*, *Moral*, and otherwise conspicuous, as from the *Source* and *Fountain*, to which on all occasions, they are not only ready to pay the *Tribute* and *Obsequiousness* of *humble Servants*, but of *Sons*, and dutiful *Alumni*. There is nothing verily which they more desire, than a fair and mutual *Correspondence* between so near *Relations*, and that they may be perpetually *Flourishing* and *Fruitful* in bringing forth (as still they do) supplies to *Church* and *State* in all its great *Capacities* :¹ Finally, that they would regard the *Royal Society* as a *Colony* of their own *planting*, and *augure* it *Success*. And if in these *Labours*, and arduous *Attempts*, several *Inventions* of present use and service to *Mankind* (either detecting *Errors*, illustrating and asserting *Truths*, or propagating *Knowledge* in *natural things*, and the visible *Works* of *God*) have been discover'd, as they *envy* not the *communicating* them to the *World* ; so should they be *wanting* to the *Society*, and to the *Honour* of divers *Learned* and *Ingenious Persons*, (who are the *Soul* and *Body* of it) not to vindicate them from the ambitious *Plagiary*, the *Insults* of *Scoffers* and injurious *Men* : Certainly, *Persons* of right *Noble* and subacted *Principles*, that were *Lovers* of their

¹ Since this Epistle was first written and publish'd the University of Oxford have instituted, and erected a Society for the promoting of Natural and Experimental Knowledge, in consort with the R. Society, with which they keep a mutual Correspondence : This I mention, for that some Malevolents had so far endeavour'd to possess divers Members of the University ; as if the Society design'd nothing less than the undermining of that, and other illustrious Academies, and which indeed so far prevail'd, as to breed a real Jealousy for some considerable time : But as this was never in the Thoughts of the Society (which had ever the Universities in greatest Veneration) so the Innocency and Usefulness of its Institution has at length disabus'd them, vindicated their Proceedings, dissipated all Surmises, and, in fine, produced an ingenious, friendly and candid Union and Correspondence between them.

Country, should be otherwise affected ; and rather strive to *encourage*, and promote Endeavours tending to so *generous* a *Design*, than decry it ; especially, when it costs them nothing but their *Civility* to so many *obliging Persons*, though they should hitherto have entertain'd them but with some innocent *Diversions*. To conclude, we *envy* none their *Dues* ; nay we gratefully *acknowledge* any *Light* which we receive either from *Home*, or from *Abroad* : We *celebrate* and *record* their *Names* amongst our *Benefactors* ; recommend them to the *Publique* ; and what we thus *freely give*, we hope as *freely to receive*.

Thus have I endeavour'd to *Vindicate* the *Royal Society* from some *Aspersions* and *Incroachments* it hitherto has suffer'd ; and shew'd under what *Weights* and *Pressure* this *Palm* does still emerge : And if for all this I fall short of my *Attempt*, I shall yet have this satisfaction, That tho I derive no *Glory* from my own *Abilities* (sensible of my great *Defects*) I shall yet *deserve* their *pardon* for my *Zeal* to its *Prosperity*.

Epictetus, κδ.

Φιλοσοφίας επιθυμείς ; παρασκευάζου αυτόθεν, &c.

Wouldst thou be a *Philosopher* ; Prepare thy self for *Scoffs* : What, you are setting up for a *Virtuoso* now ? Why so proud I pray ? Well, be not thou proud for all this ; But so persist in what seems *best* and *laudable* ; as if *God* himself had plac'd thee there ; and *remember*, that so long as thou *remain'st* in that *State* and *Resolution*, thy *Reproachers* will in time *admire* thee : But if once through *Inconstancy* thou *give out* and *flinch*, διπλοῦν προσλήψη καταγέλωτα, Thou *deservest* to be doubly *laugh'd* at.

Lord *Verulam*, *Instaur. Scient.*

Some Men (like *Lucian* in *Religion*) seek by their *Wit*, to

traduce and expose useful things ; because to arrive at them, they converse with *mean Experiments* : But those who *despise* to be *employ'd* in *ordinary and common matters*, never arrive to *solid Perfection* in *Experimental Knowledge*.

The changes and *Alterations* in the several *Chapters* and *Parts* throughout this *Discourse*, with the *Additions* and *Improvements*, have often oblig'd me to alter the *Method*, and indeed to make it almost a *New Work*.

J. Evelyn.

ADVERTISEMENT.

THAT I have frequently inserted divers *Historical* and other Passages, *apposite*, agreeable to the *Subject* (abstaining from a number more which I might have added) let it be *remember'd* that I did not altogether compile this *Work* for the sake of our ordinary *Rustics*, (meer *Foresters* and *Wood-men*) but for the more *Ingenious*; the *Benefit*, and *Diversion* of *Gentlemen*, and *Persons of Quality*, who often refresh themselves in these agreeable *Toils* of *Planting*, and the *Garden*: For the rest, I may perhaps in some places have made use of (here and there) a *Word* not as yet so familiar to every *Reader*; but *none*, that I know of, which are not sufficiently *explained* by the *Context* and *Discourse*. That this may yet be no *prejudice* to the *meaner Capacities*, let them *read* for

Ablaqueation, laying bare the *Roots*.

Amputation, cutting quite off.

Arborator, Pruner, or one that has care of the *Trees*.

Avenue, the principal *Walk* to the *Front* of the *House* or *Seat*.

Bulbs, round or *Onion-shap'd* *Roots*.

Calcine, burn to *Ashes*.

Compost, *Dung*.

Conservatory, *Green-house* to keep *choice Plants*, &c. in.

Contr'espaliere, a *Palisade* or *Pole-hedge*.

Coronary Garden, *Flower-Garden*.

Culinary, belonging to the *Kitchin*, *Roots*, *Salading*, &c.

Culture, *Dressing*.

- Decorticate*, to strip off the *Bark*.
Emuscation, cleansing it of the *Moss*.
Esculent, Roots, Salads, &c. fit to eat.
Espalieres, Wall-fruit Trees.
Exotics, outlandish, rare and choice.
Fermentation, working.
Fibrous, stringy.
Frondeation, stripping of *Leaves*, and *Boughs*.
Heterogeneous, repugnant.
Homogeneous, agreeable.
Hyemation, protection in *Winter*.
Ichnography, Ground-plot.
Inoculation, budding.
Insition, Graffing.
Insolation, exposing to the *Sun*.
Interlucation, thinning and disbranching of a *Wood*.
Irrigation, Watering.
Laboratory, Still-house.
Letation, Dung.
Lixivium, Lee.
Mural, belonging to the *Wall*.
Olitory, *Acetary*, *Salads*, &c. belonging to the *Kitchen-Garden*.
Palisade, Pole-hedge.
Parterre, Flower-Garden, or *Knots*.
Perennial, continuing all the year.
Quincunx, Trees set like the *Cinque-point* of a *Dy*.
Rectifie, re-distil.
Seminary, Nursery.
Stercoration, Dinging.
S. S. S. Stratum super Stratum, one bed, or layer upon another.
Tonsile, that which may be shorn, or clip'd.
Topiary-works, the *clipping*, *cutting* and *forming* of *Hedges*, &c.
 into *Figures* and *Works*.
Vernal, belonging to the *Spring*, &c. The rest are *obvious*.

BOOKS Published by the *AUTHOR*
of this *Discourse*

1. *The French Gard'ner*, III. Edition, *Twelves*, with Mr. *Rose's* Vineyard.
2. *Fumi-fugium* : Or, A *Prophetic Invective* against the *Smoke* of *London*. *Quarto*.
3. *Silva* : Or, A *Discourse of Forest-Trees*, &c. the *IVth Edition*, very much improv'd. *Folio*.
4. *Kalendarium Hortense*, both in *Folio* and *Octavo*. The *Xth Edition*, much augmented.
5. *Sculptura* : Or, The *History of Chalcography* and *Engraving* in *Copper*, the *Original* and *Progress* of that *Art*, &c. *Octavo*.
6. The *Parallel of Architecture*, being an *Account of Ten famous Architects*, with a *Discourse of the Terms*, and a *Treatise of Statues*. *Folio*. 2d Edition.
7. The *Idea of the Perfecting of Painting*. *Octavo*.
8. *Navigation and Commerce*, their *Original* and *Progress*. *Octavo*.
9. *Publick Employment* and an *Active Life*, prefer'd to *Solitude* and its *Appanages*, &c. *Octavo*.
10. *Terra* : Or, A *Philosophical Discourse of Earth*, the *IIIrd Edition*. *Folio* and *Octavo*.
11. *Numismata*, a *Discourse of Medals* ; to which is added, A *Digression concerning Physiognomy*. *Folio*.
12. *Acetaria* : Or, A *Discourse of Sallets*. 2d Edition.

Naming the last Discourse (save one) I take this Opportunity to acquit my self of some *Omissions* and *Mistakes*, left out in the *Errata* of *Numismata* ; but, upon discovery, immediately after, notify'd, and reform'd in the next *Philosophical Transactions* of that Month.

Amico carissimo *Johanni Evelyno,*
Armigero,

e Societate Regali Londini, J. Beale, S.P.D. In Silvam.

F*Are age quid causae est quod tu Silvestria pangis,
Inter Silvanos, capripedesque Deos ?
Inter Hamadryadas laetus, Dryadasque pudicas,
Cum tua Cyrrhæis sit Chelys apta modis !
Scilicet hoc cecinit numerosus Horatius olim,
Scriptorum Silvam quod Chorus Omnis amat.
Est locus ille Sacer Musis, & Apolline dignus,
Prima dedit summo Templam sacranda Jovi.
Hinc quoque nunc Pontem Pontus non respuit ingens,
Stringitur Oceanus, corripiturque Salum.
Hinc novus Hesperiiis emersit mundus in oris, ¹
Effuditque auri flumina larga probi.
Hinc exundavit distento Copia cornu,
Qualem & Amalthææ non habuere sinus.
Silva tibi curae est, grata & Pomona refundit
Auriferum, roseum, purpureumque nemus.
Illa famemque sitimque abigens expirat odores,
Quales nec Medus, nec tibi mittit Arabs.
Ambrosiam praebent modo cocta Cydonia. Tantum
Comprime, Nectareo Poma liquore fluunt.
Progredere, O Sæcli Cultor memorande futuri,
Felix Horticolam sic imitere Deum.*

¹ Gen. I. c. 2.

Nobilissimo Viro *Johanni Evelyno,*

Regalis Soc. Socio dignissimo.

Ausus laudato qui quondam reddere versu,
Æternum & tentare melos, conamine magno
Lucreti nomenque suum donaverat aevo :
Ille leves atomos audaci pangere musa
Aggreditur, variis & semina caeca figuris,
Naturaeque vias : non quæ Schola garrula jactat,
Non quæ rixanti ferti barbara turba Lyæo :
Ingentes animi sensus, & pondera rerum,
Grandior expressit Genius, nec scripta minora
Ev'linum decuisse solent.

Tuque per obscuros (victor Boylæ) recessus,
Naturae meditaris opus, qua luce colores¹
Percipimus, quali magnus ferit organa motu
Cartesius, quali volitant primordia plexu
Ex atomis, Gassende, tuis ; simulacraque rerum
Diffugiunt tacito vastum per inane meatu :
Mutato varios mentitur lana colores
Lumine ; dum tales ardens habet ipse figuras
Purpura, Sidonioque aliae tinxere veneno :
Materiam assiduo variatam, ut Protea, motu
Concipis, hinc formae patuit nascentis origo,
Hinc hominum species, & vasti machina caeli :²

¹ Libro de coloribus.

² De origine formarum.

*Ipse creare deus, solusque ostendere mundum
Boylæus potuit, sed nunc favet aemula Virtus,
(Magne Eveline) tibi, & generosos excitat ignes :
Pergite, Scipiadæ duo, qui vel mille Marones
Obruitis, longo & meriti lassatis honore.*

*Tu vero dilecte nimis ! qui stemmate ab alto
Patricios deducis avos, cerasque parentum
Wottonicæ¹ de stirpe domus ; virtutibus aequas
Nunc generis monumenta tui, post taedia ponti
Innumerasque errore vias, quid Sequana fallax,
Hostilis quae Rhenus agit, quae Tiberis, & Ister,
Nota tibi : triplici quid perfida Roma corona
Gessit, & Adriaca Venetus deliberat arce,
Qualiaque Odrysias vexârunt prælia lunas.
Hic qui naturae interpres & sedulus artis
Cultor, qui mores hominum cognovit, & urbes :
Dum Phœbo comes ire parat, mentemque capacem
Vidit uterque polus, nec Grajum cana vetustas
Hunc latuit, veterum nunc prisca numismata regum
Eruit, & Latias per mystica templa ruinas :
Æstimat ille forum, & vasti fundamenta Circi,
Cumque ruinoso Capitolia prisca theatro,
Et dominos colles altaeque palatia Romæ :
Regales notat inde domos, ut mole superba
Surgat apex, molles quae tecta imitantur Ionas,²
Qualia Romulea, Gothica quae marmora dextra,
Quicquid Tuscus habet, mira panduntur ab arte.
O famae patriaeque sacer ! vel diruta chartis
Vivet Roma tuis ; te vindice, laeta Corinthus
Stabit adhuc, magno nequiquam invisâ Metello.*

Nunc quoque ruris opes dulcesque ante omnia curas

¹ De Wotton in agro Surriensi.

² Consule librum Auctoris de Architectura.

*Pandis ovans, tristes maneat quae cura Decembres ;
 Pleiades haec Hyadesque jubent, haec laeta Bootes
 Semina mandat humi, atque ardenti haec Sirius agro
 Cæpit ut aestiva segetes torrere favilla,
 Hoc Maii vernantis opus, dum florea sarta
 Invitant Dominas ruris, dum vere tepenti
 Ridet ager, renovatque suos Narcissus amores.*

*Haud aliter victrix divinam Æneida vates
 Lusit opus, simul & gracili modulatus avena,
 Fata decent majora tuos, Eveline, triumphos,
 Æternum renovatur honos, te nulla vetustas
 Obruët, atque tua servanda volumina cedro
 Durent, & meritam cingat tibi laurea frontem
 Qui vitam Silvis donasti & Floribus ævum.*

R. Bohun.

ΕΙΣ ΤΗΝ ΤΟΥ ΠΑΤΡΟΣ ΔΕΝΔΡΟΛΟΓΙΑΝ.

Ἕμνήσω φρονίμοιο πατρός μελέεσσιν ἑπαίνους,
ἕμνήσω ἐπέεσσιν ἀριστεύοντα γεωργῶν
οὐρανίην ταναΐης ἀρετὴν δρυὸς αὐτὸς ἔγραψεν,
καὶ ποταπῶν γενεὴν δένδρων κατὰ δάσκιον ὕλην.
ἀθανάτων κύδιστος ἔη νεφεληγερέτα Ζεὺς,
ἔσχεν δὴ δένδροιο φίλαις πραπίδεσσιν ἐέλδωρ,
φύλλοις τ' ἀμβροσίοις θαλερᾶς δρυὸς ἐστεφάνωτο·
Ἀγγλιακῶν ὃς ἄριστος ἔη θεοείκελος ἀνὴρ,
ἱστορίην δένδρων τέλεσεν φρεσὶ κυδαλίμοισι,
ὑλογενής, κηπουρὸς ὑπείροχος, ὃς μέγ' ὄνειαρ
ἀνδράσιν ἐσσομένοις κατὰ γαίην πουλυβότειραν,
νησί τε ποντοπόροισι βαρυγδούποιο θαλάσσης.

Jo. Evelyn, Fil.

THE GARDEN.

To J. Evelyn, *Esquire.*

I NEVER had any other Desire so strong, and so like to Covetousness as that one which I have had always, That I might be Master at last of a small House and large Garden, with very moderate Conveniencies joined to them, and there dedicate the remainder of my Life only to the Culture of them, and study of Nature,

And there (with no Design beyond my Wall) whole and entire to lie,
In no unactive Ease, and no unglorious Poverty ;

Or as *Virgil* has said, shorter and better for me, that I might there *Studiis florere ignobilis otii* (though I could wish that he had rather said, *Nobilis otii*, when he spoke of his own :) But several accidents of my ill Fortune have disappointed me hitherto, and do still of that Felicity ; for though I have made the first and hardest step to it, by abandoning all Ambitions and Hopes in this World, and by retiring from the noise of all Business and almost Company ; yet I stick still in the Inn of a hired House and Garden, among Weeds and Rubbish ; and without that pleasantest Work of Human Industry, the Improvement of some-

thing which we call (not very properly, but yet we call) our own. I am gone out from *Sodom*, but I am not yet arrived at my little *Zoar*: *O let me escape thither, (is it not a little one?) and my Soul shall live.* I do not look back yet: but I have been forced to stop, and make too many halts. You may wonder, Sir, (for this seems a little too extravagant and Pindarical for *Prose*) what I mean by all this Preface; it is to let you know, That though I have mist, like a Chymist, my great End, yet I account my Affections and Endeavours well rewarded by something that I have met with by the bye; which is, that they have procur'd to me some part in your Kindness and esteem; and thereby the honour of having my Name so advantageously recommended to Posterity, by the *Epistle* you are pleased to prefix to the *most useful Book* that has been written in that kind, and which is to last as long as Months and Years.

Among many other *Arts* and *Excellencies* which you enjoy, I am glad to find this Favourite of mine the most predominant, That you choose this for your Wife, though you have hundreds of other Arts for your Concubines; though you know them, and beget Sons upon them all, (to which you are rich enough to allow great Legacies) yet the issue of this seems to be design'd by you to the main of the Estate; you have taken most pleasure in it, and bestow'd most Charges upon its Education; and I doubt not to see that Book, which you are pleased to promise to the World, and of which you have given us a large earnest in your Calendar, as accomplish'd, as any thing can be expected from an *Extraordinary Application*, and no ordinary Expences, and a long Experience. I know no body that possesses more private Happiness than

you do in your Garden ; and yet no Man who makes his Happiness more publick, by a free communication of the Art and Knowledge of it to others. All that I my self am able yet to do, is only to recommend to Mankind the search of that Felicity, which you instruct them how to find and to enjoy.

I.

Happy art thou whom God does bless
 With the full choice of thine own Happiness ;
 And happier yet, because thou'rt blest
 With Prudence how to choose the best :
 In Books and Gardens thou hast plac'd aright
 (Things well which thou dost understand,
 And both dost make with thy laborious hand)
 Thy noble innocent delight :
 And in thy virtuous Wife, where thou again dost meet
 Both Pleasures more refin'd and sweet :
 The fairest Garden in her Looks,
 And in her Mind the wisest Books.
 Oh ! who would change these soft, yet solid Joys,
 For empty Shows and senseless Noise ;
 And all which rank Ambition breeds,
 Which seem such beauteous Flowers, and are such poisonous
 Weeds ?

2.

When God did Man to his own Likeness make,
 As much as Clay, though of the purest kind,
 By the great Potters Art refin'd,
 Could the Divine Impression take :
 He thought it fit to place him, where
 A kind of Heav'n too did appear,
 As far as Earth could such a likeness bear :
 That Man no Happiness might want,
 Which Earth to her first Master could afford ;
 He did a Garden for him plant

THE GARDEN

By the quick hand of his Omnipotent Word.
 As the chief Help and Joy of Humane Life,
 He gave him the first Gift ; first, ev'n before a Wife.

3.

For God, the universal Architect,
 'T had been as easie to erect
 A Louvre, or Escurial, or a Tower,
 That might with Heav'n communication hold
 As *Babel* vainly thought to do of old :
 He wanted not the skill or power,
 In the World's Fabrick those were shown,
 And the Materials were all his own.
 But well he knew what place would best agree
 With Innocence, and with Felicity :
 And we elsewhere still seek for them in vain,
 If any part of either yet remain ;
 If any part of either we expect,
 This may our judgement in the search direct ;
 God the first Garden made, and the first City, *Cain*.

4.

O blessed Shades ! O gentle cool retreat
 From all th' immoderate Heat,
 In which the frantick World does burn and sweat !
 This does the Lion Star, Ambitions rage ;
 This Avarice, the Dog-Stars Thirst asswage ;
 Every where else their fatal Power we see,
 They make and rule Man's wretched Destiny :
 They neither set, nor disappear,
 But tyrannize o'er all the Year ;
 Whil'st we ne'er feel their Flame or Influence here.
 The Birds that dance from Bough to Bough,
 And sing above in every Tree,
 Are not from Fears and Cares more free,
 Than we who lie, or walk below,
 And should by right be Singers too.

What Princes Quire of Musick can excel
 That which within this Shade does dwell ?
 To which we nothing pay or give,
 They like all other Poets live,
 Without Reward, or Thanks for their obliging Pains ;
 'Tis well if they become not Prey :
 The Whistling Winds add their less artful Strains,
 And a grave Base the murmuring Fountains play ;
 Nature does all this Harmony bestow,
 But to our Plants, Arts, Musick too,
 The Pipe, Theorbo, and Guitar we owe ;
 The Lute it self, which once was Green and Mute :
 When *Orpheus* struck th' inspired Lute,
 The Trees danc'd round, and understood
 By Sympathy the Voice of Wood.

5.

These are the Spells that to kind Sleep invite,
 And nothing does within resistance make,
 Which yet we moderately take ;
 Who wou'd not choose to be awake,
 While he's incompass'd round with such delight,
 To th' Ear, the Nose, the Touch, the Taste, and Sight ?
 When *Venus* wou'd her dear *Ascanius* keep
 A Pris'ner in the downy Bands of Sleep,
 She od'rous Herbs and Flowers beneath him spread
 As the most soft and sweetest Bed ;
 Not her own Lap would more have charm'd his Head.
 Who, that has Reason, and his Smell,
 Would not among Roses and Jasmin dwell,
 Rather than all his Spirits choak
 With Exhalations of Dirt and Smoak ?
 And all th' uncleanness which does drown
 In pestilential Clouds a pop'lous Town ?
 The Earth it self breaths better Perfumes here,
 Than all the Female Men or Women there,
 Not without cause about them bear.

6.

When *Epicurus* to the World had taught,
 That Pleasure was the Chiefest Good,
 (And was perhaps i'th' right, if rightly understood)
 His Life he to his Doctrine brought,
 And in a Gardens Shade that Sovereign Pleasure sought.
 Whoever a true Epicure would be,
 May there find cheap and virtuous Luxury.
Vitellius his Table, which did hold
 As many Creatures as the Ark of old :
 That Fiscal Table, to which every day
 All Countries did a constant Tribute pay,
 Could nothing more delicious afford,
 Than Natures Liberality,
 Helpt with a little Art and Industry,
 Allows the meanest Gard'ners board.
 The wanton Taste no Fish or Fowl can choose,
 For which the Grape or Melon she would loose,
 Though all th' Inhabitants of Sea and Air
 Be listed in the Gluttons Bill of Fare ;
 Yet still the Fruits of Earth we see
 Plac'd the third Story high in all her Luxury.

7.

But with no Sense the Garden does comply ;
 None courts or flatters, as it does the Eye :
 When the great *Hebrew* King did almost strain
 The wond'rous Treasures of his Wealth and Brain,
 His Royal Southern Guest to entertain ;
 Though she on Silver Floors did tread,
 With bright *Assyrian* Carpets on them spread,
 To hide the Metals Poverty :
 Though she look'd up to Roofs of Gold,
 And nought around her could behold
 But Silk and rich Embroidery,
 And *Babylonian* Tapistry,

And wealthy *Hiram's* Princely Dy :
 Though *Ophirs* Starry Stones met every where her Eye;
 Though she her self and her gay Host were drest
 With all the shining Glories of the East ;
 When lavish Art her costly work had done,
 The honour and the Prize of Bravery
 Was by the Garden from the Palace won ;
 And every Rose and Lilly there did stand
 Better attir'd by Natures hand :
 The case thus judg'd against the King we see,
 By one that would not be so Rich, though Wiser far than he.

8.

Nor does this happy place only dispense
 Such various Pleasures to the Sense,
 Here Health it self does live,
 That Salt of Life which does to all a relish give,
 Its standing Pleasure, and intrinsick Wealth,
 The Bodies Virtue, and the Souls good Fortune, Health.
 The Tree of Life, when it in *Eden* stood,
 Did its Immortal Head to Heaven rear ;
 It lasted a tall Cedar till the Flood ;
 Now a small thorny Shrub it does appear ;
 Nor will it thrive too every where :
 It always here is freshest seen ;
 'Tis only here an Ever-green.
 If through the strong and beauteous Fence
 Of Temperance and Innocence,
 And wholesome Labours, and a quiet Mind,
 Diseases Passage find,
 They must not think here to assail
 A Land unarmed, or without a Guard ;
 They must fight for it, and dispute it hard,
 Before they can prevail :
 Scarce any Plant is growing here
 Which against Death some Weapon does not bear.
 Let Cities boast, that they provide
 For Life the Ornaments of Pride ;

But 'tis the Country and the Field,
That furnish it with Staff and Shield.

6.

Where does the Wisdom and the Power Divine
In a more bright and sweet Reflection shine ?
Where do we finer Strokes and Colours see
Of the Creator's real Poetry,

Than when we with attention look
Upon the third days Volume of the Book ?
If we could open and intend our Eye,

We all like *Moses* should espy
Ev'n in a Bush the radiant Deity.

But we despise these his inferior ways,
(Though no less full of Miracle and Praise)

Upon the Flowers of Heaven we gaze ;
The Stars of Earth no wonder in us raise,
Though these perhaps do more than they,
The Life of Mankind sway.

Although no part of mighty Nature be
More stor'd with Beauty, Power, and Mystery ;
Yet to encourage human Industry,
God has so ordered, that no other Part
Such Space, and such Dominion leaves for Art.

10.

We no where Art do so triumphant see,
As when it Grafts or Buds the Tree ;
In other things we count it to excel,
If it a Docile Scholar can appear
To Nature, and but imitate her well ;
It over-rules, and is her Master here.
It imitates her Makers Power Divine,
And changes her sometimes, and sometimes does refine :
It does, like Grace, the fallen Tree restore
To its blest State of Paradise before :
Who would not joy to see his conquering hand

THE GARDEN

CXV

O'er all the vegetable World command ?
 And the wild Giants of the Wood receive
 What Law he's pleas'd to give ?
 He bids th' ill-natur'd Crab produce
 The gentle Apples Winy Juice ;
 The golden Fruit that worthy is
 Of *Galetea's* purple Kiss ;
 He does the savage Hawthorn teach
 To bear the Medlar and the Pear,
 He bids the rustick Plumb to rear
 A noble Trunk, and be a Peach,
 Ev'n *Daphnes* Coyness he does mock,
 And weds the Cherry to her stock,
 Though she refus'd *Apollo's* suit ;
 Ev'n she, that chaste and Virgin-tree
 Now wonders at her self, to see
 That she's a Mother made, and blushes in her fruit.

II.

Methinks I see Great *Diocletian* walk
 In the *Salonian* Gardens noble Shade,
 Which by his own Imperial hands was made :
 I see him smile, methinks, as he does talk
 With the Ambassadors, who come in vain
 T' entice him to a Throne again :
 If I, my Friends (said he) should to you show
 All the Delights, which in these Gardens grow ;
 'Tis likelier much, that you should with me stay,
 Than 'tis that you should carry me away :
 And trust me not, my Friends, if every day,
 I walk not here with more delight,
 Than ever after the most happy fight,
 In Triumph to the Capitol I rod,
 To thank the gods, and to be thought my self almost a god.

Chertsea, Aug.
 16, 1666.

Abraham Cowley.

DENDROLOGIA

THE FIRST BOOK

CHAPTER I.

Of the Earth, Soil, Seed, Air, and Water.

1. It is not my intention here to speak of earth, as one of the common reputed elements ; of which I have long since publih'd an ample account, in an express Treatise (annexed to this volume,) which I desire my reader to peruse ; since it might well commute for the total omission of this chapter, did not method seem to require something briefly to be said : Which first, as to that of earth, we shall need at present to penetrate no deeper into her bosom, than after paring of the turfe, scarrifying the upper-mould, and digging convenient pits and trenches, not far from the natural surface, without disturbing the several strata and remoter layers, whether of clay, chalk, gravel, sand, or other successive layers, and concrets fossil, (tho' all of them useful sometimes, and agreeable to our foresters ;) tho' few of them what one would chuse before the under-turfe, black, brown, gray, and light, and breaking into short clods, and without any disagreeable scent, and with some mixture of marle or loame, but not clammy ; of which I have particularly spoken in that Treatise.

2. In the mean time, this of the soil, (which I think is a more proper term for composts) or mould rather, being of greater importance for the raising, planting, and propagation of trees in general, must at no hand be neglected, and is therefore on all occasions mentioned in almost every chapter of our ensuing discourse; I shall therefore not need to assign it any part, when I have affirm'd in general, that most timber-trees grow and prosper well in any tolerable land which will produce corn or rye, and which is not in excess stony; in which nevertheless there are some trees delight; or altogether clay, which few, or none do naturally affect; and yet the oak is seen to prosper in it, for its toughness preferr'd before any other by many workmen, though of all soils the cow-pasture doth certainly exceed, be it for what purpose soever of planting wood. Rather therefore we should take notice how many great wits and ingenious persons, who have leisure and faculty, are in pain for improvements of their heaths and barren Hills, cold and starving places, which causes them to be neglected and despair'd of; whilst they flatter their hopes and vain expectations with fructifying liquors, chymical menstruums, and such vast conceptions; in the mean time that one may shew them as heathy and hopeless grounds, and barren hills as any in England, that do now bear, or lately have born woods, groves, and copses, which yield the owners more wealth, than the richest and most opulent wheat-lands: and if it be objected that 'tis so long a day before these plantations can afford that gain; the Brabant Nurseries, and divers home-plantations of industrious persons are sufficient to convince the gain-sayer. And when by this husbandry a few

acorns shall have peopl'd the neighbouring regions with young stocks and trees ; the residue will become groves and copses of infinite delight and satisfaction to the planters. Besides, we daily see what course lands will bear these stocks (suppose them oaks, wall-nuts, chess-nuts, pines, firr, ash, wild-pears, crabs, &c.) and some of them (as for instance the pear and the firr or pine) strike their roots through the roughest and most impenetrable rocks and clefts of stone it self ; and others require not any rich or pinguid, but very moderate soil ; especially, if committed to it in seeds, which allies them to their mother and nurse without renitency or regret : And then considering what assistances a little care in easing and stirring of the ground about them for a few years does afford them : What cannot a strong plow, a winter mellowing, and summer heats, incorporated with the pregnant turf, or a slight assistance of lime, loam, sand, rotten compost, discreetly mixed (as the case may require) perform even in the most unnatural and obstinate soil ? And in such places where anciently woods have grown, but are now unkind to them, the fault is to be reformed by this care ; and chiefly, by a sedulous extirpation of the old remainders of roots, and latent stumps, which by their mustiness, and other pernicious qualities, sowre the ground, and poyson the conception ; and herewith let me put in this note, that even an over-rich, and pinguid composition, is by no means the proper bed either for seminary or nursery, whilst even the natural soil it self does frequently discover and point best to the particular species, though some are for all places alike : Nor should the earth be yet perpetually crop'd with the same, or other seeds, without

due repose, but lie some time fallow to receive the influence of heaven, according to good husbandry. But I shall say no more of these particulars at this time, because the rest is sprinkl'd over this whole work in their due places ; wherefore we hasten to the following title ; namely, the choice and ordering of the seeds.

3. Chuse your seed of that which is perfectly mature, ponderous and sound ; commonly that which is easily shaken from the boughs, or gathered about November, immediately upon its spontaneous fall, or taken from the tops and summities of the fairest and soundest trees, is best, and does (for the most part) direct to the proper season of interring, &c. according to institution.

¹ Nature herself who all created first,
 Invented sowing, and the wild plants nurs't :
 When mast and berries from the trees did drop,
 Succeeded under by a numerous crop.

Yet this is to be consider'd, that if the place you sow in be too cold for an autumnal semination, your acorns, mast, and other seeds may be prepared for the vernal by being barrel'd, or potted up in moist sand, or earth stratum s.s. during the winter ; at the expiration whereof you will find them sprouted ; and being committed to the earth, with a tender hand, as apt to take as if they had been sown with the most early ; nay, with great advantage : By this means too, they have escaped the vermine, (which

¹ Nam specimen sationis, & infitionis origo
 Ipsa fuit rerum primum natura creatrix :
 Arboribus quoniam baccæ, glandesque caducæ
 Tempestiva dabant pullorum examina subter, &c.

Lucret. l. 5.

are prodigious devourers of winter-sowing) and will not be much concern'd with the increasing heat of the season, as such as being crude, and unfermented, are newly sown in the beginning of the spring ; especially, in hot and loose grounds ; being already in so fair a progress by this artificial preparation ; and which, (if the provision to be made be very great) may be thus manag'd. Chuse a fit piece of ground, and with boards (if it have not that position of it self) design it three foot high ; lay the first foot in fine earth, another of seeds, acorns, mast, keys, nuts, haws, holly-berries, &c. promiscuously, or separate, with (now and then) a little mould sprinkled amongst them : The third foot wholly earth : Of these preparatory magazines make as many, and as much larger ones as will serve your turn, continuing it from time to time as your store is brought in. The same for ruder handlings, may you also do by burying your seeds in dry sand, or pulveriz'd earth, barrelling them (as I said) in tubs, or laid in heaps in some deep cellar where the rigour of the winter may least prejudice them ; and I have fill'd old hampers, bee-hives, and boxes with them, and found the like advantage, which is to have them ready for your seminary, as before hath been shew'd, and exceedingly prevent the season. There be also who affirm, that the careful cracking and opening of stones which include the kernels, as soon as ripe, precipitate growth, and gain a years advance ; but this is erroneous. Now if you gather them in moist weather, lay them a drying, and so keep them till you sow, which may be as soon as you please after Christmas. If they spire out before you sow them, be sure to commit them to the earth before the sprout grows dry, or

else expect little from them : And whenever you sow, if you prevent not the little field mouse, he will be sure to have the better share. See cap. xviii.

4. But to pursue this to some farther advantage ; as to what concerns the election of your seed, it is to be consider'd, that there is vast difference, (what if I should affirm more than an hundred years) in trees even of the same growth and bed, which I judge to proceed from the variety and quality of the seed : This, for instance, is evidently seen in the heart, procerity and stature of timber ; and therefore chuse not your seeds always from the most fruitful-trees, which are commonly the most aged, and decayed ; but from such as are found most solid and fair: Nor, for this reason, covet the largest acorns, &c. but (as husbandmen do their wheat) the most weighty, clean and bright: This observation we deduce from fruit-trees, which we seldom find to bear so kindly and plentifully from a sound stock, smooth rind, and firm wood, as from a rough, lax, and untoward tree ; which is rather prone to spend itself in fruit, (the ultimate effort, and final endeavour of its most delicate sap,) than in solid and close substance to encrease the timber. And this shall suffice, though some haply might here recommend to us a more accurate microscopical examen, to interpret their most secret schematismes, which were an over-nicety for these great plantations.

5. As concerning the medicating and insuccation of seeds, or enforcing the earth by rich and generous composts, &c. for trees of these kinds, I am no great favourer of it ; not only because the charge would much discourage the work ; but for that we find it unnecessary, and for most of our forest-trees, noxious ;

since even where the ground is too fertile, they thrive not so well; and if a mould be not proper for one sort, it may be fit for another: Yet I would not (by this) hinder any from the trial, what advance such experiments will produce: In the mean time, for the simple imbibition of some seeds and kernels, when they prove extraordinary dry, as the season may fall out, it might not be amiss to macerate them in milk or water only, a little impregnated with cow-dung, &c. during the space of twenty four hours, to give them a spirit to sprout and chet the sooner; especially if you have been retarded in your sowing without our former preparation: But concerning the mould, soiling and preparations of the ground, I refer you to my late Treatise of Earth, if what you meet with in this do not abundantly encounter all those difficulties.

6. Being thus provided with seeds of all kinds, I would advise to raise woods by sowing them apart, in several places destin'd for their growth, where the mould being prepar'd (as I shall shew hereafter) and so qualified (if election be made) as best to suit with the nature of the species, they may be sown promiscuously, which is the most natural and rural; or in streight and even lines, for hedge-rows, avenues, and walks, which is the more ornamental: But, because some may chuse rather to draw them out of nurseries; that the culture is not much different, nor the hinderance considerable (provided they be early and carefully removed) I will finish what I have to say concerning these trees in the seminary, and shew how they are there to be raised, transplanted, and govern'd till they can shift for themselves.

As to the air and water, they are certainly of

almost as great importance to the life and prosperity of trees and vegetables; and therefore it is to be wish'd for and sought, where they are defective; and which commonly follow, or indicate the nature of the soil, or the soil of them; (taking soil here promiscuously for the mould;) that they be neither too keen or sharp, too cold or hot; not infected with foggs and poys'nous vapours, or expos'd to sulphurous exhalations, or frigiverous winds, reverberating from hills, and other ill-situate eminencies, pressing down the incumbent particles so tainted, or convey'd through the inclosed valleys: But such as may gently enter and pervade the cenabs and vessels destin'd and appointed for their reception, intromission, respiration, and passage, in almost continual motion: In a word, such as is most agreeable to the life of man, the inverted head compared to the root, both vegetables and animals alike affected with those necessary principles, air and water, soon suffocated and perishable for the want of either, duly qualified with their proper mixts, be it nitre, or any other vegetable matter; though we neither see, nor distinctly taste it: So as all aquatics, how deeply soever submerg'd, could not subsist without this active element the air.

The same qualification is (as we said) required in water, to which 'tis of so near alliance, and whose office it is, not only to humectate, mollify, and prepare both the seeds, and roots of vegetables, to receive the nutrition, pabulum, and food, of which this of water as well as air, are the proper vehicles, insinuating what they carry into the numerous pores, and through the tubes, canales, and other emulgent passages and percolutions to the several vessels, where (as in a stomach) it is elaborated, concocted, and

digested, for distribution through every part of the plant; and therefore had need be such as should feed, not starve, infect or corrupt; which depends upon the nature and quality of the mix'd, with what other virtue, spirit, mineral, or other particles, accompanying the purest springs, (to appearance) passing through the closest strainers. This therefore requires due examination, and sometimes exposure to the air and sun, and accordingly the crudity, and other defects taken off and qualified: All which, rain-water, that has had its natural circulation, is greatly free from, so it meets with no noxious vapours in the descent, as it must do passing through fuliginous clouds of smoak and soot, over and about great cities, and other vulcanos, continually vomiting out their acrimonious, and sometimes pestiferous fervor, infecting the ambient air, as it perpetually does about London, and for many adjacent miles, as I have elsewhere ¹ shew'd.

In the mean time, whether water alone is the cause of the solid and bulky part, and consequently of the augmentation of trees and plants, without any thing more to do with that element (tho' as it serves to transport some other matter) is very ingenuously discuss'd, and curiously enquired into by Dr. *Woodward*, in his *History of the Earth*; fortified with divers nice experiments, too large to be here inserted: The sum is, that water, be it of rain, or the river (superior or inferior) carries with it a certain superfine terrestrial matter, not destitute of vegetative particles; which gives body, substance, and all other requisites to the growth and perfection of the plant, with the aid of that due heat which gives life and motion to the vehicles passage through all the parts of the vegetable,

¹ Fumefugium.

continually ascending, 'till (having sufficiently saturated them) it transpires the rest of the liquid at the summity and tops of the branches into the atmosphere, and leaving some of the less refined matter in a viscid hony-dew, or other exsudations, (often perceived on the leaves and blossoms,) anon descending and joining again with what they meet, repeat this course in perpetual circulation: Add to this, that from hence those regions and places crowded with numerous and thick standing forest-trees and woods, (which hinder the necessary evolution of this superfluous moisture, and intercourse of the air) render those countries and places, more subject to rain and mists, and consequently unwholsome; as is found in our American plantations, as formerly nearer us, in Ireland; both since so much improved by felling and clearing these spacious shades, and letting in the air and sun, and making the earth fit for tillage, and pasture, that those gloomy tracts are now become healthy and habitable. It is not to be imagined how many noble seats and dwellings in this nation of ours, (to all appearance well situated,) are for all that unhealthful, by reason of some grove, or hedge-rows of antiquated dotard trees; nay, sometimes a single tuft only, (especially the falling autumnal leaves neglected to be taken away) filling the air with musty and noxious exhalations; which being ventilated, by glades cut through them, for passage of the stagnant vapours, have been cur'd of this evil, and recovered their reputation.

But to return to where we left; water in this action, imbib'd with such matter, applicable to every species of plants and vegetables, does not as we affirm'd, operate to the full extent and perfection of

what it gives and contributes of necessary and constituent matter, without the soil and temper of the climate co-operate ; which otherwise, retards both the growth and substance of what the earth produces, sensibly altering their qualities, if some friendly and genial heat be wanting to exert the prolifick virtue : This we find, that the hot and warmer regions produce the tallest and goodliest trees and plants, in stature and other properties far exceeding those of the same species, born in the cold north : So as what is a gyant in the one, becomes a pumilo, and in comparison, but a shrubby dwarf in the other ; deficient of that active spirit, which elevates and spreads its prolifick matter and continual supplies without check, and is the cause of not only the leaves deserting the branches, whilst those trees and plants of the more benign climate, are clad in perennial verdure : And those herbacious plants, which with us in the hottest seasons hardly perfect their seeds before Winter, and require to be near their genial beds and nurse, and sometimes the artificial heat of the hot-bed. Lastly, to all this I would add that other chearful vehicle, light ; which the gloomy and torpent north is so many months depriv'd of ; the too long seclusion whereof is injurious to our exotics, kept in the conservatories, since however temper'd with heat, and duly refresh'd ; they grow sickly, and languish without the admission of light as well as air, as I have frequently found.

CHAPTER II.

Of the Seminary and of Transplanting.

1. *Qui vineam, vel arbustum constituere volet, seminaria prius facere debet*, was the precept of Columella, 1. 3. c. 5. speaking of vineyards and fruit-trees : and doubtless, we cannot pursue a better course for the propagation of timber-trees : For though it seem but a trivial design that one should make a nursery of foresters ; yet it is not to be imagin'd, without the experience of it, what prodigious numbers a very small spot of ground well cultivated, and destin'd for this purpose, would be able to furnish towards the sending forth of yearly colonies into all the naked quarters of a lordship, or demesnes ; being with a pleasant industry liberally distributed amongst the tenants, and dispos'd of about the hedg-rows, and other waste, and uncultivated places, for timber, shelter, fuel, and ornament, to an incredible advantage. This being a cheap, and laudable work, of so much pleasure in the execution, and so certain a profit in the event ; to be but once well done (for, as I affirm'd, a very small *plantarium* or nursery will in a few years people a vast extent of ground) hath made me sometimes in admiration at the universal negligence, as well as rais'd my admiration, that seeds and plants of such different kinds, should like so many tender babes and infants suck and thrive at the same breast : Though there are some indeed will not so well prosper in company ; requiring peculiar juices : But this niceness is more conspicuous in flowers and the

herbacious offspring, than in foresters, which require only diligent weeding and frequent cleansing, till they are able to shift for themselves ; and as their vessels enlarge and introse more copious nourishment, often starve their neighbours. Thus much for the nursery and *Conseminea Silva*.

2. Having therefore made choice of such seeds as you would sow, by taking, and gathering them in their just season ; that is, when dropping ripe ; and (as has been said) from fair thriving trees ; and found out some fit place of ground, well fenced, respecting the south-east, rather than the full south, and well protected from the north and west ;

¹ He that for wood his field would sow,
Must clear it of the shrubs that grow ;
Cut brambles up, and the fern mow.

This done, let it be broken up the winter before you sow, to mellow it ; especially if it be a clay, and then the furrow would be made deeper ; or so, at least, as you would prepare it for wheat : Or you may trench it with the spade, by which means it will the easier be cleansed of whatsoever may obstruct the putting forth, and insinuating of the tender roots : Then, having given it a second stirring, immediately before you sow ; cast, and dispose it into rills, or small narrow trenches, of four or five inches deep, and in even lines, at two foot interval, for the more commodious runcation, hawing, and dressing the trees : Into these furrows (about the new or increasing moon) throw your oak, beach,

¹ Qui serere ingenuum volet agrum,
Liberat prius arva fruticibus ;
Falce rubos, filicemque resecat.

Boeth. l. 2. Met.

ash, nuts, all the glandiferous seeds, mast, and key-bearing kinds, so as they lie not too thick, and then cover them very well with a rake, or fine-tooth'd harrow, as they do for pease : Or, to be more accurate, you may set them as they do beans (especially, the nuts and acorns) and that every species by themselves, for the *Roboraria*, *Glandaria*, *Ulmaria*, &c., which is the better way : This is to be done at the latter end of October, for the autumnal sowing ; and in the lighter ground about February for the vernal : For other seminations in general ; some divide the spring in three parts ; the beginning, middle, and end ; and the like of the autumn both for sowing and planting, and accordingly prepare for the work such nursery furniture, as seems most agreeable to the season.

- ¹ Then see your hopeful grove with acorns sown,
 But e're your seed into the field be thrown,
 With crooked plough first let the lusty swain
 Break-up, and stubborn clods with harrow plain.
 Then, when the stemm appears, to make it bare
 And lighten the hard earth with hough, prepare.
 Hough in the spring : nor frequent culture fail,
 Lest noxious weeds o're the young wood prevail :
 To barren ground with toyl large manure add,
 Good-husbandry will force a ground that's bad.

Proinde nemus sparsa cures de glande parandum :
 Sed tamen ante tuo mandes quam semina campo ;
 Ipse tibi duro robustus vomere fossor
 Omne solum subigat late, explanetque subactum.
 Cumque novus fisso primum de germine ramus
 Findit humum, rursus ferro versanda bicorni
 Consita vere novo tellus, cultuque frequenti
 Exercenda, herbæ circum ne forte nocentes
 Proveniant, germenque ipsum radicibus urant.
 Nec cultu campum cunctantem urgere frequenti,
 Et saturare fimo pudeat, si forte resistat
 Culturæ : nam tristis humus superanda colendo est.

Rapinus, l. 2.

Note that 6 bushels of acorns will sow or plant an acre, at one foot's distance. And if you mingle among the acorns the seeds of *Genista spinosa*, or furs, they will come up without any damage, and for a while needs no other fence, and will be kill'd by the shade of the young oaklings before they become able to do them any prejudice.

One rule I must not omit, that you cast no seeds into the earth whilst it either actually rains, or that it be over sobb'd, till moderately dry.

To this might something be expected concerning the watering of our seminaries and new plantations ; which indeed require some useful directions (especially in that you do by hand) that you pour it not with too great a stream on the stem of the plant, which washes and drives away the mould from the roots and fibers) but at such distance as it may percolate into the earth, and carry its vertue to them, with a shallow excavation, or circular basin about the stalk ; and which may be defended from being too suddenly exhausted and drunk up by the sun, and taken away before it grow mouldy. The tender stems and branches should yet be more gently refreshed, lest the too intense rays of the sun darting on them, cause them to wither, as we see in our fibrous flower-roots newly set : In the mean time, for the more ample young plantations of forest and other trees, I should think the hydrantick engine (call'd the quench-fire) (described in the *Phil. Transaction*, Num. 128) might be made very useful, rightly manag'd, and not too violently pointed against any single trees, but so exalted and directed, as the stream being spread, the water might fall on the ground like drops of rain ; which I should much

prefer before the barrels and tumbral way. Rain, river or pond-waters reserved in tubs or cisterns simple, or enrich'd, and abroad in the sun, should be frequently stirred, and kept from stagnation.

4. Your plants beginning now to peep, should be earthed up, and comforted a little ; especially, after breaking of the greater frosts, and when the swelling mould is apt to spue them forth ; but when they are about an inch above ground, you may in a moist season, draw them up where they are too thick, and set them immediately in other lines, or beds prepar'd for them ; or you may plant them in double fosses, where they may abide for good and all, and to remain till they are of a competent stature to be transplanted ; where they should be set at such distances as their several kinds require ; but if you draw them only for the thinning of your seminary, prick them into some empty beds (or a *Plantarium* purposely design'd) at one foot interval, leaving the rest at two or three.

5. When your seedlings have stood thus till June, bestow a slight digging upon them, and scatter a little mungy, half-rotten litter, fern, bean-hame, or old leaves among them, to preserve the roots from scorching, and to entertain the moisture; and then in March following (by which time it will be quite consum'd, and very mellow) you shall chop it all into the earth, and mingle it together : Continue this process for two or three years successively ; for till then, the substance of the kernel will hardly be spent in the plant, which is of main import ; but then (and that the stature of your young imps invite) you may plant them forth, carefully taking up their roots, and cutting the stem within an inch of the ground

(if the kind, of which hereafter, suffer the knife) set them where they are to continue: If thus you reduce them to the distance of forty foot, the intervals may be planted with ash, which may be fell'd either for poles, or timber, without the least prejudice of the oak: Some repeat the cutting we spake of the second year, and after March (the moon decreasing) re-cut them at half a foot from the surface; and then meddle with them no more: But this (if the process be not more severe than needs) must be done with a very sharp instrument, and with care, lest you violate, and unsettle the root; which is likewise to be practis'd upon all those which you did not transplant, unless you find them very thriving trees; and then it shall suffice to prune off the branches, and spare the tops; for this does not only greatly establish your plants by diverting the sap to the roots; but likewise frees them from the injury and concussions of the winds, and makes them to produce handsome, streight shoots, infinitely preferable to such as are abandon'd to nature, and accident, without this discipline: By this means the oak will become excellent timber, shooting into streight and single stems: The chess-nut, ash, &c. multiply into poles, which you may reduce to standards at pleasure: To this I add, that as oft as you make your annual transplanting, out of the nursery, by drawing forth the choicest stocks, the remainder will be improved by a due stirring, and turning of the mould about their roots.

But that none be discouraged, who may upon some accident, be desirous, or forc'd to transplant trees, where the partial, or unequal ground does not afford sufficient room, or soil to make the pits equally capacious, (and so apt to nourish and entertain the

roots, as where are no impediments), the worthy Mr. Brotherton (whom we shall have occasion to mention more than once in this treatise) speaking of the increase and improvement of roots, tells us of a large pinaster, 2 foot and $\frac{1}{2}$ diameter, and about 60 foot in height, the lowest boughs being 30 foot above the ground, which did spread and flourish on all sides alike, though it had no root at all towards three quarters of its situation, and but one quarter only, into which it expanded its roots so far as to 70 and 80 foot from the body of the tree: The reason was, its being planted just within the square-angle of the corner of a deep, thick and strong stone-wall, which was a kind wharfing against a river running by it, and so could have nourishment but from one quarter. And this I likewise might confirm of two elms, planted by me about 35 years since; which being little bigger than walking-staves, and set on the very brink of a ditch or narrow channel (not always full of water) wharfed with a wall of a brick and half in thickness, (to keep the bank from falling in) are since grown to goodly and equally spreading trees of near two foot diameter, solid timber, and of stature proportionable. The difference between this, and that of the pine, being their having one quarter more of mould for the roots to spread in; but which is not at all discover'd by the exuberance of the branches in either part. But to return to planting, where are no such obstacles.

6. *Theophrastus* in his Third Book *de Causis*, c. 7. gives us great caution in planting, to preserve the roots, and especially the earth adhering to the smallest fibrills, which should by no means be shaken off, as most of our gardeners do to trim and quicken them,

as they pretend, which is to cut them shorter; though I forbid not a very small topping of the stragling threds, which may else hinder the spreading of the rest, &c. Not at all considering, that those tender hairs are the very mouths, and vehicles which suck in the nutriment, and transfuse it into all the parts of the tree, and that these once perishing, the thicker and larger roots, hard, and less spongy, signifie little but to establish the stem; as I have frequently experimented in orange-trees, whose fibers are so very obnoxious to rot, if they take in the least excess of wet: And therefore *Cato* advises us to take care that we bind the mould about them, or transfer the roots in baskets, to preserve it from forsaking them; as now our nursery-men frequently do; by which they of late are able to furnish our grounds, avenues and gardens in a moment with trees and other plants, which would else require many years to appear in such perfection: For this earth being already applied, and fitted to the overtures and mouths of the fibers, it will require some time to bring them in appetite again to a new mould, by which to repair their loss, furnish their stock, and proceed in their wonted œconomy without manifest danger and interruption: nor less ought our care to be in the making, and dressing of the pits and fosses, into which we design our transplantation, which should be prepar'd and left some time open to macerating rains, frosts and sun, that may resolve the compacted salt, (as some will have it) render the earth friable, mix and qualifie it for aliment, and to be more easily drawn in, and digested by the roots and analogous stomach of the trees: This, to some degree may be artificially done, by burning of straw in the newly opened pits, and

drenching the mould with water; especially in over-dry seasons, and by meliorating barren-ground with sweet and comminuted lœtations: Let therefore this be received as a maxim, never to plant a fruit or forest-tree where there has lately been an old decay'd one taken up; till the pit be well ventilated, and furnish'd with fresh mould.

7. The author of the Natural History, *Pliny*, tells us it was a vulgar tradition, in his time, that no tree should be removed under two years old, or above three: *Cato* would have none transplanted less than five fingers in diameter; but I have shew'd why we are not to attend so long for such as we raise of seedlings. In the interim, if these directions appear too busie, or operose, or that the plantation you intend be very ample, a more compendious method will be the confused sowing of acorns, &c. in furrows, two foot asunder, covered at three fingers depth, and so for three years cleansed, and the first winter cover'd with fern, without any farther culture, unless you transplant them; but, as I shewed before, in nurseries, they would be cut an inch from the ground, and then let stand till March the second year, when it shall be sufficient to disbranch them to one only shoot, whether you suffer them to stand, or remove them elsewhere. But to make an essay what seed is most agreeable to the soil, you may by the thriving of a promiscuous semination make a judgment of,

¹ What each soil bears, and what it does refuse.

transplanting those which you find least agreeing with the place; or else, by copping the starvelings in

¹ Quid quæque ferat regio, & quid quæque recuset.

the places where they are newly sown, cause them sometimes to overtake even their untouch'd contemporaries.

Something may here be expected about the fittest season for this work of transplanting ; of which having spoken in another ¹ treatise, annex't to this, (as well as in divers other places throughout this of Forest-trees) I shall need add little ; after I have recommended the earliest removals, not only of all the sturdy sort in our woods, but even of some less tender trees in our orchards ; pears, apples, vulgar cherries, &c. whilst we favour the delicate and tender murals, and such as are pithy ; as the wall-nut, and some others. But after all, what says the plain wood-man, speaking of oaks, beech, elms, haw-thorns, and even what we call wild and hedge-fruit ? Set them, says he, at All-hallowtide, and command them to prosper ; set them at Candlemass, and intreat them to grow. Nor needs it explanation.

8. But here some may enquire what distances I would generally assign to transplanted trees ? To this somewhat is said in the ensuing periods, and as occasion offers ; though the promiscuous rising of them in forest-work, wild and natural, is to us, I acknowledge, more pleasing than all the studied accuracy in ranging of them ; unless it be where they conduct and lead us to avenues, and are planted for *vistas* (as the *Italians* term is) in which case, the proportion of the breadth and length of the walks, &c. should govern, as well as the nature of the tree ; with this only note ; that such trees as are rather apt to spread, than mount (as the oak, beech, wall-nut, &c.) be dispos'd at wider intervals, than the other,

¹ Pomona.

and such as grow best in consort, as the elm, ash, limetree, sycamore, firr, pine, &c. Regard is likewise to be had to the quality of the soil, for this work : v. g. If trees that affect cold and moist grounds, be planted in hot and dry places, then set them at closer order ; but trees which love dry and thirsty grounds, at farther distance : The like rule may also guide in situations expos'd to impetuous winds and other accidents, which may serve for general rules in this piece of tactics. In the mean time, if you plant for regular walks, or any single trees, a competent elevation of the earth in circle, and made a little hollow like a shallow bason (as I already mention'd) for the reception of water, and refreshing the roots ; sticking thorns about the edges to protect them from cattel, were not amiss. Fruit-trees thus planted, if beans be set about them, produces a little crop, and will shade the surface, perhaps, without any detriment : But this more properly belongs to Pomona. Most shrubs of ever-green and some trees may be planted very near one another ; myrtles, laurel, bays, cyprus, yew, ivy, pomegranates, and others, also need little distance, and indeed whatever is proper to make hedges : But for the oak, elm, wall-nut, firs, and the taller timber-trees, let the dismal effects of the late hurricane (never to be forgotten) caution you never to plant them too near the mansion, (or indeed any other house) that so if such accident happen, their fall and ruin may not reach them.

9. To leave nothing omitted which may contribute to the stability of our transplanted trees, something is to be premis'd concerning their staking, and securing from external injuries, especially from winds and cattel ; against both which, such as are

planted in copses, and for ample woods, are sufficiently defended by the mounds and their closer order ; especially, if they rise of seeds : But where they are expos'd in single rows, as in walks and avenues, the most effectual course is to empale them with three good quartet-stakes of competent length, set in triangle, and made fast to one another by short pieces above and beneath ; in which a few brambles being stuck, secure it abundantly without that choaking or fretting, to which trees are obnoxious that are only single staked and bushed, as the vulgar manner is : Nor is the charge of this so considerable as the great advantage, accounting for the frequent reparations which the other will require. Where cattel do not come, I find a good piece of rope, tyed fast about the neck of trees upon a wisp of straw to preserve it from galling, and the other end tightly strein'd to a hook or peg in the ground (as the shrouds in ships are fastened to the masts) sufficiently stablishes my trees against the western blasts without more trouble ; for the winds of other quarters seldom infest us. But these cords had need be well pitch'd to preserve them from wet, and so they will last many years. I cannot in the mean time conceal what a noble person has affur'd me, that in his goodly plantations of trees in Scotland, where they are continually expos'd to much greater, and more impetuous winds than we were usually acquainted with, he never stakes any of his trees ; but upon all disasters of this kind, causes only his servants to redress, and, set them up again as often as they happen to be overthrown ; which he has affirm'd to me, thrives better with them, than with those which he has staked ; and that at last they strike root so fast,

as nothing but the axe is able to prostrate them. And there is good reason for it in my opinion, whilst these concussions of the roots loosning the mould, not only make room for their more easie insinuations, but likewise open and prepare it to receive and impart the better nourishment. It is in another place I suggest that transplanted pines and firrs, for want of their penetrating taproots, are hardly consistent against these gusts after they are grown high ; especially, where they are set close, and in tufts, which betrays them to the greater disadvantage : And therefore such trees do best in walks, and at competent distances where they escape tolerably well : Such therefore as we design for woods of them, should be sow'd, and never remov'd. In the mean time, many trees are also propagated by cuttings and layers ; the ever-greens about Bartholomewtide ; other trees within two or three months after, when they will have all the sap to assist them ; every body knows the way to do it is by slitting the branch a little way, when it is a little cut directly in, and then to plunge it half a foot under good mould, and leaving as much of its extremity above it, and if it comply not well, to peg it down with an hook or two, and so when you find it competently rooted, to cut it off beneath, and plant it forth : Other expedients there are by twisting the part, or baring it of the rind ; and if it be out of reach of the ground, to fasten a tub or basket of earth near the branch, fill'd with a succulent mould, and kept as fresh as may be. For cuttings, about the same season, take such as are about the bigness of your thumb, setting them a foot in the earth, and near as much out. If it be of soft wood, as willows, poplar, alders, &c. you may take

much larger trunchions, and so tall as cattel may not reach them ; if harder, those which are young, small and more tender ; and if such as produce a knur, or burry swelling, set that part into the ground, and be sure to make the hole so wide, and point the end of your cutting so smooth, as that in setting, it violate and strip none of the bark ; the other extream may be slanted, and so treading the earth close, and keeping it moist, you will seldom fail of success : By the roots also of a thriving, lusty and sappy tree, more may be propagated ; to effect which, early in spring, dig about its foot, and finding such as you may with a little cutting bend upwards, raise them above ground three or four inches, and they will in a short time make shoots, and be fit for transplantation ; or in this work you may quite separate them from the mother-roots, and cut them off : By baring likewise the bigger roots discreetly, and hacking them a little, and then covering with fresh Mould *matres*, and mother-roots ; *nepotes*, succors ; *traduces*, and rooted setts, may be raised in abundance ; which drawing competent roots will soon furnish store of plants ; and this is practicable in elms especially, and all such trees as are apt of themselves to put forth suckers ; but of this more upon occasion ¹ hereafter. And now to prevent censure on this tedious and prolix Introduction, I cannot but look on it as the basis and foundation of all the structure, rising from this work and endeavour of mine ; since from station, sowing, continual culture and care, proceed all we really enjoy in the world : Every thing must have birth and beginning, and afterwards by diligence

¹ For the transplanting and removing of full-grown forest-trees, and others. See Cap. III. Sect. 10.

and prudent care, form'd and brought to shape and perfection : Nor is it enough to cast seeds into the ground, and leave them there, as the Ostrich does her eggs in the Lybian sands, without minding them more, (because Nature has depriv'd her of understanding) ; but great diligence is to be us'd in governing them ; not only till they spring up, but till they are arriv'd to some stature fit for transplantation, and to be sent broad ; after the same method that our children should be educated, and taken care of from their birth and cradle ; and afterwards, whilst they are under Padagogues and discipline, (for the forming of their manners and persons) that they contract no ill habits, and take such plys as are so difficult to rectifie and smooth again without the greatest industry. For prevention of this in our seminary, the like care is requisite ; whilst the young imps and seedlings are yet tender and flexible, and require not only different nourishment and protection from too much cold, heat, and other injuries ; but due and skilful management, in dressing, redressing and pruning, as they grow capable of being brought into shape, and of hopeful expectation, when time has rendered them fit for the use and service requir'd, according to their kinds. He therefore that undertakes the nursery, should be knowing not only in the choice of the seeds, where, when, and how to sow them ; but to know what time of gestation they require in the womb of their mother-earth, before parturition ; that so he may not be surprized with her delivering some of them sooner, or later than he expects them ; for some will lye two, nay, three year, e'er they peep ; most others one, and some a quarter, or a month or two ; whilst the tardy and less forward so tire the

hopes of the husbandman, that he many times digs up the platts and beds in which they were sown, despairing of a crop, sometimes ready to spring and come up, as I have found by experience to my loss : Those of hard shell and integument will lie longer buried than others ; for so the *libanus* cedar, and most of the coniferous firs, pines, &c. shed their seeds late, and sometimes remain two winters and as many summers, to open their scales glued so fast together, without some external application of fire or warm water, which is yet not so natural as when they open of themselves. The same may be observed of some minuter seeds, even among the olitories ; as that of parsley, which will hardly spring in less than a year ; so beet-seed, part in the second and third, &c. which upon inspecting the skins and membranes involving them, would be hard to give a reason for. To accelerate this, they use imbibitions of piercing spirits, salts, emollients, &c. not only to the seeds, but to the soil, which we seldom find much signify, but either to produce abortion or monsters ; and being forc'd to hasty birth, become nothing so hardy, healthful and lasting, as the conception and birth they receive from nature. These observations premis'd in general, after I have recommended to our industrious planters the appendix or table of the several sorts of soil and places that are proper, or at least may seem so ; or that are unfit for certain kinds of trees, (as well foresters and others, annexed to this work) I should proceed to particulars, and boldly advance into the thickest of the forest, did not method seem to require something briefly to be spoken of trees in general, as they are under the name of plants and vegetables, especially such as we

shall have occasion to discourse of in the following work ; tho' we also take in some less vulgarly known and familiar, of late indenizon'd among us, and some of them very useful.

By trees then is meant, a lignous woody-plant, whose property is for the most part, to grow up and erect itself with a single stem or trunk, of a thick and more compacted substance and bulk, branching forth large and spreading boughs; the whole body and external part, cover'd and invested with a thick rind or *cortex*, more hard and durable than that of other parts; which, with expanding roots, penetrate and fixes them in the earth for stability, (and according to their nature) receive and convey nourishment to the whole: And these *terræ-fili*, are what we call timber-trees, the chief subject of our following Discourse.

Trees are likewise distinguish'd into other subordinate species; *fruticis*, frutages and shrubs; which are also lignous trees, tho' of a lower and humbler growth, less spreading, and rising up in several stems, emerging from the same root, yielding plenty of suckers; which being separated from it, and often carrying with them some small fiber, are easily propagated and planted out for a numerous store: And this, (being clad with a more tender bark or fiber) seems to differ the *frutex* from other arborious kinds; since as to the shaft and stems of such as we account dwarf and pumilo with us, they rise often to tall and stately trees, in the more genial and benign climes.

Suffrutrices are shrubs lower than the former, lignescent and more approaching to the stalky herbs, lavender, rue, &c. but not apt to decay so soon, after they have seeded; whilst both these kinds seem also

little more to differ from one another, than do trees from them ; all of them consisting of the same variety of parts, according to their kinds and structure, cover'd with some woody, hard membraneous, or tender rind, suitable to their constitution, and to protect them from outward injuries ; producing likewise buds, leaves, blossoms and flowers, pregnant with fruit, and yielding saps, liquors and juices, *lachrymæ*, gums, and other exsudations, tho' diversifying in shape and substance, tast, odour, and other qualities and operations, according to the nature of the species ; the various structure and contexture of their several vessels and organs, whose office it is to supply the whole plant with all that is necessary to its being and perfection, after a stupendious, tho' natural process ; which minutely to describe, and analogically compare, as they perform their functions, (not altogether so different from creatures of animal life) would require an anatomical lecture ; which is so learnedly and accurately done to our hands, by Dr. Grew, *Malpighius*, and other ingenious naturalists.

But besides this general definition, as to what is meant by trees, *frutexes*, &c. they are likewise specifically distinguish'd by other characters, leaves, buds, blossoms, &c. but especially by what they produce of more importance, by their fruit ye shall know them :
v. g.

The *glandiferæ*, oaks and ilex's yield acorns, and other useful excrescencies: The mast-bearers are the beech, and such as include their seeds and fruit in rougher husks; as the chessnut-tree, &c. the walnut, hazle, avelans, &c. are the *nuciferæ*, &c. to the *coniferæ*, *resiniferæ*, *squammiferæ*, &c. belong the whole

tribe of cedars, firs, pines, &c. apples, pears, quinces, and several other *edulæ* fruits; peaches, abricots, plums, &c. are reduc'd to the *pomiferæ*: The *bacciferæ*, are such as produce kernels, sorbs, cherries, holley, bays, laurell, yew, juniper, elder, &c. and all the berry-bearers. The *genistæ* in general, and such as bear their seeds in cods, come under the tribe of *siliquosæ*: The *lanuginæ* are such as bed their seeds in a cottony-down.

The ash, elm, tilia, poplar, hornbeam, willow, salices, &c. are distinguish'd by their keys, tongues, *samera*, *pericurpia*, and *theca*, small, flat and husky skins, including the seeds, as in so many foliol's, bags and purses, fine membranous cases, catkins, palmes, julus's, &c. needless to be farther mention'd here, being so particularly describ'd in the chapters following; as are also the various ever-greens and exoticks.

CHAPTER III.

Of the Oak.

1. *Robur*, the oak; I have sometimes consider'd it very seriously, what should move *Pliny* to make a whole chapter of one only line, which is less than the argument alone of most of the rest in his huge volume: but the weightiness of the matter does worthily excuse him, who is not wont to spare his words, or his reader. *Glandiferi maximè generis omnes, quibus honos apud Romanos perpetuus.* "Mast-bearing-trees were principally those which the Romans held in chiefest repute," lib. 16. cap. 3. And in the fol-

lowing where he treats of chaplets, and the dignity of the civic coronet ; it might be compos'd of the leaves or branches of any oak, provided it were a bearing tree, and had acorns upon it, and was (as ¹ *Macrobius* tells us). Recorded among the *felices arbores* ; but this *φυλλινὸν σέφανον* was interwoven, and twisted with thorns and briars ; and the garland carried to usher the bride to her husband's house, intimating that happy state was not exempt from its pungencies and cares. It is then for the esteem which these wise and glorious people had of this tree above all others, that I will first begin with the oak ; and indeed it carries it from all other timber whatsoever, for building of ships in general, and in particular being tough, bending well, strong and not too heavy, nor easily admitting water.

2. 'Tis pity that the several kinds of oak are so rarely known amongst us, that wherever they meet with *quercus*, they take it promiscuously for our common oak ; as likewise they do *Δρῦς*, which comprehends all mast-bearing trees whatsoever, (which I think they have no latin word for) : And in the *Silva Glandifera* were reckon'd the chessnut, *ilix*, *esculus*, *cerris*, *suber*, &c. various species rather than different trees, white, red, black, &c. among our American plantations, (especially the long-stalked oak not as yet much taken notice of) : we shall here therefore give an account of four only ; two of which are most frequent with us ; for we shall say little of the *cerris* or *ægilops*, goodly to look on, but for little else : Some have mistaken it for beech, whereas indeed it is a kind of oak bearing a small round acorn almost covered with the cup, which is

¹ *Saturn.* lib. II. cap. 16.

very rugged, the branches loaded with a long moss hanging down like dishevell'd hair which much annoys it. Φάγος is indeed doubtless a species of oak; however by the Latins usually apply'd to the beech, whose leaf exceedingly differs from that of the oak, as also the mast and bark rugged, and growing among the hills and mountains; the other in the valleys, and perhaps, but few of them in Italy. Physicians, naturalists and botanists should therefore be curious how they describe and place such trees mention'd by *Theophrastus* and others, under the same denomination as frequently they do; being found so very different when accurately examin'd. There is likewise the *esculus*, which though *Vitruvius*, *Pliny*, *Dalcampius* and others take for a smaller kind, *Virgil* celebrates for its spreading, and profound root; and this *Dalcampius* will therefore have to be the *platyphyllos* of *Theophrastus*, and as our botanists think, his *phegos*, as producing the most edible fruit. But to confine our selves; the *quercus urbana*, which grows more upright, and being clean and lighter is fittest for timber: And the *robur*, or *quercus silvestris*, (taking *robur* for the general name, if at least contradistinct from the rest); which (as the name imports) is of a vast robust and inflexible nature, of an hard black grain; bearing a smaller acorn, and affecting to spread in branches, and to put forth his roots more above ground; and therefore in the planting, to be allow'd a greater distance, viz. from twenty five, to forty foot; (nay sometimes as many yards;) whereas the other shooting up more erect, will be contented with fifteen. This kind is farther to be distinguished by its fulness of leaves, which tarnish, and becoming yellow at the fall, do commonly

clothe it all the winter ; the roots growing very deep and stragling. The author of *Britannia Baconica*, speaks of an oak in Lanhadron-Park in Cornwall, which bears constantly leaves speckled with white ; and of another call'd the painted oak ; others have since been found at Fridwood, near Sittingbourn in Kent ; as also sycamore and elms, in other places mentioned by the learned Dr. Plot in his *Nat. Hist. of Oxfordshire* : Which I only mention here, that the variety may be compar'd by some ingenious person thereabouts, as well as the truth of the fatal præ-admonition, of oaks bearing strange leaves : Besides that famous oak of *New Forest* in *Hampshire*, which puts forth its buds about Christmass, but wither'd again before night ; and was order'd (by our late King Charles II.) to be inclos'd with a Pale ; (as I find it mentioned in the last edition of Mr. Camden's *Brit.*) And so was another before this ; which his grandfather, King James, went to visit, and caused benches to be plac'd about it ; which giving it reputation, the people never left hacking of the boughs and bark till they kill'd the tree : As I am told they have serv'd that famous oak near *White-Ladys* which hid and protected our late Monarch from being discovered and taken by the Rebel-Soldiers, who were sent to find him, after his almost miraculous escape at the battel of *Worcester*. In the mean time, as to this extraordinary precosness, the like is reported of a certain walnut-tree as well as of the famous white-thorns of *Glassenbury*, and blackthorns in several places. Some of our common oaks bear their leaves green all winter ; but they are generally pollards, and such as are shelter'd in warm corners and hedge rows. To speak then particularly

of oaks, and generally of all other trees of the same kind, (by some infallible characters) notice should be taken of the manner of their spreading, stature and growth, shape and size of the acorn, whether single or in clusters, the length or shortness of the stalks, roundness of the cup, breadth, narrowness, shape, and indentures of the leaf; and so of the bark, Τραχυς, asperous, or smooth, brown or bright, &c. Tho' most (if not all of them) may rather be imputed to the genius and nature of the soil, situation, or goodness of the seed, than either to the pretended sex or species. And these observations may serve to discover many accidental varieties in other trees, without nicer distinctions; such as are fetch'd from profess'd botanists; who make it not so much their study, to plant and propagate trees, as to skill in their medicinal virtues, and other uses; always excepting our learned countryman, Mr. Ray, whose incomparable work omits nothing useful or desirable on this subject; wanting only the accomplishments of well-design'd sculps. There is likewise a kind of *hemeris* or dwarf-oak (like the *robur VII. clusii*) frequent in New-England; and the white one of *Virginia*, a most stately tree, which (bearing acorns) might easily be propagated here, if it were worth the while.

3. I shall not need to repeat what has already been said Cap. 2. concerning the raising of this tree from the acorn; they will also endure the laying, but never to advantage of bulk or stature: It is in the mean time the propagation of these large spreading oaks, which is especially recommended for the excellency of the timber, and that his Majesties forests were well and plentifully stor'd with them; because they require

room, and space to amplify and expand themselves, and would therefore be planted at more remote distances, and free from all encumbrances: And this upon consideration how slowly a full-grown oak mounts upwards, and how speedily they spread, and dilate themselves to all quarters, by dressing and due culture; so as above forty years advance is to be gain'd by this only industry: And, if thus his Majesties forests and chases were stor'd, *viz.* with this spreading tree at handsom intervals, by which grazing might be improv'd for the feeding of deer and cattel under them, (for such was the old *Saltus*) benignly visited with the gleams of the sun, and adorn'd with the distant land-skips appearing through the glades, and frequent vallies;

¹ (.....betwixt
Whose rows the azure sky is seen immix'd,
With hillocks, vales, and fields, as now we see
Distinguish'd in a sweet variety;
Such places which wild apple-trees throughout
Adorn, and happy shrubs grow all about,)

As the poet describes his olive-groves, nothing could be more ravishing; for so we might also sprinkle fruit-trees amongst them (of which hereafter) for cyder, and many singular uses, and should find such goodly plantations the boast of our rangers, and forests infinitely preferable to any thing we have yet beheld, rude, and neglected as they are: I say, when his Majesty shall proceed (as he hath design'd) to animate

¹ (Cærulea distinguens inter plaga currere posset
Per tumulos, & convalles, camposque profusa:
Ut nunc esse vides vario distincta lepore
Omnia, que pomis intersita dulcibus ornant
Arbustisque tenent felicibus obsita circum).

Lueret. l. 5.

this laudable pride into fashion, forests and woods (as well as fields and inclosures) will present us with another face than now they do. And here I cannot but applaud the worthy industry of old Sir Harbotle Grimstone, who (I am told) from a very small nursery of acorns, which he sow'd in the neglected corners of his ground, did draw forth such numbers of oaks of competent growth; as being planted about his fields in even, and uniform rows, about one hundred foot from the hedges; bush'd, and well water'd till they had sufficiently fix'd themselves, did wonderfully improve both the beauty, and the value of his demesnes. But I proceed.

4. Both these kinds would be taken up very young, and transplanted about October; some yet for these hardy, and late springing trees, defer it till the winter be well over; but the earth had need be moist; and though they will grow tolerably in most grounds, yet do they generally affect the sound, black, deep, and fast mould, rather warm than overwet and cold, and a little rising; for this produces the firmest timber; though my L. Bacon prefers that which grows in the moister grounds for ship-timber, as the most tough, and less subject to rift. But let us hear Pliny: This is a general rule, saith he; "What trees soever they be which grow tolerably, either on hills, or valleys, arise to greater stature, and spread more amply in the lower ground: But the timber is far better, and of a finer grain, which grows upon the mountains, excepting only apple and pear-trees." And in the 39 cap. lib. 16. "The timber of those trees which grow in moist and shady places is not so good as that which comes from a more expos'd situation, nor is it so

“ close, substantial and durable ” : Upon which he much prefers the timber growing in *Tuscany*, before that towards the *Venetian* side, and upper part of the *Gulph* : And that timber so grown, was in greatest esteem long before Pliny, we have the Spear of *Agamemnon*..... ἔχων ἀνεμοτρεφὲς ἔγχος. Ἰλ. λ. ¹ from a tree so expos'd ; and *Didymus* gives the reason, Τὰ γὰρ ἐν ἀνέμῳ (says he) πλείον γυμναζόμενα δένδρα στερέα, &c. *For that being continually weather-beaten, they become hardier and tougher* : Otherwise, that which is wind-shaken, never comes to good ; and therefore, when we speak of the climate, 'tis to be understood of valleys rather than hills, and in calm places, than exposed, because they shoot streight and upright. The result of all is, that upon occasion of special timber, there is a very great and considerable difference ; so as some oaken-timber proves manifestly weaker, more spungy, and sooner decaying than other. The like may be affirm'd of ash, and other kinds ; and generally speaking, the close-grain'd is the stoutest, and most permanent : But of this, let the industrious consult that whole tenth chapter in the second book of *Vitruvius*, where he expressly treats of this argument, *De Abiete supernate & infernate, cum Apennini descriptione* : Where we note concerning oak, that it neither prospers in very hot, nor excessive cold countries ; and therefore there is little good of it to be found in *Africa* ; or indeed, the lower and most southern parts of *Italy* (but the *Venetians* have excellent timber) nor in *Denmark*, or *Norway* comparable to ours ; it chiefly affecting a temperate climate, and where they grow naturally in

¹ See what *Vossius* has written in his *Observations on Catullus*, p. 204. *Indomitus turbo contorquens flamine*.....

abundance, 'tis a promising mark of it. If I were to make choice of the place, or the tree, it should be such as grows in the best cow-pasture, or up-land meadow, where the mould is rich, and sweet, (Suffolk affords an admirable instance) and in such places you may also transplant large trees with extraordinary success : And therefore it were not amiss to bore and search the ground where you intend to plant or sow, before you fall to work ; since earth too shallow, or rocky is not so proper for this timber ; the roots fix not kindly, and though for a time they may seem to flourish, yet they will dwindle : In the mean time, 'tis wonderful to consider how strangely the oak will penetrate to come to a marly bottom ; so as where we find this tree to prosper, the indication of a fruitful and excellent soil is certain even by the token of this natural augury only ; so as by the plantation of this tree and some others, we have the advantage of profit rais'd from the pregnancy, substance and depth of our land ; whilst by the grass and corn, (whose roots are but a few inches deep), we have the benefit of the crust only.

5. But to discourage none, oaks prosper exceedingly even in gravel and moist clays, which most other trees abhor ; yea, even the coldest clay-grounds that will hardly graze: But these trees will frequently make stands, as they encounter variety of footing, and sometimes proceed again vigorously, as they either penetrate beyond, or out-grow their obstructions, and meet better earth ; which is of that consequence, that I dare boldly affirm, more than an hundred years advance is clearly gain'd by soil and husbandry. I have yet read, that there grow oaks,

(some of which have contain'd ten loads apiece) out of the very walls of *Silcester* in Hantshire, which seem to strike root in the very stones ; and even in our renowned Forest of Dean itself, some goodly oaks have been noted to grow upon ground, which has been as it were a rock of ancient cinders, buried there many ages since. It is indeed obser'd, that oaks which grow in rough stony grounds, and obstinate clays, are long before they come to any considerable stature, (for such places, and all sort of clay, is held but a step-mother to trees) but in time they afford the most excellent timber, having stood long, and got good footing. The same may we affirm of the lightest sands, which produces a smoother-grain'd timber, of all other the most useful for the joyner ; but that which grows in gravel is subject to be frow (as they term it) and brittle. What improvement the stirring of the ground about the roots of oaks is to the trees, I have already hinted ; and yet in copses where they stand warm, and so thicken'd with the underwood, as this culture cannot be practis'd, they prove in time to be goodly trees. I have of late tried the grafting of oaks, but as yet with slender success : Ruellius indeed affirms it will take the pear and other fruit ; and if we may credit the poet,

¹ The sturdy oak does golden apples bear.

² And under elms swine do the mast devour.

¹Aurea duræ
Mala ferant quercus.
Ecl. 8.

² Glandemque sues fregere sub Ulmo.
Geor.

Which I conceive to be the more probable, for that the sap of the oak is of an unkind tincture to most trees. But for this improvement, I would rather advise inoculation, as the ordinary elm upon the witch-hazel, for those large leaves we shall anon mention, and which are so familiar in France.

6. That the transplanting of young oaks gains them ten years advance, some happy persons have affirmed : From this belief, if in a former impression I have desired to be excused, and produc'd my reasons for it, I shall not persist against any sober man's experience ; and therefore leave this article to their choice ; since (as the butchers phrase is) change of pasture makes fat calves ; and so transplantations of these hard-wood-trees, when young, may possibly, by an happy hand, in fit season, and other circumstances of soil, sun, and room for growth, be an improvement : But as for those who advise us to plant oaks of too great a stature, they hardly make any considerable progress in an age ; and therefore I cannot encourage it, unless the ground be extraordinarily qualify'd, or that the oak you would transplant, be not above 6 or 7 foot growth in height: Yet if any be desirous to make tryal of it, let their stems be of the smoothest and tenderest bark ; for that is ever an indication of youth, as well as the paucity of their circles, which in disbranching and cutting the head off, at five or six foot height (a thing, by the way, which the French usually spare when they transplant this tree) may (before you stir their roots) serve for the more certain guide ; and then plant them immediately, with as much earth as will adhere to them, in the place destin'd for their station ; abating only

the ¹ tap-root, which is that down-right, and stubby part of the roots (which all trees rais'd of seeds do universally produce) and quickning some of the rest with a sharp knife (but sparing the fibrous, which are the main suckers and mouths of all trees) spread them in the foss or pit which hath been prepar'd to receive them. I say, in the foss, unless you will rather trench the whole field, which is incomparably the best ; and infinitely to be preferr'd before narrow pits and holes (as the manner is) in case you plant any number considerable, the earth being hereby made loose, easier and penetrable for the roots, about which you are to cast that mould, which (in opening of the trench) you took from the surface, and purposely laid apart ; because it is sweet, mellow, and better impregnated : But in this work, be circumspect never to inter your stem deeper than you found it standing ; for profound burying very frequently destroys a tree, though an error seldom observed : If therefore the roots be sufficiently covered to keep the body steady and erect, it is enough ; and the not minding of this trifling circumstance, does very much deceive our ordinary wood-men, as well as gardeners ; for most roots covet the air (though that of the *Quercus urbano* least of any) ; for like the *Esculus*

¹ How much to heaven her towring head ascends,
So much towards hell her piercing root extends.

¹ Which yet some, upon good experience will not allow in transplanting young Oaks ; affirming the taking them up without any abatement, or the least wound, does exceedingly advance the growth of this tree above such as are depriv'd of it.

¹Quæ quantum vertice ad auras
Æthereas, tantum radice in Tartara tendit.
Geo. 1. 2.

And the perfection of that, does almost as much concern the prosperity of a tree, as of man himself, since *homo* is but *arbor inversa* ; which prompts me to this curious, but important advertisement, that the position be likewise sedulously observed.

7. For, the southern parts being more dilated, and the pores expos'd (as evidently appears in their horizontal sections) by the constant excentricity of the hyperbolical circles of all trees, (save just under Æquator, where the circles centre, as we find in those hard woods which grow there) ours, being now on the sudden, and at such a season converted to the north, does starve and destroy more trees (how careful soever men have been in ordering the roots, and preparing the ground,) than any other accident whatsoever (neglect of staking, and defending from cattle excepted) ; the importance whereof caused the best of poets, and most experienc'd in this *Argument*, giving advice concerning this article, to add.

- ¹ The card'nal points upon the bark they sign,
 And as before it stood, in the same line
 Place to warm south, or the obverted pole ;
 Such force has custom, in each tender soul.

Which monition, though Pliny, and some others think good to neglect, or esteem indifferent, I can confirm from frequent losses of my own, and by particular tryals ; having sometimes transplanted great trees at mid-summer with success (the earth adhering to the roots) and miscarried in others, where this circumstance only was omitted.

¹ Quinetiam Coeli regionem in cortice signant,
 Ut quo quæque modo steterit, quâ parte calores
 Austrinos tulerit, quæ terga obverterit axi,
 Restituant : Adeo in teneris consuescere multum est.

To observe therefore the coast, and side of the stock (especially of fruit-trees) is not such a trifle as by some pretended : For if the air be as much the mother or nurse, as water and earth, (as more than probable it is) such blossoming plants as court the motion of the meridian sun, do as 't were evidently point out the advantage they receive by their position, by the clearness, politure, and comparative splendor of the southside : And the frequent mossiness of trees on the opposite side, does sufficiently note the unkindness of that aspect ; most evident in the bark of oaks white and smooth ; the trees growing more kindly on the south side of an hill, than those which are expos'd to the north, with an hard, dark, rougher and more mossie integument, as I can now demonstrate in a prodigious coat of it, investing some pyracanths which I have removed to a northern dripping shade. I have seen (writes a worthy friend to me on this occasion) whole hedge-rows of apples and pears that quite perished after that shelter was removed : The good husbands expected the contrary, and that the fruit should improve, as freed from the prædations of the hedge ; but use and custom made that shelter necessary ; and therefore (saith he) a stock for a time is the weaker, taken out of a thicket, if it be not well protected from all sudden and fierce invasions, either of crude air or winds. Nor let any be deterr'd, if being to remove any trees, he shall esteem it too consumptive of time ; for with a brush dipped in any white colour, or oaker, a thousand may be marked as they stand, in a moment ; and that once done, the difficulty is over. I have been the larger upon these two remarks, because I find them so material, and yet so much neglected.

8. There are other rules concerning the situation of trees ; the former author commending the north-east-wind both for the flourishing of the tree, and advantage of the timber ; but to my observation in our climates, where those sharp winds do rather flanker than blow fully opposite upon our plantations, they thrive best ; and there are as well other circumstances to be considered, as they respect rivers and marshes obnoxious to unwholsom and poysonous fogs, hills and seas, which expose them to the weather ; and those *silvifragi venti*, our cruel and tedious western-winds ; all which I leave to observation, because these accidents do so universally govern, that it is not easie to determine farther than that the timber is commonly better qualified which hath endur'd the colder aspects without these prejudices. And hence it is that Seneca observes, wood most expos'd to the winds to be the most strong and solid, and that therefore *Chiron* made *Achilles's* spear of a mountain-tree ; and of those the best, which grow thin, not much shelter'd from the north. Again, *Theophrastus* seems to have special regard to places ; exemplifying in many of Greece, which exceeded others for good timber, as doubtless do our oaks in the Forest of Dean all others of England : And much certainly there may reasonably be attributed to these advantages for the growth of timber, and of almost all other trees, as we daily see by their general improsperity, where the ground is a hot gravel, and a loose earth : An oak, or elm in such a place shall not in an hundred years, overtake one of fifty, planted in its proper soil ; though next to this, and (haply) before it, I prefer the good air. But thus have they such vast junipers in Spain ; and the ash

in some parts of the Levant (as of old near Troy) so excellent, as it was after mistaken for cedar, so great was the difference ; as now the Cantabrian, or Spanish exceeds any we have elsewhere in Europe. And we shall sometimes in our own country see woods within a little of each other, and to all appearance, growing on the same soil, where oaks of twenty years growth, or forty, will in the same bulk, contain their double in heart and timber ; and that in one, the heart will not be so big as a man's arm, when the trunk exceeds a man's body : This ought therefore to be weighed in the first plantation of copses, and a good eye may discern it in the first shoot ; the difference proceeding doubtless from the variety of the seed, and therefore great care should be had of its goodness, and that it be gather'd from the best sort of trees, as was formerly hinted, Chap. 1.

9. *Veterem arborem transplantare* was said of a difficult enterprize ; yet before we take leave of this paragraph, concerning the transplanting of great trees, and to shew what is possible to be effected in this kind, with cost and industry ; Count Maurice (the late Governor of Brasil for the Hollanders) planted a grove near his delicious paradise of Friburgh, containing six hundred coco-trees of eighty years growth, and fifty foot high to the nearest bough : These he wafted upon floats and engines, four long miles ; and planted them so luckily, that they bare abundantly the very first year ; as Gasper Barlcœus hath related in his Elegant Description of that Prince's Expedition. Nor hath this only succeeded in the Indies alone ; Monsieur de Fiat (one of the Mareschals of France) hath with huge oaks done the like at Fiat. Shall I yet bring you nearer home ? A great person

in Devon, planted oaks as big as twelve oxen could draw, to supply some defect in an avenue to one of his houses ; as the Right Honourable the Lord Fitz-Harding, late Treasurer of His Majesty's Household, assur'd me ; who had himself likewise practis'd the removing of great oaks by a particular address extremely ingenious, and worthy the communication.

10. Chuse a tree as big as your thigh, remove the earth from about him ; cut through all the collateral roots, till with a competent strength you can enforce him down upon one side, so as to come with your ax at the top-root ; cut that off, redress your tree, and so let it stand cover'd about with the mould you loosen'd from it, till the next year, or longer if you think good ; then take it up at a fit season ; it will likely have drawn new tender roots apt to take, and sufficient for the tree, wheresoever you shall transplant him. Some are for laying bare the whole roots, and then dividing it into 4 parts, in form of a cross, to cut away the interjacent rootlings, leaving only the cross and master-roots, that were spared to support the tree ; and then covering the pit with fresh mould (as above) after a year or two, when it has put forth, and furnish'd the interstices you left between the cross-roots, with plenty of new fibers and tender shoots, you may safely remove the tree itself, so soon as you have loosened and reduc'd the 4 decusseted roots, and shortned the top-roots : And this operation is done without stooping or bending the tree at all : And if in removing it with as much of the clod about the new roots, as possible, it would be much the better.

Pliny notes it as a common thing, to re-establish huge trees which have been blown down, part of

their roots torn up, and the body prostrate ; and, in particular, of a firr, that when it was to be transplanted, had a top-root which went no less than eight cubits perpendicular ; and to these I could superadd (by woful experience) where some oaks, and other old trees of mine, tore up with their fall and ruin, portions of earth (in which their former spreading roots were ingag'd) little less in bulk and height than some ordinary cottages and houses, built on the common : Such havock, was the effect of the late prodigious hurricane. But to proceed. To facilitate the removal of such monstrous trees, for the adornment of some particular place, or the rarity of the plant, there is this farther expedient : A little before the hardest frosts surprise you, make a square trench about your tree, at such distance from the stem as you judge sufficient for the root ; dig this of competent depth, so as almost quite to undermine it ; by placing blocks and quarters of wood, to sustain the earth ; this done, cast in as much water as may fill the trench, or at least sufficiently wet it, unless the ground were very moist before. Thus let it stand, till some very hard frost do bind it firmly to the roots, and then convey it to the pit prepar'd for its new station, which you may preserve from freezing, by laying store of warm litter in it, and so close the mould the better to the stragling fibers, placing what you take out about your new guest, to preserve it in temper : But in case the mould about it be so ponderous as not to be remov'd by an ordinary force ; you may then raise it with a crane or pully, hanging between a triangle (or like machine) which is made of three strong and tall limbs united at the top, where a pully is fastned,

as the cables are to be under the quarters which bear the earth about the roots : For by this means you may weigh up, and place the whole weighty clod upon a trundle, sledge, or other carriage, to be convey'd and replanted where you please, being let down perpendicularly into the place by the help of the foresaid engine. And by this address you may transplant trees of a wonderful stature, without the least disorder ; and many times without topping, or diminution of the head, which is of great importance, where this is practis'd to supply a defect, or remove a curiosity.

11. Some advise, that in planting of oaks, &c. four or five be suffer'd to stand very near to one another, and then to leave the most prosperous, when they find the rest to disturb his growth ; but I conceive it were better to plant them at such distances, as they may least incommode one another : For timber-trees, I would have none nearer than forty foot where they stand closest ; especially of the spreading kind.

12. Lastly, trees of ordinary stature transplanted (being first well water'd) must be sufficiently staked, and bush'd about with thorns, or with something better, to protect them from the concussions of the winds, and from the casual rubbing, and poysonous brutting of cattle and sheep, the oyliness of whose wooll is also very noxious to them ; till being well grown and fixed (which by seven years will be to some competent degree) they shall be able to withstand all accidental invasions, but the axe ; for I am now come to their pruning and cutting, in which work the seasons are of main importance.

13. Therefore, if you would propagate trees for

timber, cut not off their heads at all, nor be too busie with lopping : But if you desire shade and fuel, or bearing of mast alone, lop off their tops, sear, and unthriving branches only : If you intend an outright felling, expect till November ; for this præmature cutting down of trees before the sap is perfectly at rest, will be to your exceeding prejudice, by reason of the worm, which will certainly breed in timber which is felled before that period : But in case you cut only for the chimney, you need not be so punctual as to the time ; yet for the benefit of what you let stand, observe the moon's increase if you please. The reason of these differences, is ; because this is the best season for the growth of the tree which you do not fell, the other for the durableness of the timber which you do : Now that which is to be burnt is not so material for lasting, as the growth of the tree is considerable for the timber : But of these particulars more at large in cap. 3. book III.

14. The very stumps of oak, especially that part which is dry, and above ground, being well grubb'd, is many times worth the pains and charge, for sundry rare and hard works ; and where timber is dear. I could name some who abandoning this to workmen for their pains only, when they perceiv'd the great advantage, repented of their bargain, and undertaking it themselves, were gainers above half : I wish only for the expedition of this knotty work, some effectual engine were devised ; such as I have been told a worthy person of this nation made use of, by which he was able with one man, to perform more than with twelve oxen ; and surely, there might be much done by fastning of iron-hooks and fangs about one root, to extract another ; the hook chain'd to some port-

able screw or winch : I say, such an invention might effect wonders, not only for the extirpation of roots, but the prostrating of huge trees : That small engine, which by some is call'd the *german-devil*, reform'd after this manner, and duly applied, might be very expedient for this purpose, and therefore we have exhibited the following figure, and submit it to improvement and tryal.

But this is to be practis'd only where you design a final extirpation ; for some have drawn suckers even from an old stub-root ; but they certainly perish by the moss which invades them, and are very subject to grow rotten. Pliny speaks of one root, which took up an entire acre of ground, and Theophrastus describes the *Lycean Platanus* to have spread an hundred foot ; if so, the argument may hold good for their growth after the tree is come to its period. They made cups of the roots of oaks heretofore, and such a curiosity Athenæus tells us was carv'd by Thericleus himself ; and there is a way so to tinge oak after long burying and soaking in water, (which gives it a wonderful politure) as that it has frequently been taken for a course ebony : Hence even by floating, comes the Bohemian oak, Polish, and other northern timber, to be of such excellent use for some parts of shipping : But the blackness which we find in oaks, that have long lain under ground, (and may be call'd subterranean timber) proceeds from some vitriolic juice of the bed in which they lie, which makes it very weighty ; but (as the excellent naturalist and learned physician Dr. Sloane observes) it dries, splits, and becomes light, and much impairs.

15. There is not in nature a thing more obnoxious to deceit, than the buying of trees standing, upon

the reputation of their appearance to the eye, unless the chapman be extraordinarily judicious ; so various are their hidden and conceal'd infirmities, till they be fell'd and sawn out : So as if to any thing applicable, certainly there is nothing which does more perfectly confirm it, than the most flourishing out-side of trees, *fronti nulla fides*. A timber-tree is a merchant-adventurer, you shall never know what he is worth till he be dead.

16. Oaks are in some places (where the soil is especially qualified) ready to be cut for cops in fourteen years and sooner ; I compute from the first semination ; though it be told as an instance of high encouragement (and as indeed it merits) that a lady in Northamptonshire sowed acorns, and liv'd to cut the trees produc'd from them, twice in two and twenty years ; and both as well grown as most are in sixteen or eighteen. This yet is certain, that acorns set in hedg-rows, have in thirty years born a stem of a foot diameter. Generally, cops-wood should be cut close, and at such intervals as the growth requires ; which being seldom constant, depends much on the places and the kinds, the mould and the air, and for which there are extant particular statutes to direct us ; of all which more at large hereafter. Oak for tan-bark may be fell'd from April to the last of June, by a Statute in the 1 *Jacobi*. And here some are for the disbarking of oaks, and so to let them stand, before they fell.

17. To enumerate now the incomparable uses of this wood, were needless ; but so precious was the esteem of it, that of old there was an express law amongst the Twelve Tables, concerning the very gathering of the acorns, though they should be found

fallen into another man's ground : The land and the sea do sufficiently speak for the improvement of this excellent material ; houses and ships, cities and navies are built with it ; and there is a kind of it so tough, and extremely compact, that our sharpest tools will hardly enter it, and scarcely the very fire it self, in which it consumes but slowly, as seeming to partake of a ferruginous and metallin shining nature, proper for sundry robust uses. It is doubtless of all timber hitherto known, the most universally useful and strong ; for though some trees be harder, as box, cornus, ebony, and divers of the Indian woods ; yet we find them more fragil, and not so well qualify'd to support great incumbencies and weights, nor is there any timber more lasting, which way soever us'd. There has (we know) been no little stir amongst learned men, of what material the Cross was made, on which our Blessed Saviour suffer'd : Venerable Bede in *Collectaneis*, affirms it to have been fram'd of several woods, namely cypress, cedar, pine, and box ; and to confirm it S. Hierom has cited the 6th of *Isaiah* 13. *Gloria libani ad te veniet, & buxus & pinus simul ad ornandum locum sanctificationis meæ, & locum pedum meorum significabo* ; but following the version of the LXX. he reads *in cupresso, pinu & cedro, &c.* Others insert the palm, and so compose the gibbet of no less than four different timbers, according to the old verse :

¹ Nail'd were his feet to cedar, to palm his hands ;
Cypress his Body bore, title on olive stands :

¹ Quatuor ex lignis domini crux dicitur esse, &c.
Pes crucis est cedrus, corpus tenet alta cupressus ;
Palma manus retinet, titulo lætatur oliva.

And for this of the palm, they fetch it from that of 7 *Cant.* 8. where 'tis said, *ascendam in palmam, & apprehendam fructus ejus*, and from other allegorical and mysterious expressions of the Sacred Text, without any manner of probability; whilst by Alphonsus Ciacconius, Lipsius, Angelus Rocca, Falconius, and divers other learned men (writing on this subject) and upon accurate examination of the many fragments pretended to be parcels of it, 'tis generally concluded to have been the oak; and I do verily believe it; since those who have described those countries, assure us there is no tree more frequent; which (with relation to several celebrations and mysteries under oaks in the Old Testament) has been the subject of many fine discourses. Nor is it likely they should chuse, or assemble so many sorts of woods with that curiosity, to execute one upon, whom they esteemed a malefactor; besides, we read how heavy it was, which cypress, cedar and palm are not in comparison with oak; whilst Gretser denies all this, *lib. 1. cap. 6.* and concludes upon his accurate examination of several fragments yet extant, that 'tis not discernible of what timber it was fram'd. We might add to these, the furious zeal of the bloody and malicious Jews (to see our B. Lord inhumanly executed) could not possibly allow leisure to frame a gibbet of so many rare and curious materials: Let this therefore pass for an errant legend.

That which is twin'd and a little wreathed (easily to be discern'd by the texture of the bark) is best to support burthens for posts, columns, summers, &c. for all which our English oak is infinitely preferable to the French, which is nothing so useful, nor comparably so strong; insomuch as I have frequently

admir'd at the sudden failing of most goodly timber to the eye, which being employ'd to these uses, does many times most dangerously fly in sunder, as wanting that native spring and toughness which our English oak is indu'd withal. And here we forget not the stress which Sir H. Wotton, and other architects put even in the very position of their growth, their native streightness and loftiness, for columns, supporters, cross-beams, &c. and 'tis found that the rough-grain'd body of a stubbed oak, is the fittest timber for the case of a cyder-mill, and such like engines, as best enduring the unquietness of a ponderous rolling-stone. For shingles, pales, lathes, coopers ware, clap-board for wainscot, (the ancient ¹ *intestina opera* and works within doors) and some pannells are curiously vein'd, of much esteem in former times, till the finer grain'd Spanish and Norway timber came amongst us, which is likewise of a whiter colour. There is in New-England a certain red-oak, which being fell'd, they season in some moist and muddy place, which branches into very curious works. It is observ'd that oak will not easily glue to other wood; no not very well with its own kind; and some sorts will never cohere tolerably, as the box and horn-beam, tho' both hard woods; so nor service with cornell, &c. Oak is excellent for wheel-spokes, pins and pegs for tyling, &c. Mr. Blith makes spars and small building-timber of oaks of eleven years growth, which is a prodigious advance, &c. The smallest and streightest is best, discover'd by the upright tenor of the bark, as being the most proper for cleaving: The knottiest for water-works, piles, and the like, because 'twill drive best, and last longest; the crooked,

¹ And therefore were joyners called intestinary. See Leg. 2. Cod. Theodos.

yet firm, for knee-timber in shipping, millwheels, &c. In a word, how absolutely necessary the oak is above all the trees of the forest in naval-architecture, &c. consult Whitson, lib. 1. cap. 13.

Were planting of these woods more in use, we should banish our hoops of hazel, &c. for those of good copse-oak, which being made of the younger shoots, are exceeding tough and strong : One of them being of ground-oak, will outlast six of the best ash ; but this our coopers love not to hear of, who work by the great for sale, and for others. The smaller trunchions and spray, make billet, bavine and coals ; and the bark is of price with the tanner and dyer, to whom the very saw-dust is of use, as are the ashes and lee for bucking linnen ; and to cure the roapishness of wine : And 'tis probable the cups of our acorns would tan leather as well as the bark, I wonder no body makes the experiment, as it is done in Turkey with the *valonia*, which is a kind of acorn growing on the oaks. The ground-oak, while young, is us'd for poles, cudgels and walking-staffs, much come into mode of late, but to the wast of many a hopeful plant which might have prov'd good timber ; and I the rather declaim against the custom, because I suspect they are such as are for the most part cut, and stolen by idle persons, and brought up to London in great bundles, without the knowledge or leave of the owners, who would never have glean'd their copses for such trifling uses. Here I am again to give a general notice of the peculiar excellency of the roots of most trees, for fair, beautiful, chamleted and lasting timber, applicable to many purposes ; such as formerly made hafts for daggers, hangers, knives, handles for staves, tabacco-boxes, and elegant joyners-

work, and even for some mathematical instruments of the larger size, to be had either in, or near the roots of many trees ; however 'tis a kindness to premonish stewards and surveyors, that they do not negligently wast those materials : Nor may we here omit to mention tables for painters, which heretofore were us'd by the most famous artists, especially the curious pieces of Raphael, Durer, and Holbin, and before that of canvass, and much more lasting : To these add the galls, misletoe, polypod, agaric (us'd in antidotes) uvæ, fungus's to make tinder, and many other useful excrescencies, to the number of above twenty, which doubtless discover the variety of transudations, percolations and contextures of this admirable tree ; but of the several fruits, and animals generated of them, and other trees, Francisco Redi promises an express Treatise, in his *Esperienze intorno alla Generatione de gl' Insetti*, already publish'd. Pliny affirms, that the galls break out all together in one night, about the beginning of June, and arrive to their full growth in one day ; this I should recommend to the experience of some extraordinary vigilant wood-man, had we any of our oaks that produc'd them, Italy and Spain being the nearest that do : Galls are of several kinds, but grow upon a different species of *robur* from any of ours, which never arrive to any maturity ; the white and imperforated are the best ; of all which, and their several species, see Jasp. Bauhinus, and the excellent Malpighius, in his Discourse *de Gallis*, and other morbus tumors, raised by, and producing insects, infecting the leaves, stalks and branches of this tree with a venomous liquor or froth, wherein they lay and deposite their eggs, which bore and perforate these excrescences, when

the worms are hatch'd, so as we see them in galls.

What benefit the mast does universally yield (once in two years at least) for the fattening of hogs and deer, I shall shew upon another occasion, before the conclusion of this Discourse. A peck of acorns a day, with a little bran, will make an hog ('tis said) increase a pound-weight *per diem* for two months together. They give them also to oxen mingled with bran, chop'd or broken; otherwise they are apt to sprout and grow in their bellies. Others say, they should first be macerated in water, to extract their malignity; cattle many times perishing without this preparation. Cato advises the husband-man to reserve 240 bushels of acorns for his oxen, mingled with a like quantity of beans and lupines, and to drench them well. But in truth they are more proper for swine, and being so made small, will fatten pigeons, peacocks, turkeys, pheasants and poultry; nay 't is reported, that some fishes feed on them, especially the tunny, in such places of the coast where trees hang over arms of the sea. Acorns, *esculus ab esca* (before the use of wheat-corn was found out) were heretofore the food of men, nay of Jupiter himself, (as well as other productions of the earth) till their luxurious palats were debauched: And even in the Romans time, the custom was in Spain to make a second service of acorns and mast, (as the French now do of marrons and chesnuts) which they likewise used to roast under the embers.

¹Fed with the oaken mast
The aged trees themselves in years surpass'd.

¹Et quernâ glande repasta
Æquâsse annosas vivendo corpora Quercus.

And men had indeed hearts of oak ; I mean, not so hard, but health, and strength, and liv'd naturally, and with things easily parable and plain.

¹ Blest age o'th' world, just nymph, when man did dwell
Under thy shade, whence his provision fell ;
Sallads the meal, wildings were the dissert :
No tree yet learn'd by ill-example, art,
With insititious fruit to symbolize,
As in an emblem, our adulteries.

As the sweet poet bespeaks the dryad ; and therefore it was not call'd *Quercus*, (as some etymologists fancy'd) because the Pagans (*quæribantur responsa*) had their oracles under it, but because they sought for acorns : But 'tis in another ² place where I shew you what this acorn was ; and even now I am told, that those small young acorns which we find in the stock-doves craws, are a delicious fare, as well as those incomparable salads of young herbs taken out of the maws of partridges at a certain season of the year, which gives them a preparation far exceeding all the art of cookery. Oaks bear also a knur, full of a cottony matter, of which they anciently made wick for their lamps and candles ; and among the *Selectiora Remedia* of Jo. Prævotius, there is mention of an oil *e querna glande* chymically extracted, which he affirms to be of the longest continuance, and least consumptive of any other whatsoever for such lights,

¹ Fœlix illa ætas mundi, justissima nymphe,
Cùm dabat umbra domum vivam tua, cùm domus ipsa
Deciduâ dominos pascebat fruge quietos,
Solâque præbebant sylvestria poma secundas
Gramineis epulas mensis ; nondum arte magistra
Arbor adulteriis præluserat insita nostris, &c.

Couleii Pl. l. 6.

² Cap. I. Book III.

ita ut uncia singulis mensibus vix ab sumatur continuo igne : The ingenious author of the Description of the Western Islands of Scotland, tells us, that (upon his own experience) a rod of oak of 4, 5, 6 or 8 inches about, being twisted like a with, boil'd in wort, well dry'd, and kept in a little bundle of barley-straw, and then steep'd again in wort, causes it to ferment, and procures yest : The rod should be cut before mid-May, and is frequently us'd in this manner to furnish yest, and being preserv'd, will serve, and produce the same effect many years together ; and (as the historian affirms) that he was shew'd a piece of a thick wyth, which had been kept for making ale with for above 20 years, &c. In the mean time, the leaves of oaks abundantly congested on snow, preserve it as well for wine, as a deep pit, or the most artificial refrigeratory. Nor must we pass by the sweet mel-dews, so much more copiously found on the leaves of this tree, than any other ; whence the industrious bees gather such abundance of honey, as that instead of carrying it to their hives, they glut themselves to death : But from this ill report (hastily taken up by Euricius Cordus) our learned Mr. Ray has vindicated this temperat and abstemious useful creature. Varro affirms, they made salt of oak ashes, with which they sometimes seasoned meat, but more frequently made use of it to sprinkle among, and fertilize their seed-corn : Which minds me of a certain oak found buried somewhere in Transilvania, near the Salt-pits, that was entirely converted into an hard salt, when they came to examine it by cutting. This experiment (if true) may possibly encourage some other attempts for the multiplying of salt : Nor less strange is that which some report of a certain water somewhere in Hungary,

which transmutes the leaves of this tree into brass, and iron into copper. Of the galls is made trial of spaw-water, and the ground and basis of several dies, especially sadder colours, and are a great revenue to those who have quantities of them: Nor must I forget ink, compos'd of galls ℥iiij, coppras ℥ij, gum-arabic ℥i: Beat the galls grossly, and put them into a quart of claret, or French-wine, and let them soak for eight or nine days, setting the vessel (an earthen glaz'd pitcher is best) in the hot sun, if made in summer; in winter near the fire, stirring it frequently with a wooden spatula: Then add the coppras and gum, and after it has stood a day or two, it will be fit to use. There are a world of receipts more, of which see *Caneparius de Atramentis*. Of the very moss of the oak, that which is white, composes the choicest cypress-powder, which is esteemed good for the head; but impostors familiarly vend other mosses under that name, as they do the fungi (excellent in hemorages and fluxes) for the true agaric, to the great scandal of physick. Young red oaken leaves decocted in wine, make an excellent gargle for a sore mouth; and almost every part of this tree is sovereign against fluxes in general, and where astringents are proper. The dew that impearls the leaves in May, insolated, meteorizes and sends up a liquor, which is of admirable effect in ruptures: The liquor issuing out between the bark, (which looks like treacle) has many sovereign vertues; and some affirm, the water stagnate in the hollow stump of a newly fell'd oak, is as effectual as *lignum sanctum* in the foul disease, and also stops a diarrhæa: And a water distill'd from the acorns is good against the pthisick, stitch in the side, and heals inward ulcers, breaks the stone, and

refrigerates inflammations, being applied with linnen dipp'd therein: nay, the acorns themselves eaten fasting, kill the worms, provoke urine, and (some affirm) break even the stone it self. The coals of oak beaten and mingled with honey, cures the carbuncle; to say nothing of the viscus's, polypods, and other excrescences, of which innumerable remedies are composed, noble antidotes, syrups, &c. Nay, 'tis reported, that the very shade of this tree is so wholesome, that the sleeping, or lying under it becomes a present remedy to paralyticks, and recovers those whom the mistaken malign influence of the walnut-tree has smitten: But what is still more strange, I read in one Paulus a Physician of Denmark, that an handful or two of small oak buttons, mingled with oats, given to horses which are black of colour, will in few days eating alter it to a fine dapple-grey, which he attributes to the vitriol abounding in this tree. To conclude; and upon serious meditation of the various uses of this and other trees, we cannot but take notice of the admirable mechanism of vegetables in general, as in particular in this species; that by the diversity of percolations and strainers, and by mixtures, as it were of divine chymistry, various concoctions, &c. the sap should be so green on the indented leaves, so lustily esculent for our hardier and rustick constitutions in the fruit; so flat and pallid in the atramental galls; and haply, so prognostick in the apple; so suberous in the bark (for even the cork-tree is but a courser oak) so oozy in the tanners pit; and in that subduction so wonderfully specifick in corroborating the entrails, and bladder, reins, loins, back, &c. which are all but the gifts and qualities, with many more, that these robust sons of the earth

afford us; and that in other specifics, even the most despicable and vulgar elder imparts to us in its rind, leaves, buds, blossoms, berries, ears, pith, bark, &c. Which hint may also carry our remarks upon all the varieties of shape, leaf, seed, fruit, timber, grain, colour, and all those other forms that philosophers have enumerated; but which were here too many for us to repeat. In a word, so great and universal is the benefit and use of this poly-crest, that they have prohibited the transporting it out of Norway, where there grows abundance. Let us end with the poet:

- ² When ships for bloody combat we prepare,
Oak affords plank, and arms our men of war;
Maintains our fires, makes ploughs to till the ground,
For use no timber like the oak is found.

CHAPTER IV.

Of the Elm.

1. *Ulmus* the elm, there are four or five sorts, and from the difference of the soil and air divers spurious: Two of these kinds are most worthy our culture, the vulgar, viz. the mountain elm, which is taken to be the *oriptelea* of Theophrastus; being of a less jagged and smaller leaf; and the *vernacula* or French

¹ Of the ilex and cork (reckon'd among the glandiferus) see Book II. cap. v. and of the sacred and mysterious Missalto, Book III. cap. i.; see also more of *quercus*, Mr. Ray's *Hist. Plan.* tom. III. cap. *De Quercus*, tom. II. p. 1390.

² Si quando armandæ naves, & bella paranda,
Det quercus nautis tabulata, det arma furori
Bellantum; det ligna foco, det aratra colono,
Aut aliis aliis porro sumatur in usus.

Rapinus.

elm, whose leaves are thicker, and more florid, glabrous and smooth, delighting in the lower and moister grounds, where they will sometimes rise to above an hundred foot in height, and a prodigious growth, in less than an age ; my self having seen one planted by the hand of a Countess living not long since, which was near 12 foot in compass, and of an height proportionable ; notwithstanding the numerous progeny which grew under the shade of it, some whereof were at least a foot in diameter, that for want of being seasonably transplanted, must needs have hindered the procerity of their ample and indulgent mother : I am persuaded some of these were *viviradices*, & *traduces*, produc'd of the falling seeds.

2. For though both these sorts are rais'd of *appendices*, or suckers (as anon we shall describe) yet this latter comes well from the *samera* or seeds, and therefore I suppose it to be the ancient *atinia*, for such an elm they acknowledge to be rais'd of seeds, which being ripe about the beginning of March (though frequently not till the following month) will produce them ; as we might have seen abundantly in the gardens of the Thuilleries, and that of Luxembourgh at Paris, where they usually sow themselves, and come up very thick ; and so do they in many places of our country, tho' so seldom taken notice of, as that it is esteemed a fable, by the less observant and ignorant vulgar ; let it therefore be tried in season, by turning and raking some fine earth, often refreshed, under some amply spreading tree, or to raise them of their seeds (being well dried a day or two before) sprinkled on beds prepar'd of good loamy fresh earth, and sifting some of the finest

mould thinly over them, and watering them when need requires. Being risen (which may be within 4 or 5 months) an inch above ground (refreshed, and preserved from the scraping of birds and poultry) comfort the tender seedlings by a second sifting of more fine earth, to establish them ; thus keep them clean weeded for the first two years, and cleansing the side-boughs ; or till being of fitting stature to remove into a nursery at wider intervals, and even rows, you may thin and transplant them in the same manner as you were directed for young oaks ; only they shall not need above one cutting, where they grow less regular and hopeful. But because this is an experiment of some curiosity, obnoxious to many casualties, and that the producing them from the mother-roots of greater trees is very facile and expeditious (besides the numbers which are to be found in the hedge-rows and woods, of all plantable sizes) I rather advise our forester to furnish himself from those places.

3. The suckers which I speak of, are produced in abundance from the roots, whence, being dextrously separated, after the earth has been well loosened, and planted about the end of October, they will grow very well : Nay, the stubs only, which are left in the ground after a felling (being fenced in as far as the roots extend) will furnish you with plenty, which may be transplanted from the first year or two, successively, by slipping them from the roots, which will continually supply you for many years, after that the body of the mother-tree has been cut down : Aud from hence probably is sprung that (I fear) mistake of Salmasius and others, where they write of the growing of their chips (I suppose having some

of the bark on) scattered in hewing of their timber ; the error proceeding from this, that after an elm-tree has been fell'd, the numerous suckers which shoot from the remainders of the latent roots, seem to be produced from this dispersion of the chips: Let this yet be more accurately examined; for I pronounce nothing magisterially, since it is so confidently reported.

4. I have known stakes sharpned at the ends for other purposes, take root familiarly in moist grounds, and become trees ; and divers have essay'd with extraordinary success the trunchions of the boughs and arms of elms cut to the scantling of a man's arm, about an ell in length. These must be chopp'd on each side opposite, and laid into trenches about half a foot deep, covered about two or three fingers deep with good mould. The season for this work is towards the exit of January, or early in February, if the frosts impede not ; and after the first year, you may cut, or saw the trunchions off in as many places as you find cause, and as the shoots and rooted sprouts will direct you for transplantation. Another expedient for the propagation of elms is this : Let trenches be sunk at a good distance (viz. twenty or thirty yards) from such trees as stand in hedge-rows, and in such order as you desire your elms should grow ; where these gutters are, many young elms will spring from the small roots of the adjoining trees. Divide (after one year) the shoots from their mother-roots (which you may dextrously do with a sharp spade) and these transplanted, will prove good trees without any damage to their progenitors. Or do thus, lop a young elm, the lop being about three years growth, do it in the latter end of March, when the sap begins to creep up into the boughs, and the

buds ready to break out ; cut the boughs into lengths of four foot slanting, leaving the knot where the bud seems to put forth in the middle : Inter these short pieces in trenches of three or four inches deep, and in good mould well trodden, and they will infallibly produce you a crop ; for even the smallest suckers of elms will grow, being set when the sap is newly stirring in them. There is yet a fourth way no less expeditious, and frequently confirmed with excellent success : Bare some of the master-roots of a vigorous tree within a foot of the trunk, or thereabouts, and with your axe make several chops, putting a small stone into every cleft, to hinder their closure, and give access to the wet ; then cover them with three or four inch-thick of earth ; and thus they will send forth suckers in abundance, (I assure you one single elm thus well ordered, is a fair nursery) which after two or three years, you may separate and plant in the *Ulmarium*, or place designed for them ; and which if it be in plumps (as they call them) within ten or twelve foot of each other, or in hedge-rows, it will be the better : For the elm is a tree of consort, sociable, and so affecting to grow in company, that the very best which I have ever seen, do almost touch one another : This also protects them from the winds, and causes them to shoot of an extraordinary height ; so as in little more than forty years, they even arrive to a load of timber ; provided they be sedulously and carefully cultivated, and the soil propitious. For an elm does not thrive so well in the forest, as where it may enjoy scope for the roots to dilate and spread at the sides, as in hedge-rows and avenues, where they have the air likewise free : Note, that they spring abundantly by layers also.

5. There is besides these sorts we have named, one of a more scabrous harsh leaf, but very large, which becomes an huge tree, (frequent in the northern counties) and is distinguished by the name of the witch-hazle in our Statute Books, as serving formerly to make long bowes of ; but the timber is not so good as the first more vulgar ; but the bark at time of year, will serve to make a course bast-rope with.

6. Of all the trees which grow in our woods, there is none which does better suffer the transplantation than the elm ; for you may remove a tree of twenty years growth with undoubted success : It is an experiment I have made in a tree almost as big more as my waste ; but then you must totally disbranch him, leaving only the summit intire ; and being careful to take him up with as much earth as you can, refresh him with abundance of water. This is an excellent, and expeditious way for great persons to plant the accesses of their houses with ; for being disposed at sixteen or eighteen foot interval, they will in a few years bear goodly heads, and thrive to admiration. Some that are very cautious, emplaster the wounds of such over-grown elms with a mixture of clay and horse-dung, bound about them with a wisp of hay or fine moss, and I do not reprove it, provided they take care to temper it well, so as the vermine nestle not in it. But for more ordinary plantations, younger trees, which have their bark smooth and tender, clear of wens and tuberous bunches (for those of that sort seldom come to be stately trees) about the scantling of your leg, and their heads trimm'd at five or six foot height, are to be prefer'd before all other. Cato would have none of these sorts of trees to be removed till they are five or six fingers in diameter ; others

think they cannot take them too young ; but experience (the best mistress) tells us, that you can hardly plant an elm too big. There are who pare away the root within two fingers of the stem, and quite cut off the head ; but I cannot commend this extream severity, no more than I do the strewing of oats in the pit ; which fermenting with the moisture and frequent waterings, is believed much to accelerate the putting forth of the roots ; not considering, that for want of air they corrupt and grow musty, which more frequently suffocates the roots, and endangers the whole tree.

7. I have affirmed how patient this tree is of transplantation ; not only for that I observe so few of them to grow wild in England, and where it may not be suspected, but they or their predecessors have been planted by some industrious hand ; but for that those incomparable walks and vistas of them, both at Aranjuez, Casal del Campo, Madrid, the Escorial, and other places of delight, belonging to the King and Grandees of Spain, are planted with such as they report Philip the second caused to be brought out of England ; before which (as that most honourable person the Earl of Sandwich, when his Majesty's Ambassador Extraordinary at that Court writ to me) it does not appear there were any of those trees in all Spain. But of that plantation, see it more particularly describ'd in the Eighth Chapter, Book III^d of this Discourse, whither I refer my reader : Whilst (as to my own inclination) I know of no tree amongst all the foresters, becoming the almost *interminat lontananza* of walks and vistas, comparable to this majestick plant : But let us hear it as sweetly advised as described ;

- ¹ An elm for graceful verdure, bushy bough,
 A lofty top, and a firm rind allow.
 Plant elm in borders, on the grass-plots list,
 Branches of elm into thick arbours twist ;
 A gallery of elm draw to the end,
 That eyes can reach, or a breath'd race extend.

8. The elm delights in a sound, sweet, and fertile land, something more inclined to loamy moisture, and where good pasture is produced ; though it will also prosper in the gravelly, provided there be a competent depth of mould, and be refreshed with springs ; in defect of which, being planted on the very surface of the ground (the swarth par'd first away, and the earth stirred a foot deep or more) they will undoubtedly succeed ; but in this trial, let the roots be handsomly spread, and covered a foot or more in height ; and above all, firmly staked. This is practicable also for other trees, where the soil is over-moist or unkind : For as the elm does not thrive in too dry, sandy, or hot grounds, no more will it abide the cold and spongy ; but in places that are competently fertile, or a little elevated from these annoyances ; as we see in the mounds, and casting up of ditches, upon whose banks the female sort does more naturally delight ; though it seems to be so much more addicted to some places than to others, that I have frequently doubted, whether it be a pure *indigene* or *translatitious* ;

¹ Ut viror est ulmo lætus, ramique comantes,
 Arduus, alta petens & levi cortice truncus.
 Ulmum adhibe ordinibus, quoties sudenda per hortum,
 Sunt serie spatia ingenti, texendaque totis
 Æstivos contra soles umbracula campis :
 Una alias inter texendis aptior ulmus
 Marginibus spatiorum, exornandoque vireto.
 Seque adeo series, plano super æquore, tendat
 Ulmorum tractu longo ; quantum ipsa tuentum
 Lumina, vel gressus valeant lustrare sequentum.

and not only because I have hardly ever known any considerable woods of them (besides some few nurseries near Cambridge, planted I suppose for store) but almost continually in tufts, hedge-rows, and mounds; and that Shropshire, and several other counties, and rarely any beyond Stamford to Durham, have any growing in many miles together: Indeed Camden mentions a place in Yorkshire call'd Elmet; and V. Bede, *Eccl. Hist. l. 11. c. 14.* (speaking of a fire hap'ning there, and describing of the harm it did thereabout, *ulmarium* or *ulmetum*) *evasit autem ignem altare, quia lapidum erat, & servatur adhuc in monasterio r. abbatis & presbyteri thrythwulf, quod in sylva elmete est*; but neither does this speak it miraculous, (for the altar it seems was stone) or that the elms grew spontaneously. In the mean time, some affirm they were first brought out of Lombardy, where indeed I have observ'd very goodly trees about the rich grounds, with pines among them, *vitelus almi*; for I hear of none either in Saxony or Denmark, nor in France, (growing wild) who all came and prey'd upon us after the Romans. But leaving this to the learned.

9. The elm is by reason of its aspiring and tapering growth, (unless it be topped to enlarge the branches, and make them spread low) the least offensive to corn and pasture-grounds; to both which, and the cattel, they afford a benign shade, defence, and agreeable ornament: But then as to pastures, the wand'ring roots (apt to infect the fields and grass with innumerable suckers) the leading mother-root ought to be quite separated on that part, and the suckers irradiated. The like should be done where they are placed near walks of turf or gravel.

10. It would be planted as shallow as might be ; for, as we noted, deep interring of roots is amongst the catholick mistakes ; and of this, the greatest to which trees are obnoxious. Let new-planted elms be kept moist by frequent refreshings upon some half-rotten fern, or litter laid about the foot of the stem ; the earth a little stirred and depressed for the better reception and retention of the water.

11. Lastly, your plantation must above all things be carefully preserved from cattel and the concussions of impetuous winds, till they are out of reach of the one, and sturdy enough to encounter the other.

12. When you lop the side-boughs of an elm (which may be about January for the fire, and more frequently, if you desire to have them tall ; or that you would form them into hedges, for so they may be kept plashed, and thickned to the highest twig ; affording both a magnificent and august defence against the winds and sun) I say, when you trim them, be careful to indulge the tops ; for they protect the body of your trees from the wet, which always invades those parts first, and will in time perish them to the very heart ; so as elms beginning thus to decay, are not long prosperous. Sir Hugh Plat relates (as from an expert carpenter) that the boughs and branches of an elm should be left a foot long next the trunk when they are lopp'd ; but this is to my certain observation, a very great mistake either in the relator, or author ; for I have noted many elms so disbranched, that the remaining stubs grew immediately hollow, and were as so many conduits or pipes, to hold, and convey the rain to the very body and heart of the tree.

13. There was a cloyster of the right French elm

in the little garden near to Her Majesty's the Queen-Mother's Chappel at Somerset-House, which were (I suppose) planted there, by the industry of the F. F. Capuchines, that would have directed you to the incomparable use of this noble tree for shade and delight, into whatever figure you will accustom them. I have my self procured some of them from Paris, but they were so abused in the transportation, that they all perished save one, which now flourishes with me: I have also lately graffed elms to a great improvement of their heads. Virgil tells us they will join in marriage with the oak, and they would both be tryed; and that with the more probable success, for such lignous kinds, if you graff under the earth, upon, or near the very root it self, which is likely to entertain the cyon better than when more exposed, till it be well fixt, and have made some considerable progress.

14. When you would fell, let the sap be perfectly in repose; as 'tis commonly about November or December, even to February, after the frost hath well nipp'd them: I have already alledged my reason for it; and I am told, that both oak and elm so cut, the very saplings (whereof rafters, spars, &c. are made) will continue as long as the very heart of the tree, without decay. In this work, cut your kerfe near to the ground; but have a care that it suffer not in the fall, and be ruined with its own weight: This depends upon your wood-man's judgment in disbranching, and is a necessary caution to the felling of all other timber-trees. If any begin to doat, pick out such for the axe, and rather trust to its successor. And if cutting over-late, by floating them 2 or 3 months in the water, it prevents the worm, and proves the best of seasons.

15. Elm is a timber of most singular use ; especially where it may lie continually dry, or wet, in extreams ; therefore proper for water-works, mills, the ladles, and soles of the wheel, pipes, pumps, aquæ-ducts, pales, ship-planks beneath the water-line ; and some that has been found buried in bogs has turned like the most polish'd and hardest ebony, only discerned by the grain : Also for wheel-wrights, handles for the single hand-saw, rails and gates made of elm (thin sawed) is not so apt to rive as oak : The knotty for naves, hubs ; the straight and smooth for axle-trees, and the very roots for curiously dappled works, scarce has any superior for kerbs of coppers, featheridge, and weather-boards, (but it does not without difficulty, admit the nail without boreing) chopping-blocks, blocks for the hat-maker, trunks, and boxes to be covered with leather ; coffins, for dressers and shovel-board-tables of great length, and a lustrous colour if rightly seasoned ; also for the carver, by reason of the tenor of the grain, and toughness which fits it for all those curious works of frutages, foliage, shields, statues, and most of the ornaments appertaining to the orders of architecture, and for not being much subject to warping ; I find that of old they used it even for hinges and hooks of doors ; but then, that part of the plank which grew towards the top of the tree, was in work to be always reversed ; and for that it is not so subject to rift ; Vitruvius commends it both for tenons and mortaises : But besides these, and sundry other employments, it makes also the second sort of charcoal ; and finally, (which I must not omit) the use of the very leaves of this tree, especially of the female, is not to be despis'd ; for being suffered to dry in the sun upon the branches, and the spray strip'd

off about the decrease in August (as also where the suckers and stolones are super-numerary, and hinder the thriving of their nurses) they will prove a great relief to cattel in winter, and scorching summers, when hay and fodder is dear they will eat them before oats, and thrive exceedingly well with them ; remember only to lay your boughs up in some dry and sweet corner of your barn : It was for this the poet prais'd them, and the epithet was advis'd,

¹ fruitful in leaves the elm.

In some parts of Herefordshire they gather them in sacks for their swine, and other cattel, according to this husbandry. But I hear an ill report of them for bees, that surfeiting of the blooming seeds, they are obnoxious to the lask, at their first going abroad in spring, which endangers whole stocks, if remedies be not timely adhibited ; therefore 'tis said in great elm countries they do not thrive ; but the truth of which I am yet to learn. The green leaf of the elms contused, heals a green wound or cut, and boiled with the bark, consolidates fractur'd bones. All the parts of this tree are abstersive, and therefore sovereign for the consolidating wounds ; and assuage the pains of the gout : But the bark decocted in common water, to almost the consistence of a syrup, adding a third part of *aqua vitæ*, is a most admirable remedy for the *ischadicæ* or hip-pain, the place being well rubb'd and chaf'd by the fire. Other wonderful cures perform'd by the liquor, &c. of this tree, see Mr. Ray's *History of Plants*, lib. xxv. cap. I. sect. 5. and for other species of the elm, his Supplement, tom. III. *ad cap. De Ulmo*. tom. II. p. 1428.

¹fœcundæ frondibus ulmi.

Georg. 2.

CHAPTER V.

Of the Beech.

1. The beech, [*fagus*] (of two or three kinds) and numbred amongst the glandiferous trees, I rank here before the martial ash, because it commonly grows to a greater stature. But here I may not omit a note of the accurate critic Palmerius, upon a passage in Theophrastus, ¹ where he animadverts upon his interpreter, and shews that the ancient Φηγός was by no means the beech, but a kind of oak; for that the figure of the fruit is so widely unlike it, that being round, this triangular; and both Theophrastus and Pausanias make it indeed a species of oak, (as already we have noted in cap. III.) wholly differing in trunk, as well as fruit and leaf; to which he adds (what determines the controversie) ξύλον τῆς φηγοῦ ἰσχυρότατον καὶ ἀσηπέσατον, Ἔ. C. *that it is of a firmer timber, not obnoxious to the worm*; neither of which can so confidently be said of the beech. Yet La Cerda too seems guilty of the same mistake: But leaving this, there are of our *fagi*, two or three kinds with us; the mountain (where it most affects to grow) which is the whitest, and most sought after by the turner; and the campestral or wild, which is of a blacker colour, and more durable. They are both to be rais'd from the mast, and govern'd like the oak (of which amply) and that is absolutely the best way of furnishing a wood; unless you will make a nursery, and then you are to treat the mast as you are instructed

¹ Theophrast. l. 3. c. 9.

in the chapter of ashes, sowing them in autumn, or later, even after January, or rather nearer the spring, to preserve them from vermin, which are very great devourers of them. But they are likewise to be planted of young seedlings, to be drawn out of the places where the fruitful trees abound. In transplanting them, cut off only the boughs and bruised parts two inches from the stem, to within a yard of the top, but be very sparing of the root: This for such as are of pretty stature. They make spreading trees, and noble shades with their well furnish'd and glistering leaves, being set at forty foot distance, but they grow taller, and more upright in the forests, where I have beheld them at eight and ten foot, shoot into very long poles; but neither so apt for timber, nor fuel: The shade unpropitious to corn and grass, but sweet, and of all the rest, most refreshing to the weary shepherd—*lentus in umbra*, ecchoing Amaryllis with his oten pipe. Mabillon tells us in his Itinerary, of the old beech at Villambrosa, to be still flourishing, (and greener than any of the rest) under whose umbrage the famous eremit Gualbertus had his cell.

This tree planted in pallisade, affords a useful and pleasant skreen to shelter orange and other tender case-trees from the parching sun, &c. growing very tall, and little inferior to the horn-beam, or Dutch-elm. In the valleys (where they stand warm, and in consort) they will grow to a stupendous procerity, though the soil be stony and very barren: Also upon the declivities, sides, and tops of high hills, and chalky mountains especially, for tho' they thrust not down such deep and numerous roots as the oak; and grow to vast trees, they will strangely insinuate their

roots into the bowels of those seemingly impenetrable places, not much unlike the fir it self, which with this so common tree, the great Cæsar denies to be found in Britanny ; *Materia cujusque generis, ut in Gallia, præter fagum & abietem* : But certainly from a grand mistake, or rather, for that he had not travelled much up into the countrey : Some will have it *fagus* instead of *ficus*, but that was never reckon'd among the timber-trees : Virgil reports it will graff with the chesnut.

2. The beech serves for various uses of the housewife ;

¹ Hence in the world's best years the humble shed,
Was happily, and fully furnished :
Beech made their chests, their beds and the joyn'd-stools,
Beech made the board, the platters, and the bowls.

With it the turner makes dishes, trays, rims for buckets, and other utensils, trenchers, dresser-boards, &c. likewise for the wheeler, joyner, for large screws, and upholster for sellyes, chairs, stools, bedsteads, &c. for the bellows-maker, and husbandman his shovel and spade-graffs ; floates for fishers nets instead of corks, is made of its bark ; for fuel, billet, bavin and coal, tho' one of the least lasting : Not to omit even the very shavings for the fining of wines. Peter Crescentius writes, that the ashes of beech, with proper mixture, is excellent to make glass with. If the timber lie altogether under water, 'tis little inferior to elm, as I find it practised and asserted by

¹ Hinc olim juvenis mundi melioribus annis,
Fortunatarum domuum non magna supellex
Tota petebatur ; sellas, armaria, lectos,
Et mensas dabat, & lances & pocula fagus, &c.
Couleij Pl. 1. 6.

shipwrights : Of old they made their *vasa vindematoria* and *corbes messoriae* (as we our pots for strawberries) with the rind of this beech, nay, and vessels to preserve wine in, and that curiously wrought cup which the shepherd in the *Bucolicks* wagers withal, was engraven by Alcimedon upon the bark of this tree : And an happy age it seems :

¹No wars did men molest,
When only beechen-bowls were in request.

Of the thin *lamina* or scale of this wood (as our cutlers call it) are made scabards for swords, and band-boxes, superinduc'd with thin leather or paper, boxes for writings, hat-cases, and formerly book-covers. I wonder we cannot split it our selves, but send into other countries for such trifles. In the cavities of these trees, bees much delight to hive themselves : Yet for all this, you would not wonder to hear me deplore the so frequent use of this wood, if you did consider that the industry of France furnishes that country for all domestick utensils with excellent walnut ; a material infinitely preferable to the best beech, which is indeed good only for shade and for the fire, as being brittle, and exceedingly obnoxious to the worm, where it lies either dry, or wet and dry, as has been noted ; but being put ten days in water, it will exceedingly resist the worm : To which, as I said, it is so obnoxious, that I wish the use of it were by a law, prohibited all joyners, cabinet-makers, and such as furnish tables, chairs, bed-steads, cofers, screws, &c. They have a way to black and polish

¹Nec bella fuerunt,
Faginus adstabat dum scyphus ante dapes.

Tibul.

it, so as to render it like ebony, and with a mixture of soot and urine, imitate the wall-nut ; but as the colour does not last, so nor does the wood it self (for I can hardly call it timber) soon after the worm has seiz'd it, unless one sponge and imbibe it well with the oyl of spike, where they have made holes. Ricciolus indeed much commends it for oars ; and some say, that the vast Argo was built of the *fagus*, a good part of it at least, as we learn out of Apollonius ; this will admit of interpretation ; the *fagus* yet by Claudian is mentioned with the alder,

¹ So he that to export o're sea his wares
A vessel builds, and to expose prepares
His life to storms, first beech and elder cuts,
And measuring them, to various uses puts.

But whilst we thus condemn the timber, we must not omit to praise the mast, which fats our swine and deer, and hath in some families even supported men with bread : Chios indured a memorable siege by the benefit of this mast ; and in some parts of France they now grind the buck in mills : It affords a sweet oyl, which the poor people eat most willingly : But there is yet another benefit which this tree presents us ; that its very leaves (which make a natural and most agreeable canopy all the summer) being gathered about the fall, and somewhat before they are much frostbitten, afford the best and easiest matrasses in the world to lay under our quilts instead of straw ; because, besides their tenderness and loose lying

¹ Sic qui vecturus longinqua per æquora merces
Molitur tellure ratem, vitamque procellis
Objectare parat, fagos metitur, & alnos,
Ad varium rudibus silvis accommodat usum, &c.

together, they continue sweet for seven or eight years long, before which time straw becomes musty and hard ; they are thus used by divers persons of quality in Dauphine ; and in Swizzerland I have sometimes lain on them to my great refreshment ; so as of this tree it may properly be said,

¹ The wood's an house ; the leaves a bed.

Being pruin'd it heals the scar immediately, and is not apt to put forth so soon again as other trees.

The stagnant water in the hollow-trees cures the most obstinate tetter, scabs, and scurfs, in man or beast, fomenting the part with it ; and the leaves chew'd are wholesome for the gums and teeth, for which the very buds, as they are in winter hardned and dried upon the twigs, make good tooth-pickers. Swine may be driven to mast about the end of August: But it is observ'd, that where they feed on't before it be mature, it intoxicates them for a while ; and that generally their fat is not so good and solid, but drips away too soon. In the mean time, the kernels of the mast are greedily devour'd by squirrels, mice, and above all, the dormice, who harbouring in the hollow-trees, grow so fat, that in some countries abroad, they take infinite numbers of them, (I suppose) to eat ; and what relief they give thrushes, black-birds, feldefares and other birds, every body knows. See Mithiolus in *dioscord.* l. 1. of what they suffer in Carinthiæ, Carniola, and Itiria. Supplement to this Tract. *vid.* Ray's tom. III. Lib. xxv. *Dendrologia Fago.* tom. II. p. 1382.

¹Silva domus, cubilia frondes.

Juvenal.

CHAPTER VI.

Of the Horn-beam.

1. *Ostrys* the horn-beam, (by some called the horse-beech, from the resemblance of the leaf) in Latin (ignorantly) the *Carpinus*, is planted of sets; though it may likewise be rais'd from the *jūlas* and seeds, which being mature in August, should be sown in October, and will lie a year in the bed, which must be well and carefully shaded so soon as they peep: But the more expeditious way is by layers or sets, of about an inch diameter, and cut within half a foot of the earth: Thus it will advance to a considerable tree. The places it chiefly desires to grow in are in cold hills, stiff ground, and in the barren and most expos'd parts of woods. We have it no where more abounding in the south, than in the woods of Hartfordshire; very few westward.

2. Amongst other uses which it serves for, as mill-cogs, &c. (for which it excels either yew or crab) yoak-timber (whence of old, and for that it was as well flexible as tough, 'twas call'd ζυγία) heads of beetles, stocks and handles of tools: It is likewise for the turners use excellent; good fire-wood, where it burns like a candle, and was of old so employ'd;

Carpinus tædas fissa facesque dabit.

(For all which purposes its extream toughness and whiteness commends it to the husbandman.) Being planted in small fosses or trenches, at half a foot

interval, and in the single row, it makes the noblest and the stateliest hedges for long walks in gardens, or parks, of any tree whatsoever whose leaves are deciduous, and forsake their branches in winter; because it grows tall, and so sturdy, as not to be wronged by the winds: Besides, it will furnish to the very foot of the stem, and flourishes with a glossie and polish'd verdure, which is exceeding delightful, of long continuance, and of all other the harder woods, the speediest grower; maintaining a slender, upright-stem, which does not come to be bare and sticky in many years; it has yet this (shall I call it) infirmity, that keeping on its leaf till new ones thrust them off, 'tis clad in russet all the winter long. That admirable *espalier*-hedge in the long middle walk of Luxemburgh garden at Paris (than which there is nothing more graceful) is planted of this tree; and so was that cradle, or close-walk, with that perplext canopy which lately cover'd the seat in his Majesty's Garden at Hampton-Court, and as now I hear, they are planted in perfection at New-park, the delicious villa of the Noble Earl of Rochester, belonging once to a near kinsman of mine, who parted with it to K. Charles the First of Blessed Memory. These hedges are tonsile; but where they are maintain'd to fifteen or twenty foot height (which is very frequent in the places before mention'd) they are to be cut, and kept in order with a syth of four foot long, and very little falcated; this is fix'd on a long sneed or streight handle, and does wonderfully expedite the trimming of these and the like hedges: An oblong square, palisado'd with this plant, or the Flemish *ormus*, as is that I am going to describe, and may be seen in that inexhaustible magazine at Brompton Park (cultivated

by those two industrious fellow-gardiners, Mr. London, and Mr. Wise) affords such an *umbraculum frondium*, the most natural, proper station and convenience for the protection of our orange-trees, myrtles, (and other rare perennials and exoticks) from the scorching darts of the sun, and heat of summer ; placing the cases, pots, &c. under this shelter, when either at the first peeping out of the winter conclave, or during the increasing heat of summer, they so are ranged and disposed, as to adorn a noble area of a most magnificent paradisian dining-room to the top of hortulan pomp and bliss, superior to all the artificial furniture of the greatest prince's court : Here the Indian narcissus, tuberoses, Japan-lillies, jasmines, jonquills, lalaes, periclymena, roses, carnations, (with all the pride of the *parter*) intermixt between the tree-cases, flowry vasas, busts and statues, entertain the eye, and breath their redolent odors and perfumes to the smell : The golden fruit and apples of Hesperides, gratifie the taste, with the delicious annanas, affecting all the sensories ; whilst the chearful ditties of *canorus* birds, recording their innocent *amours* to the murmurs of the bubling fountain, delight the ear, and with the charming accents of the fair and vertuous sex, (preferable to all the admired composure of the most skilful musitians) join consort in hymns and hallelujahs to the bountiful and glorious Creator, who has left none of the senses, which he has not gratify'd at once, with their most agreeable and proper objects.

But to return to Brompton : 'Tis not to be imagin'd what a surprizing scene, such a spacious *salone*, tapis-tried with the natural verdure of the glittering foliage, present the spectator, and recompenses the toil of the ingenious planter ; when after a little

patience, he finds the slender plants, set but at five or six foot distance, (nor much more in height, well prun'd and dress'd) ascend to an altitude sufficient to shade and defend his paradisian treasure without excluding the milder gleams of the glorious and radiant planet, with his cherishing influence, and kindly warmth, to all within the inclosure, refreshed with the cooling and early dew, pregnant with the sweet exhalations which the indulgent mother and teeming earth sends up, to nourish and maintain her numerous and tender off-spring.

But after all, let us not dwell here too long, whilst the inferences to be derived from those tempting and temporary objects, prompt us to raise our contemplations a little on objects yet more worthy our noblest speculations, and all our pains and curiosity, representing that happy state above, namely, the cœlestial paradise: Let us, I say, suspend our admiration a while, of these terrestrial gayeties, which are of so short continuance, and raise our thoughts from being too deeply immers'd and rooted in them, aspiring after those supernal, more lasting and glorious abodes, namely, a paradise; not like this of ours (with so much pains and curiosity) made with hands, but eternal in the heavens; where all the trees are Trees of Life; the flowers all amaranths; all the plants perennial, ever verdant, ever pregnant; and where those who desire knowledge, may fully satiate themselves; taste freely of the fruit of that tree, which cost the first gardiner and posterity so dear; and where the most voluptuous inclinations to the allurements of the senses, may take, and eat, and still be innocent; no forbidden fruit; no serpent to deceive; none to be deceived,

Hail, O hail then, and welcome, you bless'd elyziums, where a new state of things expects us; where all the pompous and charming delights that detain us here a while, shall be changed into real and substantial fruitions, eternal springs, and pleasure intellectual, becoming the dignity of our nature!

I beg no pardon for the application, but deplore my no better use of it, and that whilst I am thus upon the wing, I must now descend so soon again.

Of all the foresters, this preserves it self best from the bruttings of deer, and therefore to be kindly entertain'd in parks: But the reason why with us, we rarely find them ample and spreading, is, that our husbandman suffers too large and grown a lop, before he cuts them off, which leaves such ghastly wounds, as often proves exitial to the tree, or causes it to grow deform'd and hollow, and of little worth but for the fire; whereas, were they oftener taken off, when the lops were younger, though they did not furnish so great wood, yet the continuance and flourishing of the tree, would more than recompence it. For this cause,

3. They very frequently plant a clump of these trees before the entries of most of the great towns in Germany, to which they apply timber-frames for convenience, and the people to sit and solace in. *Scamozzi* the architect, says, that in his time he found one whose branches extended seventy foot in breadth; this was at Vuimfen near the Necker, belonging to the Duke of Wirtemberg: But that which I find planted before the gates of Strasburgh, is a *platanus*, and a lime-tree growing hard by one another, in which is erected a *Pergolo* eight foot from the ground, of fifty foot wide, having ten arches of twelve foot

height, all shaded with their foliage; and there is besides this, an over-grown oak, which has an arbour in it of sixty foot diameter: Hear we *Rapinus* describe the use of the horn-beam for these and other elegancies.

¹ In walks the horn-beam stands, or in a maze
Through thousand self-entangling labyrinths strays:
So clasp the branches lopp'd on either side,
As though an alley did two walls divide:
This beauty found, order did next adorn
The boughs into a thousand figures shorn,
Which pleasing objects weariness betray'd,
Your feet into a wilderness convey'd.
Nor better leaf on twining arbor spread,
Against the scorching sun to shield your head.
Evelyn, *Rapin*.

CHAPTER VII.

Of the Ash.

1. *Fraxinus* the ash, is with us reputed male and female, the one affecting the higher grounds; the other the plains, of a whiter wood, and rising many times to a prodigious stature; so as in forty years from the key, an ash hath been sold for thirty pounds

¹ In tractus longos facilis tibi carpinus ibit,
Mille per errores, indeprehensosque recessus,
Et molles tendens secto ceu pariete ramos,
Præbebit viridem diverso è margine scenam.
Primus honos illi quondam, post additus ordo est,
Attonsæque comæ, & formis quæsita voluptas
Innumeris, furtoque viæ, obliquoque recessu:
In tractus acta est longos & opaca vireta.
Quinetiam egregiæ tendens umbracula frondis
Temperat ardentem ramis ingentibus æstus.

sterling : And I have been credibly inform'd, that one person hath planted so much of this one sort of timber in his life time, as hath been valued worth fifty thousand pounds to be bought. These are pretty encouragements, for a small and pleasant industry. That there is a lower, and more knotty sort, every husbandman can distinguish.

2. The keys or touns being gathered from a young thriving tree when they begin to fall (which is about the end of October, and the ensuing month) are to be laid to dry, and then sowed any time betwixt that and Christmas ; but not altogether so deep as your somer masts : Thus they do in Spain, from whence it were good to procure some of the keys from their best trees : A very narrow seminary will be sufficient to store a whole country : They will lie a full year in the ground before they appear ; therefore you must carefully fence them all that time, and have patience : But if you would make a considerable wood of them at once, dig, or plow a parcel of ground, as you would prepare it for corn, and with the corn, especially oats, (or what other grain you think fittest) sow also good store of keys, some crab-kernels, &c. amongst them : Take off your crop of corn, or seed in its season, and the next year following, it will be cover'd with young ashes, which will be fit either to stand (which I prefer) or be transplanted for divers years after ; and these you will find to be far better than any you can gather out of the woods (especially suckers, which are worth nothing) being removed at one foot stature (the sooner the better) ; for an ash of two years thus taken out of the nursery, shall outstrip one of ten, taken out of the hedge ; provided you defend them well from

cattel, which are exceedingly licorish after their tops : The reason of this hasty transplanting, is to prevent their obstinate and deep rooting ; *tantus amor terræ* which makes them hard to be taken up when they grow older, and that being removed, they take no great hold till the second year, after which, they come away amain ; yet I have planted them of five and six inches diameter, which have thriven as well as the smaller wands. You may accelerate their springing by laying the keys in sand, and some moist fine earth s. s. s. but lay them not too thick, or double, and in a cover'd, though airy place for a winter, before you sow them ; and the second year they will come away mainly ; so you weed, trim and cleanse them. Cut not his head at all (which being young, is pithy) nor, by any means the fibrous part of the roots ; only that down-right, or taproot (which gives our husbandmen so much trouble in drawing) is to be totally abated : But this work ought to be in the increase of October, or November, and not in the Spring. We are (as I told you) willing to spare his head rather than the side branches (which whilst young, may be cut close) because being yet young, it is but of a spongy substance ; but being once well fixed, you may cut him as close to the earth as you please ; it will cause him to shoot prodigiously, so as in a few years to be fit for pike-staves ; whereas if you take him wild out of the forest, you must of necessity strike off the head, which much impairs it. Hedge-row ashes may the oftner be decapitated, and shew their heads again sooner than other trees so us'd. Young ashes are sometimes in winter frost-burnt, black as coals, and then to use the knife is seasonable, though they do commonly recover of themselves

slowly. In South-Spain, (where, as we said, are the best) after the first dressing, they let them grow till they are so big, as being cleft into four parts, each part is sufficient to make a pike-staff: I am told there is a Flemish ash planted by the Dutchmen in Lincolnshire, which in six years grows to be worth twenty shillings the tree; but I am not assur'd whether it be the ash or abeele; either of them were, upon this account, a worthy encouragement, if at least the latter can be thought to bear that price, which I much question: From these low cuttings come our ground-ashes, so much sought after for arbours, espaliers, and other pole-works: They will spring in abundance, and may be reduced to one for a standard-tree, or for timber, if you design it; for thus hydra-like, a ground-cut-ash,

¹ By havock, wounds and blows,
More lively and luxuriant grows.

Ash will be propagated from a bough slipt off with some of the old wood, a little before the bud swells, but with difficulty by layers. Such as they reserve for spears in Spain, they keep shrip'd up close to the stem, and plant them in close order, and moister places. These they cut above the knot (for the least nodosity spoils all) in the decrease of January, which were of the latest for us: It is reported that the ash will not only receive its own kind, but graff, or be inoculated with the pear and apple, but to what improvement I know not.

3. It is by no means convenient to plant ash in

¹ Per damna, per cædes, ab ipso
Ducit opes animúmque ferro.

Hor.

plow-lands; for the roots will be obnoxious to the coulter; and the shade of the tree is malignant both to corn and grass, when the head and branches over-drip and emaciate 'em; but in hedge-rows and plumps, they will thrive exceedingly, where they may be dispos'd at nine or ten foot distance, and sometimes nearer: But in planting of a whole wood of several kinds of trees for timber, every third set at least, would be an ash. The best ash delights in the best land (which it will soon impoverish) yet grows in any; so it be not over-stiff, wet, and approaching to the marshy, unless it be first well drain'd: By the banks of sweet, and crystal rivers and streams, I have observ'd them to thrive infinitely. One may observe as manifest a difference in the timber of ashes, as of the oak; much more than is found in any one kind of elm, *cæteris paribus*: For so the ground-ash (like the oak) much excels a bough, or branch of the same bulk, for strength and toughness; and in yet farther emulation of the oak, it has been known to prove as good and lasting timber for building, nay, preferr'd before it, where there has been plenty of oak; vast difference there is also in the strength of ground, and quarter'd ash: 'Tis likewise remarkable that the ash, like the cork-tree, grows when the bark is as it were quite peel'd off, as has been observ'd in several forests, where the deer have bared them as far as they could climb: Some ash is curiously camleted and vein'd, I say, so differently from other timber, that our skilful cabinet-makers prize it equal with ebony, and give it the name of green ebony, which the customer pays well for; and when our wood-men light upon it, they may make what money they will of it: But to bring it to that curious lustre, so as

'tis hardly to be distinguished from the most curiously diaper'd olive, they varnish their work with the china-varnish, (hereafter described) which infinitely excels linseed-oyl, that Cardan so commends, speaking of this root. The truth is, the *bruscum* and *molluscum* to be frequently found in this wood, is nothing inferior to that of maple, (of which hereafter) being altogether as exquisitely diaper'd, and wav'd like the gamahes of Achates; an eminent example of divers strange figures of fish, men and beasts, Dr. Plott speaks of to be found in a dining-table made of an old ash, standing in a gentleman's house somewhere in Oxfordshire: Upon which is mention'd that of Jacobus Gaffarellus, in his book of *Unheard-of Curiosities*; namely of a tree found in Holland, which being cleft, had in the several slivers, the figures of a chalice, a priest's albe, his stole, and several other pontifical vestments: Of this sort was the elm growing at Middle-Aston in Oxfordshire, a block of which wood being cleft, there came out a piece so exactly resembling a shoulder of veal, that it was worthy to be reckon'd among the curiosities of this nature.

4. The use of ash is (next to that of the oak it self) one of the most universal: It serves the soldier & *Fraxinus utilis hastis*, and heretofore the scholar, who made use of the inner bark to write on, before the invention of paper, &c. The carpenter, wheel-wright, cart-wright, for ploughs, axle-trees, wheel-rings, harrows, bulls, oares, the best blocks for pullies and sheffs, as seamen name them; for drying herrings, no wood like it, and the bark for the tanning of nets; and, like the elm, for the same property (of not being so apt to split and scale) excellent for tenons

and mortaises: Also for the cooper, turner, and thatcher: Nothing like it for our garden palisade-hedges, hop-yards, poles, and spars, handles, stocks for tools, spade-trees, &c. In sum, the husbandman cannot be without the ash for his carts, ladders, and other tackling, from the pike to the plow, spear, and bow; for of ash were they formerly made, and therefore reckon'd amongst those woods, which after long tension, has a natural spring, and recovers its position; so as in peace and war it is a wood in highest request: In short, so useful and profitable is this tree, (next to the oak) that every prudent lord of a mannor, should employ one acre of ground, with ash or acorns, to every 20 acres of other land; since in as many years, it would be more worth than the land it self. There is extracted an oyl from the ash, by the process on other woods, which is excellent to recover the hearing, some drops of it being distill'd warm into the ears; and for the *caries* or rot of the bones, tooth-ach, pains in the kidneys, and spleen, the anointing therewith is most sovereign. Some have us'd the saw-dust of this wood instead of *guiacum*, with success. The chymists exceedingly commend the seed of ash to be an admirable remedy for the stone: But (whether by the power of magick or nature, I determine not) I have heard it affirm'd with great confidence, and upon experience, that the rupture to which many children are obnoxious, is healed, by passing the infant thro' a wide cleft made in the bole or stem of a growing ash-tree, thro' which the child is to be made pass; and then carried a second time round the ash, caused to repass the same aperture again, that the cleft of the tree suffer'd to close and coalesce, as it will, the rupture of the child, being

carefully bound up, will not only abate, but be perfectly cur'd. The *manna* of Calabria is found to exsude out of the leaves and boughs of this tree, during the hot summer-months. Lastly, the white and rotten dotard part composes a ground for our gallants sweet-powder, and the trunchions make the third sort of the most durable coal, and is (of all other) the sweetest of our forest-fuelling, and the fittest for ladies chambers, it will burn even whilst it is green, and may be reckoned amongst the *ἀκαπνα ξύλα*. To conclude, the very dead leaves afford (like those of the elm) relief to our cattle in winter; and there is a dwarf-sort in France, (if in truth it be not, as I suspect, our witchentree) whose berries feed the poor people in scarce years; but it bears no keys, like to ours, which being pickled tender, afford a delicate salading. But the shade of the ash is not to be endur'd, because the leaves produce a noxious insect; and for displaying themselves so very late, and falling very early, not to be planted for umbrage or ornament; especially near the garden, since (besides their predatious roots) the leaves dropping with so long a stalk, are drawn by clusters into the worm-holes, which foul the allies with their keys, and suddenly infect the ground. Note, that the season for felling of this tree must be when the sap is fully at rest; for if you cut it down too early, or over-late in the year, it will be so obnoxious to the worm, as greatly to prejudice the timber; therefore to be sure, fell not till the three mid-winter months, beginning about November: But in lopping of pollards, (as of soft woods) Mr. Cook advises it should be towards the Spring, and that you do not suffer the lops to grow too great: Also, that so soon as a pollard comes to be considerably hollow at the

head, you suddenly cut it down, the body decaying more than the head is worth : The same he pronounces of taller ashes, and where the wood-peckers make holes (who constantly indicate their being faulty) to fell it in the Winter. I am astonish'd at the universal confidence of some, that a serpent will rather creep into the fire, than over a twig of ash ; this is an old imposture of¹ Pliny's, who either took it up upon trust, or we mistake the tree. Other species, see *Ray Dendrolog.* t. III. lib. xxx. p. 95. *De fraxino*, t. II. p. 1704.

CHAPTER VIII.

Of the Chesnut.

1. The next is the chesnut, [*castanea*] of which Pliny reckons many kinds, especially about Tarentum and Naples ; Janus Cornarius, upon that of Aetius, (*verbo* Δρῦς) speaks of the Lopimi, as a nobler kind, such as the *Euboicæ*, which the Italians call *maroni*, *quasi castaneæ maris* ; but we commend those of Portugal or Bayonne, chusing the largest, brown, and most ponderous for fruit, such as Pliny calls *coctivæ*, but the lesser ones to raise for timber. They are produc'd best by sowing and setting ; previous to which, let the nuts be first spread to sweat, then cover them in sand ; a month being past, plunge them in water, reject the swimmers ; being dry'd, for thirty days more, sand them again, and to the water-ordeal as before. Being thus treated till the

¹ V. *Churasium*, &c. *de viperis*.

beginning of Spring, or in November, set them as you would do beans ; and as some practise it, drench'd for a night or more, in new milk ; but without half this preparation, they need only be put into the holes with the point upmost, as you plant tulips ; Pliny will tell you they come not up, unless four or five be pil'd together in a hole ; but that is false, if they be good, as you may presume all those to be which pass this examination ; nor will any of them fail : But being come up, they thrive best unremoved, making a great stand for at least two years upon every transplanting ; yet if needs you must alter their station, let it be done about November, and that into a light friable ground, or moist gravel, however they will grow even in clay, sand, and all mixed soils, upon exposed and bleak places, and the pendent declivities of hills to the north, in dry airy places, and sometimes (tho' not so well) near marshes and waters ; but they affect no other compost, save what their own leaves afford them, and are more patient of cold than heat : As for their sowing in the nursery, treat them as you are taught in the wall-nut.

2. If you design to set them in Winter, or Autumn, I counsel you to interr them within their husks, which being every way arm'd, are a good protection against the mouse, and a providential integument. Pliny l. 15. c. 23. from this natural guard, concludes them to be excellent food, and doubtless Cæsar thought so, when he transported them from Sardis first into Italy, whence they were propagated into France, and thence among us ; another encouragement to make such experiments out of foreign countries. Some sow them confusedly in the furrow like the acorn, and govern them as the oak ; but then

would the ground be broken up 'twixt November and February ; and when they spring, be censed, and thinn'd two foot asunder, after two years growth : Likēwise may copses of chesnuts be wonderfully increased and thickned, by laying the tender and young branches ; but such as spring from the nuts and marrons, are best of all, and will thrive exceedingly, if (being let stand without removing) the ground be stirr'd, and loosened about their roots, for two or three of the first years, and the superfluous wood prun'd away ; and indeed for good trees, they should be shrip'd up after the first year's removal ; they also shoot into gallant poles from a felled stem : Thus will you have a copse ready for a felling, within eight years, which (besides many other uses) will yield you incomparable poles for any work of the garden, vineyard or hopyard, till the next cutting : And if the tree like the ground, will in ten or twelve years grow to a kind of timber, and bear plentiful fruit.

3. I have seen many chesnut-trees transplanted as big as my arm, their heads cut off at five and six foot height ; but they came on at leisure : In such plantations, and all others for avenues, you may set them from thirty to ten foot distance, though they will grow much nearer, and shoot into poles, if (being tender) you cultivate them like the ash, the nature of whose shade it resembles, since nothing affects much to grow under it : Some husbands tell me, that the young chesnut-trees should not be pruned or touched with any knife or edge-tool, for the first three or four years, but rather cropp'd or broken off, which I leave to farther experience ; however, many forbear to top them, when they transplant.

4. The chesnut being graffed in the wallnut, oak, or beech, (I have been told) will come exceeding fair, and produce incomparable fruit ; for the wallnut, and chesnut in each other, it is probable ; but I have not as yet made a full attempt ; they also speak of inoculating cherries in the chesnut-stock for a later fruit. In the mean time, I wish we did more universally propagate the horse-chesnut, which being easily increas'd from layers, grows into a good standard, and bears a most glorious flower, even in our cold country : This tree (so call'd, for the cure of horses broken-winded, and other cattel of coughs) is now all the mode for the avenues to their countrey palaces in France, as appears by the late Superintendent's plantation at Vaux. It was first brought from Constantinople to Vienna, thence into Italy, and so France ; but to us from the Levant more immediately, and flourishes so well, and grows so goodly a tree in competent time, that by this alone, we might have ample encouragement to denizen other strangers amongst us. One inconvenience to which this beautiful tree is obnoxious, is that it does not well resist impetuous and stormy winds, without damage.

5. The chesnut is (next the oak) one of the most sought after by the carpenter and joyner : It hath formerly built a good part of our ancient houses in the city of London, as does yet appear. I had once a very large barn near the city, fram'd intirely of this timber : And certainly they grew not far off ; probably in some woods near the town : For in that description of London, written by Fitz-Stephens, in the reign of Hen. II. he speaks of a very noble and large forest which grew on the Boreal part of it ; *proxime* (says he) *patet foresta ingens, saltus nemorosi ferarum,*

latebræ cervorum, damarum, aprorum, & taurorum silvestrium, &c. A very goodly thing it seems, and as well stor'd with all sorts of good timber, as with venison and all kind of chase ; and yet some will not allow it a free-born of this island ; but of that I make little doubt. The chesnut affords the best stakes and poles for palisades, pedament for vine-props and hops, as I said before : Also for mill-timber and water-works, or when it may lie buried ; but if water touch the roots of the growing trees, it spoils both fruit and timber : 'Tis likewise observed, that this tree is so prevalent against cold, that where they stand, they defend other plantations from the injuries of the severest frosts : I am sure being planted in hedge-rows, & *circa agrorum itinera*, or for avenues to our country-houses, they are a magnificent and royal ornament. This timber also does well (if kept dry) for columns, tables, chests, chairs, stools, bedsteads ; for tubs, and wine-casks, which it preserves with the least tincture of the wood of any whatsoever : If the timber be dipp'd in scalding oyl, and well pitch'd, it becomes extreamly durable ; but otherwise I cannot celebrate the tree for its sincerity, it being found that (contrary to the oak) it will make a fair shew outwardly, when 'tis all decay'd, and rotten within ; but this is in some sort recompenc'd, if it be true, that the beams made of chesnut-tree have this property, that being somewhat brittle, they give warning, and premonish the danger by a certain crackling which it makes ; so as 'tis said to have frightened those out of the Baths at Antandro, whose roof was laid with this material ; but which Pliny says, was of hazle, very unlike it. Formerly they made consultatory staves of this tree ; and the variegated rods which Jacob

peel'd to lay in the troughs, and impress a fancy in his father-in-law's conceiving ewes, were of this material. The coals are excellent for the smith, being soon kindled, and as soon extinguisht; but the ashes of chesnut-wood are not convenient to make a lee with, because it is observ'd to stain the linnen. As for the fruit, 'tis better to beat it down from the tree, some little time before they fall off themselves; thus they will the better keep, or else you must smoke-dry them. But we give that fruit to our swine in England, which is amongst the delicacies of princes in other countries; and being of the larger nut, is a lusty and masculine food for rusticks at all times; and of better nourishment for husbandmen than coal, and rusty bacon; yea, or beans to boot, instead of which, they boil them in Italy with their bacon; and in Virgil's time, they eat them with milk and cheese. The best tables in France and Italy make them a service, eating them with salt, in wine, or juice of lemmon and sugar; being first roasted in embers on the chaplet; and doubtless we might propagate their use amongst our common people, (as of old the Βαλανοφάγοι) being a food so cheap, and so lasting. In Italy they also boil them in wine, and then smoke them a little; these they call *anseri* or geese, I know not why: Those of Piemont add fennel, cinnamon and nutmeg to their wine, if in water, mollify them with the vapour only; but first they peel them. Others macerate them in rose-water. The bread of the flower is exceeding nutritive; 'tis a robust food, and makes women well complexion'd, as I have read in a good author: They also make fritters of chesnut-flower, which they wet with rose-water, and sprinkle with grated *parmegiano*, and so

fry them in fresh butter, a delicate : How we here use them in stew'd-meats, and beatille-pies, our French-cooks teach us ; and this is in truth the very best use of their fruit, and very commendable ; for it is found that the eating of them raw, or in bread (as they do much about Limosin) is apt to swell the belly, though without any other inconvenience that I can learn, and yet some condemn them as dangerous for such as are subject to the gravel in the kidneys, and however cook'd and prepar'd, flatulent, offensive to the head and stomach, and those who are subject to the cholick. The best way to preserve them, is to keep them in earthen vessels in a cold place ; some lay them in a smoke-loft, others in dry barley-straw, others in sand, &c. The leaves of the chesnut-tree make very wholsom mattresses to lie on, and they are good littier for cattel : But those leafy-beds, for the crackling noise they make when one turns upon them, the French call *licts de Parliament* : Lastly, the flower of chesnuts made into an electuary, and eaten with hony fasting, is an approved remedy against spitting blood, and the cough ; and a decoction of the rind of the tree, tinctures hair of a golden colour, esteem'd a beauty in some countries : Other species, v. Ray, *Dendrolog.* T. III, &c.

CHAPTER IX.

Of the Walnut.

1. *Juglans, quasi Jovis glans*, the¹ wall or welch-nut (though no where growing of it self, some say, in Europe) is of several sorts; Monsieur Rencaume (of the French Academy) reckons nine; the soft-shell and the hard, the whiter and the blacker grain: This black bears the worst nut, but the timber much to be preferred, and we might propagate more of them if we were careful to procure them out of Virginia, where they abound and bear a squarer nut, of all other the most beautiful, and best worth planting; indeed had we store of these, we should soon despise the rest; yet those of Grenoble come in the next place, and are much priz'd by our cabinet-makers: In all events, be sure to plant from young and thriving trees, bearing full and plump kernels. It is said that the walnut-kernel wrap'd in its own leaf, being carefully taken out of its shell, brings a nut without shell, but this is a trifle; the best way to elevate them, is to set them as you do the chesnut, being planted of the nut, or set at the distance you would have him stand; for which they^s may be prepar'd by beating them off the tree (as was prescribed of the chesnut) some days before they quit the branches of themselves, and kept in their husks, or without them, till Spring, or by bedding them (being dry) in sand, or good earth, till March or earlier, from the time they fell, or were

¹ See Servius introduc'd discoursing of this and other nuts, *Macrob. Saturn.* l. 3. c. 18.

beaten off the tree : Or if before, they be set with husk and all upon them ; for the extream bitterness thereof is most exitial and deadly to worms ; or it were good to strew some furzes (broken or chopp'd small) under the ground amongst them, to preserve them from mice and rats, when their shells begin to wax tender ; especially if, as some, you supple them a little in warm cows milk ; but being treated as before, you will find them already sprouted, and have need only to be planted where they are to abide ; because (as we said long since) they are most impatient of transplanting : But if there be an absolute necessity of removing, let your tree never be above four years old, and then by no means touch the head with your knife, nor cut away so much as the very top-root, being so old, if you can well dispose of it, since being of a pithy and hollow substance, the least diminution, or bruise, will greatly endanger the killing : But see here what we have said of the chesnut. I have been told, that the very tops, and palish buds of this tree, when it first sprouts, though as late as April, will take hold of the ground, and grow to an incredible improvement ; but first they steep them in milk and saffron ; but this attempt did not succeed with us, yet it will be propagated by a branch slipp'd off with some of the old wood, and set in February : An industrious and very experienc'd husbandman told me, that if they be transplanted as big as ones middle, it may be done safer than when younger ; I do only report it : What they hint of putting a tile-shard under the nuts when first set, to divaricate and spread the roots (which are otherwise apt to penetrate very deep) I like well enough ; 'tis certain they will receive their own cyons being graffed, and that it does

improve their fruit. The best compost is the strewing of ashes at the foot of the trees, the salt whereof being washed into the earth, is the best dressing, whilst the juice of the fallen leaves, though it kill the worm, is noxious to the root. This tree does not refuse to thrive even among others, and in great woods, provided you shrip up the collateral arms.

2. The walnut delights in a dry, sound and rich land; especially if it incline to a feeding chalk, or marle; and where it may be protected from the cold (though it affect cold rather than extream heat) as in great pits, valleys and high-way sides; also in stony-grounds, if loamy, and on hills, especially chalky; likewise in corn-fields: Thus Burgundy abounds with them, where they stand in the midst of goodly wheat-lands, at sixty, and an hundred foot distance; and it is so far from hurting the crop, that they look on them as a great preserver, by keeping the grounds warm; nor do the roots hinder the plow. Whenever they fell a tree (which is only the old and decayed) they always plant a young one near him; and in several places twixt Hanaw and Francfort in Germany, no young farmer whatsoever is permitted to marry a wife, till he bring proof that he hath planted, and is a father of such a stated number of walnut-trees, as the law is inviolably observed to this day, for the extraordinary benefit which this tree affords the inhabitants: And in truth, were this timber in greater plenty amongst us, we should have far better utensils of all sorts for our houses, as chairs, stools, bedsteads, tables, wainscot, cabinets, &c. instead of the more vulgar beech, subject to the worm, weak, and unsightly; but which to counterfeit, and deceive the unwary, they wash over with a decoction made of

the green-husks of walnuts, &c. I say, had we store of this material, especially of the Virginian, we should find an incredible improvement in the more stable furniture of our houses, as in the first frugal and better days of Rome, when

- ¹ Tables made here at home, those times beheld,
Of our own wood, for that same purpose fell'd,
Old walnut blown down, when the wind set east.

Sir R. Stapylton.

For if it had been cut in that season, it would not have prov'd so sound, as we shew in our chapter of felling. It is certain, that the *mensæ nucinæ*, were once in price even before the *citrin*, as Strabo notes ; and nothing can be more beautiful than some planks and works which I have beheld of it, especially that which comes from Grenoble, of all other the most beautiful and esteemed.

3. They render most graceful avenues to our countrey dwellings, and do excellently near hedge-rows ; but had need be planted, at forty or fifty foot interval, for they affect to spread both their roots and branches. The *Bergstras* (which extends from Heidelberg to Darmstadt) is all planted with walnuts ; for so by another ancient law, the borderers were obliged to nurse up, and take care of them ; and that chiefly, for their ornament and shade ; so as a man may ride for many miles about that countrey under a continued arbour, or close-walk ; the traveller both refreshed with the fruit and the shade, which some have causelesly defam'd for its ill effects on the head,

¹ Illa domi natas, nostraque ex arbore mensas
Tempora viderunt : hos lignum stabat in usus,
Annosam si fortè nucem dejecerat Eurus.

Juv. l. 4. Sat. 11.

for which the fruit is a specifique and a notable signature ; although I deny not, but the scent of the fallen leaves, when they begin to be damp'd with lying, may emit somewhat a heady steam, which to some has prov'd noxious ; but not whilst they were fresh, and lively upon the trees. How would such publick plantations improve the glory and wealth of a nation ! But where shall we find the spirits among our countrey-men ? Yes, I will adventure to instance in those plantations of Sir Richard Stidolph, upon the downs near Lether-head in Surrey ; Sir Robert Clayton at Morden near Godstone (once belonging to Sir John Evelyn) and so about Cassaulton, where many thousands of these trees do celebrate the industry of the owners, and will certainly reward it with infinite improvement, as I am assured they do in part already, and that very considerably ; besides the ornament which they afford to those pleasant tracts, for some miles in circumference. There was lately (and for ought I know is yet) an avenue of four leagues in length, and 50 paces breadth, planted with young oaklings, as strait as a line, from the city of Utrecht to Amersfort, affording a most goodly prospect ; which minds me of what Sorbiere tells in a sceptical discourse to Monsieur de Martel, speaking of the readiness of the people in Holland to furnish and maintain whatsoever may conduce to the publick ornament, as well as convenience ; that their plantations of these and the like trees, even in their very roads and common highways, are better preserv'd and entertain'd (as I my self have likewise been often an eye-witness) than those about the houses and gardens of pleasure belonging to the nobles and gentry of most other countries : And in effect it is a most

ravishing object, to behold their amenities in this particular : With us, says he (speaking of France) they make a jest at such political ordinances, by ruining these publick and useful ornaments, if haply some more prudent magistrate do at any time introduce them. Thus in the reign of Henry the Fourth, (during the superintendency of Monsieur de Sulli) there was a resolution of adorning all the highways of France with elms, &c. but the rude and mischievous peasants did so hack, steal and destroy what they had begun, that they were forced to desist from the thorough prosecution of the design ; so as there is nothing more expos'd, wild, and less pleasant than the common roads of France for want of shade, and the decent limits which these sweet and divertissant plantations would have afforded. Not to omit that political use, as my Lord Bacon hints it, where he speaks of the statues and monuments of brave men, and such as had well deserv'd of the publick, erected by the Romans even in their highways ; since doubtless, such noble and agreeable objects would exceedingly divert, entertain, and take off the minds and discourses of melancholy people, and pensive travellers, who having nothing but the dull and enclosed ways to cast their eyes on, are but ill conversation to themselves, and others, and instead of celebrating, censure their superiors. It is by a curious person, and industrious friend of mine, observ'd, that the sap of this tree rises and descends with the sun's diurnal course (which it visibly slackens in the night) and more plentifully at the root on the south side, though those roots cut on the north were larger, and less distant from the body of the tree ; and not only distill'd from the ends, which were next the stem,

but from those which were cut off and separated, which was never observ'd to happen in the birch, or other sap-yielding trees.

¹ Mr. Oldenburg speaks of one of the present kings in Europe, who drinks much of the juice of this tree, and finds great benefit thereby.

4. What universal use the French make of the timber of this sole tree, for domestic affairs, may be seen in every room both of poor and rich : It is of singular account with the joyner, for the best grain'd, and colour'd wainscot ; with the gun-smith for stocks, for coach-wheels excellent, and the bodies of coaches, (they make hoops and bows with it in New-England, for want of yew :) The drum-maker uses it for rims, the cabinet-maker for inlayings, especially the firm and close timber about the roots, which is admirable for fleck'd and chambletted works, some wood especially, as that which we have from Bologne, New-England and Virginia, (where they are of three or four sorts, differing in their leaves, fruit and stature) very black of colour, and so admirably streaked, as to represent natural flowers, landskips, and other fancies : To render this the better-coloured, joyners put the boards into an oven after the batch is forth, or lay them in a warm stable, and when they work it, polish it over with its own oyl very hot, which makes it look black and sleek, and the older it is, the more esteemable ; but then it should not be put in work till thoroughly seasoned, because it will shrink beyond expectation. It is only not good to confide in it much for beams or joysts, because of its brittleness, of which yet, it has been observ'd to give timely notice, as also the chesnut, by the crackling

¹ *Philosoph. Transact.* vol. III, num. xl, p. 802.

before it breaks. Besides the uses of the wood, the fruit with husk and all, when tender and very young, is for preserves (condited in separate decoctions, by our curious ladies) also for food and oyl; of extraordinary use with the painter, in whites, and other delicate colours, also for gold-size and varnish; and with this they polish walking-staves, and other works which are wrought in with burning: For food they fry with it in some places, and eat it instead of butter, in Berry, where they have little or none good; and therefore they plant infinite numbers of these trees all over that countrey: The use of it to burn in lamps, is common there. The younger timber is held to make the better-coloured work (and so the oak) but the older more firm and close, is finer chambered for ornament; and the very husks and leaves being macerated in warm water, and that liquor poured on the carpet of walks, and bowling-greens, does infallibly kill the worms, without endangering the grass: Not to mention the dye which is made of this lixive, to colour wooll, woods, and hair, as of old they us'd it. The water of the husks is sovereign against all pestilential infections, and that of the leaves to mundifie and heal inveterate ulcers. That which is produced of the thick-shell, becomes best timber, that of the thinner, better fruit. Columella has sundry excellent rules how to ascertain and accelerate the growth of this tree, and to improve its qualities; and I am assur'd, that having been graffed on the ash (though others say no incision improves it) it thrives exceedingly, becomes a handsome tree, and what is most estimable, bears its fruit within four years, all which I recommend to the farther industrious. The green husk dry'd, or the first

peeping red buds and leaves reduced to powder, serves instead of pepper, to condite meats and sauces. 'Tis thought better to cudgel off the fruit, when dropping ripe, than to gather it by hand; and that the husk may open, lay them by in a dry room, sometimes turning them with a broom, but without washing, for fear of mouldiness. In Italy they arm the tops of long poles with nails and iron for the purpose, and believe the beating improves the tree; which I no more believe, than I do that discipline would reform a perverse shrew: Those nuts which come not easily out of their husks, should be laid to mellow in heaps, and the rest expos'd in the sun, till the shells dry, else they will be apt to perish the kernel: Some again preserve them in their own leaves, or in a chest made of walnut-tree wood; others in sand, especially if you will preserve them for a seminary; do this in October, and keep them a little moist, that they may spear, to be set early in February: Thus after two years they may be removed at a yard asunder, cutting the top-root, and side branches, but sparing the head; and being two yards high, bud, or remove them immediately. Old nuts are not wholesome till macerated in warm, and almost boiling water; but if you lay them in a leaden pot, and bury them in the earth, so as no vermin can attaque them, they will keep marvellously plump the whole year about, and may easily be blanched: In Spain they use to strew the gratings of old and hard nuts (first peel'd) into their tarts and other meats. For the oyl, one bushel of nuts will yield fifteen pounds of peel'd and clear kernels, and that half as much oyl, which the sooner 'tis drawn, is the more in quantity, though the dryer the nut, the better in quality; the lees, or marc of

the pressing, is excellent to fatten hogs with. After the nuts are beaten down, the leaves would be sweep'd into heaps, and carried away, because their extreme bitterness impairs the ground, and as I am assured, prejudices the trees : The green husks boiled, make a good colour to dye a dark yellow, without any mixture ; and the distillation of its leaves with honey and urine, makes hair spring on baldheads : Besides its use in the famous Salernitan antidote ; if the kernel a little masticated, be applied to the biting of a suspected mad-dog, and when it has lain three hours, be cast to poultery, they will die if they eat of it. In Italy, when a countreyman finds any pain in his side, he drinks a pint of the fresh oyl of this nut, and finds immediate ease : And more famous is the wonderful cure, which the *fungus* substance separating the lobes of the kernel, pulveriz'd and drank in wine, in a moderate quantity, did recover the English army in Ireland of a dysentery, when no other remedy could prevail : The same also in pleurisies, &c. The juice of the outward rind of the nut, makes an excellent gargle for a sore-throat : The kernel being rubb'd upon any crack or chink of a leaking or crazy vessel, stops it better than either clay, pitch, or wax : In France they eat them blanch'd and fresh, with wine and salt, having first cut them out of the shells before they are hardned, with a short broad brass-knife, because iron rusts, and these they call *cernois*, from their manner of scooping them out. Lastly, of the *fungus* emerging from the trunk of an old tree, (and indeed some others) is made touch-wood, artificially prepar'd in a *lixivium* or lye, dried, and beaten flat, and then boil'd with salt-peter, to render it apter to kindle. The tree wounded in the Spring, yields a

liquor, which makes an artificial wine. See Birch, cap. xvii. Of other species, see Mr. Ray's *Dendrolog.* Tom. III. p. 5, 6.

CHAPTER X.

Of the Service, and black cherry-tree.

I. *Sorbus*, the service-tree (of which there are four sorts) is rais'd of the chequers, or berries, which being ripe (that is) rotten, about September (and the pulp rub'd off clean from the stones, in dry sand, and so kept till after Christmas) may be sown like beech-mast, educated in the nursery like the chesnut : It is reported that the sower never sees the fruit of his labour ; either for that it bears only being very old, or that men are commonly so, before they think of planting trees : But this is an egregious mistake ; for these come very soon to be trees, and being planted young, thrive exceedingly ; I have likewise planted them as big as my arm successfully : The best way is therefore to propagate them of suckers, of which they put forth enough, as also of sets, and may be budded with great improvement : They delight in reasonable good stiff ground, rather inclining to cold, than over-hot ; for in places which are too dry, they never bear kindly. The *torminalis* (so called for its effects against gripings of the bowels) is the kind most frequent with us ; for those of the narrower, and less indented leaf, are not so common in England as in France, bearing a sort of berry of the pear-shape, and is there call'd the *cormier* ; this tree may be graffed either on

it self, or on the white-thorn, and quince. To this we might add, the *mespilus* or medlar, being an hard wood, and of which I have seen very beautiful walking-staves. But there is yet a rare kind of service-tree, frequent in Germany, which we find not in our woods, and they speak of another sort, which bears poyson-berries.

2. The timber of the sort is useful for the joyner, and of which I have seen a room curiously wainscotted: Also for the engraver of wood-cuts, bows, pullys, skrews, mill-spindles and other; goads to drive oxen with, &c. pistol and gun-stocks, and for most that the wild-pear-tree, serves; and being of a very delicate grain for the turner, and divers curiosities, and looks beautifully, and is almost everlasting, being rubb'd over with oyl of linseed, well boil'd, it may be made to counterfeit ebony, or almost any Indian wood, colour'd according to art: Also it is taken to build with, yielding beams of considerable substance: The shade is beautiful for walks, and the fruit not unpleasant, especially the second kind, of which with new wine and honey, they make a *conditum* of admirable effect to corroborate the stomach; and the fruit alone is good in dysentery's and lasks. The water distill'd from the stalks of the flowers and leaves in M. B. and twice rectified upon fresh matter, is incomparable for consumptive and tabid bodies, taking an ounce daily at several times: Likewise it cures the green-sickness in virgins, and is prevalent in all fluxes; distill'd warm into the ears it abates the pain: The wood or bark contus'd, and applied to any green wound, heals it; and the powder thereof drank in oyl olive, consolidates inward ruptures: Lastly, the salt of the wood taken in decoction of *althæa* to three grains, is an

incomparable remedy to break, and expel gravel. The service gives the husbandman an early presage of the approaching Spring, by extending his adorned buds for a peculiar entertainment, and dares peep out in the severest Winters.

3. That I rank this amongst the forest berry-bearing trees, (frequent in the hedges, and growing wild in Herefordshire, and many places; for I speak not here of our orchard-cherries, said to have been brought into Kent out of Flanders by Hen. VIII.) is chiefly from the suffrage of that industrious planter Mr. Cooke, from whose ingenuity and experience (as well as out of gratitude for his frequent mentioning of me in his elaborate and useful work) I acknowledge to have benefited my self, and this edition; though I have also given no obscure tast of this pretty tree in Chap. xx.

It is rais'd of the stones of black-cherries very ripe (as they are in July) endeavouring to procure such as are full, and large; whereof some he tells us, are little inferior to the black Orleance, without graffing, and from the very genius of the ground. These gather'd, the fleshy part is to be taken off, by rolling them under a plank in dry sand, and when the humidity is off (as it will be in 3 or 4 days) reserve them in sand again a little moist and hous'd, 'till the beginning of February, when you may sow them in a light gravelly mould, keeping them clean for two years, and thence planting them into your nurseries, to raise other kinds upon, or for woods, copses and hedge-rows, and for walks and avenues, which if of a dryish soil, mixt with loam, though the bottom be gravel, will thrive into stately trees, beautified with blossoms of a surprizing whiteness, greatly relieving the sedulous bees, and attracting birds.

If you sow them in beds immediately after they are excarnated, they will appear the following Spring, and then at two years shoot, be fit to plant out where you please ; otherwise, being kept too long e'er you sow them, they will sleep two Winters: And this is a rule, which he prescribes for all sorts of stone-fruit.

You may almost at any time remove young cherry-trees, abating the heads to a single shoot.

He recommends it for the copse, as producing a strong shoot, and as apt to put forth from the roots, as the elm ; especially, if you fell lusty trees : In light ground it will increase to a goodly tall tree, of which he mentions one, that held above 85 foot in height : I have my self planted of them, and imparted to my friends, which have thriv'd exceedingly ; but till now did not insert it among the foresters : The vertues of the fruit of this cherry-tree against the epilepsy, palsy, and convulsions, &c. are in the spirits and distill'd waters. Concerning its other uses, see the chapter and section above-mentioned, to which add *pomona*, Chap. 8. annexed with this treatise. This tree affords excellent stocks for the budding and grafting of other cherries on.

And here I might mention the bitter cherry of Canada, (tho' exceedingly unlike to ours) which would yet be propagated for the incomparable liquor it is said to yield, preferable to the best limonade, by an incision of two inches deep in the stem, and sloping to the length of a foot, without prejudice to the tree. What is said of it, and of the maple, in the late discovery of the North-America, may be seen in the late description of those countries. For other exotic species, v. Ray *Dendrolog.* Tom. III. p. 45, 46.

CHAPTER XI.

Of the Maple.

1. The maple [*acer minus*] (of which authors (see Salmasius upon *Solinus*, c. 33.) reckon very many kinds) was of old held in equal estimation almost with the citron; especially the *bruscum*, the French-maple and the *pavonaceus*, peacocks-tail maple, which is that sort so elegantly undulated, and crisped into variety of curles, as emulates the famous *citria*. It were a most laudable attempt, if some would enquire out, and try the planting of such sorts as are not indigenes amongst us; such as is especially the German *Aier*, and that of Virginia, not yet cultivated here, but an excellent tree: And if this were extended to other timber, and exotic trees likewise, it would prove of extraordinary benefit and ornament to the publick, and were worthy even of the royal care. They are all produced of seeds contain'd in the folliacles and keys, or birds-tongues (as they are call'd) like the ash, (after a year's interrment) and like to it, affect a sound, and a dry mould; growing both in woods and hedge-rows, especially in the latter; which if rather hilly than low, affords the fairest timber. It is also propagated by layers and suckers. By shredding up the boughs to a head, I have caused it to shoot to a wonderful height in a little time; but if you will lop it for the fire, let it be done in January; and indeed it is observ'd to be of noxious influence to the subnascent plants of other kinds, by reason of a clammy dew which it sheds upon them, and therefore they would

not be indulg'd in pollards, or spreading trees, but to thicken under-woods and copses. The timber is far superior to beech for all uses of the turner, who seeks it for dishes, cups, trays, trenchers, &c. as the joyner for tables, inlayings, and for the delicateness of the grain, when the knurs and nodosities are rarely diaped, which does much advance its price : Our turners will work it so thin, that it is almost transparent : Also for the lightness (under the name *Aier*) imploy'd often by those who make musical instruments : Also that especially, which grows in Friuli, Carniola, and Saltzburglandt : There is a larger sort, which we call the sycomor.

2. But the description of this lesser maple, and the ancient value of it, is worth the citing. *Acer operum elegantia, & subtilitate cedro secundum ; plura ejus genera: Album, quod praecipui candoris vocatur Gallicum: In Transpadana Italia, transque Alpes nascens. Alterum genus, crispo macularum discursu, qui cum excellentior fuit, à similitudine caudæ pavonum nomen accepit.* ‘The
 ‘ maple, (says Pliny) for the elegancy and fineness of
 ‘ the wood, is next to the very cedar it self. There
 ‘ are several kinds of it, especially the white, which
 ‘ is wonderfully beautiful ; this is call'd the French-
 ‘ maple, and grows in that part of Italy, that is on the
 ‘ other side of Po beyond the Alpes : The other has
 ‘ a curl'd grain, so curiously maculated, that from a
 ‘ near resemblance, it was usually call'd the Peacock's-
 ‘ tail, &c. He goes on to commend that of Istria,
 and that growing on the mountains for the best : But
 in the next chapter ; *Pulcherrimum vero est bruscum,
 multoque excellentius etiamnum mollusculum, tuber utrum-
 que arboris ejus. Bruscum intortiùs crispum, mollusculum
 simplicius sparsum ; et si magnitudinem mensarum caperet,*

haud dubiè præferretur cedro, nunc intra pugillares, lectorumque silicios aut laminas, &c. è brusco fiunt mensæ nigrescentes, &c. Plin. l. 16. c. 15, 16. ‘ The *bruscum*, ‘ or Knur is wonderfully fair, but the *molluscum* is ‘ counted most precious ; both of them knobs and ‘ swellings out of the tree. The *bruscum* is more ‘ intricately crisp’d ; the *molluscum* not so much ; and ‘ had we trees large enough to saw into planks for ‘ tables, ’twould be preferr’d before cedar, (or citron, ‘ for so some copies read it) but now they use it only ‘ for small table-books, and with its thin boards to ‘ wainscot bed-testers with, &c. The *bruscum* is of ‘ a blackish kind, with which they make tables. Thus far Pliny. And such spotted tables were the famous Tigrin, and Pantherine curiosities of ; not so call’d from being supported with figures carved like those beasts, as some conceive, and was in use even in our grand-fathers days, but from its natural spots and maculations, *hem, quantis facultatibus æstimavere ligneas maculas !* as Tertullian crys out, *de Pallio*, c, 5. Such a table was that of Cicero’s, which cost him 10000 *Sesterces* ; such another had Asinius Gallus. That of King Juba was sold for 15000, and another which I read of, valu’d at 140000 H.S. which at about 3*d.* sterling, arrives to a pretty sum ; and yet that of the Mauritanian Ptoleme, was far richer, containing four foot and an half diameter, three inches thick, which is reported to have been sold for its weight in gold : Of that value they were, and so madly luxurious the age, that when they at any time reproach’d their wives for their wanton expensiveness in pearl and other rich trifles, they were wont to retort, and turn the tables upon their husbands. The knot of the timber was the most esteem’d, and is said

to be much resembled by the female cypress : We have now, I am almost persuaded, as beautiful planks of some walnut-trees, near the root ; and yew, ivy, rose-wood, ash, thorn, and olive, I have seen incomparable pieces ; but the great art was in the seasoning, and politure ; for which last, the rubbing with a man's hand who came warm out of the bath, was accounted better than any cloth, as Pliny reports. Some there be who contend, this citern was a part near the root of the cedar, which, as they describe it, is very oriental and odoriferous ; but most of the learned favour the citron, and that it grew not far from our Tangier, about the foot of Mount Atlas, whence haply some industrious person might procure of it from the Moors ; and I did not forget to put his then Excellency my Lord H. Howard (since his Grace the Duke of Norfolk) in mind of it ; who I hoped might have opportunities of satisfying our curiosity, that by comparing it with those elegant woods, which both our own countries, and the Indies furnish, we might pronounce something in the controversie : But his not going so far into the countrey, and the disorder which happen'd at his being there, quite frustrated this expectation : Here I think good to add, what honest Palissy philosophises after his plain manner, about the reason of those pretty undulations and chamfers, which we so frequently find in divers woods, which he takes to be the descent, as well as ascent of moisture : For what else (says he) becomes of that water which we often encounter in the cavities, when many branches divaricate, and spread themselves at the tops of great trees (especially pollards) unless (according to its natural appetite) it sink into the very body of the stem through the

pores? For example, in the walnut, you shall find, when 'tis old, that the wood is admirably figur'd, and, as it were, marbl'd, and therefore much more esteem'd by the joiners, cabinet-makers, and *ouvrages de marqueterie*, in-layers, &c. than the young, which is paler of colour, and without any notable grain, as they call it. For the rain distilling along the branches, when many of them break out into clusters from the stem, sinks in, and is the cause of these marks; since we find it exceedingly full of pores: Do but plane off a thin chip, or sliver from one of these old trees, and interposing it 'twixt your eye and the light, you shall observe it to be full of innumerable holes (much more perspicuous and ample, by the application of a good¹ microscope.) But above all, notable for these extravagant damaskings and characters, is the maple; and 'tis notorious, that this tree is very full of branches from the root to its very summit, by reason that it produces no considerable fruit: These arms being frequently cut, the head is more surcharged with them, which spreading like so many rays from a centre, form that hollowness at the top of the stem whence they shoot, capable of containing a good quantity of water every time it rains: This sinking into the pores, as was before hinted, is compell'd to divert its course as it passes through the body of the tree, where-ever it encounters the knot of any of those branches which were cut off from the stem; because their roots not only deeply penetrate towards the heart, but are likewise of themselves very hard and impervious; and the frequent obliquity of this course of the subsiding moisture, by reason of these obstructions, is, as may be conceived, the cause

¹ Not invented in Palissy's days.

of those curious works, which we find remarkable in this, and other woods, whose branches grow thick from the stem : But for these curious contextures, consult rather the learned Dr. Grew. We have shew'd how by culture, and stripping up, it arrives to a goodly tree ; and surely there were some of them of large bulk, and noble shades, that Virgil should chuse it for the Court of his Evander (one of his worthiest princes, in his best of poems) sitting in his maple-throne ; and when he brings Æneas into the royal cottage, he makes him this memorable complement ; greater, says great Cowley, than ever was yet spoken at the Escorial, the Louvre, or White-hall.

¹ This humble roof, this rustique court, said he,
 Receiv'd Alcides crown'd with victory :
 Scorn not (great guest) the steps where he has trod,
 But contemn wealth, and imitate a God.

The savages in Canada, when the sap rises in the maple, by an incision in the tree, extract the liquor ; and having evaporated a reasonable quantity thereof (as suppose 7 or 8 pound), there will remain one pound, as sweet and perfect sugar, as that which is gotten out of the cane ; part of which sugar has been for many years constantly sent to Rouen in Normandy, to be refin'd : There is also made of this sugar an excellent syrup of maiden-hair and other capillary plants, prevalent against the *scorbut* ; though Mr. Ray thinks otherwise, by reason of the saccharine substance remaining in the decoction : See *Synops. Stirp.* & Tom. III. *Dendrolog. de Acere.* p. 93, 94.

¹ Hæc (inquit) limina victor
 Alcides.....

CHAPTER XII.

Of the Sycomor.

1. The sycomor, or wild fig-tree, (falsly so called) is, our *album*, *acer majus*, or broad-leav'd *mas*, one of the maples, and is much more in reputation for its shade than it deserves; for the honey-dew leaves, which fall early (like those of the ash) turn to mucilage and noxious insects, and putrifie with the first moisture of the season; so as they contaminate and mar our walks; and are therefore by my consent, to be banish'd from all curious gardens and avenues. 'Tis rais'd of the keys in the husk (as soon as ripe) they come up the first Spring; also by roots and layers, in ground moist, not over-wet or stiff, and to be govern'd as other nursery plants.

2. There is in Germany a better sort of sycomor than ours, (nor are ours *indiginæ*) wherewith they make saddle-trees, and divers other things of use; our own is excellent for trenchers, cart, and plow-timber, being light, tough, and not much inferior to ash it self; and if the trees be very tall and handsome, are the more tolerable for distant walks especially where other better trees prosper not so well, or where a sudden shade is expected: Some commend them to thicken copp'ces, especially in parks, as least apt to the spoil of deer, and that it is good fire-wood. This tree being wounded, bleeds a great part of the year; and the liquor emulating that of the birch, which for hapning to few of the rest (that is, to bleed Winter and Summer) I therefore mention: The sap is sweet

and wholesome, and in a short time yields sufficient quantity to brew with; so as with one bushel of malt, is made as good ale as four bushels with ordinary water, upon Dr. Tongue's experience, *Transact.* vol. iv. f. 917.

CHAPTER XIII.

Of the Lime-Tree.

1. *Tilia* the lime-tree, or [linden] is of two kinds; the male (which some allow to be but a finer sort of elm) or maple rather, is harder, fuller of knots, and of a redder colour; but producing neither flower, nor seed, (so constantly and so mature with us) as does the female, whose blossom is also very odoriferous, perfuming the air, the leaf larger; the wood is likewise thicker, of small pith, and not obnoxious to the worm; so as it seems Theophrastus *de Pl.* l. 3. c. 10. said true, that though they were of both sexes, *διαφέρουσι δὲ τῇ μορφῇ τῇ ὄλῃ, &c.* yet they totally differ'd as to their form. We send commonly for this tree into Flanders and Holland, (which indeed grow not so naturally wild with us) to our excessive cost, whiles our own woods do in some places spontaneously produce them, and though of somewhat a smaller leaf, yet altogether as good, apt to be civiliz'd, and made more florid: From thence I have received many of their berries; so as it is a shameful negligence, that we are no better provided of nurseries, of a tree so choice, and universally acceptable: For so they may be rais'd either of the seeds in October, or (with

better success) by the suckers and plants, which are treated after the same method, and in as great abundance as the elm, like to which it should be cultivated. You may know whether the seeds be prolific, by searching the husk ; if biting, or cutting it in sunder it be full and white, and not husky, as sometimes we find the foreigners : Be sure to collect your seed in dry weather, airing it in an open room, and reserving it in sand, (as has been taught) till mid-February, when you may sow it in pretty strong, fresh and loamy mould, kept shaded, and moist as the season requires, and clear of weeds, and at the period of two years, plant them out, dress'd and prun'd as discretion shall advise. But not only by the suckers and layers, at the roots, but even by branches lopp'd from the head, may this tree be propagated ; and peeling off a little of the bark, at a competent distance from the stem or arms, and covering it with loam mingled with rich earth, they will shoot their fibers, and may be seasonably separated : But to facilitate this and the like attempts, it is advisable to apply a ligature above the place, when the sap is ascending, or beneath it, when it (as they say vulgarly) descends. From June to November you may lay them ; the scrubs and less erect, do excellently to thicken copp'ces, and will yield lusty shoots, and useful fire-wood.

2. The lime-tree affects a rich feeding loamy soil ; in such ground their growth will be most for speed and spreading. They may be planted as big as ones leg ; their heads topp'd at about six or eight foot bole ; thus it will become (of all other) the most proper, and beautiful for walks, as producing an upright body, smooth and even bark, ample leaf, sweet blossom, the delight of bees, and a goodly shade

at distance of eighteen, or twenty five foot. They are also very patient of pruning ; but if it taper over much, some of the collateral boughs would be spar'd, or cut off, to check the sap, which is best to be done about Midsummer ; and to make it grow upright, take off the prepondering branches with discretion, and so you may correct any other tree, and redress its obliquity.

The root in transplanting would not be much lopp'd; and this (says Mr. Cook) is a good lesson for all young planted trees.

3. The Prince Elector did lately remove very great lime-trees out of one of his forests, to a steep hill, exceedingly expos'd to the heat of the sun, at Heidelberg ; and that in the midst of summer : They grow behind that strong tower on the southwest, and most torrid part of the eminence ; being of a dry, reddish barren earth ; yet do they prosper rarely well : But the heads were cut off, and the pits into which they were transplanted, were (by the industry and direction of *Monsieur de Son*, a Frenchman, and admirable mechanician, who himself related it to me) fill'd with a composition of earth and cow-dung, which was exceedingly beaten, and so diluted with water, as it became almost a liquid pap : It was in this, that he plunged the roots, covering the surface with the turf : A singular example of removing so great trees at such a season, and therefore by me taken notice of here expresly. Other perfections of the tree (besides its unparallel'd beauty for walks) are that it will grow in almost all grounds : That it lasts long ; that it soon heals its scars ; that it affects uprightness ; that it stoutly resists a storm ; that it seldom becomes hollow.

4. The timber of a well-grown lime is convenient for any use that the willow is ; but much to be preferr'd, as being both stronger, and yet lighter ; whence Virgil calls them *tillas leves* ; and therefore fit for yokes, and to be turn'd into boxes for the apothecaries ; and Columella commends *arculas tiliaceas*. And because of its colour, and easy working, and that it is not subject to split, architects make with it models for their designed buildings ; and the carvers in wood, not only for small figures, but large statues and intire histories, in bass, and high relieve ; witness (besides several more) the lapidation of St. Stephen, with the structures and elevations about it : The trophies, festoons, frutages, encarpa, and other sculptures in the frontoons, freezes, capitals, pedestals, and other ornaments and decorations, (of admirable invention and performance) to be seen about the choir of St. Paul's and other churches ; royal palaces, and noble houses in city and countrey. All of them, the works and invention of our Lysippus, Mr. Gibbons ; comparable, and for ought appears, equal to any thing of the antients ; having had the honour (for so I account it) to be the first who recommended this great artist to his Majesty, Charles the II. I mention it on this occasion, with much satisfaction. With the twigs, they made baskets and cradles, and of the smoother side of the bark, tablets for writing ; for the antient *Philyra* is but our *Tilia* ; of which Munting affirms, he saw a book made of the inward bark, written about 1000 years since. Such another was brought to the Count of St. Amant, Governor of Arras, 1662, for which there was given 8000 ducats by the Emperor, and that it contain'd a work of Cicero, *De Ordinanda Republica, & De Inveniendis Ora-*

tionum Exordiis : A piece inestimable, never publish'd ; is now in the library at Vienna, after it had formerly been the greatest rarity in that of the late Cardinal Mazarine : Other papyraceous trees are mention'd by West-Indian travellers, especially in Hispaniola, Java, &c. which not only exceed our largest paper for breadth and length, and may be written on on both sides, but is comparable to our best vellum. Bellonius says, that the Grecians made bottles of the *tilia*, which they finely rozin'd within-side, so likewise for pumps of ships, also lattices for windows : Shoemakers use dressers of the plank to cut leather on, as not so hard as to turn the edges of their knives ; and even the coarsest membrane, or slivers of the tree growing 'twixt the bark and the main body, they now twist into bass-ropes ; besides, the truncheons make a far better coal for gun-powder than that of alder it self ; Scriblets for painters first draughts are also made of its coals ; and the extraordinary candor and lightness, has dignify'd it above all the woods of our forest, in the hands of the Right Honourable the White-Stave officers of His Majesty's Imperial Court. Those royal plantations of these trees in the parks of Hampton-court, and St. James's, will sufficiently instruct any man how these (and indeed all other trees which stand single) are to be govern'd, and defended from the injuries of beasts, and sometimes more unreasonable creatures, till they are able to protect themselves. In Holland (where the very high-ways are adorn'd with them) they frequently clap three or four deal-boards (in manner of a close trunk) about them ; but it is not so well ; because it keeps out the air, which should have free access and intercourse to the bole, and by no means be excluded from flowing freely

about them, or indeed any other trees ; provided they are secur'd from cattel, and the violence of impetuous winds, &c. as His Majesty's are, without those close coffins, in which the Dutch-men seem rather to bury them alive: In the mean time, is there a more ravishing or delightful object, than to behold some intire streets, and whole towns planted with these trees, in even lines before their doors, so as they seem like cities in a wood ? this is extreamly fresh, of admirable effect against the epilepsie, for which the delicately scented blossoms are held prevalent, and skreen the houses both from winds, sun, and dust ; than which there can be nothing more desirable where streets are much frequented. For thus

¹ The stately Lime, smooth, gentle, streight and fair,
 (With which no other Dryad may compare)
 With verdant locks, and fragrant blossoms deckt,
 Does a large, ev'n, odorate shade project.

Diræ and curses therefore on those inhuman and ambitious tyrants, who, not contented with their own dominions, invade their peaceful neighbour, and send their legions, without distinction, to destroy and level to the ground such venerable and goodly plantations, and noble avenues, irreparable marks of their barbarity.

The distance for walks (as we said) may in rich ground, be twenty five foot, in more ordinary soil, eighteen or twenty. For a most prodigious tree of this kind, see Chap. 39. sect. 10.

The berries reduc'd to powder, cure the dysentery

¹ Stat philyra ; haud omnes formosior altera surgit
 Inter hamadryades ; mollissima, candida, lævis,
 Et viridante comâ, & beneolenti flore superba,
 Spargit odoratam latè, atque æqualiter umbram.

Couleri, 1. 6, Pl

and stop blood at the nose : The distill'd-water is good against the epilepsy, apoplexy, vertigo, trembling of the heart, gravel ; Schroder commends a mucilage of the bark for wounds, *repellens urinam, & menses ciens,* &c. And I am told, the juice of the leaves fixes colours.

CHAPTER XIV.

Of the Poplar, Aspen, and Abele.

1. *Populus*. I begin this second class (according to our former distribution) with the poplar, of which there are several kinds ; white, black, &c. (which in Candy 'tis reported bears seed) besides the aspen. The white (famous heretofore for yielding its *umbram hospitalem*) is the most ordinary with us, to be rais'd in abundance by every set or slip. Fence the ground as far as any old poplar-roots extend, they will furnish you with suckers innumerable, to be slipp'd from their mothers, and transplanted the very first year : But if you cut down an old tree, you shall need no other nursery. When they are young, their leaves are somewhat broader and rounder (as most other trees are) than when they grow aged. In moist and boggy places they will flourish wonderfully, so the ground be not spewing ; but especially near the margins and banks of rivers,

Populus in fluviiis.....

and in low, sweet, and fertile ground ; yea, and in the dryer likewise. Also trunchions of seven or eight foot long, thrust two foot into the earth, (a hole

being made with a sharp hard stake, fill'd with water, and then with fine earth pressed in, and close about them) when once rooted, may be cut at six inches above ground ; and thus placed at a yard distant, they will immediately furnish a kind of copp'ce. But in case you plant them of rooted trees, or smaller sets, fix them not so deep ; for though we bury the trunchions thus profound, yet is the root which they strike, commonly but shallow. They will make prodigious shoots in 15, or 16 years ; but then the heads must by no means be diminish'd, but the lower branches may, yet not too far up ; the foot would also be cleansed every second year. This for the white. The black poplar is frequently pollar'd when as big as one's arm, eight or nine foot from the ground, as they trim them in Italy, for their vines to serpent and twist on, and those they poll, or head every second year, sparing the middle, streight, and thrivingest shoot, and at the third year cut him also. There be yet that condemn the pruning of this poplar, as hindring their growth.

2. The shade of this tree is esteemed very wholesome in Summer, but they do not become walks, or avenues by reason of their suckers, and that they foul the ground at fall of the leaf ; but they would be planted in barren woods, and to flank places at distance, for their increase, and the glittering brightness of their foliage : The leaves are good for cattel, which must be stripp'd from the cut boughs before they are faggoted. This to be done in the decrease of October, and reserv'd in bundles for winter-fodder. The wood of white poplar is sought of the sculptor, and they saw both sorts into boards, which, where they lie dry, continue a long time. Of this material they also

made shields of defence in sword and buckler-days. Dioscorides writes, that the bark chopt small, and sow'd in rills, well and richly manur'd and watered, will produce a plentiful crop of mushrooms ; or warm water, in which yest is dissolv'd, cast upon a new-cut stump : It is to be noted, that those *fungi*, which spring from the putrid stumps of this tree are not venomous (as of all, or most other trees they are) being gathered after the first autumnal rains. There is a poplar of a paler green, and is the properest for watry ground : 'Twill grow of trunchions from two, or eight foot long, and bringing a good lop in a short time, is by some preferr'd to willows.

For the setting of these, Mr. Cook advises the boring of the ground with a sort of auger, to prevent the stripping of the bark from the stake in planting : A foot and half deep, or more if great, (for some may be 8 or 9 foot) for pollards, cut sloping, and free of cracks at either end : Two or three inches diameter, is a competent bigness, and the earth should be ramm'd close to them.

Another expedient is, by making drains in very moist ground, two spade deep, and three foot wide, casting up the earth between the drains, sowing it the first year with oats to mellow the ground, the next Winter setting it for copp'ce, with these, any, or all the watry sorts of trees ; thus, in four or five years, you will have a handsome fell, and so successively : It is in the former author, where the charge is exactly calculated, to whom I refer the reader. I am inform'd, that in Cheshire there grow many stately and streight black poplars, which they call *peplurus*, that yield boards and planks of an inch and half thickness ; so fit for floaring of rooms, by some preferr'd to oak,

for the whiteness and lasting, where they lie dry.

3. They have a poplar in Virginia of a very peculiar shap'd leaf, as if the point of it were cut off, which grows very well with the curious amongst us to a considerable stature. I conceive it was first brought over by John Tradescant, under the name of the tulip-tree, (from the likeness of its flower) but is not, that I find, taken much notice of in any of our herbals: I wish we had more of them; but they are difficult to elevate at first.

4. The aspen only (which is that kind of *libyca* or white poplar, bearing a smaller, and more tremulous leaf, (by the French call'd *la tremble* or quaker) thrusts down a more searching foot, and in this likewise differs, that he takes it ill to have his head cut off: Pliny would have short trunchions couched two foot in the ground (but first two days dried) at one foot and half distance, and then moulded over.

5. There is something a finer sort of white poplar, which the Dutch call *abele*, and we have of late *abele* much transported out of Holland: These are also best propagated of slips from the roots, the least of which will take, and may in March, at three or four years growth, be transplanted.

6. In Flanders (not in France, as a late author pretends) they have large nurseries of them, which first they plant at one foot distance, the mould light and moist, by no means clayie, in which though they may shoot up tall, yet for want of root, they never spread; for, as I said, they must be interr'd pretty deep, not above three inches above ground; and kept clean, by pruning them to the middle-shoot for the first two years, and so till the third or fourth. When you transplant, place them at eight, ten, or twelve

foot interval : They will likewise grow of layers, and even of cuttings in very moist places. In three years, they will come to an incredible altitude ; in twelve, be as big as your middle ; and in eighteen or twenty, arrive to full perfection. A specimen of this advance we have had of an *abele*-tree at Sion, which being lopp'd in Febr. 1651, did by the end of October 52, produce branches as big as a man's wrist, and 17 foot in length ; for which celerity we may recommend them to such late builders, as seat their houses in naked and unshelter'd places, and that would put a guise of antiquity upon any new inclosure ; since by these, whilst a man is in a voyage of no long continuance, his house and lands may be so covered, as to be hardly known at his return. But as they thus increase in bulk, their value (as the Italian poplar, has taught us) advances likewise ; which after the first seven years, is annually worth twelve pence more : So as the Dutch look upon a plantation of these trees, as an ample portion for a daughter, and none of the least effects of their good husbandry ; which truly may very well be allow'd, if that calculation hold, which the late worthy ¹ Knight has asserted, (who began his plantation not long since about Richmond,) that 30 pound being laid out in these plants, would render at the least ten thousand pounds in eighteen years ; every tree affording thirty plants, and every of them thirty more, after each seven year's improving twelve pence in growth, till they arrive to their acme.

7. The black poplar grows rarely with us ; it is a stronger and taller tree than the white, the leaves more dark, and not so ample. Divers stately ones of these, I remember about the banks of Po in Italy ; which

1. Sir Richard Weston.

flourishing near the old Eridanus (so celebrated by the poets) in which the temerarious Phaeton is said to have been precipitated, doubtless gave argument to that fiction of his sad sister's metamorphosis, and the amber of their precious tears. It was whiles I was passing down that river towards Ferrara, that I diverted my self with this story of the ingenious poet. I am told there is a mountain-poplar much propagated in Germany about Vienna, and in Bohemia, of which some trees have yielded planks of a yard in breadth ; why do we procure none of them ?

8. The best use of the poplar, and *abele* (which are all of them hospitable trees, for any thing thrives under their shades) is for walks and avenues about grounds which are situated low, and near the water, till coming to be very old, they are apt to grow knurry, and out of proportion. The timber is incomparable for all sorts of white wooden vessels, as trays, bowls and other turners ware ; and of especial use for the bellows-maker, because it is almost of the nature of cork, and for ship-pumps, though not very solid, yet very close, and yet light ; so as it may be us'd for the soles, as well as wooden-heels of shooes, &c. Vitruvius *l. de Materia Cœdenda*, reckons it among the building-timbers, *quæ maxime in œdificiis sunt idoneæ*. Likewise to make carts, because it is exceeding light ; for vine, and hop-props, and divers vimeous works. The loppings in January are for the fire ; and therefore such as have proper grounds, may with ease, and in short time, store themselves for a considerable family, where fuel is dear : but the truth is, it burns untowardly, and rather moulders away, than maintains any solid heat. Of the twigs (with the leaves on) are made brooms. The *brya*, or catkins

attract the bees, as do also the leaves (especially of the black) more tenacious of the meldeaws than most forest-trees, the oak excepted.

Of the aspen, our wood-men make hoops, fire-wood, and coals, &c. and of the bark of young trees, in some countries, it serves for candle or torch-wood.

The juice of poplar leaves, dropp'd into the ears, asswages the pain ; and the buds contus'd, and mix'd with honey, is a good *collyrium* for the eyes ; as the unguent to refrigerate and cause sleep.

One thing more is not to be pass'd over, of the white-poplar ; that the seeds of misselto being put into holes bored in the bark of this tree, have produced the plant : Experiment sufficient to determine that so long controverted question, concerning spontaneous and æquivocal generations. vid. D. Raii P. L. Append. p. 1918.

CHAPTER XV.

Of the Quick-Beam.

1. The quick-beam [*ornus*, or as the *pinax* more peculiarly, *fraxinus bubula* ; others, the wild sorb] or (as some term it) the witcher, is a species of wild-ash. The Berries which it produced in October, may then be sown ; or rather the sets planted : I have store of them in a warm grove of mine, and 'tis of singular beauty : It rises to a reasonable stature, shoots upright, and slender, and consists of a fine smooth bark. It delights to be both in mountains and woods, and to fix it self in good light grounds ; Virgil affirms, 'twill unite with the pear.

2. Besides the use of it for the husbandman's tools, goads, &c. the wheelright commends it for being all heart ; if the tree be large, and so well grown as some there are, it will saw into planks, boards and timber, (vide Chap xxx. Sect. 10.) and our fletchers commend it for bows next to yew ; which we ought not to pass over, for the glory of our once right English ancestors : In a Statute of HEN. 8. you have it mention'd : It is excellent fuel ; but I have not yet observed any other use, save that the blossoms are of an agreeable scent, and the berries such a tempting bait for the thrushes, that as long as they last, you shall be sure of their company. Some highly commend the juice of the berries, which (fermenting of it self) if well preserv'd, makes an excellent drink against the spleen and scurvy : Ale and beer brew'd with these berries, being ripe, is an incomparable drink, familiar in Wales, where this tree is reputed so sacred, that as there is not a church-yard without one of them planted in them (as among us the yew) so on a certain day in the year, every body religiously wears a cross made of the wood, and the tree is by some authors call'd *fraxinus Cambro-Britannica* ; reputed to be a preservative against fascinations and evil-spirits ; whence, perhaps, we call it witchen ; the boughs being stuck about the house, or the wood used for walking-staves.

CHAPTER XVI.

Of the Hasel.

1. *Nux silvestris*, or *corylus*, the hasel, is best rais'd from the ¹ nuts, (also by suckers and layers) which you shall sow like mast, in a pretty deep furrow toward the end of February, or treat them as you are instructed in the walnut ; light ground may immediately be sown and harrow'd-in very accurately ; but in case the mould be clay, plow it earlier, and let it be sufficiently mellow'd with the frosts ; and then the third year cut your trees near to the ground with a sharp bill, the moon decreasing.

2. But if you would make a grove for pleasure, plant them in fosses, at a yard distance, and cut them within half a foot of the earth, dressing them for three or four Springs and Autumns, by only loosning the mould a little about their roots. Others there are, who set the nuts by hand at one foot distance, to be transplanted the third year, at a yard asunder : But this work is not to be taken in hand so soon as the nuts fall, till winter be well advanc'd ; because they are exceedingly obnoxious to the frosts ; nor will they sprout till the Spring ; besides, vermin are great devourers of them : Preserve them therefore moist, not mouldy ; by laying them in their own dry leaves, or in sand, till January.

² Hasels from sets and suckers take.

¹ *De nucum generibus*, vide Macrob. Sect. L. II. c. 14.

² *Plantis & duræ coryli nascuntur*..... *Georg.* 2.

3. From whence they thrive very well, the shoots being of the scantlings of small wands and switches, or somewhat bigger, and such as have drawn divers hairy twigs, which are by no means to be disbranch'd, no more than their roots, unless by a very sparing and discreet hand. Thus, your *coryletum*, or copp'ce of hasels, being planted about Autumn, may (as some practise it) be cut within three or four inches of the ground the Spring following, which the new cyon will suddenly repair in clusters, and tufts of fair poles of twenty, or sometimes thirty foot long: But I rather should spare them till two or three years after, when they shall have taken strong hold, and may be cut close to the very earth, the improsperous and feeble ones especially. Thus are likewise filberts to be treated, both of them improved much by transplanting, but chiefly by graffing, and it would be try'd with filberts, and even with almonds themselves, for more elegant experiments.

In the mean time, I do not confound the filbert, pontic, or filbord, distinguish'd by its beard, among our foresters (or bald hasel-nuts) which doubtless we had from abroad; and bearing the names of *avelan*, *avelin*, as I find in some ancient records and deeds in my custody, where my ancestors names were written *Avelan*, *alias*, *Evelin*, generally.

4. For the place, they above all affect cold, barren, dry, and sandy grounds; also mountains, and even rocky soils produce them; and where quarries of free-stone lie underneath, as that at Hasulbery in Wilts, Haseling-field in Cambridge-shire, Haselmeer in Surrey, and other places; but more plentifully, if the ground be somewhat moist, dankish and mossie, as in the fresher bottoms, and sides of hills, hoults, and in

hedge-rows. Such as are maintain'd for copp'ces, may after twelve years be fell'd the first time ; the next, at seven or eight, &c. for by this period, their roots will be compleatly vigorous. You may plant them from October to January, provided you keep them carefully weeded, till they have taken fast hold ; and there is not among all our store, a more profitable wood for copp'ces, and therefore good husbands should store them with it.

5. The use of the hasel is for poles, spars, hoops, forks, angling-rods, faggots, cudgels, coals, and springs to catch birds ; and it makes one of the best coals, once us'd for gun-powder ; being very fine and light, till they found alder to be more fit : There is no wood which purifies wine sooner, than the chips of hasel : Also for with's and bands, upon which, I remember, Pliny thinks it a pretty speculation, that a wood should be stronger to bind withal, being bruis'd and divided, than when whole and entire : The coals are us'd by painters, to draw with like those of Sallow : Lastly, for riding switches, and divinatory rods for the detecting and finding out of minerals ; (at least, if that tradition be no imposture) is very wonderful ; by whatsoever occult virtue, the forked-stick (so cut, and skilfully held) becomes impregnated with those invisible steams and exhalations ; as by its spontaneous bending from an horizontal posture, to discover not only mines, and subterraneous treasure, and springs of water, but criminals, guilty of murther, &c. made out so solemnly, and the effects thereof, by the attestation of magistrates, and divers other learned and credible persons, (who have critically examined matters of fact) is certainly next to miracle, and requires a strong faith : Let the curious

therefore consult that philosophical treatise of ¹ Dr. Vallemont ; which will at least entertain them with a world of surprizing things. But now after all the most signal honour it was ever employ'd in, and which might deservedly exalt this humble and common plant above all the trees of the wood, is that of hurdles, (especially the flexible white : the red and brittle) ; not for that it is generally used for the folding of our innocent sheep, an emblem of the church ; but for making the walls of one of the first Christian Oratories in the world ; and particularly in this island, that venerable and sacred fabrick at Glas-tenbury, founded by St. Joseph of Arimathea ; which is storied to have been first compos'd but of a few small hasel-rods interwoven about certain stakes driven into the ground ; and walls of this kind, instead of laths and punchions, superinduc'd with a course mortar made of loam and straw, do to this day inclose divers humble cottages, sheads and out-houses in the countrey ; and 'tis strong and lasting for such purposes, whole, or cleft, and I have seen ample enclosures of courts and gardens so secur'd.

6. There is a compendious expedient for the thickening of copp'ces which are too transparent, by laying of a sampler or pole of an hasel, ash, poplar, &c. of twenty or thirty foot in length (the head a little lopp'd) into the ground, giving it a chop near the foot, to make it succumb ; this fastned to the earth with a hook or two, and cover'd with some fresh mould at a competent depth (as gardeners lay their carnations) will produce a world of suckers, thicken and furnish a copp'ce speedily. I add no more of

¹ Vallemont, *Physique occult ou traite de la baguet divinatoire, &c.* But concerning the exploration, and superstitious original, see Sir Thomas Brown, *Vulg. Err.* cap. xxiv. sect. 17. and the commentators upon 4. Hosea. 12.

filberts, a kinder and better sort of hasel-nut, of larger and longer shape and beard; the kernels also cover'd with a fine membrane, of which the red is more delicate: They both are propagated as the hasel, and while more domestick, planted either asunder, or in palisade, are seldom found in the copp'ces: They are brought among other fruit, to the best tables for desert, and are said to fatten, but too much eaten, obnoxious to the asthmatic. In the mean time, of this I have had experience; that hasel-nuts, but the filberd specially, being full ripe, and peel'd in warm water, (as they blanch almonds) make a pudding very little (if at all) inferior to that our ladies make of almonds. But I am now come to the water-side; let us next consider the aquatic.

CHAPTER XVII.

Of the Birch.

1. The birch [*betula*, in British *bedw*, doubtless a proper indigene of England, (whence some derive the name of Barkshire) though Pliny calls it a Gaulish tree] is altogether produc'd of roots or suckers, (though it sheds a kind of *samera* about the Spring) which being planted at four or five foot interval, in small twigs, will suddenly rise to trees; provided they affect the ground, which cannot well be too barren, or spongy; for it will thrive both in the dry, and the wet, sand, and stony, marshes, and bogs; the water-galls, and uliginous parts of forests that hardly bear any grass, do many times spontaneously produce it in abund-

ance, whether the place be high, or low, and nothing comes amiss to it. Plant the small twigs, or suckers having roots, and after the first year, cut them within an inch of the surface ; this will cause them to sprout in strong and lusty tufts, fit for copp'ce, and spring-woods ; or, by reducing them to one stem, render them in a very few years fit for the turner. For

2. Though birch be of all other the worst of timber, yet has it its various uses, as for the husbandman's ox-yoaks ; also for hoops, small screws, paniers, brooms, wands, bavin-bands, and wythes for fagots ; and claims a memory for arrows, bolts, shafts, (our old English artillery ;) also for dishes, bowls, ladles, and other domestic utensils, in the good old days of more simplicity, yet of better and truer hospitality. In New-England our Northern Americans make canoos, boxes, buckets, kettles, dishes, which they sow, and joyn very curiously with thread made of cedar-roots, and divers other domestical utensils, as baskets, baggs, with this tree, whereof they have a blacker kind ; and out of a certain excrescence from the bole, a *fungus*, which being boil'd, beaten, and dry'd in an oven, makes excellent spunck or touch-wood, and balls to play withal ; and being reduc'd to powder, astringent, is an infallible remedy in the hæmerhoids. They make also not only this small ware, but even small-craft, pinnaces of birch, ribbing them with white cedar, and covering them with large flakes of birch-bark, sow them with thread of spruse-roots, and pitch them, as it seems we did even here in Britain, as well as the Veneti, making use of the willow, whereof Lucan,

¹ When Sicoris to his own banks restor'd,
 Had quit the field, of twigs, and willow-board
 They build small craft, cover'd with bullocks-hide,
 In which they reach'd the rivers farther side :
 So sail the Veneti if Padus flow,
 The Britains sail on their rough ocean so.

Also for fuel : In many of the mosses in the West-Riding of Yorkshire, are often dug up birch-trees, that burn and flame like firr and candle-wood ; and I think Pliny says the Gaules extracted a sort of bitumen out of birch : Great and small coal, are made by the charring of this wood ; (see Book III Chap. 4. of fuel) as of the tops and loppings, Mr. Howard's new tanne. The inner white cuticle and silken-bark, (which strips off of it self almost yearly) was anciently us'd for writing-tables, even before the invention of paper ; of which there is a birch-tree in Canada, whose bark will serve to write on, and may be made into books, and of the twigs very pretty baskets ; with the outward thicker and courser part of the common birch, are divers houses in Russia, Poland, and those poor northern tracts cover'd, instead of slates and tyle : Nay, one who has lately publish'd an account of Sweden, says, that the poor people grind the very bark of birch-trees, to mingle with their bread-corn. 'Tis affirm'd by Cardan, that some birch-roots are so very extravagantly vein'd, as to represent the shapes and images of beasts, birds, trees, and many other pretty resemblances. Lastly, of the

¹ Primum cana salix madefacto vimine, parvam
 Texitur in puppim, cæsoque induta juvenco,
 Vectoris patiens, tumidum super emicat amnem.
 Sic Venetus stagnante Pado, fusoque Britannus
 Navigat oceano.....

² See *Philos. Transact.* Vol. 9. num. 105. p. 93.

whitest part of the old wood, found commonly in doating birches, is made the grounds of our effeminate farin'd gallants sweet powder ; and of the quite consum'd and rotten (such as we find reduc'd to a kind of reddish earth in superannuated hollow-trees) is gotten the best mould for the raising of divers seedlings of the rarest plants and flowers ; to say nothing here of the magisterial *fascēs*, for which anciently the cudgels were us'd by the *lictor*, for lighter faults, as now the gentler rods by our tyrannical pædagogues.

3. I should here add the uses of the water too, had I full permission to tamper with all the medicinal virtues of trees : But if the sovereign effects of the juice of this despicable tree supply its other defects (which make some judge it unworthy to be brought into the catalogue of woods to be propagated) I may perhaps for once, be permitted to play the empiric, and to gratifie our laborious wood-man with a draught of his own liquor ; and the rather, because these kind of secrets are not yet sufficiently cultivated ; and ingenious planters would by all means be encourag'd to make more trials of this nature, as the Indians and other nations have done on their palmes ; and trees of several kinds, to their great emolument. The mystery is no more than this : About the beginning of March (when the buds begin to be proud and turgid, and before they explain into leaves) with a chizel and a mallet, cut a slit almost as deep as the very pith, under some bough or branch of a well-spreading birch ; cut it oblique, and not long-ways (as a good chirurgion would make his orifice in a vein) inserting a small stone or chip, to keep the lips of the wound a little open. Sir Hugh Plat,

(giving a general rule for the gathering of sap, and tapping of trees) would have it done within one foot of the ground, the first rind taken off, and then the white bark slit over-thwart, no farther than to the body of the tree : Moreover, that this wound be made only in that part of the bark which respects the south-west, or between those quarters ; because (says he) little or no sap riseth from the northern, nor indeed when the east-wind blows. In this slit, by the help of your knife to open it, he directs that a leaf of the tree be inserted, first fitted to the dimensions of the slit, from which the sap will distil in manner of filtration : Take away the leaf, and the bark will close again, a little earth being clapped to the slit. Thus the Knight for any tree. But we have already shew'd how the birch is to be treated : Fasten therefore a bottle, or some such convenient vessel appendant ; this does the effect as well as perforation or tapping : Out of this aperture will extil a limpid and clear water, retaining an obscure smack both of the tast and odor of the tree ; and which (as I am credibly inform'd) will in the space of twelve or fourteen days, preponderate, and out-weigh the whole tree it self, body and roots ; which if it be constant, and so happen likewise in other trees, is not only stupendous, but an experiment worthy the consideration of our profoundest philosophers : *An ex sola aqua fiunt arbores?* whether water only be the principle of vegetables, and consequently of trees : I say, I am credibly inform'd ; and therefore the late unhappy ¹ angry-man might have spar'd his anim-

¹ Dr. Stubb. See the tractate intituled, *Aditus novus ad occultas sympathiæ & antipathiæ causas inveniendas, per principia philosophiæ naturalis, & fermentorum artificiosâ anatomiâ hausta, patefactas*, à Silvestro Rattray, M.D. Glasquensi, 1658. p. 55.

adversion : For he that said but twenty gallons run, does he know how many more might have been gotten out of larger apertures, at the insertion of every branch, and foot in the principal roots during the whole season ? But I conceive I have good authority for my assertion, out of the author cited in the margin, whose words are these : *Si mense Martio perforaveris betulam, &c. exstillabit aqua limpida, clara, & pura, obscurum arboris saporem & odorem referens, quæ spatio 12 aut 14 dierum, præponderabit arbori cum ramis & radicibus, &c.* His exceptions about the beginning of March are very insignificant ; since I undertake not punctuality of time ; and his own pretended experience shew'd him, that in hard weather it did not run till the expiration of the month, or beginning of April ; and another time, on the tenth of February ; and usually he says, about the twenty-fourth day, &c. at such uncertainty : What immane difference then is there between the twenty-fourth of Feb. and commencement of March ? Besides, these anomolous bleedings, (even of the same tree) happen early or later, according to the temper of the air and weather. In the mean time, evident it is, that we know of no tree which does more copiously attract, be it that so much celebrated spirit of the world, (as they call it) in form of water (as some) or a certain specifiquè liquor richly impregnated with this balsamical property : That there is such a *magnes* in this simple tree, as does manifestly draw to it self some occult and wonderful virtue, is notorious ; nor is it conceivable, indeed, the difference between the efficacy of that liquor which distils from the bole, or parts of the tree nearer to the root (where Sir Hugh would celebrate the incision) and that which weeps out from

the more sublime branches, more impregnated with this astral vertue, as not so near the root, which seems to attract rather a cruder, and more common water, through fewer strainers, and neither so pure, and aerial as in those refined percolations, the nature of the places where these trees delight to grow (for the most part lofty, dry, and barren) consider'd. But I refer these disquisitions to the learned; especially, as mention'd by that incomparable philosopher, and my most noble friend, the Honourable Mr. Boyle, in his second part of the *Usefulness of Natural Philosophy*, Sect. 1. Essay 3^d. where he speaks of the *manna del corpo*, or trunk-manna, as well as of that liquor from the bough; also of the *sura* which the coco-trees afford; and that Polonian secret of the liquor of the walnut-tree root; with an encouragement of more frequent experiments to educe saccharine substances upon these occasions: But the book being publish'd so long since this *Discourse* was first printed, I take only here the liberty to refer the reader to one of the best entertainments in the world.

But now before we expatiate farther concerning saps; it is by some controverted, whether this exhaustion would not be an extreme detriment to the growth, substance, and other parts of trees: As to the growth and bulk, if what I have observ'd of a birch, which has for very many years been perforated at the usual season, (besides the scars made in the bark) it still thrives, and is grown to a prodigious substance, the species consider'd. What it would effect in other trees (the vine excepted unseasonably launc'd) I know not: But this calls to mind, a tryal of Esq; Brother-ton, (mentioning some excortications and incisions, by what he observ'd in pruning,) that most (if not

all) of the sap ascends by the lignous part of trees, not the cortical ; nor between the cortical and lignous : And that the increase of a tree's growth in thickness, is by the descent of the sap, and not by the ascent ; so as if there were no descent, the tree would increase very little, if at all ; for that there is a perpetual circulation of the sap, during the whole Summer ; and whilst it is in this course, and not a descent at Michaelmas only, as some hold, but evaporated by the branches, during Summer and Autumn, and at Spring supplied with rains. He also thinks it probable, that the bodies of plants, as well as those of animals, are nourish'd and increas'd by a double *pabulum* or food ; as water and air both impregnated, mixing and coalescing by a mutual conversion.

That all plants and animals seem to have a two-fold kind of roots, one spreading into the earth, the other shooting up into the air ; which, as they receive and carry up their proper nutriments to the body of the plant and root, so they carry off the useless dregs and recrements, &c. But this curious note seeming fitter to have been plac'd in our chapter of Pruning, (upon which this learned gentleman has given us his experience) I beg pardon for this diverticle, and return to my subject.

4. But whilst the second edition was under my hand, there came to me divers papers upon this subject, experimentally made by a worthy friend of mine, a learned and most industrious person, which I had here once resolv'd to have publish'd, according to the generous liberty granted me for so doing ; but understanding he was still in pursuit of that useful, and curious secret, I chang'd my resolution into an earnest address, that he would communicate it to the world

himself, together with those other excellent enquiries and observations, which he is adorning for the benefit of planters, and such as delight themselves in those innocent rusticities. I will only by way of corollary, hint some particulars for satisfaction of the curious ; and especially that we may in some sort gratifie those earnest suggestions and queries of the late most obliging¹ publisher of the *Philosophical Transactions*, to whose indefatigable pains the learned world has been infinitely engag'd. In compliance therefore to his *Queries*, Monday, Octob. 19. 1668. numb. 40. p. 797, 801, &c. these generals are submitted : That in such trials as my friend essay'd, he has not yet encountred with any sap but what is very clear and sweet ; especially that of the sycomor, which has a dulcoration as if mixed with sugar, and that it runs one of the earliest : That the maple distill'd when quite rescinded from the body, and even whilst he yet held it in his hand : That the sycomor ran at the root, which some days before yielded no sap from his branches ; the experiment made at the end of March : But the accurate knowledge of the nature of sap, and its periodic motions and properties in several trees, should be observed by some at entire leisure to attend it daily, and almost continually, and will require more than any one person's industry can afford : For it must be enquir'd concerning every tree, its age, soil, situation, &c. the variety of its ascending sap depending on it ; and then of its sap ascending in the branches and roots ; descending in cut branches ; ascending from root, and not from branches ; the seasons and difference of time in which those accidents happen, &c. He likewise thinks the best expedient to procure store of liquor,

1. Mr. Oldenburg.

is, to cut the trees almost quite through all the circles, on both sides the pith, leaving only the outmost circle, and the barks on the north, or north-east side unpierced ; and this hole, the larger it is bored, the more plentifully 'twill distill ; which if it be under, and through a large arm, near the ground, it is effected with greatest advantage, and will need neither stone, nor chip to keep it open, nor spigot to direct it to the recipient. Thus it will, in a short time, afford liquor sufficient to brew with ; and in some of these sweet saps, one bushel of mault will afford as good ale, as four in ordinary waters, even in March it self ; in others, as good as two bushels ; for this, preferring the sycomor before any other : But to preserve it in best condition for brewing, till you are stored with a sufficient quantity, it is advis'd, that what first runs, be insolated and placed in the sun, till the remainder be prepar'd, to prevent its growing sour : But it may also be fermented alone, by such as have the secret : To the curious these essays are recommended : That it be immediately stopp'd up in the bottles in which it is gathered, the corks well wax'd, and expos'd to the sun, till (as was said) sufficient quantity be run ; then let so much rye-bread (toasted very dry, but not burnt) be put into it, as will serve to set it a working ; and when it begins to ferment, take it out, and bottle it immediately. If you add a few cloves, &c. to steep in it, 'twill certainly keep the year about : 'Tis a wonder how speedily it extracts the tast and tincture of the spice. Mr. Boyle proposes a sulphurous fume to the bottles : Spirit of wine may haply not only preserve, but advance the virtues of saps ; and infusions of rasins are obvious, and without decoction best, which does but spend the more

delicate parts. Note, that the sap of the birch, will make excellent mead.

5. To these observations, that of the weight and virtue of the several juices, would be both useful and curious : As whether that which proceeds from the bark, or between that and the wood be of the same nature with that which is supposed to spring from the pores of the woody circles ? and whether it rise in like quantity, upon comparing the incisures ? All which may be try'd, first attempting through the bark, and saving that apart, and then perforating into the wood, to the thickness of the bark, or more ; with a like separation of what distills. The period also of its current would be calculated ; as how much proceeds from the bark in one hour, how much from the wood or body of the tree, and thus every hour, with still a deeper incision, with a good large augre, till the tree be quite perforated : Then by making a second hole within the first, fitted with a lesser pipe, the interior heart-sap may be drawn apart, and examin'd by weight, quantity, colour, distillation, &c. and if no difference perceptible be detected the presumption will be greater, that the difference of heart and sap in timber, is not from the saps plenty or penury, but the season ; and then possibly, the very season of squaring, as well as felling of timber, may be considerable to the preservation of it.

6. The notice likewise of the saps rising more plentifully, and constantly in the sun, than shade ; more in the day than night, more in the roots than branch, more southward, and when that, and the west-wind blows, than northward, &c. may yield many useful observations : As for planting, to set thicker, or thinner (*si cætera sint paria*) namely, the nature of the

tree, soil, &c. and not to shade overmuch the roots of those stems we desire should mount, &c. That in transplanting trees we turn the best and largest roots towards the south, and consequently the most ample and spreading part of the head correspondent to the roots : For if there be a strong root on that quarter, and but a feeble attraction in the branches, this may not always counterpoise the weak roots on the north-side, damnified by the too puissant attraction of over large branches : This may also suggest a cause why trees flourish more on the south-side, and have their integument and coats thicker on those aspects annually, with divers other useful speculations, if in the mean time, they seem not rather to be *punitillos* over nice for a plain forester. Let the curious further consult *Philos. Transactions*, numb. 43, 44, 46, 48, 57, 58, 68, 70, 71. for farther instances and tryals, upon this subject of sap. And that excellent treatise of Hen. Meibomius. *De Gervisiis Potibusque; & Ebriamini-bus extra Vinum*, annex't to *Turnebus de Vino*, &c. Where he shews how, and by whom, (after the first use of water and milk) were introduc'd the drinks made from vegetables, vines, corn, and other fruits and juices tapp'd out of trees, &c.

7. To shew our reader yet, that these are no novel experiments, we are to know, that a large tract of the world, almost altogether subsists on these treen liquors ; especially that of the date, which being grown to about seven or eight foot in height, they wound, as we have taught, for the sap, which they call toddy, a very famous drink in the East-Indies. This tree increasing every year about a foot, near the opposite part of the first incisure, they pierce again, changing the receiver ; and so still by opposite

wounds and notches, they yearly draw forth the liquor, till it arrive to near thirty foot upward, and of these they have ample groves and plantations which they set at seven or eight foot distance : But then they use to percolate what they extract, through a stratum made of the rind of the tree, well contus'd and beaten, before which preparation, it is not safe to drink it ; and 'tis observed that some trees afford a much more generous wine than others of the same kind. In the coco and palmeto trees, they chop a bough, as we do the *bétula* ; but in the date, make the incision with a chisel in the body very neatly, in which they stick a leaf of the tree, as a *lingula* to direct it into the appendant vessel, which the subjoin'd figure represents, and illustrates with its improvement to our former discourse.

Note, if there be no fitting arms, the hole thus obliquely perforated, and a faucet or pipe made of a swan's or goose's quill inserted, will lead the sap into the recipient; and this is a very neat way, and as effectual : I would also have it try'd, whether the very top twigs, grasped in the hand together, a little cropt with a knife, and put into the mouth of a bottle, would not instil, if not as much, yet a more refined liquor, as some pretend.

8. The liquor of the birch is esteemed to have all the virtues of the spirit of salt, without the danger of its acrimony ; most powerful for the dissolving of the stone in the bladder, bloody water and strangury : Helmont shews how to make a beer of the water ; but the wine is a most rich cordial, curing (as I am told) consumptions, and such interior diseases as accompany the stone in the bladder or reins¹ : The juice

¹ *De Lithiasi*, c. 8. n. 24, 25, &c.



(a. b.) *The Body of the Tree* (g.) *boar'd at that part of the Arm* (f.) *join'd to the Stem, with an Augre of an Inch or more diameter, according to the bigness of the Tree.* (c.) *A part of the Bark, or if you will, a Faucet of Quill bent down into the Mouth of the Bottle (e.) to conduct the Liquour into it.* (d.) *The String about the Arm (f.) by which the Bottle hangs.*

decocted with honey and wine, Dr. Needham affirms he has often cur'd the scorbut with. This wine, exquisitely made, is so strong, that the common sort of stone-bottles cannot preserve the spirits, so subtile they are and volatile ; and yet it is gentle, and very harmless in operation within the body, and exceedingly sharpens the appetite, being drunk *ante pastum* : I will present you a receipt, as it was sent me by a fair lady, and have often, and still use it.

9. To every gallon of birch-water put a quart of honey, well stirr'd together ; then boil it almost an hour with a few cloves, and a little limon-peel, keeping it well scumm'd : When it is sufficiently boil'd, and become cold, add to it three or four spoonfuls of good ale to make it work (which it will do like new ale) and when the yest begins to settle, bottle it up as you do other winy liquors. It will in a competent time become a most brisk and spiritous drink, which (besides the former virtues) is a very powerful opener, and doing wonders for cure of the phthysick : This wine may (if you please) be made as successfully with sugar, instead of honey 1 *lb.* to each gallon of water ; or you may dulcifie it with raisins, and compose a raisin-wine of it. I know not whether the quantity of the sweet ingredients might not be somewhat reduc'd, and the operation improv'd : But I give it as receiv'd. The author of the *Vinetum Brit.* boils it but to a quarter or half an hour, then setting it a cooling, adds a very little yest to ferment and purge it ; and so barrels it with a small proportion of cinamon and mace bruis'd, about half an ounce of both to ten gallons, close stopp'd, and to be bottled a month after. Care must be taken to set the bottles in a very cool place, to preserve them from flying ; and the wine is

rather for present drinking, than of long duration, unless the refrigeratorie be extraordinarily cold. The very smell of the first springing leaves of this tree, wonderfully recreates and exhilarates the spirits.

10. But besides these, beech, alder, ash, sycomor, elder, &c. would be attempted for liquors : Thus crabs, and even our very brambles may possibly yield us medical and useful wines. The poplar was heretofore esteem'd more physical than the *betula*. The sap of the oak, juice, or decoction of the inner bark, cures the fashions, or farcy, a virulent and dangerous infirmity in horses, and which (like cancers) were reputed incurable by any other topic, than some actual, or potential cautery : But, what is more noble, a dear friend of mine affur'd me, that a countrey neighbour of his (at least fourscore years of age) who had lain sick of a bloody strangury (which by cruel torments reduc'd him to the very article of death) was, under God, recover'd to perfect, and almost miraculous health and strength (so as to be able to fall stoutly to his labour) by one sole draught of beer, wherein was the decoction of the internal bark of the oak-tree ; and I have seen a composition of an admirable sudorific, and diuretic for all affections of the liver, out of the like of the elm, which might yet be drunk daily, as our coffee is, and with no less delight : But quacking is not my trade ; I speak only here as a plain husband-man, and a simple forester, out of the limits whereof, I hope I have not unpardonably transgressed : Pan was a physician, and he (you know) was president of the woods. But I proceed to the alder.

CHAPTER XVIII.

Of the Alder.

1. *Alnus*, the alder, (both *conifera* and *jūlifera*) is of all other the most faithful lover of watery and boggy places, and those most despis'd weeping parts, or water-galls of forests; *crassisque paludibus alni*; for in better and dryer ground they attract the moisture from it, and injure it. They are propagated of trunchions, and will come of seeds (for so they raise them in Flanders, and make wonderful profit of the plantations) like the poplar; or of roots, (which I prefer) the trunchions being set as big as the small of ones leg, and in length about two foot; whereof one would be plunged in the mud. This profound fixing of aquatick-trees being to preserve them stedly, and from the concussions of the winds, and violence of waters, in their liquid and slippery foundations. They may be placed at four or five foot distance, and when they have struck root, you may cut them, which will cause them to spring in clumps, and to shoot out into many useful poles. But if you plant smaller sets, cut them not till they are arriv'd to some competent bigness, and that in a proper season: Which is, for all the aquaticks and soft woods, not till Winter be well advanc'd, in regard of their pithy substance. Therefore, such as you shall have occasion to make use of before that period, ought to be well grown, and fell'd with the earliest, and in the first quarter of the increasing moon, that so the successive shoot receive no prejudice: Some, before they fell, disbark

their alders, and other trees ; of which see Cap. III. Book III. But there is yet another way of planting alders after the Jersey manner, and as I receiv'd it from a most ingenious gentleman of that country, which is, by taking trunchions of two or three foot long, at the beginning of Winter, and to bind them in faggots, and place the ends of them in water 'till towards the Spring, by which season they will have contracted a swelling spire, or knurr about that part, which being set, does (like the gennet-moil apple-tree) never fail of growing and striking root. There is a black sort more affected to woods, and drier grounds ; and bears a black berry, not so frequently found ; yet growing somewhere about Hampsted, as the learned Dr. Tan. Robinson observes.

2. There are a sort of husbands who take excessive pains in stubbing up their alders, where-ever they meet them in the boggie places of their grounds, with the same indignation as one would extirpate the most pernicious of weeds ; and when they have finished, know not how to convert their best lands to more profit than this (seeming despicable) plant might lead them to, were it rightly understood. Besides, the shadow of this tree, does feed and nourish the very grass which grows under it ; and being set, and well plashed, is an excellent defence to the banks of rivers ; so as I wonder it is not more practis'd about the Thames, to fortifie, and prevent the mouldring of the walls, and the violent weather they are exposed to.

3. You may cut aquatic-trees every third or fourth year, and some more frequently, as I shall shew you hereafter. They should also be abated within half a foot of the principal head, to prevent the perishing of the main stock ; and besides, to accelerate their

sprouting. In setting the trunchions, it were not amiss to prepare them a little after they are fitted to the size, by laying them a while in water ; this is also practicable in willows, &c.

4. Of old they made boats of the greater parts of this tree, and excepting Noah's ark, the first vessels we read of, were made of this material.

¹ When hollow alders first the waters try'd,

² And down the rapid Poe light alders glide.

And as then, so now, are over-grown alders frequently sought after, for such buildings as lie continually under water, where it will harden like a very stone ; whereas being kept in any unconstant temper, it rots immediately, because its natural humidity is of so near affinity with its adventitious, as Scaliger assigns the cause. Vitruvius tells us, that the morasses about Ravenna in Italy, were pil'd with this timber, to superstruct upon, and highly commends it. I find also they us'd it under that famous Bridge at Venice, the *Rialto*, which passes over the *Gran-Canal*, bearing a vast weight. Jos. Bauhimus pretends, that in tract of time, it turns to stone ; which perhaps it may seem to be (as well as other aquatick) where it meets with some lapidescant quality in the earth and water.

5. The poles of alder are as useful as those of willows ; but the coals far exceed them, especially for gun-powder : The wood is likewise useful for piles, pumps, hop-poles, water-pipes, troughs, sluces, small

¹ Tunc alnos primum fluvii sensere cavatas.
Georg. I.

² Nec non & torrentem undam levis innatat alnus
Missa Pado 2.

trays, and trenchers, wooden-heels; the bark is precious to dyers, and some tanners, and leather-dressers make use of it; and with it, and the fruits (instead of galls) they compose an ink. The fresh leaves alone applied to the naked soal of the foot, infinitely refresh the surbated traveller. The bark macerated in water, with a little rust of iron, makes a black dye, which may also be us'd for ink: The interior rind of the black alder purges all hydropic, and serous humours; but it must be dry'd in the shade, and not us'd green, and the decoction suffer'd to settle two or three days, before it be drunk.

Being beaten with vinegar, it heals the itch certainly: As to other uses the swelling bunches, which are now and then found in the old trees, afford the inlayer pieces curiously chambletted, and very hard, &c. but the faggots better for the fire, than for the draining of grounds by placing them (as the guise is) in the trenches; which old rubbish of flints, stones, and the like gross materials, does infinitely exceed, because it is for ever, preserves the drains hollow, and being a little moulded over, will produce good grass, without any detriment to the ground; but this is a secret, not yet well understood, and would merit an express paragraph, were it here seasonable,

.....*Et jam nos inter opacas*
Musa vocat salices.....

CHAPTER XIX.

Of the Withy, Sallow, Ozier, and Willow.

1. *Salix* : Since Cato has attributed the third place to the *salictum*, preferring it even next to the very ortyard ; and (what one would wonder at) before even the olive, meadow, or corn-field it self (for *salictum tertio loco, nempe post vineam, &c.*) and that we find it so easily rais'd, of so great, and universal use, I have thought good to be the more particular in my discourse upon it ; especially, since so much of that which I shall publish concerning them, is derived from the long experience of a most learned and ingenious person, from whom I acknowledge to have received many of these hints. Not to perplex the reader with the various names, Greek, Gallic, Sabin, Amerine, Vitex, &c. better distinguish'd by their growth and bark ; and by Latin authors all comprehended under that of *salices* ; our English books reckon them promiscuously thus ; the common-white willow, the black, and the hard-black, the rose of Cambridge, the black-withy, the round-long sallow ; the longest sallow, the crack-willow, the round-ear'd shining willow, the lesser broad-leav'd willow, silver sallow, upright broad-willow, repent broad-leav'd, the red-stone, the lesser willow, the strait-dwarf, the long-leav'd yellow sallow, the creeper, the black-low willow, the willow-bay, and the ozier. I begin with the withy.

2. The withy is a reasonable large tree, (for some have been found ten foot about) is fit to be planted

on high banks, and ditch-sides within reach of water and the weeping sides of hills ; because they extend their roots deeper than either sallows or willows. For this reason you shall plant them at ten, or twenty foot distance ; and though they grow the slowest of all the twiggie trees, yet do they recompence it with the larger crop ; the wood being tough, and the twigs fit to bind strongly ; the very peelings of the branches being useful to bind arbor-poling, and in topiary-works, vine-yards, espalier-fruit, and the like : And we are told of some that grow twisted into ropes of 120 paces, serving instead of cables. There are two principal sorts of these withies, the hoary, and the red-withy, (which is the Greek) toughest, and fittest to bind, whilst the twigs are flexible and tender.

3. Sallows grow much faster, if they are planted within reach of water, or in a very moorish ground, or flat plain ; and where the soil is (by reason of extraordinary moisture) unfit for arable, or meadow ; for in these cases, it is an extraordinary improvement: In a word, where birch and alder will thrive. Before you plant them, it is found best to turn the ground with a spade ; especially, if you design them for a flat. We have three sorts of sallows amongst us, (which is one more than the ancients challeng'd, who name only the black and white, which was their *nitellina*) the vulgar round leav'd, which proves best in dryer banks, and the hopping-sallows, which require a moister soil, growing with incredible celerity: And a third kind, of a different colour from the other two, having the twigs reddish, the leaf not so long, and of a more dusky green ; more brittle whilst it is growing in twigs, and more tough when arriv'd to a competent size : All of them useful for the thatcher.

4. Of these, the hopping-sallows are in greatest esteem, being of a clearer terse grain, and requiring a more succulent soil ; best planted a foot deep, and a foot and half above ground (though some will allow but a foot) for then every branch will prove excellent for future setlings. After three years growth (being cropped the second and third) the first years increase will be 'twixt eight and twelve foot long generally ; the third years growth, strong enough to make rakes and pike-staves ; and the fourth for Mr. Blithe's trenching plow, and other like utensils of the husbandman.

5. If ye plant them at full height (as some do at four years growth, setting them five or six foot length, to avoid the biting of cattel) they will be less useful for streight staves, and for setlings, and make less speed in their growth ; yet this also is a considerable improvement.

6. These would require to be planted at least five foot distance, (some set them as much more) and in the *quincunx* order : If they affect the soil, the leaf will come large, half as broad as a man's hand, and of a more vivid green, always larger the first year, than afterwards : Some plant them sloping, and cross-wise like a hedge, but this impedes their wonderful growth ; and (though Pliny seems to commend it, teaching us how to excorticate some places of each set, for the sooner production of shoots) it is but a deceitful fence, neither fit to keep out swine nor sheep ; and being set too near, inclining to one another, they soon destroy each other.

7. The worst sallows may be planted so near yet, as to be instead of stakes in a hedge, and then their tops will supply their dwarfishness ; and to prevent

hedge-breakers, many do thus plant them ; because they cannot easily be pull'd up, after once they have struck root.

8. If some be permitted to wear their tops five or six years, their palms will be very ample, and yield the first and most plentiful relief to bees, even before our abricots blossom. The hopping-sallows open, and yield their palms before other sallows, and when they are blown (which is about the *exit* of May, or sometimes June) the palms (or *ὠλεσίκαρποι frugiperdæ*, as Homer terms them for their extream levity) are four inches long, and full of a fine lanuginous cotton. Of this sort, there is a *salix* near Dorking in Surrey, in which the *julus* bears a thick cottonous substance. A poor body might in an hour's space, gather a pound or two of it, which resembling the finest silk, might doubtless be converted to some profitable use, by an ingenious house-wife, if gather'd in calm evenings, before the wind, rain and dew impair them ; I am of opinion, if it were dry'd with care, it might be fit for cushions, and pillows of chastity, for such of old was the reputation of the shade of those trees.

9. Of these hopping sallows, after three years rooting, each plant will yield about a score of staves, of full eight foot in length, and so following, for use, as we noted above : Compute then how many fair pike-staves, perches, and other useful materials, that will amount to in an acre, if planted at five foot interval : But a fat and moist soil, requires indeed more space, than a lean or dryer ; namely, six or eight foot distance.

10. You may plant setlings of the very first years growth ; but the second year they are better, and the third year, better than the second ; and the fourth, as good as the third ; especially, if they approach the

water. A bank at a foot distance from the water, is kinder for them than a bog, or to be altogether immers'd in the water.

11. 'Tis good to new-mould them about the roots every second, or third year; but men seldom take the pains. It seems that sallows are more hardy, than even willows and oziers, of which Columella takes as much care as of vines themselves. But 'tis cheaper to supply the vacuity of such accidental decays, by a new plantation, than to be at the charge of digging about them three times a year, as that author advises; seeing some of them will decay, whatever care be used.

12. Sallows may also be propagated like vines, by courbing, and bowing them in arches, and covering some of their parts with mould, &c. Also by cuttings and layers, and some years by the seeds likewise.

13. For setlings, those are to be preferr'd which grow nearest to the stock, and so (consequently) those worst, which most approach the top. They should be planted in the first fair and pleasant weather in February, before they begin to bud; we about London begin at the latter end of December. They may be cut in Spring for fuel, but best in Autumn for use; but in this work (as of poplar) leave a twig or two; which being twisted archwise, will produce plentiful sprouts, and suddenly furnish a head.

14. If in our copp'ces one in four were a sallow set, amongst the rest of varieties, the profit would recompence the care; therefore where in woods you grub up trees, thrust in trunchions of sallows, or some aquatic kind. In a word, an acre or two furnish'd with this tree, would prove of great benefit to the planter.

15. The swift growing sallow is not so tough and

hardy for some uses as the slower, which makes stocks for gard'ners spades ; but the other are proper for rakes, pikes, mops, &c. Sallow-coal is the soonest consum'd ; but of all others, the most easie and accommodate for painters scribbets, to design their work, and first sketches on paper with, &c. as being fine, and apt to slit into pencils.

16. To conclude, there is a way of graffing a sallow-trunchion ; take it of two foot and half long, as big as your wrist ; graff at both ends a fig, and mulberry-cyon of a foot long, and so, without claying, set the stock so far into the ground, as the plant may be three or four inches above the earth : This (some affirm) will thrive exceedingly the first year, and in three, be fit to transplant. The season for this curiosity is February. Of the sallow (as of the lime-tree) is made the shooe-maker's carving or cutting-board, as best to preserve the edge of their knives, for its equal softness every way.

17. Oziers, or the aquatick and lesser *salix*, are of innumerable kinds, commonly distinguish'd from sallows, as sallows are from withies ; being so much smaller than the sallow, and shorter liv'd, and requiring more constant moisture, yet would be planted in rather a dryish ground, than over moist and spewing, which we frequently cut trenches to avert. It likewise yields more limber and flexible twigs for baskets, flaskets, hampers, cages, lattices, cradles, the bodies of coaches and wagons, for which 'tis of excellent use, light, durable, and neat, as it may be wrought and cover'd: for chairs, hurdles, stays, bands, the stronger for being contus'd and wreathed, &c. likewise for fish wairs, and to support the banks of impetuous rivers : In fine, for all wicker and twiggy works :

Viminibus salices.....

18. But these sort of oziers would be cut in the new shoot : For if they stand longer, they become more inflexible ; cut them close to the head (a foot, or so above earth) about the beginning of October ; unless you will attend till the cold be past, which is better ; and yet we about London, cut them in the most piercing seasons, and plant them also till Candlemas, which those who do not observe, we judge ill husbands, as I learn from a very experienc'd basket-maker ; and in the decrease, for the benefit of the workman, though not altogether for that of the stock, and succeeding shoot : When they are cut, make them up into bundles, and give them shelter ; but such as are for white-work (as they call it) being thus faggotted, and made up in bolts, as the term is, severing each sort by themselves, should be set in water, the ends dipped ; and indeed all peel'd wares of the viminious kind, are not otherwise preserved from the worm ; but for black and unpeel'd, shelter'd under covert only, or in some vault or cellar, to keep them fresh, sprinkling them now and then in excessive hot weather : The peelings of the former, are for the use of the gard'ner and cooper, or rather the splicings.

19. We have in England these three vulgar sorts ; one of little worth, being brittle, and very much resembling the fore-mentioned sallow, with reddish twigs, and more greenish and rounder leaves : Another kind there is, call'd perch, of limber and green twigs having a very slender leaf ; the third sort is totally like the second, only the twigs are not altogether so green, but yellowish, and near the popinjay : This is the very best for use, tough and hardy. But the

most usual names by which basket-makers call them about London, and which are all of different species (therefore to be planted separately) are, the hard-gelster, the horse-gelster, whyning or shrivell'd-gelster, the black-gelster, in which Suffolk abounds. Then follow the golstones, the hard and the soft golstone, (brittle, and worst of all the golstones) the sharp and slender top'd yellow-golstone; the fine-golstone: Then is there the yellow ozier, the green ozier, the snake, or speckled ozier, swallow-tayl, and the Spaniard: To these we may add (amongst the number of oziars, for they are both govern'd and us'd alike) the Flanders-willow, which will arrive to be a large tree, as big as one's middle, the oftner cut, the better: With these our coopers, tie their hoops to keep them bent. Lastly, the white-sallow; which being of a year or two growth, is us'd for green-work; and if of the toughest sort, to make quarter-can-hoops, of which our seamen provide great quantities, &c.

20. These choicer sorts of oziars, which are ever the smallest, also the golden-yellow, and white, which is preferr'd for propagation, and to breed of, should be planted of slips of two or three years growth, a foot deep, and half a yard length, in moorish grounds, or banks, or else in furrows; so that (as some direct) the roots may frequently reach the water; for *fluminibus salices*..... though we commonly find it rots them, and therefore never chuse to set them so deep as to scent it, and at three or four foot distance.

21. The season for planting is January, and all February, though some not till Mid-February, at two foot square; but cattle being excessively liquorish of their leaves and tender buds, some talk of a graffing them out of reach upon sallows, and by this, to advance

their sprouting ; but as the work would consume time, so have I never seen it succeed.

22. Some do also plant oziars in their eights, like quick-sets, thick, and (near the water) keep them not more than half a foot above ground ; but then they must be diligently cleansed from moss, slab, and ouze, and frequently prun'd (especially the smaller spires) to form single shoots ; at least, that few, or none grow double ; these they head every second year about September, the autumnal cuttings being best for use :
But generally

23. You may cut withies, sallows and willows, at any mild and gentle season, between leaf and leaf, even in Winter ; but the most congruous time both to plant and to cut them, is *crescente luna vere, circa calendas Martias* ; that is, about the new moon, and first open weather of the early Spring.

24. It is in France, upon the Loire, where these eights (as we term them) and plantations of oziars and withies are perfectly understood ; and both there, and in divers other countries beyond seas, they raise them of seeds contain'd in their *juli*, or catkins, which they sow in furrows, or shallow trenches, and it springs up like corn in the blade, and comes to be so tender and delicate, that they frequently mow them with a scyth : This we have attempted in England too, even in the place where I live, but the obstinate and unmerciful weed did so confound them, that it was impossible to keep them clean with any ordinary industry, and so they were given over : It seems either weeds grow not so fast in other countries, or that the people (which I rather think) are more patient and laborious.

Note, that these *juli*, are not all of them seed-

bearers, some are sterile, and whatever you raise of them, will never come to bear ; and therefore by some they are called the male sort, as Mr. Ray (that learned botanist) has observed. The ozier is of that emolument, that in some places I have heard twenty pounds has been given for one acre ; ten is in this part an usual price ; and doubtless, it is far preferable to the best corn-land ; not only for that it needs but once planting, but because it yields a constant crop and revenue to the world's end ; and is therefore in esteem of knowing persons, valu'd in purchase accordingly ; consider'd likewise how easily 'tis renew'd when a plant now and then fails, by but pricking in a twig of the next at hand, when you visit to cut them : We have in the parish near Greenwich, where I lately dwelt, improv'd land from less than one pound, to near ten pounds the acre : And when we shall reflect upon the infinite quantities of them we yearly bring out of France and Flanders, to supply the extraordinary expence of basket-work, &c. for the fruiterers, lime-burners, gardeners, coopers, packers-up of all sorts of ware, and for general carriage, which seldom last above a journey or two, I greatly admire gentlemen do no more think of employing their moist grounds (especially, where tides near fresh rivers are reciprocal) in planting and propagating oziers. To omit nothing of the culture of this useful ozier, Pliny would have the place to be prepared by trenching it a foot and half deep, and in that, to fix the sets, or cuttings of the same length at six foot interval. These (if the sets be large) will come immediately to be trees ; which after the first three years, are to be abated within two foot of the ground. Then in April he advises to dig about them : Some

raise them abundantly, by laying poles of them in a boggy earth only: Of these they formerly made vine-props, *juga*, as Pliny calls them, for archwise bending and yoaking, as it were, the branches to one another; and one acre hath been known to yield props sufficient to serve a vine-yard of 25 acres.

25. John Tradescant brought a small ozier from S. Omers in Flanders, which makes incomparable net-works, not much inferior to the Indian twig, or bent-works which we have seen; but if we had them in greater abundance, we should haply want the artificers who could employ them, and the dexterity to vernish so neatly.

26. Our common *salix*, or willow, is of two kinds, the white and the black: The white is also of two sorts, the one of a yellowish, the other of a browner bark: The black willow is planted of stakes, of three years growth, taken from the head of an old tree, before it begins to sprout: Set them of six foot high, and ten distant; as directed for the poplar. Those woody sorts of willow, delight in meads and ditch-sides, rather dry, than over-wet (for they love not to wet their feet, and last the longer) yet the black sort, and the reddish, do sometimes well in more boggy grounds, and would be planted of stakes as big as one's leg, cut as the other, at the length of five or six foot or more into the earth; the hole made with an oaken-stake and beetle, or with an iron crow (some use a long auger) so as not to be forced in with too great violence: But first, the trunchions should be a little stop'd at both extrems, and the biggest planted downwards: To this, if they are soaked in water two or three days (after they have been siz'd for length, and the twigs cut off ere you plant them) it will be

the better. Let this be done in February, the mould as well clos'd to them as possible, and treated as was taught in the poplar. If you plant for a kind of wood, or copp'ce (for such I have seen) set them at six foot distance, or nearer, in the *quincunx*, and be careful to take away all suckers from them at three years end : You may abate the head half a foot from the trunk, *viz.* three or four of the lustiest shoots, and the rest cut close, and bare them yearly, that the three, four or more you left, may enjoy all the sap, and so those which were spared, will be gallant pearches within two years. Arms of four years growth, will yield substantial sets, to be planted at eight or ten foot distance ; and for the first three years well defended from the cattle, who infinitely delight in their leaves, green, or wither'd. Thus, a willow may continue twenty, or five and twenty years, with good profit to the industrious planter, being headed every four or five years ; some have been known to shoot no less than twelve foot in one year, after which, the old, rotten dotards may be fell'd, and easily supply'd. But if you have ground fit for whole copp'ces of this wood, cast it into double dikes, making every foss near three foot wide, two and half in depth ; then leaving four foot at least of ground for the earth (because in such plantations the moisture should be below the roots, that they may rather see, than feel the water) and two tables of sets on each side, plant the ridges of these banks with but one single table, longer and bigger than the collateral, *viz.* three, four, five or six foot high, and distant from each other, about two yards. These banks being carefully kept weeded for the first two years, till the plants have vanquish'd the grass, and not cut

till the third ; you may then lop them traverse, and not obliquely, at one foot from the ground, or somewhat more, and they will head to admiration ; but such which are cut at three foot height, are most durable, as least soft and aquatick : They may also be grafted 'twixt the bark, or budded ; and then they become so beautiful, as to be fit for some kind of delightful walks ; and this I wish were practis'd among such as are seated in low and marshy places, not so friendly to other trees. Every acre at eleven or twelve years growth, may yield you near a hundred load of wood : Cut them in the Spring for dressing, but in the Fall for timber and fuel : I have been inform'd, that a gentleman in Essex, has lopp'd no less than 2000 yearly, all of his own planting. It is far the sweetest of all our English fuel, (ash not excepted) provided it be sound and dry, and emitting little smoak, is the fittest for ladies chambers ; and all those woods and twigs would be cut either to plant, work with, or burn in the dryest time of the day.

To confirm what we have advanc'd in relation to the profit which may be made by this husbandry, see what comes to me from a worthy person whom we shall have occasion to mention, with great respect, in the next chapter, when we speak of quicksets.

The considerable improvement which may be made in common fields, as well as inclosed grounds, he demonstrates by a little spot of meadow, of about a rod and half ; part of which being planted about 50 years since with willows (in a clump not exceeding four pole in length, on one side about 12) several of them at the first and second lopping, being left with a strait top, run up like elms, to 30 or 40 foot in height ; which some years since yielded boards of

14 or 15 inches broad as good for flooring, and other purposes within doors, as deals, last as long, work finer, white and beautiful : 'tis indeed a good while since they were planted, but it seems the crop answer'd this patience, when he cut up as many of them (the year 1700) as were well worth 10*l.* And since that another tree, for which a joyner offer'd him as much for those were left, which was more by half than the whole ground it self was worth ; so as having made 20*l.* of the spot, he still possesses it without much damage to the grass. The method of planting was first by making holes with an iron crow, and widening them with a stake of wood, fit to receive a lusty plant, and sometimes boaring the ground with an auger ; but neither of these succeeding, (by reason the earth could not be ramm'd so close to the sides and bottom of the sets, as was requisite to keep them steady, and seclude the air, which would corrupt and kill the roots) he caus'd holes, or little pits of a foot square and depth to be dug, and then making a hole with the crow in the bottom of the pits, to receive the set, and breaking the turf which came out of it, ramm'd it in with the mould close to the sets (as they would do to fix a gate-post) with great care not to gall the bark of it. He had divers times before this miscarry'd, when he us'd formerly to set them in plain ground, without breaking the surface, and laying it close to the sets ; and therefore, if the soil be moist, he digs a trench by the side of the row, and applies the mould which comes out of it about the sets ; so that the edge of the bank raised by it, may be somewhat higher than the earth next the set, for the better descent of the rain, and advantage of watering the sets in dry weather ; preventing likewise their

rooting in the bank, which they would do if the ground next the plant or set were made high, and sloped; and being left unfenc'd, cattel would tread down the bank, and lay the roots bare: The ground should therefore not be raised above 2 or 3 inches towards the body of the set. Now if the ground be dry, and want moisture, he chuses to bank them round, (as I have described it in my *Pomona*, cap. vii.) the fosses environing the mound and hillock, being reserves for the rain, cools and refreshes the sets.

He farther instances, that willows of about 20 years growth, have been worth 30s. and another sold for 3*l.* which was well worth 5*l.* and affirms, that the willows planted in beds, between double ditches, in boggy ground, may be fit to be cut every five years, and pay as well as the best meadow-pasture, which is of extraordinary improvement.

27. There is a sort of willow of a slender and long leaf, resembling the smaller ozier; but rising to a tree as big as the sallow, full of knots, and of a very brittle spray, only here rehears'd to acknowledge the variety.

28. There is likewise the garden-willow, which produces a sweet and beautiful flower, fit to be admitted into our hortulan ornaments, and may be set for partitions of squares; but they have no affinity with other. There is also in Shropshire another very odori-ferous kind, extreamly fit to be planted by pleasant rivulets, both for ornament and profit: It is propagated by cuttings or layers, and will grow in any dry bottom, so it be sheltred from the south, affording a wonderful and early relief to the industrious bee: Vitruvius commends the *vitex* of the Latines (imper- tinently called *agnus castus*, the one being but the interpretation of the other) as fit for building; I sup-

pose they had a sort of better stature than the shrub growing among the curious with us, and which is celebrated for its chast effects, and for which the Ancients employ'd it in the rites of Ceres : I rather think it more convenient for the sculptor (which he likewise mentions) provided we may (with safety) restore the text, as Perrault has attempted, by substituting *lævitatem*, for the author's *regiditatem*, stubborn materials being not so fit for that curious art.

29. What most of the former enumerated kinds differ from the sallows, is indeed not much considerable, they being generally useful for the same purposes; as boxes, such as apothecaries and goldsmiths use; for cart-saddle-trees, yea gun-stocks, and half-pikes, harrows, shooe-makers lasts, heels, clogs for pattens, forks, rakes, especially the tooth, which should be wedged with oak; but let them not be cut for this when the sap is stirring, because they will shrink; pearches, rafters for hovels, portable and light ladders, hop-poles, ricing of kidney-beans, and for supporters to vines, when our English vineyards come more in request: Also for hurdles, sieves, lattices; for the turner, kyele-pins, great town-tops; for platters, little casks and vessels; especially to preserve verjuices in, the best of any: Pales are also made of cleft willow, dorsers, fruitbaskets, cann, hives for bees, trenchers, trays, and for polishing and whetting table-knives, the butler will find it above any wood or whet-stone; also for coals, bavin, and excellent firing, not forgetting the fresh boughs, which of all the trees in nature, yield the most chast and coolest shade in the hottest season of the day; and this umbrage so wholesome, that physicians prescribe it to feaverish persons, permitting them to be plac'd even about their beds, as a safe and

comfortable *refrigerium*. The wood being preserved dry, will dure a very long time; but that which is found wholly putrified, and reduc'd to a loamy earth in the hollow trunks of superannuated trees, is, of all other, the fittest to be mingled with fine mould, for the raising our choicest flowers, such as anemonies, ranunculus's, auriculas, and the like.

¹ What would we more? low broom, and sallows wild,
Or feed the flock, or shepherds shade, or field
Hedges about, or do us honey yield.

30. Now by all these plantations of the aquatick trees, it is evident, the lords of moorish commons, and unprofitable wasts, may learn some improvement, and the neighbour bees be gratified; and many tools of husbandry become much cheaper. I conclude with the learned Stephanus's note upon these kind of trees, after he has enumerated the universal benefit of the *salictum*: *nullius enim tutior redditus, minorisve impendii, aut tempestatis securior.*

CHAPTER XX.

Of Fences, Quick-sets, &c.

1. Our main plantation is now finish'd, and our forest adorned with a just variety: But what is yet all this labour, but loss of time, and irreparable expence, unless our young, and (as yet) tender plants

¹ Quid majora sequor? Salices, humilesque genistæ,
Aut illæ pecori frondem, aut pastoribus umbram
Sufficiunt, sepemque satis & pabula melli.

Georg. 2.

be sufficiently guarded with munitions from all external injuries? For, as old Tusser,

IF CATTEL, OR TONY MAY ENTER TO CROP,
YOUNG OAK IS IN DANGER OF LOSING HIS TOP.

But with something a more polish'd stile, though to the same purpose, the best of poets,

¹ Plash fences thy plantation round about,
And whilst yet young, be sure keep Cattel out ;
Severest Winters, scorching sun infest,
And sheep, goats, bullocks, all young plants molest ;
Yet neither cold, nor the hoar rigid frost,
Nor heat reflecting from the rocky coast,
Like cattel trees, and tender shoots confound,
When with invenom'd teeth the twigs they wound.

2. For the reason that so many complain of the improsperous condition of their wood-lands, and plantations of this kind, proceeds from this neglect; though (sheep excepted) there is no employment whatsoever incident to the farmer, which requires less expence to gratifie their expectations: One diligent and skilful man, will govern five hundred acres: But if through any accident a beast shall break into his master's field; or the wicked hunter make a cap for his dogs and horses, what a clamour is there made for the disturbance of a years crop at most in a little corn! whilst

¹ *Texendæ sepes etiam, & pecus omne tenendum est :
Præcipuè, dum frons tenera, imprudensque laborum,
Cui, super indignas hiemes, solemque potentem,
Silvestres uri assiduè, capreæque sequaces
Illudunt : Pascuntur oves, avidæque juvencæ.
Frigora nec tantum cana concreta pruina,
Aut gravis incumbens scopulis arentibus æstas,
Quantum illi nocuere greges, durique venenum
Dentis, & admorso signata in stirpe cicatrix.*

Georg. 2.

abandoning his young woods all this time, and perhaps many years, to the venomous bitings and treading of cattel, and other like injuries (for want of due care) the detriment is many times irreparable ; young trees once cropp'd, hardly ever recovering : It is the bane of all our most hopeful timber.

3. But shall I provoke you by an instance ? A kinsman of mine has a wood of more than 60 years standing ; it was, before he purchas'd it, expos'd and abandon'd to the cattel for divers years : Some of the outward skirts were nothing save shrubs and miserable starvings ; yet still the place was dispos'd to grow woody ; but by this neglect continually suppress'd. The industrious gentleman has fenced in some acres of this, and cut all close to the ground ; it is come in eight or nine years, to be better worth than the wood of sixty ; and will (in time) prove most incomparable timber, whilst the other part (so many years advanc'd) shall never recover ; and all this from no other cause, than preserving it fenc'd : Judge then by this, how our woods come to be so decryed : Are five hundred sheep worthy the care of a shepherd ? and are not five thousand oaks worth the fencing, and the inspection of a Hayward ?

¹ And shall men doubt to plant, and careful be ?

Let us therefore shut up what we have thus laboriously planted, with some good quick-set hedge ; which,

²All countries bear, in every ground
As denizen, or interloper found :

¹ Et dubitant homines serere, atque impendere curam ?

Georg. 2.

² Omne solum natale est, intrat ubique
Ardelio ; illa quidem cultis excluditur agris

From gardens and till'd fields expell'd, yet there,
 On the extreams stands up, and claims a share.
 Nor mastiff-dog, nor pike-man can be found
 A better fence to the enclosed ground.
 Such breed the rough and hardy Cantons rear,
 And into all adjacent lands prefer,
 Though rugged churles, and for the battle fit ;
 Who courts and states with complement or wit,
 To civilize, nor to instruct pretend ;
 But with stout faithful service to defend.
 This tyrants know full well, nor more confide
 On guards that serve less for defence than pride :
 Their persons safe they do not judge amiss,
 And realms committed to their guard of Swiss.

For so the ingenious poet has metamorphos'd him,
 and I could not withstand him.

4. The haw-thorn, (*oxyacantha vulgaris*) and indeed the very best of common hedges, is either rais'd of seeds or plants ; but then it must not be with despair, because sometimes you do not see them peep the first year ; for the haw, and many other seeds, being invested with a very hard integument, will now and then suffer imprisonment two whole years under the earth ; and our impatience at this, does often frustrate the resurrection of divers seeds of this nature ; so that we frequently dig up, and disturb the beds where they have been sown, in despair, before they

Plerumque, atque hortis ; sed circumsepit utrosque
 Atque omnes aditus servat fidissima custos,
 Utilior latrante cane, armatoque Priapo.
 Aspera frigoribus saxisque Helvetia tales
 Educat, & peregre terras emittit in omnes
 Enormes durosque viros, sed fortia bello
 Pectora ; non illi cultu, non moribus aulas,
 Atque urbes decorare valent, sed utrasque fideli
 Defendunt opera ; nec iis, gens cauta, tyranni,
 Præponunt speciosa magis, multùmque sonora
 Præsidia ; his certi vitam tutantur opesque, &c.
Coultii, pl. l. 6.

have gone their full time ; which is also the reason of a very popular mistake in other seeds ; especially, that of the holly, concerning which there goes a tradition, that they will not sprout till they be pass'd through the maw of a thrush ; whence the saying, *turdus exitium suum cacat* (alluding to the *viscus* made thereof, not the misselto of oak) but this is an error, as I am able to testify on experience ; they come up very well of the Berries, treated as I have shew'd in chap. 26. and with patience ; for (as I affirm'd) they will sleep sometimes two entire years in their graves ; as will also the seeds of yew, sloes, *phillyrea angustifolia*, and sundry others, whose shells are very hard about the small kernels ; but which is wonderfully facilitated, by being (as we directed) prepar'd in beds, and magazines of earth, or sand for a competent time, and then committed to the ground before the full in March, by which season they will be chitting, and speedily take root : Others bury them deep in the ground all Winter, and sow them in February : And thus I have been told of a gentleman who has considerably improv'd his revenue, by sowing haws only, and raising nurseries of quick-sets, which he sells by the hundred far and near : This is a commendable industry ; any neglected corners of ground will fit this plantation. Or were such places plow'd in furrow about the ground, you would fence, and sow'd with the mark of the cyder-press, crab-kernels, &c. kept secure from cattel till able to defend it self ; it would yield excellent stocks to graff and transplant : And thus any larger plot, by plowing and cross-plowing the ground, and sowing it with all sorts of forest-seeds ; breaking and harrowing the clods, and cleansing it from weeds with the haugh, (till the plants

over-top them) a very profitable grove may be rais'd, and yield magazin of singular advantage, to furnish the industrious planter.

5. But Columella has another expedient for the raising of our *spinetum*, by rubbing the now mature hips and haws, ashen-keys, &c. into the crevices of bass-ropes, or wisps of straw, and then burying them in a trench : Whether way you attempt it, they must (so soon as they peep, and as long as they require it) be sedulously cleans'd of the weeds ; which, if in beds for transplantation, had need be at the least three or four years ; by which time even your seedlings will be of stature fit to remove ; for I do by no means approve of the vulgar præmature planting of sets, as is generally us'd throughout England ; which is to take such only as are the very smallest, and so to crowd them into three or four files, which are both egregious mistakes.

6. Whereas it is found by constant experience, that plants as big as ones thumb, set in the posture, and at the distance which we spake of in the horn-beam ; that is, almost perpendicular (not altogether, because the rain should not get in 'twixt the rind and wood) and single, or at most, not exceeding a double row, do prosper infinitely, and much out-strip the densest and closest ranges of our trifling sets, which make but weak shoots, and whose roots do but hinder each other, and for being couch'd in that posture, on the sides of banks, and fences (especially where the earth is not very tenacious) are bared of the mould which should entertain them, by that time the rains and storms of one Winter have passed over them. In Holland and Flanders, (where they have the goodliest hedges of this kind about the counterscarps of their

invincible fortifications, to the great security of their musketeers upon occasion) they plant them according to my description, and raise fences so speedily, and so impenetrable, that our best are not to enter into the comparison. Yet, that I may not be wanting to direct such as either affect the other way, or whose grounds may require some bank of earth, as ordinarily the verges of copp'ces, and other inclosures do ; you shall by line, cast up your foss of about three foot broad, and about the same depth, provided your mould hold it; beginning first to turn the turf, upon which, be careful to lay some of the best earth to bed your quick in, and there lay, or set the plants; two in a foot space is sufficient; being diligent to procure such as are fresh gathered, streight, smooth, and well rooted; adding now and then, at equal spaces of twenty or thirty foot, a young oakling or elm-sucker, ash, or the like, which will come in time (especially in plain countries) to be ornamental standards, and good timber: If you will needs multiply your rowes, a foot or somewhat less: Above that, upon more congested mould, plant another rank of sets, so as to point just in the middle of the vacuities of the first, which I conceive enough : This is but for the single foss ; but if you would fortifie it to the purpose, do as much on the other side, of the same depth, height, and planting; and then last of all, cap the top in *pyramis* with the worst, or bottom of the ditch: Some, if the mould be good, plant a row or two on the edge, or very crest of the mound, which ought to be a little flatned: Here also may they set their dry-hedges, for hedges must be hedg'd till they are able to defend and shade their under-plantation, and I cannot reprove it: But great care is to be had in this work,

that the main bank be well footed, and not made with too sudden a declivity, which is subject to fall-in after frosts and wet weather; and this is good husbandry for moist grounds; but where the land lies high, and is hot and gravelly, I prefer the lower fencing; which, though even with the area it self, may be protected with stakes and a dry hedge, on the fosse side, the distance competent, and to very good purposes of educating more frequent timber amongst the rows.

7. Your hedge being yet young, should be constantly weeded two or three years, especially before Midsummer (of brambles especially, the great dock, and thistle, &c.) though some admit not of this work till after Michaelmas, for reasons that I approve not: It has been the practice of Herefordshire, in the plantation of quick-set-hedges, to plant a crab-stock at every twenty foot distance; and this they observe so religiously, as if they had been under some rigorous statute requiring it: But by this means they were provided in a short time with all advantages for the grafting of fruit amongst them, which does highly recompence their industry. Some cut their sets at three years growth even to the very ground, and find that in a year or two it will have shot as much as in seven, had it been let alone.

8. When your hedge is now of near six years stature, plash it about February or October; but this is the work of a very dextrous and skilful husbandman; and for which our honest countrey-man Mr. Markam gives excellent directions; only I approve not so well of his deep cutting, if it be possible to bend it, having suffered in something of that kind: It is almost incredible to what perfection

some have laid these hedges, by the rural way of plashing, better than by clipping; yet may both be used for ornament, as where they are planted about our garden-fences, and fields near the mansion. In Scotland, by tying the young shoots with bands of hay, they make the stems grow so very close together, as that it encloseth rabbits in warrens instead of pales: And for this robust use we shall prefer the black-thorn; the extravagant suckers which are apt to rise at distance from the hedge-line, being sedulously extirpated, that the rest may grow the stronger and thicker.

9. And now since I did mention it, and that most I find do greatly affect the vulgar way of quicking (that this our discourse be in nothing deficient) we will in brief give it you again after George Markham's description, because it is the best, and most accurate, although much resembling our former direction, of which it seems but a repetition, 'till he comes to the plashing. In a ground which is more dry than wet (for watry places it abhors) plant your quick thus: Let the first row of sets be placed in a trench of about half a foot deep, even with the top of your ditch, in somewhat a sloping, or inclining posture; then, having rais'd your bank near a foot upon them, plant another row, so as their tops may just peep out over the middle of the spaces of your first row: These cover'd again to the height or thickness of the other, place a third rank opposite to the first, and then finish your bank to its intended height. The distances of the plants would not be above one foot; and the season to do the work in, may be from the entry of February, till the end of March; or else in September to the beginning of December. When

this is finish'd, you must guard both the top of your bank, and outmost verge of your ditch, with a sufficient dry-hedge, interwoven from stake to stake into the earth (which commonly they do on the bank) to secure your quick from the spoil of cattle. And then being careful to repair such as decay, or do not spring, by supplying the dead, and trimming the rest; you shall after three years growth sprinkle some timber-trees amongst them; such as oak, beech, ash, maple, fruit, or the like; which being drawn young out of your nurseries, may be very easily inserted.

I am not in the mean time ignorant of what is said against the scattering these masts and keys among our fences; which grown to over-top the subnascent hedge, may prejudice it with their shade and drip: But this might be prevented by planting hollies (proof against these impediments) in the line or trench, where you would raise standards, as far as they usually spread in many years, and which, if placed at good distances, how close soever to the stem, would (besides their stout defence) prove a wondrous decoration, to large and ample enclosures: But to resume our former work; that which we affirm'd to require the greatest dexterity, is, the artificial plashing of our hedge, when it is now arrived to a six, or seven years head; though some stay till the tenth, or longer. In February therefore, or October, with a very sharp hand-bill, cut away all superfluous sprays and straglers, which may hinder your progress, and are useless. Then, searching out the principal stems, with a keen and light hatchet, cut them slant-wise close to the ground, hardly three quarters through, or rather, so far only, as till you can make them comply handsomely, which is your best direction, (lest you rift the

stem) and so lay it from your sloping as you go, folding in the lesser branches which spring from them; and ever within a five or six foot distance, where you find an upright set (cutting off only the top to the height of your intended hedge) let it stand as a stake, to fortifie your work, and to receive the twinings of those branches about it. Lastly, at the top (which would be about five foot above ground) take the longest, most slender, and flexible twigs which you reserved (and being cut as the former, where need requires) bind-in the extremities of all the rest, and thus your work is finished: This being done very close and thick, makes an impregnable hedge, in few years; for it may be repeated as you see occasion; and what you so cut-away, will help to make your dry-hedges for your young plantations, or be profitable for the oven, and make good bavin. Namely, the extravagant side branches springing the more upright, 'till the newly wounded are healed. There are some yet who would have no stakes cut from the trees, save here and there one; so as to leave half the head naked, and the other standing; since the over-hanging bows will kill what is under them, and ruin the tree; so pernicious is this half-topping: But let this be a total amputation for a new and lusty spring: There is nothing more prejudicial to subnascent young trees, than when newly trim'd and prun'd, to have their (as yet raw) wounds poyson'd with continual dripping; as is well observed by Mr. Nourse: But this is meant of repairing decay'd hedges. For stakes in this work, oak is to be preferr'd, tho' some will use elder, but it is not good; or the blackthorn, crab-tree, in moorish ground withy, ash, maple, hasel, not lasting, (which some make hedges of;

but it being apt to the browsing of cattle, when the young shoots appeared, it does better in copp'ces) the rest not lasting, should yet be driven well in at every yard of interval both before, and after they are bound, till they have taken the hard earth, and are very fast; and even your plash'd-hedges, need some small thorns to be laid over, to protect the spring from cattle and sheep, 'till they are somewhat fortified; and the doubler the winding is lodg'd, the better; which should be beaten, and forced down together with the stakes, as equally as may be. Note, that in sloping your windings, if it be too low done (as very usually) it frequently mortifies the tops, therefore it ought to be so bent, as it may not impede the mounting of the sap: If the plash be of a great, and extraordinary age, wind it at the neather boughs all together, and cutting the sets as directed, permit it rather to hang downwards a little, than rise too forwards; and then twist the branches into the work, leaving a set free, and unconstrain'd at every yard space, besides such as will serve for stakes, abated to about five foot length (which is a competent stature for an hedge) and so let it stand. One shall often find in this work, especially in old neglected hedges, some great trees, or stubs, that commonly make gaps for cattle: Such should be cut so near the earth, as till you can lay them thwart, that the top of one may rest on the root or stub of the other, as far as they extend, stopping the cavities with its boughs and branches; and thus hedges which seem to consist but only of scrubby-trees and stumps, may be reduced to a tolerable fence: But in case it be superannuated, and very old, 'tis advisable to stub all up, being quite

renewed, and well guarded. We have been the longer on these descriptions, because it is of main importance, and that so few husband-men are so perfectly skill'd in it : But he that would be more fully satisfied, I would have to consult Mr. Cook, chap. 32. or rather *instar omnium* (and after all which has been said of this useful art of fencing) what I cannot without injury to the publick, and ingratitude to the persons, (who do me the honour of imparting to me their experiences) but as freely communicate.

It is then from the Reverend Mr. Walker of Great-Billing near Northampton, that (with several other particulars relating to our rural subject) I likewise receive from that worthy gentleman Tho. Franklin of Ecton, Esq ; the following method of planting, and fencing with quick-sets ; which we give you in his own words.

10. ‘ About 10 or 12 years since, I made some
‘ essays to set some little clumps of hedges and trees,
‘ of about two pole in breadth, and three in length :
‘ The out-fences ditch'd on the outside, but the
‘ quick-sets in the inside of the bank, that the dead-
‘ hedges might stand on the outside thereof ; so that
‘ a small hedge of 18 or 20 inches high, made of
‘ small wood, the stakes not much bigger than a
‘ man's thumb, which (the banks being high) suffici-
‘ ently defended them for four years time, and were
‘ hedg'd with less than one load of shreadings of
‘ willow-sets, which, (as my workmen told me) would
‘ have requir'd 6 load of copp'ce-wood : But the next
‘ year after their being planted, finding wast ground
‘ on the top of the bank of the outer fence, between
‘ the dead-hedge and the quick, I put a foot-set in

‘ the same space between the quick and the dead-
‘ hedge, which prosper’d better than those planted in
‘ the side of the bank, after the vulgar way, and hold
‘ it still. This put me upon thinking, that a set
‘ cheaper and better of quick-fence, might possibly
‘ be found out ; and accordingly I made some tryals,
‘ with good success, (at least better than the old way)
‘ tho’ not to my full satisfaction, till I had perus’d
‘ Mr. Evelyn’s *Silva*, &c. The method I us’d, was
‘ this : First I set out the ground for ditches and
‘ quick, in breadth ten foot ; then subdivided that by
‘ marking out 2 foot $\frac{1}{2}$ on each side (more or less, at
‘ pleasure) for the ditches, leaving 5 in the middle
‘ between them : Then digging up two foot in the
‘ midst of that 5 foot, plant the sets in ; tho’ it
‘ require more labour and charge, I found it soon
‘ repay’d the cost. This done, I began to dig the
‘ fosses, and to set up one row of turfs on the outside
‘ of the said five foot ; namely, one row on each side
‘ thereof, the green side outmost, a little reclining, so
‘ as the grass might grow : After this, returning to
‘ the place begun at, I ordered one of the men to dig
‘ a spit of the under-turfmould, and lay it between
‘ the turfs, plac’d edge-wise, as before describ’d, upon
‘ the 2 foot which was purposely dug in the middle,
‘ and prepar’d for the sets, which the planter sets
‘ with two quicks upon the surface of the earth,
‘ almost upright, whilst another workman lays the
‘ mould forward, about 12 inches, and then sets two
‘ more, and so continues. Some there are who plant
‘ three rows of sets about 8 inches interval ; but I do
‘ not approve it ; for they choak one another. This
‘ finished, I order another row of turfs to be plac’d
‘ on each side upon the top of the former, and fill the

‘ vacuity between the sets and the turfs, as high as
‘ their tops, always leaving the middle where the sets
‘ are planted, hollow, and somewhat lower than the
‘ sides of the banks, by 8 or 10 inches, that the rain
‘ may descend to their roots, which is of great ad-
‘ vantage to their growth, and far better than by the
‘ old way ; where the banks too much sloping, the
‘ roots of the sets are seldom wetted in an ordinary
‘ season, the Summer following ; but which if it
‘ prove dry, many of the sets perish, especially the
‘ late planted : Whereas those which I planted in the
‘ latter end of April, tho’ the Summer hapned to be
‘ somewhat dry, generally scap’d, very few of them
‘ miscarrying. Now the planting thus advanc’d, the
‘ next care is fencing ; by setting an hedge of about
‘ 20 inches high upon the top of the bank, on each
‘ side thereof, leaning a little outward from the sets,
‘ which will protect them as well (if not better) than
‘ a hedge of 3 foot, or four inches more, standing
‘ upon the surface of the ground, which being rais’d
‘ with the turfs and sods about 20 inches, and the
‘ hedge about 20 inches more, will make 3 foot 4
‘ inches ; so as no cattle can approach the dead-hedge
‘ to prejudice it, unless they set their feet in the
‘ ditch it self ; which will be at least a foot deep, and
‘ from the bottom of the fosse to the top of the hedge,
‘ about 4 foot and $\frac{1}{2}$, which they can hardly reach
‘ over to crop the quick, as they might in the old
‘ way ; and besides, such an hedge will endure a year
‘ longer. I have at this present, an hedge which has
‘ stood these 5 years ; and tho’ 9 or 10 foot be suffi-
‘ cient for both ditches and bank, yet where the
‘ ground is but indifferent, ’tis better husbandry to
‘ take 12 foot, which will allow of a bank at least

‘ 6 foot broad, and gives more scope to place the
 ‘ dead hedges farther from the sets ; and the ditches
 ‘ being shallow, will in two years time, graze ; tho’
 ‘ I confine my self for the most part to 9 or 10 ;
 ‘ because I would take off the only objection of wasting
 ‘ ground by this way, should others follow it. In
 ‘ reply to this, I affirm, that if you take 12 foot in
 ‘ breadth, for ditch and bank, you wast more ground,
 ‘ than by the common way : For in that a quick is
 ‘ rarely set, but there is 9 foot between the dead
 ‘ hedges, which is entirely lost all the time of fencing :
 ‘ When as with double ditches, there remains at least
 ‘ 18 inches on each side where the turfs were set on
 ‘ edge, that bear more grass than when it lay on the
 ‘ flat. But admitting it did totally lay wast 3
 ‘ foot of ground, the damage were very inconsiderable,
 ‘ since forty pearch, in length 220 yards, which makes
 ‘ pearches, 7, 25", 9', or 7 pole $\frac{1}{4}$, which at 13 *shil.*
 ‘ 4 *pence* the acre, amounts not to 7*d.* $\frac{1}{2}$ *per ann.* Now
 ‘ that this is not only the best and cheapest way of
 ‘ quick-setting, will appear by comparing the charge
 ‘ of both : In the usual way, the charge of a 3 foot
 ‘ ditch is 4*d.* per pole, the owner providing sets ; if
 ‘ the workman finds them, he will have for making
 ‘ the said ditch, and setting them, 8*d.* the pole, and
 ‘ for hedging, two pence ; that is, for both sides 4*d.*
 ‘ the pole, which renders the charge of hedging,
 ‘ ditching, and sets, 12*d.* the pole ; that is, for forty
 ‘ rod in length, forty shillings : Then one load of
 ‘ wood out of the copp'ce costs us, with the carriage,
 ‘ (tho' but two or 3 miles distance) ten shillings ;
 ‘ which will seldom hedge above 8 pole (single hedge.)
 ‘ But allowing it to do ten, to fence 40 pole, there
 ‘ must be at least 8 load of wood, which costs 4*l.*

‘ making the whole expence for ditching, setting,
 ‘ and fencing of 40 pole, to be 6*l.* reck’ning with the
 ‘ least ; for I know not any that will undertake to do
 ‘ it under 3*s.* 6*d.* per pole, and then the 40 pole costs
 ‘ 7*l.* Whereas, with double ditches, both of them,
 ‘ setting and sets, will be done for 8*d.* per pole, and
 ‘ the husbandman get as good wages, as with a single
 ‘ ditch, (for tho’ the labour about them is more, yet
 ‘ the making the table is saved) which costs 1*l.* 6*s.* 8*d.*
 ‘ And the hedges being but low, they’ll make better
 ‘ wages at hedging for a penny the pole, than at two
 ‘ pence for common hedges ; which comes to 6*s.* 8*d.*
 ‘ for hedging forty pole on both sides : Thus one load
 ‘ of wood, will fence 30 pole at least, and 40 hedg’d
 ‘ with $\frac{2}{3}$ of wood less, than in the other way, and
 ‘ cost but 1*l.* 6*s.* 8*d.* which makes the whole charge
 ‘ of sets, ditching, fencing, and wood, but three
 ‘ pounds.

<i>l.</i>	<i>s.</i>	<i>d.</i>
01	06	08
00	06	08
01	06	08
03	00	00

Hitherto this obliging and industrious gentleman.

11. To other uses : The Root of an old thorn is excellent both for boxes and combs, and is curiously and naturally wrought : I have read, that they made ribs to some small boats or vessels with the white-thorn, and it is certain, that if they would plant them single, and in standards, where they might be safe, they would rise into large body’d trees in time, and be of excellent use for the turner, not inferior to box, and accounted among the fortunate trees, and there-

fore us'd in *fasces nuptiarum*, since the jolly shepherds carried the white-thorn at the rapine of the Sabines; and ever since counted¹ propitious.

The distill'd water, and stone, or kernels of the haw reduc'd to powder, is generally agreed to be sovereign against the stone. The black-crab rightly season'd and treated, is famous for walking-staves, and if over-grown, us'd in mill-work; yea, and for rafters of great ships. Here we owe due eulogy to the industry of the late Lord Shaftsbury, who has taught us to make such enclosures of crab-stocks only, (planted close to one another) as there is nothing more impregnable and becoming; or you may sow cyder-kernels in a rill, and fence it for a while, with a double dry hedge, not only for a sudden and beautiful, but a very profitable inclosure; because, amongst other benefits, they will yield you cyderfruit in abundance: But in Devonshire, they build two walls with their stones, setting them edge-ways, two, and then one between; and so as it rises, fill the interval, or *cofer* with earth (the breadth and height as you please) and continuing the stone-work, and filling, and as you work, beating in the stones flat to the sides, they are made to stick everlastingly: This is absolutely the neatest, most saving, and profitable fencing imaginable, where slaty stones are in any abundance; and it becomes not only the most secure to the lands, but the best for cattle, to lye warm under the walls; whilst other hedges, (be they never so thick) admit of some cold winds in Winter-time when the leaves are off. Upon these banks they plant not only quick-sets, but even timber-trees, which exceedingly thrive, being out of all danger.

See Varro in *Atis*. Ovid, *Fast.* 6. de spina sumitur alba.

12. The *pyracantha paliurus*, and like preciouser sorts of thorn and robust evergreens, adorn'd with caralin-berries, might easily be propagated by seeds, layers, or cutting, into plenty sufficient to store even these vulgar uses, were men industrious; and then, how beautiful and sweet would the environs of our fields be! for there are none of the spinous shrubs more hardy, none that make a more glorious shew, nor fitter for our defence, competently arm'd; especially the *rhannus*, which I therefore joyn to the *oxyacantha*, for its terrible and almost irresistible spines, able almost to pierce a coat of mail; and for this made use of by the malicious Jews, to crown the sacred tempels of our Blessed Saviour, and is yet preferred among the most venerable reliques in St. Chapel at Paris, as is pretended, by the devotees, &c. and hence has the tree (for it sometimes exceeds a shrub) the name of Christ's Thorn. Thus might berberies now and then be also inserted among our hedges, which, with the hips, haws, and cornel-berries, do well in light lands, and would rather be planted to the South, than North or West, as usually we observe them.

13. Some (as we noted) mingle their very hedges with oaklings, ash, and fruit-trees, sown or planted, and 'tis a laudable improvement; though others do rather recommend to us sets of all one sort, and will not so much as admit of the black-thorn to be mingled with the white, because of their unequal progress; and indeed, timber-trees set in the hedge (though contemporaries with it) do frequently wear it out; and therefore I should rather encourage such plantations to be at some yards distance, near the verges, than perpendicularly in them. Lastly, if in planting any the most robust forest-trees, (especially oak, elm,

chesnut) at competent spaces, and in rows; you open a ring of ground, at about four foot distance from the stem, and prick in quick-set plants; you may after a while, keep them clipp'd, at what height you please: They will appear exceedingly beautiful to the eye, prove a good fence, and yield useful bush, bavin, and (if you maintain them unshorn) hips and haws in abundance: This would therefore especially be practis'd, where one would invite the birds.

14. In Cornwall they secure their lands and woods, with high mounds, and on them they plant acorns, whose roots bind in the looser mould, and so form a coronet of trees. They do likewise (and that with great commendation) make hedges of our *genista spinosa*, prickly furzes, of which they have a taller sort, such as the French imploy for the same purpose in Bretagne, where they are incomparable husbands. NO. 1140

15. It is to be sown (which is best) or planted of the roots in a furrow: If sown, weeded till it be strong; both tonsile, and to be diligently clip'd, which will render it very thick, an excellent and beautiful hedge: Otherwise, permitted to grow at large, 'twill yield very good faggot: It is likewise admirable covert for wildfowl, and will be made to grow even in moist, as well as dry places: The young and tender tops of furzes, being a little bruis'd and given to a lean sickly horse, will strangely recover and plump him. Thus, in some places, they sow in barren grounds (when they lay them down) the last crop with this seed, and so let them remain till they break them up again, and during that interim, reap considerable advantage: Would you believe (writes a worthy correspondent of mine) that in Herefordshire (famous for plenty of wood) their

thickets of furzes (*viz.* the vulgar) should yield them more profit than a like quantity of the best wheat-land of England? for such is theirs: If this be question'd, the scene is within a mile of Hereford, and proved by anniversary experience, in the lands, as I take it, of a gentleman who is now one of the burgesses for that city. And in Devonshire (the seat of the best husbands in the world) they sow on their worst land (well plow'd) the seeds of the rankest furzes, which in four or five years becomes a rich wood: No provender (as we say) makes horses so hardy as the young tops of these furzes; no other wood so thick, nor more excellent fuel; and for some purposes also, yielding them a kind of timber to their more humble buildings, and a great refuge for fowl and other game: I am assur'd, in Bretaine 'tis sometimes sown no less than twelve yards thick, for a speedy, profitable, and impenetrable mound: If we imitated this husbandry in the dry and hot barren places of Surrey, and other parts of this nation, we might exceedingly spare our woods; and I have bought the best sort of French-seed at the shops in London. It seems that in the more eastern parts of Germany, and especially in Poland, this vulgar trifle, and even our common Broom is so rare, that they have desired the seeds of them out of England, and preserve them with extraordinary care in their best gardens; this I learn out of our Johnson's *Herbal*; by which we may consider, that what is reputed a curse, and a cumber in some places, is esteem'd the ornament and blessing of another: But we shall not need go so far for this, since both beech and birch are almost as great strangers in many parts of this nation, particularly North-

ampton and Oxfordshire. Mr. Cook is much in praise of juniper for hedges, especially for the more elegant inclosures, and we daily see how it's improved of late.

16. This puts me in mind of the *genista scoparia*, broom; another improvement for barren grounds, and saver of more substantial fuel: It may be sown English, or (what is more sweet and beautiful) the Spanish, with equal success. In the western parts of France, and Cornwall, it grows with us to an incredible height (however our poet gives it the epithet of *humilis*) and so it seems they had it of old, as appears by Gratius his *genistæ altinates*, with which (as he affirms) they us'd to make staves for their spears, and hunting darts. The seeds of broom, vomit, and purge, whilst the buds, and flowers being pickled, are very grateful.

17. Lastly, (*sambucus*) a considerable fence may be made of the elder, set of reasonable lusty trunchions; much like the willow, and (as I have seen them maintain'd) laid with great curiosity, and far excelling those extravagant plantations of them about London, where the lops are permitted to grow without due and skilful laying. There is a sort of elder which has hardly any pith; this makes exceeding stout fences, and the timber very useful for cogs of mills, butchers skewers, and such tough employments. Old trees do in time become firm, and close up the hollowness to an almost invisible pith. But if the medicinal properties of the leaves, bark, berries, &c. were thoroughly known, I cannot tell what our countryman could ail, for which he might not fetch a remedy from every hedge, either for sickness or wound: The inner bark of elder, apply'd to any burning, takes out

the fire immediately ; that, or, in season, the buds, boil'd in water-grewel for a break-fast, has effected wonders in a fever ; and the decoction is admirable to asswage inflammations and tetrous humours, and especially the scorbut : But an extract, or *theriaca* may be compos'd of the berries, which is not only efficacious to eradicate this epidemical inconvenience, and greatly to assist longævity ; (so famous is the story of Neander) but is a kind of *catholicon* against all infirmities whatever ; and of the same berries is made an incomparable spirit, which drunk by it self, or mingled with wine, is not only an excellent drink, but admirable in the dropsie : In a word, the water of the leaves and berries is approved in the dropsie, every part of the tree being useful, as may be seen at large in Blockwitzius's *anatomy* thereof. The ointment made with the young buds, and leaves in May with butter, is most sovereign for aches, shrunk sinews, hæmorrhoids, &c. and the flowers macerated in vinegar, not only are of a grateful relish, but good to attenuate and cut raw and gross humours. Lastly, the *fungus* (which we call Jews-ears) decocted in milk, or macerated in vinegar, is of known effect in the angina and sores of the throat. And less than this could I not say (with the leave of the charitable physician) to gratifie our poor wood-man ; and yet when I have said all this, I do by no means commend the scent of it, which is very noxious to the air, and therefore, though I do not undertake that all things which sweeten the air, are salubrious, nor all ill savours pernicious ; yet, as not for its beauty, so neither for its smell, would I plant elder, near my habitation ; since we learn from Biesius,¹ that a certain house in

¹ Bies. *de Aeris potestate.*

Spain, seated amongst many elder-trees, diseas'd and kill'd almost all the inhabitants, which when at last they were grubb'd up, became a very wholesome and healthy place. The elder does likewise produce a certain green fly, almost invisible, which is exceedingly troublesome, and gathers a fiery redness where it attacks.

18. There is a shrub called the spindle-tree, (*euonymus*, or *fusanum*) commonly growing in our hedges, which bears a very hard wood, of which they sometimes made bows for viols, and the inlayer us'd it for its colour, and instrument-makers for tooting of organs, and virginal-keys, tooth-pickers, &c. What we else do with it, I know not, save that (according with its name, abroad) they make spindles with it. I also learn, that three, or four of the berries, purge both by vomit, and siege, and the powder made of the berry, being bak'd, kills nits, and cures scurfy heads. Matthiolus says, the poor people about Trent, press oyl out of the berries, wherewith to feed their lamps : But why they were wont to scourge parricides with rods made of this shrub, before they put them into the sack, see Modestinus l. penult ss. *ad legem Pomp. de parricid.* cited by Mr. Ray. Here might come in (or be nam'd at least) wild-cornel, or dog-wood, good to make mill-cogs, pestles, bobins for bone-lace, spokes for wheels, &c. the best skewers for butchers, because it does not taint the flesh, and is of so very hard a substance, as to make wedges to cleave and rive other wood with, instead of iron. (But of this, see chap. 11. book II.) And lastly, the *viburnum*, or way-faring-tree, growing also plentifully in every corner, makes pins for the yoaks of oxen ; and superstitious people think, that it protects their cattel from being bewitch'd and us'd to plant the shrub about

their stalls ; 'tis certainly the most plyant and best bands to fagot with. The leaves and berries are astringent, and make an excellent gargle for loose teeth, sore throats, and to stop fluxes : The leaves decocted to a lie, not only colour the hairs black, but fasten their roots ; and the bark of the root, macerated under ground, well beaten, and often boil'd, serves for birdlime.

19. The American *yucca* is a hardier plant than we take it to be, for it will suffer our sharpest Winter, (as I have seen by experience) without that trouble and care of setting it in cases, in our conservatories for hyemation ; such as have beheld it in flower (which is not indeed till it be of some age) must needs admire the beauty of it ; and it being easily multiplied, why should it not make one of the best and most ornamental fences in the world for our gardens, with its natural palisadoes, as well as the more tender, and impatient of moisture, the aloes, does for their vineyards in Languedoc, &c. but *we* believe nothing improvable, save what our grand-fathers taught us. Finally, let tryal likewise be made of that thorn, mentioned by Capt. Liggon in his *History of Barbadoes* ; whether it would not be made grow amongst us, and prove as convenient for fences as there ; the seeds, or sets transported to us with due care. And thus, having accomplished what (by your commands) I had to offer concerning the propagation of the more solid, material, and useful trees, as well the dry, as aquatical ; and to the best of my talent fenc'd our plantation in : I should here conclude, and set a bound likewise to my discourse, by making an apology for the many errors and impertinencies of it, did not the zeal and ambition of this illustrious Society to promote and im-

prove all attempts which may concern publick utility or ornament, perswade me, that what I am adding for the farther encouragement to the planting of some other useful (though less vulgar) trees, will at least obtain your pardon if it miss of your approbation.

20. To discourse in this stile of all such fruit-trees as would prove of greatest emolument to the whole nation, were to design a just volume ; and there are directions already so many, and so accurately deliver'd and publish'd (but which cannot be affirm'd of any of the former classes of forest-trees, and other remarks, at the least to my poor knowledge and research) that it would be needless to repeat.

21. I do only wish (upon the prospect, and meditation of the universal benefit) that every person whatsoever, worth ten pounds *per annum*, within Her Majesty's dominions, were by some indispensible statute, obliged to plant his hedge-rows with the best and most useful kinds of them ; especially in such places of the nation, as being the more in-land counties, and remote from the seas and navigable rivers, might the better be excus'd from the planting of timber, to the proportion of those who are more happily and commodiously situated for the transportation of it.

22. Undoubtedly, if this course were taken effectually, a very considerable part both of the meat and drink which is spent to our prejudice, might be saved by the countrey-people, even out of the hedges and mounds, which would afford them not only the pleasure and profit of their delicious fruit, but such abundance of cyder and perry, as should suffice them to drink of one of the most wholesome and excellent beverages in the world. Old Gerard did long since alledge us an example worthy to be pursu'd ; I have

seen (saith he, speaking of apple-trees, lib. 3. cap. 101.) in the pastures and hedge-rows about the grounds of a worshipful gentleman dwelling two miles from Hereford, call'd Mr. Roger Bodnome, so many trees of all sorts, that the servants drink for the most part no other drink but that which is made of apples : The quantity is such, that by the report of the gentleman himself, the parson hath for tythe many hogs-heads of cyder : The hogs are fed with the fallings of them, which are so many, that they make choice of those apples they do eat, who will not tast of any but of the best. An example doubtless to be follow'd of gentlemen that have land and living ; but Envy saith, The poor will break down our hedges, and we shall have the least part of the fruit : But forward, in the name of God, graff, set, plant, and nourish up trees in every corner of your ground ; the labour is small, the cost is nothing, the commodity is great ; your selves shall have plenty, the poor shall have somewhat in time of want to relieve their necessity, and God shall reward your good minds and diligence. Thus far honest Gerard. And in truth, with how small a charge and infinite pleasure this were to be effected, every one that is patron of a little nursery, can easily calculate : But by this expedient many thousands of acres, sow'd now yearly with barley, might be cultivated for wheat, or converted into pasture, to the increase of corn and cattel : Besides, the timber which the pear-tree, black-cherry and many thorny plums (which are best for grain, colour, and gloss) afford, comparable (for divers curious uses) with any we have enumerated. The black-cherry-wood grows sometimes to that bulk, as is fit to make stools with, cabinets, tables, especially the redder sort, which will

polish well ; also pipes, and musical instruments, the very bark employ'd for bee-hives : But of this I am to render a more ample account, in the appendix to this Discourse. I would farther recommend the more frequent planting and propagation of fir, pine-trees, and some other beneficial materials, both for ornament and profit ; especially, since we find by experience, they thrive so well, where they are cultivated for curiosity only.

DENDROLOGIA

THE SECOND BOOK

CHAPTER I.

Of the Mulberry.

1. *Morus*, the mulberry: It may possibly be wonder'd by some why we should insert this tree amongst our forest inhabitants; but we shall soon reconcile our industrious planter, when he comes to understand the incomparable benefit of it, and that for its timber, durableness, and use for the joyner and carpenter, and to make hoops, bows, wheels, and even ribs for small vessels, instead of oak, &c. though the fruit and the leaves had not the due value with us, which they deservedly enjoy in other places of the world.

2. But it is not here I would recommend our ordinary black fruit bearers, though that be likewise worth the propagation; but that kind which is call'd the white mulberry (which I have had sent me out of Languedoc) one of them of a broad leaf, found there and in Provence, whose seeds being procured from Paris, where they have it from Avignon, should be thus treated in the seminary.

3. In countries where they cultivate them for the silk-worm, and other uses, they sow the perfectly mature berries of a tree whose leaves have not been

gather'd ; these they shake down upon an old sheet spread under the tree, to protect them from gravel and ordure, which will hinder you from discerning the seed : If they be not ripe, lay them to mature upon shelves, but by no means till they corrupt ; to prevent which, turn them daily ; then put them in a fine sieve ; and plunging it in water, bruise them with your hand ; do this in several waters, then change them in other clear water, and the seed will sink to the bottom, whilst the pulp swims, and must be taken off carefully : This done, lay them to dry in the sun upon a linnen cloth, for which one hour is sufficient, then van and sift it from the husks, and reserve it till the season. This is the process of curious persons, but the sowing of ripe mulberries themselves is altogether as good, and from the excrement of hogs, and even dogs (that will frequently eat them) they will rise abundantly. Note, that in sowing of the berry, 'tis good to squash and bruise them with fine sifted mould, and if it be rich, and of the old bed, so much the better: They would be interr'd, well moistned and cover'd with straw, and then rarely water'd till they peep ; or you may squeeze the ripe berries in ropes of hair or bast, and bury them, as is prescrib'd for hipps and haws ; the earth in which you sow them, should be fine mould, and as rich as for melons, rais'd a little higher than the area, as they make the beds for ordinary pot-herbs, to keep them loose and warm, and in such beds you may sow seeds as you do purslane, mingled with some fine earth, and thinly cover'd, and then for a fortnight, strew'd over with straw, to protect them both from sudden heat and from birds : The season is April or May, though some forbear even till July and August,

and in the second quarter of the moon, the weather calm and serene. At the beginning, keep them moderately fresh (not over wet) and clean weeded, secured from the rigor of frosts ; the second year of their growth, about the beginning of October, or early Spring, draw them gently out, prune the roots, and dipping them a little in pond-water, transplant them in a warm place or nursery ; 'tis best ranging them in drills, two foot large, and one in depth, each drill three foot distance, and each plant two. And if thus the new earth be somewhat lower than the surface of the rest, 'twill the better receive the rain : Being planted, cut them all within three inches of the ground. Water them not in Winter, but in extream necessity, and when the weather is warm, and then do it in the morning. In this cold season you shall do well to cover the ground with the leaves of trees, straw, or short litter, to keep them warm ; and every year you shall give them three dressings or half diggings ; *viz.* in April, June, and August ; this, for the first year, still after rain : The second Spring after transplanting, purge them of all superfluous shoots and scions, reserving only the most towardly for the future stem ; this to be done yearly, as long as they continue in the nursery ; and if of the principal stem so left, the frost mortifie any part, cut it off, and continue this government till they are near six foot high, after which suffer them to spread into heads by discreetly pruning and fashioning them : But if you plant where cattle may endanger them, the stem had need be taller, for they are extreamly liquorish of the leaves.

4. When now they are about five years growth, you may transplant them without cutting the root (provided you erradicate them with care) only trim-

ming the head a little ; the season is from September to November in the new-moon, and if the holes or pits you set them in were dug and prepar'd some months before, it would much secure their taking ; some cast horns, bones, shells, &c. into them, the better to loosen the earth about them, which should be rich, and well refresh'd all Summer. A light, and dry mould is best, well expos'd to the sun and air, which above all things this tree affects, and hates watery low grounds : In sum, being a very lasting tree, they thrive best where vines prosper most, whose society they exceedingly cherish ; nor do they less delight to be amongst corn, no way prejudicing it with its shade. The distance of these standards would be twenty, or twenty four foot every way, if you would design walks or groves of them ; if the environs of fields, banks of rivers, high-ways, &c. twelve or fourteen foot may suffice, but the farther distant, the better ; for the white spreads its root much farther than the black, and likes the valley more than the higher ground.

5. Another expedient to increase mulberries, is, by layers from the suckers at the foot, this done in Spring, leaving not above two buds out of the earth, which you must diligently water, and the second year they will be rooted : They will also take by passing any branch or arm slit, and kept a little open with a wedge, or stone, through a basket of earth, which is a very sure way : Nay, the very cuttings will strike in Spring, but let them be from shoots of two years growth, with some of the old wood, though of seven or eight years ; these set in rills, like vines, having two or three buds at the top, will root infallibly, especially if you twist the old wood a little,

or at least hack it, though some slit the foot, inserting a stone, or grain of an oat, to suckle and entertain the plant with moisture.

6. They may also be propagated by graffing them on the black mulberry in Spring, or inoculated in July, taking the cyons from some old tree, that has broad, even, and round leaves, which causes it to produce very ample and tender leaves, of great emolument to the silk-master.

7. Some experienc'd husbandmen advise to poll our mulberries every three or four years, as we do our willows; others not till 8 years; both erroneously. The best way is yearly to prune them of their dry and superfluous branches, and to form their heads round and natural. The first year of removal where they are to abide, cut off all the shoots, to five or six of the most promising; the next year leave not above three of these, which dispose in triangle as near as may be, and then disturb them no more, unless it be to purge them (as we taught) of dead seare-wood, and extravagant parts, which may impeach the rest; and if afterward any prun'd branch shoot above three or four cyons, reduce them to that number. One of the best ways of pruning is, what they practise in Sicily and Provence, to make the head hollow, and like a bell, by cleansing them of their inmost branches; and this may be done, either before they bud, *viz.* in the new-moon of March, or when they are full of leaves in June or July, if the season prove any thing fresh. Here I must not omit what I read of the Chinese culture, and which they now also imitate in Virginia, where they have found a way to raise these plants of the seeds, which they mow and cut like a crop of grass, which sprout, and bear leaves

again in a few months : They likewise (in Virginia) have planted them in hedges, as near together as we do gooseberries and currans, for their more convenient clipping, which they pretend to do with scissers.

8. The mulberry is much improv'd by stirring the mould at root, and letation.

9. We have already mentioned some of the uses of this excellent tree, especially of the white, so called because the fruit is of a paler colour, which is also of a more luscious taste, and lesser than the black ; the rind likewise is whiter, and the leaves of a mealy clear green colour, and far tenderer, and sooner produc'd by at least a fortnight, which is a marvelous advantage to the newly disclos'd silk-worm : Also they arrive sooner to their maturity, and the food produces a finer web. Nor is this tree less beautiful to the eye than the fairest elm, very proper for walks and avenues : The timber (amongst other properties) will last in the water as well as the most solid oak, and the bark makes good and tough bast-ropes. It suffers no kind of vermin to breed on it, whether standing or fell'd, nor dares any caterpillar attack it, save the silk-worm only. The loppings are excellent fuel : But that for which this tree is in greatest and most worthy esteem, is for the leaves, which (besides the silk-worm) nourishes cows, sheep, and other cattle ; especially young porkers, being boil'd with a little bran ; and the fruit excellent to feed poultry. In sum, whatever eats of them, will with difficulty be reduc'd to endure any thing else, as long as they can come by them : To say nothing of their other sovereign qualities, as relaxing of the belly, being eaten in the morning, and curing inflammations and ulcers of the mouth and throat, mix'd with *Mel*

rosarum, in which receipt they do best, being taken before they are over-ripe. I have ¹ read, that in Syria they make bread of them ; but that the eating of it makes men bald : As for drink, the juice of the berry mixed with cider-apples, makes an excellent liquor, both for colour and taste.

10. To proceed with the leaf (for which they are chiefly cherish'd) the benefit of it is so great, that they are frequently let to farm for vast sums ; so as some one sole tree has yielded the proprietor a rent of twenty shillings *per annum*, for the leaves only ; and six or seven pounds of silk, worth as many pounds sterling, in five or six weeks, to those who keep the worms. We know that till after Italy had made silk above a thousand years, (and where the tree it self was not a stranger, none of the ancients writing any thing concerning it) they receiv'd it not in France; it being hardly yet an hundred, since they betook themselves to this manufacture in Provence, Languedoc, Dauphine, Lionnois, &c. and not in Tourain and Orleans, till Hen. the Fourth's time ; but it is incredible what a revenue it now amounts to in that kingdom. About the same time, or a little after, it was that King James did with extraordinary care recommend it to this nation, by a book of directions, acts of council, and all other princely assistance. But this did not take, no more than that of Hen. the Fourth's proposal about the environs of Paris, who filled the high-ways, parks, and gardens of France with the trees, beginning in his own gardens for encouragement : Yet, I say, this would not be brought into example, till this present great monarch, by the indefatigable diligence of *Monsieur* Colbert (Super-

¹ Andr. Medicus apud Athenaeum, *Deipnos*. lib. 3 cap. 29.

intendent of His Majesty's Manufactures) who has so successfully reviv'd it, that 'tis prodigious to consider what an happy progress they have made in it; to our shame be it spoken, who have no other discouragements from any insuperable difficulty whatever, but our sloth, and want of industry; since wherever these trees will grow and prosper, the silk-worms will do so also; and they were alike averse, and from the very same suggestions, where now that manufacture flourishes in our neighbour countries. It is demonstrable, that mulberries in four or five years may be made to spread all over this land; and when the indigent, and young daughters in proud families are as willing to gain three or four shillings a day for gathering silk, and busying themselves in this sweet and easie employment, as some do to get four pence a day for hard work at hemp, flax, and wooll; the reputation of mulberries will spread in England and other plantations. I might say something like this of saffron, which we yet too much neglect the culture of; but, which for all this I do not despair of seeing reassum'd, when that good genius returns. In order to this hopeful prognostick, we will add a few directions about gathering of their leaves, to render this chapter one of the most accomplish'd, for certainly one of the most accomplish'd and agreeable works in the world.

II. The leaves of the mulberry should be collected from trees of seven or eight years old; if of such as are very young, it impairs their growth, neither are they so healthful for the worms, making them hydropical, and apt to burst: As do also the leaves of such trees as be planted in a too waterish, or over-rich soil, or where no sun comes, and all sick, and yellow leaves

are hurtful. It is better to clip, and let the leaves fall upon a subtended sheet or blanket, than to gather them by hand: and to gather them, than to strip them, which marrs and gauls the branches, and bruises the leaves that should hardly be touched. Some there are who lop off the boughs, and make it their pruning, and it is a tolerable way, so it be discreetly done in the over-thick parts of the tree; but these leaves gather'd from a separated branch, will die, and wither much sooner than those which are taken from the tree immediately, unless you set the stem in water. Leaves gathered from boughs cut off, will shrink in three hours; whereas those you take from the living tree, will last as many days; and being thus a while kept, are better than over-fresh ones. It is a rule, never to gather in a rainy season, nor cut any branch whilst the wet is upon it; and therefore against such suspected times, you are to provide before-hand, and to reserve them in some fresh, but dry place: The same caution you must observe for the dew, tho' it do not rain, for wet food kills the worms. But if this cannot be altogether prevented, put the leaves between a pair of sheets well dried by the fire, and shake them up and down 'till the moisture be drunk up in the linnen, and then spreading them to the air a little, on another dry cloth, you may feed with them boldly. The top-leaves and oldest, would be gathered last of all, as being most proper to repast the worms with, towards their last change. The gatherer must be neat, and have his hands clean, and his breath sweet, and not poison'd with onions, or tabacco, and be careful not to press the leaves, by crouding them into the bags or baskets. Lastly, that they gather only (unless in case of necessity) leaves from the present, not from

the former years sprigs, or old wood, which are not only rude and harsh, but are annex'd to stubb'd stalks, which injure the worms, and spoil the denudated branches. One note more let me add, that in first hatching the eggs disclosing (as sometimes) earlier than there is provision for them on the tree, the tender leaves of lettuce, dandelion or endive may supply, so they feed not on them too long, or overmuch, which gives them the lask.

12. This is what I thought fit to premonish concerning the gathering of the leaves of this tree for silk-worms, as I find it in *Monsieur Isnard's Instructions*, and that exact discourse of his, published some years since, and dedicated to *Monsieur Colbert*, (who has, it seems, constituted this industrious and experienc'd person, surveyor of this princely manufacture about Paris) and because the book it self is rare, and known by very few. I have no more to add, but this for our encouragement, and to encounter the objections which may be suggested about the coldness and moisture of our country; that the Spring is in Provence no less inconstant than is ours in England; that the colds at Paris are altogether as sharp; and that when in May it has continued raining for nine and twenty days successively, *Monsieur Isnard* assures us, he proceeded in his work without the least disaster; and in the year 1664, he presented the French King his Master, with a considerable quantity of better silks, than any Messina or Bononia could produce, which he sold raw at Lions, for a pistol the pound; when that of Avignon, Provence, and Dauphine produc'd little above half that price. But you are to receive the compleat history of the silk-worm, from that incomparable treatise, which the learned Malpighius

has lately sent out of Italy, and dedicated to the Royal Society, as a specimen and noble effect of its universal correspondence, and concernments for the improvement of useful knowledge. To this I add that beneficial passage of the learned Dr. Beale, communicated in the 12th. vol. *Philos. Transactions*, n. 133. p. 816, where we find recommended the promotion of this tree in England, from its success in several Northern Counties, and even in the moist places of Ireland: He shews how it may be improv'd by grafting on the fig; or the larger black mulberry, on that of the smallest kind: Also of what request the *Diamoron*, or *Guidenie* made of the juice of this fruit, was with the Ancients, with other excellent observations: What other incomparable remedies the fruit of this tree affords, see Plin. *Nat. Hist.* lib. 23. cap. 7. There is a mulberry-tree brought from Virginia not to be contemn'd; upon which they find silk-worms, which would exceed the silk of Persia it self, if the planters of nauseous tabacco did not hinder the culture. Sir Jo. Berkley (who was many years Governor of that ample Colony) told me, he presented the King (Char. II.) with as much of silk made there, as made his Majesty a compleat suit of apparel. Lastly, let it not seem altogether impertinent, if I add one premonition to those less experienc'd gardners, who frequently expose their orange, and like tender-furniture trees of the green-house too early: That the first leaves putting forth of this wise tree, (*sapientissima*, as¹ Pliny calls it) is a more infallible note when those delicate plants may be safely brought out to the air, than by any other prognostick or indication. For other species, *vid. Raii Dendro.* p. 12.

¹ *A mora, ob tarditatem.*

CHAPTER II.

Of the Platanus, Lotus, Cornus, Acacia, &c.

1. *Platanus*, that so beautiful and precious tree, anciently sacred to ¹ Helena, (and with which she crown'd the *Lar*, and *Genius* of the place) was so doated on by Xerxes, that Ælian and other authors tell us, he made halt, and stopp'd his prodigious army of seventeen hundred thousand soldiers, which even cover'd the sea, exhausted rivers, and thrust mount Athos from the Continent, to admire the pulcritude and procerity of one of these goodly trees ; and became so fond of it, that spoiling both himself, his concubines, and great persons of all their jewels, he cover'd it with gold, gems, neck-laces, scarfs and bracelets, and infinite riches : In sum, was so enamour'd of it, that for some days, neither the concernment of his Grand Expedition, nor interest of honour, nor the necessary motion of his portentous army, could persuade him from it : He styl'd it his mistress, his minion, his Goddess ; and when he was forc'd to part from it, he caus'd the figure of it to be stamp'd in a medal of gold, which he continually wore about him. Where-ever they built their sumptuous and magnificent colleges for the exercise of youth in gymnastics, as riding, shooting, wrestling, running, &c. (like to our French Academies) and where the graver philosophers also met to converse together, and improve their studies, betwixt the *Xista*, and *subdiales ambulationes* (which were portico's open to the air) they

¹ Euripides *epithai*.

planted groves and walks of platans, to refresh and shade the *Palæstritæ* ; as you have them describ'd by Vitruvius, lib. 5. cap. 11. and as Claudius Perrault has assisted the text, with a figure, or ichnographical plot. These trees¹ the Romans first brought out of the Levant, and cultivated with so much industry and cost, for their stately and proud heads only, that great orators and states-men, Cicero and Hortensius, would exchange now and then a turn at the bar, that they might have the pleasure to step to their villas, and refresh their platans, which they would often irrigate with wine instead of water ; *crevit & affuso laetior umbra mero* : when Hortensius taught trees to tipple wine ; and so priz'd the very shadow of it, that when afterwards they transplanted them into France, they exacted a² *solarium* and tribute of any of the natives, who should presume but to put his head under it. But whether for any virtue extraordinary in the shade, or other propitious influence issuing from them, a worthy Knight, who stay'd at Ispahan in Persia, when that famous city was infected with a raging pestilence, told me, that since they have plant-ed a greater number of these noble trees about it, the plague has not come nigh their dwellings. Pliny affirms, there is no tree whatsoever which so well defends us from the heat of the sun in Summer, nor that admits it more kindly in Winter. And for our encouragement, I do upon experience assure you, that they will flourish and abide with us, without any more trouble than frequent and plentiful watering, which from their youth they excessively delight in, and gratefully acknowledge by their growth accord-

¹ Macrob. *saturnal.* 3. c. 11.

² *Solarium* quod pro folo pendetur, as the pandects name the tax paid for the shades that bear no fruit.

ingly ; so as I am perswaded, that with very ordinary industry, they might be propagated to the incredible ornament of the walks and avenues to great-mens houses. The introduction of this true plane among us, is, perhaps due to the great Lord Chancellor Bacon, who planted those (still flourishing ones) at Verulam ; as to mine, to that honourable gentleman, the late Sir George Crook of Oxfordshire, from whose bounty I received an hopeful plant now growing in my villa : Nor methinks should it be so great a rarity, (if it be true) that being brought from Sicily, it was planted as near us as the Morini.

3. There was lately at Basil in Switzerland, an ancient goodly *Platanetum*, and now in France they are come again in vogue : I know it was anciently accounted ἀκαρπος ; but they may with us be rais'd of their seeds with care, in a moist soil, as here I have known them. But the reason of our little success, is, that we very rarely have them sent us ripe ; which should be gather'd late in Autumn, and brought us from some more Levantine parts than Italy. They come also of layers abundantly, affecting a fresh and feeding ground ; for so they plant them about their rivulets and fountains. The West-Indian plane is not altogether so rare, but it rises to a goodly tree, and bears a very ample and less jagged leaf : That the Turks use their *platanus* for the building of ships, I learn out of Ricciolus *Hydrog.* l. 10. c. 37. and out of Pliny, canoos and vessels for the sea have been excavated out of their prodigious trunks.

4. The same opinion have I of the noble *lotus arbor*, (another lover of the water) which in Italy yields both an admirable shade, and timber immortal, growing to a vast tree, where they come sponta-

neously ; but its fruit seems not so tempting as it is storied it was to the companions of Ulysses : The first who brought the lotus out of Virginia, was the late industrious Tradescant. Of this wood are made pipes, and wind-instruments, and of its root, hafts for knives and other tools, &c. The offer of Crassus to Domitius for half a dozen of these trees, growing about an house of his in Rome, testifies in what esteem they were had for their incomparable beauty and use.

The cornell tree, though not mention'd by Pliny for its timber, is exceedingly commended for its durability, and use in wheelwork, pinns and wedges, in which it lasts like the hardest iron ; and it will grow with us to good bulk and stature ; and the preserv'd and pickl'd berries, (or cherries rather) are most refreshing, an excellent condiment, and do also well in tarts. But that is very old, which Mathiolus affirms upon his own experience, that one who has been bitten of a mad-dog, if in a year after he handle the wood of this tree till it grow warm, relapses again into his former distemper.

The same reported of the *cornus femina*, or wild cornel ; which is like the former for compactedness, and made use of for cart-timber, and other rustick instruments ; besides, for the best of butchers skewers, tooth-pickers, and in some countries abroad they decoct the berries, which press'd, yield an oyl for the lamp.

Lastly, the acacia, and that of Virginian, deserves a place among our avenue trees, (could they be made to grow upright) adorning our walks with their exotic leaf, and sweet flowers ; very hardy against the pinching Winter, but not so proof against its blustering winds ; though it be arm'd with thorns :

nor do the roots take such hold of the ground, insinuating, and running more like liquorish, and apt to emaciate the soil ; I will not therefore commend it for gardens, unless for the variety ; of which there are several, some without thorns : They love to be planted in moist ground.

One thing more there is, which (for the use and benefit which these and the like exotics afford us) I would take hold of, as upon all occasions I do in this work : Namely, to encourage all imaginary industry of such as travel foreign countries, and especially gentlemen who have concerns in our American plantations, to promote the culture of such plants and trees (especially timber) as may yet add to those we find already agreeable to our climat in England. What we have said of the mulberry, and the vast emolument rais'd by the very leaves, as well as wood of that only tree (beside those we now have mention'd, strangers till of late, and believ'd incicurable here,) were sufficient to excite and stir up our utmost industry. History tells us, the noble and fruitful cuntry of France, was heretofore thought so steril and barren, that nothing almost prospering in it, the inhabitants were quite deserting it, and with their wives and children going to seek some other more propitious abodes ; till some of them hapning to come into Italy, and tasting the juice of the delicious grape, the rest of their countrey men took arms, and invaded the territories where those vines grew ; which they transplanted into *Gallia*, and have so infinitely improv'd since, that France alone yields more of that generous liquor, than not only Italy and Greece, but all Europe and Asia beside : Who almost would believe that the austere Rhenish, abounding on the

fertile banks of the Rhine should produce so soft and charming a liquor, as does the same vine, planted among the rocks and pumices of the so remote and mountainous Canaries ?

This for the encouragement and honour of those who improve their countries with things of use and general benefit : Now in the mean time, how have I beheld a florist, or meaner gardener transported at the casual discovery of a new little spot, double leaf, streak or dash extraordinary in a tulip, anemony, carnation, auricula, or amaranth ! cherishing and calling it by their own names, raising the price of a single bulb, to an enormous sum ; till a law in Holland was made to check that tulipa-mania : The florist in the mean time priding himself as if he had found the elixir, or perform'd some notable atchievement, and discover'd a new countrey.

This for the defects, (for such those variegations produc'd by practice, or mixture, mangonisms and starving the root, are by chance met with now and then) of a fading flower : How much more honour then were due in justice to those persons, who bring in things of much real benefit to their countrey ? especially trees for fruit and timber ; the oak alone (besides the shelter it afforded to our late Sovereign Charles the II^d) having so often sav'd and protected the whole nation from invasion, and brought it in so much wealth from foreign countries. I have been told, there was an intention to have instituted an Order of the Royal-Oak ; and truly I should think it to become a green-ribbon (next to that of St. George) superior to any of the romantick badges, to which abroad is paid such veneration, deservedly to be worn by such as have signaliz'd themselves by their conduct

and courage; for the defence and preservation of their country. Bespeaking my reader's pardon for this digression, we proceed in the next to other useful exoticks.

CHAPTER III.

Of the Fir, Pine, Pinaster, Pitch-tree, Larsh, and Subterranean trees.

1. *Abies, picea, pinus, pinaster*, larsh, &c. are all of them easily rais'd of the kernels and nuts, which may be gotten out of their polysperm and turbinate cones, clogs, and squams, by exposing them to the sun, or a little before the fire, or in warm-water, till they begin to gape, and are ready to deliver themselves of their numerous burthens.

2. There are of the fir two principal species; the *picea*, or male, which is the bigger tree; very beautiful and aspiring, and of an harder wood, and hirsute leaf: And the silver-fir, or female. I begin with the first: The boughs whereof are flexible and bending; the cones dependent, long and smooth, growing from the top of the branch; and where gaping, yet retain the seeds in their receptacles, when fresh gather'd, giving a grateful fragrancy of the rosin: The fruit is ripe in September. But after all, for a perfecter account of the true and genuine fir-tree, (waving the distinction of *sapinum*, from *sapinus*, *literâ sed unâ* differing, as of another kind) is a noble upright tree from the ground, smooth and even, to the eruption of the branches; as is that they call the *sapinum*, and thence tapering to the summit of the *fusterna*: The arms and branches

(with yew-like leaves) grow from the stem opposite to one another, *seriatim* to the top, (as do all cone-bearers) discovering their age ; which in time, with their weight, bend them from their natural tendency, which is upright, especially toward the top of aged trees, where the leaf is flattish, and not so regular : The cone great and hard, pyramidal and full of winged-seeds.

The silver-fir, of a whitish colour, like rosemary under the leaf, is distinguish'd from the rest, by the pectinal shape of it : The cones not so large as the *picea*, grow also upright, and this they call the female : For I find botanists not unanimously agreed about the sexes of trees. The layers, and even cuttings of this tree, take root, and improve to trees, tho' more naturally by its winged-seeds : But the masculine *picea* will endure no amputation ; nor is comparable to the silver-fir for beauty, and so fit to adorn walks and avenues ; tho' the other also be a very stately plant ; yet with this infirmity, that tho' it remain always green, it sheds the old leaves more visibly, and not seldom breaks down its ponderous branches : Besides, the timber is nothing so white ; tho' yet even that colour be not always the best character : That which comes from Bergin, Swinsound, Mott, Longland, Dranton, &c. (which experienc'd work-men call the dram) being long, strait and clear, and of a yellow more cedry colour, is esteemed much before the white for flooring and wainscot, for masts, &c. those of Prussia, which we call spruce, and Norway (especially from Gottenberg) and about Riga, are the best ; unless we had more commerce of them from our Plantations in New England, which are preferable to any of them ; there lying rotting at present at Pascataway, a mast of

such prodigious dimensions, as no body will adventure to ship, and bring away. All these bear their seeds in conick figures, and squamons, after an admirable manner and closeness, to protect their winged-seeds.

The hemlock-tree (as they call it in New-England) is a kind of spruce : In the Scottish Highlands are trees of wonderful altitude (though not altogether so tall, thick, and fine as the former) which grow upon places so unaccessible, and far from the sea, that (as one says) they seem to be planted by God on purpose for nurseries of seed, and monitors to our industry, reserved with other blessings, to be discover'd in our days amongst the new-invented improvements of husbandry, not known to our southern people of this nation, &c. Did we consider the pains they take to bring them out of the Alps, we should less stick at the difficulty of transporting them from the utmost parts of Scotland. To the former sorts we may add the Esterund firs, Tonsberry, Frederick-stad, Hellerone, Holmstrand, Landifer, Stavenger, Lawrwat, &c. There is likewise a kind of fir, call'd in Dutch the green-boome, much us'd in building of ships, though not for men of war, because of its lightness, and that it is not so strong as oak ; but yet proper enough for vessels of great burden, and which stand much out of the water : This sort comes into Holland from Norway, and other Eastland countries ; It is somewhat heavier yet than fir, and stronger, nor do either of them bend sufficiently : As to the seeds, they may be sown in beds or cases at any time, during March ; and when they peep, carefully defended with furzes, or the like fence, from the rapacious birds, which are very apt to pull them up, by taking hold of that little infecund part of the seed, which they commonly

bear upon their tops : The beds wherein you sow them had need be shelter'd from the southern aspects, with some skreen of reed, or thick hedge : Sow them in shallow rills, not above half-inch-deep, and cover them with fine light mould : Being risen a finger in height, establish their weak stalks, by sifting some more earth about them ; especially the pines, which being more top-heavy, are more apt to swag. When they are of two or three years growth, you may transplant them where you please ; and when they have gotten good root, they will make prodigious shoots, but not for the three or four first years comparatively. They will grow both in moist and barren gravel, and poor ground, so it be not over-sandy and light, and want a loamy ligature ; but before sowing (I mean here for large designs) turn it up a foot deep, sowing, or setting your seeds an hand distance, and riddle earth upon them : In five or six weeks they will peep. When you transplant, water them well before, and cut the clod out about the root, as you do melons out of the hot-bed, which knead close to them like an egg : Thus they may be sent safely many miles, but the top must neither be bruised, nor much less cut, which would dwarf it for ever : One kind also will take of slips or layers, interr'd about the latter end of August, and kept moist.

3. The best time to transplant, were in the beginning of April ; they would thrive mainly in a stiff, hungry clay, or rather loam ; but by no means in over-light, or rich soil : Fill the holes therefore with such barren earth, if your ground be improper of it self ; and if the clay be too stiff, and untractable, with a little sand, removing with as much earth about the roots as is possible, though the fir will

better endure a naked transplantation, than the pine : If you be necessitated to plant towards the latter end of Summer, lay a pretty deal of horse-litter upon the surface of the ground, to keep off the heat, and in Winter the cold ; but let no dung touch either stem or root : You may likewise sow in such earth about February, they will make a shoot the very first year of an inch ; next an handful, the third year three foot, and thence forward, above a yard annually. A Northern gentleman (who has oblig'd me with this process upon his great experience) assures me, that fir, and this *feralis arbor*, (as Virgil calls the pine) are abundantly planted in Northumberland, which are in few years grown to the magnitude of ship-masts ; and from all has been said, deduces these encouragements. 1. The facility of their propagation. 2. The nature of their growth, which is to affect places where nothing else will thrive. 3. Their uniformity and beauty. 4. Their perpetual verdure. 5. Their sweetness. 6. Their fruitfulness ; affording seed, gum, fuel, and timber of all other woods the most useful, and easy to work, &c. All which highly recommend it as an excellent improvement of husbandry, fit to be enjoyn'd by some solemn edict, to the inhabitants of this our island, that we may have masts, and those other materials of our own growth : In planting the silver *abies*, set not the roots too deep, it affects the surface more than the rest.

4. The pine (of which are reckon'd no less than ten several sorts, preferring the domestic, or sative for the fuller growth) is likewise of both sexes, whereof the male growing lower, with a rounder shape, hath its wood more knotty and rude than the female ; it's lank, longer, narrow and pointed ; bears

a black, thick, large cone, including the kernel within an hard shell, cover'd under a thick scale : The nuts of this tree (not much inferior to the almond) are used among other ingredients, in beatillapies, at the best tables. They would be gather'd in June, before they gape ; yet having hung two years (for there will be always some ripe, and some green on the same tree) preserve them in their nuts, in sand, as you treat acorns, &c. 'till the season invite, and then set or sow them in ground which is cultivated like the fir, in most respects ; only, you may bury the nuts a little deeper. By a friend of mine, they were rolled in a fine compost made of sheepsdung, and scatter'd in February, and this way never fail'd fir and pine ; they came to be above inch-high by May ; and a Spanish author tells us, that to macerate them five days in a child's urine, and three days in water, is of wonderful effect : This were an expeditious process for great plantations ; unless you would rather set the pine as they do pease, but at wider distances, that when there is occasion of removal, they might be taken up with the earth and all, I say, taken up, and not remov'd by evulsion ; because they are (of all other trees) the most obnoxious to miscarry without this caution ; and therefore it were much better (where the nuts might be commodiously set, and defended) never to remove them at all, it gives this tree so considerable a check. The safest course of all, were to set the nuts in an earthen-pot, and in frosty weather, shewing it a little to the fire, the intire clod will come out with them, which are to be reserved, and set in the naked earth, in convenient and fit holes prepar'd beforehand, or so soon as the thaw is universal : Some commend the

strewing a few oats at the bottom of the fosses or pits in which you transplant the naked roots, for a great promotement of their taking, and that it will cause them to shoot more in one year than in three : But to this I have already spoken. Other kinds not so rigid, nor the bark, leaf, cone and nuts so large, are those call'd the mountain-pine, a very large stately tree : There is likewise the wild, or bastard-pine, and *teā*, clad with thin long leaves, and bearing a turbinated cone : Abundance of excellent rosin comes from this tree. There is also the *pinaster*, another of the wild-kind ; but none of them exceeding the Spanish, call'd by us, the Scotch pine, for its tall and erect growth, proper for large and ample walks and avenues : Several of the other wild sorts, inclining to grow crooked. But for a more accurate description of these coniferous trees, and their perfect distinctions, consult our Mr. Ray's most elaborate and useful work, where all that can be expected or desir'd, concerning this profitable, as well as beautiful tree, is amply set down, *Hist. Plant.* lib. 25. cap. I.

5. I am assur'd (by a person most worthy of credit) that in the territory of Alzey (a country in Germany, where they were miserably distressed for wood, which they had so destroy'd as that they were reduc'd to make use of straw for their best fuel) a very large tract being newly plowed, (but the wars surprizing them, not suffer'd to sow,) there sprung up the next year a whole forest of pine-trees, of which sort of wood there was none at all, within less than fourscore miles ; so as 'tis verily conjectur'd by some, they might be wafted thither from the country of Westrasia, which is the nearest part to that where they grow : If this be true, we are no more to wonder,

how, when our oak-woods are grubb'd up, beech, and trees of other kinds, have frequently succeeded them : What some impetuous winds have done in this nature, I could produce instances almost miraculous : I shall say nothing of the opinion of our master Varro, and the learned ¹ Theophrastus, who were both of a faith, that the seeds of plants drop'd out of the air. Pliny in his 16th. book, chap. 33. upon discourse of the Cretan cypress, attributes much to the *indoles*, and nature of the soil, virtue of the climate, and impressions of the air. And indeed it is very strange, what is affirm'd of that pitchy-rain, (reported to have fallen about Cyrene, the year 430. U. C.) after which, in a short time, sprung up a whole wood of the trees of *Laserpicium*, producing a precious gum, not much inferior to benzoin, if at least the story be warrantable: But of these aerial irradiations, various conceptions, and æquivocal productions without seed, &c. difficulties to be solv'd by our philosophers, whence those leaves of the platan come; which Dr. Spon tells us (in his *Travels*) are found floating in some of the fountains of the isles of the Strophades ; no such tree growing near them by 30 miles : But these may haply be convey'd thro' some unknown subterranean passage ; for were it by the wind, it having a very large leaf, they would be been flying in, or falling out of the air.

6. In transplanting of these coniferous trees, which are generally resinaceous, viz. fir, pine, larix, cedar, and which have but thin and single roots, you must never diminish their heads, nor be at all busie with their roots, which pierce deep, and is all their foundation, unless you find any of them bruised, or much broken ; therefore such down-right roots as you may

¹ De causis, l. I. cap. 5.

be forc'd to cut off, it were safe to sear with an hot iron, and prevent the danger of bleeding, to which they are obnoxious even to destruction, though unseen, and unheeded : Neither may you disbranch them, but with great caution, as about March, or before, or else in September, and then 'tis best to prune up the side-branches close to the trunk, cutting off all that are above a year old ; if you suffer them too long, they grow too big, and the cicatrice will be more apt to spend the tree in gum ; upon which accident, I advise you to rub over their wounds with a mixture of cow-dung ; the neglect of this cost me dear, so apt are they to spend their gum. Indeed, the fir and pine seldom out-live their being lopp'd. Some advise us to break the shells of pines to facilitate their delivery, and I have essay'd, but to my loss ; nature does obstetricate, and do that office of her self, when it is the proper season ; neither does this preparation at all prevent those which are so buried, whilst their hard integuments protect them both from rotting, and the vermin.

Pinastes, the domestic pine grows very well with us, both in mountains and plains ; but the *pinaster*, or wilder (of which are four sorts) best for walks ; *pulcherrima in hortis*, (as already we have said) because it grows tall and proud, maintaining their branches at the sides, which the other pine does less frequently. There is in New-England, a very broad pine, which increases to a wonderful bulk and magnitude, inso-much as large canoos have been excavated out of the body of it, without any addition. But beside these large and gigantick pines, there is the spinet, with sharp thick bristles, yielding a rosin or liquor odorous, and useful in carpentary-work.

8. The fir grows tallest, being planted reasonable close together ; but suffers nothing to thrive under them. The pine not so inhospitable ; for (by Pliny's good leave) it may be sown with any tree, all things growing well under its shade, and excellent in woods ; hence Claudian,

¹ The friendly pine the mighty oak invites.

9. They both affect the cold, high, and rocky grounds, *abies in montibus altis* : Those yet which grow on the more southern, and less expos'd quarters, a little visited with the beams of the sun, are found to thrive beyond the other, and to afford better timber ; and this was observed long since by Vitruvius of the *infernates* (as he calls them) in comparison with the *supernates*, which growing on the Northern and shady side of the Appennines, were nothing so good, which he imputes to the want of due digestion. They thrive (as we said) in the most sterile places, yet will grow in better, but not in over-rich, and pinguid. The worst land in Wales bears (as I am told) large pine ; and the fir according to his aspiring nature, loves also the mountain more than the valley ; but *ἐν τοῖς παλισκίοις ὄλωσ οὐ φύεται*, *it cannot endure the shade*, as Theophrastus observes, *de Pl.* l. 4. c. 1. But this is not rigidly true ; for they will grow in consort, till they even shade and darken one another, and will also descend from the hills, and succeed very well, being desirous of plentiful waterings, till they arrive to some competent stature ; and therefore they do not prosper so well in an over sandy and hungry soil, or gravel, as in the very entrails of the rocks, which afford more drink

¹ Et comitem quercum pinus amica trahit.

to the roots, that penetrate into their meanders, and winding recesses. But though they require this refreshing at first, yet do they perfectly abhor all stercoration ; nor will they much endure to have the earth open'd about their roots for ablaqueation, or be disturb'd : This is also to be understood of cypress. A fir, for the first half dozen years, seems to stand, or at least make no considerable advance, but it is when throughly rooted, that it comes away miraculously. That honourable and learned knight Sir Norton Knatchbull, (whose delicious plantation of pines and firs I beheld with great satisfaction) having assur'd me, that a fir-tree of his raising, did shoot no less than sixty foot in height, in little more than twenty years ; and what are extant at Sir Peter Wentworth's of Lillingston Lovel ; Cornbury in Oxfordshire, and other places ; but especially those trees growing now in Harefield Park in the county of Middlesex (belonging to Mr. Serjeant Nudigate) where there are two Spanish or silver firs, that at 2 years growth from the seed, being planted there *an.* 1603, are now become goodly masts : The biggest of them from the ground to the upper bough, is 81 feet, though forked on the top, which has not a little impeded its growth : The girt, or circumference below, is thirteen foot, and the length (so far as is timber, that is, to six inches square) 73 foot, in the middle 17 inches square, amounting by calculation to 146 foot of good timber : The other tree is indeed not altogether so large, by reason of its standing near the house when it was burnt (about 40 years since) when one side of the tree was scorched also ; yet it has not only recover'd that scar, but thrives exceedingly, and is within eight or nine foot, as tall as the other, and would probably

have been the better of the two, had not that impediment happen'd, it growing so taper, and erect, as nothing can be more beautiful : This I think (if we had no other) is a pregnant instance, as of the speedy growing of that material ; so of all the encouragement I have already given for the more frequent cultivating this ornamental, useful, and profitable tree, abounding doubtless formerly in this countrey of ours, if what a grave and authentick author writes be true, Athenæus relating, that the stupendious vessel, built so many ages since by Hiero, had its mast out of Britain. Take notice that none of these mountainous trees should be planted deep ; but as shallow as may be for their competent support.

The *picea* (already describ'd) grows on the Alps among the pine, but neither so tall, nor so upright, but bends its branches a little, which have the leaf quite about them, short and thick, not so flat as the fir : The cones grow at the point of the branches, and are much longer than most other cones, containing a small darkish seed. This tree produces a gum almost as white and firm as frankincense : But it is the *larix* (another sort of pine) that yields the true Venetian turpentine ; of which hereafter.

10. There is also the *piceaster*, already mention'd, (a wilder sort) (the leaves stiff and narrow pointed, and not so close) out of which the greatest store of pitch is boil'd. The *taeda* likewise, which is (as some think) another sort abounding in Dalmatia, more unctuous, and more patient of the warmer situations, and so inflammable, that it will slit into candles ; and therefore some will by no means admit it to be of a different species, but a metamorphosis of over-grown fattiness, to which the most judicious incline. But

of these, the Grand Canaries (and all about the mountains near Tenariff) are full, where the inhabitants do usually build their houses with the timber of the pitch-tree : They cut it also into wainscot, in which it succeeds marvellously well ; abating that it is so obnoxious to firing, that whenever a house is attacqu'd, they make all imaginable hast out of the conflagration, and almost despair of extinguishing it : They there also use it for candle-wood, and to travel in the night by the light of it, as we do by links and torches : Nor do they make these *teas* (as the Spaniards call them) of the wood of pine alone, but of other trees, as of oak and hasel, which they cleave and hack, and then dry in the oven, or chimney, but have certainly some unctuous and inflammable matter, in which they afterwards dip it ; but thus they do in Biscay, as I am credibly inform'd.

11. The bodies of these being cut, or burnt down to the ground, will emit frequent suckers from the roots ; but so will neither the pine nor fir, nor indeed care to be topped : But the fir may be propagated of layers, and cuttings, which I divulge as a considerable secret that has been essay'd with success.

12. That all these, especially the fir and pine will prosper well with us, is more than probable, because it is a kind of demonstration, that they did heretofore grow plentifully in Cumberland, Cheshire, Stafford, and Lancashire, if the multitudes of these trees to this day found entire, and buried under the earth, though suppos'd to have been o'rethrown and cover'd so ever since the universal Deluge, be indeed of this species : Dr. Plot speaks of a fir-tree in Staffordshire, of 150 foot high, which some think of spontaneous growth ; besides several more so irregularly standing,

as shews them to be natives : But to put this at last out of controversie, see the extract of Mr. de la Prim's letter to the Royal Society, *Transact.* n. 277, and the old map of Crout, and of the yet (or lately) remaining firs, growing about Hatfield in the commons, flourishing from the shrubs and stubs of those trees, to which I refer the reader. As for buried trees of this sort, the late Dr. Merrett, in his *Pinax*, mentions several places of this nation, where subterraneous-trees are found ; as namely, in Cornwall, *ad finem terræ, in agris Flints*; in Penbroke-shire towards the shore, where they so abound, *ut totum littus* (says the Doctor) *tanquam silva cædua apparet* ; in Cheshire also (as we said) Cumberland and Anglesey, and several of our Euro-boreal tracts, and are called Noah's-ark. By Chatnesse in Lancashire (says Camden) the low mossie ground was no very long time since, carried away by an impetuous flood, and in that place now lies a low irriguous vale, where many prostrate trees have been digged out : And from another I receive, that in the moors of Somersetshire (towards Bridgewater) some lengths of pasture growing much withered, and parched more than other places of the same ground, in a great drowth, it was observ'd to bear the length and shape (in gross) of trees ; they digg'd, and found in the spot oaks, as black as ebony, and have been from hence instructed, to take up many hundreds of the same kind : In a fenny tract of the Isles of Axholme, (lying part in Lincolnshire, and part in Yorkshire) have been found oaks five yards in compass, and fifteen in length, some of them erect, and standing as they grew ; in firm earth below the moors, with abundance of fir, which lie more stooping than the oak ; some being 36 yards long, besides the

tops : And so great is the store of these subterraneans, as the inhabitants have for divers years carried away above 2000 cart-loads yearly: See Dugdall's *History of Draining*. This might be of good use for the like detections in Essex, Lincolnshire, and places either low situate, or adjacent to the sea ; also at Binfield Heath in Kent, &c. These trees were (some think) carried away in times past, by some accident of inundation, or by waters undermining the ground, till their own weight, and the winds bow'd them down, and overwhelm'd them in the mud : For 'tis observ'd, that these trees are no where found so frequently, as in boggy places ; but that the burning of these trees so very bright, should be an argument they were fir, is not necessary, since the bituminous quality of such earth, may have imparted it to them ; and Camden denies them to be fir-trees ; suggesting the query ; whether there may not possibly grow trees even under the ground, as well as other things ? Theophrastus indeed, l. iv. c. 8. speaks of whole woods ; bays and olives, bearing fruit ; and that of some oaks bearing acorns, and those even under the sea ; which was so full of plants and other trees, as ('tis said) Alexander's forces sailing to the Indies, were much hindred by them. There are in Cumberland, on the sea-shore, trees sometimes discover'd at low-water, and at other times that lie buried in the sand ; and in other mossie places of that county, 'tis reported, the people frequently dig up the bodies of vast trees without boughs, and that by direction of the dew alone in Summer ; for they observe it never lies upon that part under which those trees are interr'd. These particulars I find noted by the ingenious author of the *Britannia Baconica*. How vast a forest, and what goodly trees

were once standing in Holland, and those Low-countries, till about the year 860, that an hurricane obstructing the mouth of the Rhine near Catwic, made that horrid devastation, good authors mention ; and they do this day find monstrous bodies and branches, (nay with the very nuts, most intire) of prostrate and buried trees, in the Veene, especially towards the south, and at the bottom of the waters : Also near Bruges in Flanders, whole woods have been found twenty ells deep, in which the trunks, boughs, and leaves do so exactly appear, as to distinguish their several species, with the series of their leaves yearly falling ; of which see Boetius de Boot.

Dr. Plot in his *Nat. Hist. of Oxford and Staffordshires* mentions divers subterraneous oaks, black as ebony, and of mineral substance for hardness ; (see cap. 3. oak) quite through the whole substance of the timber, caus'd (as he supposes, and learnedly evinces) by a vitriolic humour of the earth ; of affinity to the nature of the ink-galls, which that kind of tree produces : Of these he speaks of some found sunk under the ground, in an upright and growing posture, to the perpendicular depth of sixty foot ; of which one was three foot diameter, of an hardness emulating the politest ebony : But these trees had none of them their roots, but were found plainly to have been cut off by the kerf : There were great store of hasel-nuts, whose shells were as sound as ever, but no kernel within. It is there the inquisitive author gives you his conjecture, how these deep interments happen'd ; namely, by our ancesters (many ages since) clearing the ground for tillage, and when wood was not worth converting to other uses, digging trenches by the sides of many trees, in which they buried some ; and

others they slung into quagmires, and lakes to make room for more profitable agriculture : But I refer you to the chapter. In the mean time, concerning this mossie-wood (as they usually term it, because, for the most part, dug-up in mossie and moory-bogs where they cut for turff) it is highly probable (with the learned Mr. Ray) that these places were many ages since, part of firm-land covered with wood, afterwards undermined, and overwhelmed by the violence of the sea, and so continuing submerg'd, till the rivers brought down earth, and mud enough to cover the trees, filling up the shallows, and restoring them to the *terra-firma* again, which he illustrates from the like accident upon the coast of Suffolk, about Dunwich, where the sea does at this day, and hath for many years past, much incroach'd upon the land, undermining, and subverting by degrees, a great deal of high-ground ; so as by ancient writings it appears, a whole wood of more than a mile and half, at present is so far within the sea : Now if in succeeding ages (as probable it is enough) the sea shall by degrees be fill'd up, either by its own working, or by earth brought down by land-floods, still subsiding to the bottom, and surmounting the tops of these trees, and so the space again added to the firm-land ; the men that shall then live in those parts, will, it's likely, dig-up these trees, and as much wonder how they came there, as we do at present those we have been speaking of.

In the mean time, to put an end to the various conjectures, concerning the causes of so many trees being found submerg'd, for the most part attributed to the destruction made by the Noatick inundation ; after all has been said of what was found in the level

of Hatfield, (drain'd at the never to be forgotten charge and industry of Sir Cornelius Vermuiden) I think there will need no more enquiry : For there was discover'd trees not only of fir and pitch, but of very goodly oaks, even to the length of 100 foot, which were sold at 15 *l.* the tree, black and hard as ebony ; all their roots remaining in the soil, and their natural posture, with their bodies prostrate by them, pointing for the most part north-east : And of such there seem'd to be millions, of all the usual species natural to this countrey, sound and firm ash only excepted, which were become so rotten, and soft, as to be frequently cut through with the spade only ; whereas willows and other tender woods, continu'd very sound and entire : Many of these subterranean trees of all sorts, were found to have been cut and burnt down, squar'd and converted for several uses, into boards, bales, stakes, piles, barrs, &c. some trees half riven, with the wedges sticking in them ; broken axe-heads in shape of sacrificing instruments, and frequently several coins of the emperor Vespasian, &c. There was among others, one prodigious oak of 120 foot in length, and 12 in diameter, 10 foot in the middle, and 6 at the small end ; so as by computation, this monster must have been a great deal longer, and for this tree was offered 20 *l.* The truth and history of all this is so perfectly describ'd by Mr. Alan. de la Pryme (inserted among the *Transactions* of the R. Society) that there needs no more to be said of it to evince, that not only here, but in other places, where such trees are found in the like circumstances, that it has been the work and effects of vast armies of the Romans, when finding they could not with all their force subdue the bar-

barous inhabitants, by reason of their continual issuing out of those intricate fortresses and impediments, they caused whole forests to be cut down by their legions and soldiers, whom they never suffer'd to remain idle during their Winter quarters, but were continually exercis'd in such publick and useful works, as required multitude of hands ; by which discipline they became hardy, active, and less at leisure to mutiny or corrupt one another : I do not affirm that this answers all submerg'd trees, but of very many imputed to other causes.

But we shall enquire farther concerning these subterranean productions anon, and whether the earth, as well as the water, have not the virtue of strange transmutations : These trees are found in moors, by poking with staves of three or four foot length, shod with iron.

13. In Scotland many submerged oaks are found near the river Neffe ; and (as we noted) there is a most beautiful sort of fir, or rather pine, bearing small sharp cones, (some think it the Spanish *pinaster*) growing upon the mountains ; of which, from the late Marquess of Argyle, I had sent me some seeds, which I have sown with tolerable success ; and I prefer them before any other, because they grow both very erect, and fixing themselves stoutly, need little, or no support. Near Loughbrun, 'twixt the Lough, and an hill, they grow in such quantity, that from the spontaneous fall, ruin and decay of the trees lying cross one another to a man's height, partly covered with mosse, and partly earth, and grass (which rots, fills up, and grows again) a considerable hill has in process of time been raised to almost their very tops, which being an accident of singular

remark, I thought fit to mention. Both fir and pine (sociable trees) planted pretty near together (shread and clipt at proper seasons) make stately, noble, and very beautiful skreens and fences to protect orange, myrtle and other curious greens, from the scorching of the sun, and ruffling winds, preferable to walls : See how to be planted and cultivated with the dimensions of a skreen, in the rules for the defence of gardens, annexed to *de la Quintin*, num. xv. by Mr. London, and Mr. Wise. In the mean time, none of these sorts are to be mingled in taller woods or copp'ces, in which they starve one another, and lose their beauty. And now those who would see what Scotland produces (of innumerable trees of this kind) should consult the learned Sir Rob. Sibald.

14. For the many, and almost universal use of these trees, both sea and land will plead,

¹ The useful pine for ships.....

Hence Papinius 6. *Thebaid.* calls it *audax abies*. They make our best mast, sheathing, scaffold-poles, &c. heretofore the whole vessel ; It is pretty (saith Pliny) to consider, that those trees which are so much sought after for shipping, should most delight in the highest of mountains, as if it fled from the sea on purpose, and were afraid to descend into the waters. With fir we likewise make all intestine works, as wainscot, floors, pales, balks, laths, boxes, bellies for all musical instruments in general, nay the ribs and sides of that enormous stratagem, the so famous Trojan ² horse,

¹ dant utile lignum
Naviis pinus..... *Georg.* 2.

² *Macrob. Sat.* 56. cap. 9.

may be thought to be built of this material, and if the poet mistake not,

¹The ribs with deal they fit.

There being no material more obedient and ready to bend for such works.

In Holland they receive their best mast out of Norway, and even as far as Moscovy, which are best esteemed, (as consisting of long fibers, without knots) but deal-boards from the first; and though fir rots quickly in salt-water, it does not so soon perish in fresh; nor do they yet refuse it in merchant-ships, especially the upper-parts of them, because of its lightness: The true pine was ever highly commended by the Ancients for naval architecture, as not so easily decaying; and we read that Trajan caused vessels to be built both of the true, and spurious kind, well pitch'd, and over-laid with lead, which perhaps might hint our modern sheathing with that metal at present. Fir is exceeding smooth to polish on, and therefore does well under gilding-work, and takes black equal with the pear-tree: Both fir, and especially pine, succeed well in carving, as for capitals, festoons, nay, statues, especially being gilded, because of the easiness of the grain, to work and take the tool every way; and he that shall examine it nearly, will find that famous image of the B. Virgin at Loretto, (reported to be carved by the hands of St. Luke) to be made of fir, as the grain easily discovers it: The *torulus* (as Vitruvius terms it) and heart of deal, kept dry, rejecting the *albumen* and white, is everlasting; nor does there any wood so

¹ Sectaque intexunt abiete costas. *Æn.* 2.

well agree with the glew, as it, or is so easie to be wrought : It is also excellent for beams, and other timber-work in houses, being both light, and exceedingly strong, and therefore of very good use for bars, and bolts of doors, as well as for doors themselves, and for the beams of coaches, a board of an inch and half thick, will carry the body of a coach with great ease, by reason of a natural spring which it has, not easily violated. You shall find, that of old they made carts and other carriages of it ; and for piles to superstruct on in boggy grounds ; most of Venice, and Amsterdam is built upon them, with so excessive charge, as some report, the foundations of their houses cost as much, as what is erected on them ; there being driven in no fewer than 13659 great masts of this timber, under the new Stadt-house of Amsterdam. For scaffolding also there is none comparable to it ; and I am sure we find it an extraordinary saver of oak, where it may be had at reasonable price. I will not complain what an incredible mass of ready money, is yearly exported into the northern countries for this sole commodity, which might all be saved were we industrious at home, or could have them out of Virginia, there being no country in the whole world stor'd with better ; besides, another sort of wood which they call cypress, much exceeding either fir or pine for this purpose ; being as tough and springy as yew, and bending to admiration ; it is also lighter than either, and everlasting in wet or dry ; so as I much wonder, that we enquire no more after it : In a word, not only here and there an house, but whole towns, and great cities are, and have been built of fir only ; nor that alone in the north, as Mosco, &c. where the

very streets are pav'd with it, (the bodies of the trees lying prostrate one by one in manner of a raft) but the renowned city of Constantinople; and nearer home Tholose in France, was within little more than an hundred years, most of fir, which is now wholly marble and brick, after 800 houses had been burnt, as it often chances at Constantinople; but where no accident even of this devouring nature, will at all move them to re-edifie with more lasting materials. To conclude with the uses of fir, we have most of our pot-ashes of this wood, together with torch, or funebral-staves; nay, and of old, spears of it, if we may credit Virgil's Amazonian combat,

.....¹ She prest
A long fir-spear through his exposed breast.

Lastly, the very chips, or shavings of deal-boards, are of other use than to kindle fires alone: Thomas Bartholinus in his *Medicina Danorum Dissert.* 7, &c. where he disclaims the use of hops in beer, (as pernicious and malignant, and from several instances how apt it is to produce and usher in infections, nay, plagues, &c.) would substitute in its place, the shavings of deal-boards, as he affirms, to give a grateful odor to the drink; and how sovereign those resinous-woods, the tops of fir, and pines, are against the scorbut, gravel in the kidneys, &c. we generally find: It is in the same chapter, that he commends also wormwood, *marrubium*, *chamelæagnum*, sage, tamarisc, and almost any thing, rather than hops. The bark of the pine heals ulcers; and the inner rind

.....¹ Cujus apertum
Adversi longâ transverberat abiete pectus.
Æn. II.

cut small, contus'd, and boil'd in store of water, is an excellent remedy for burns and scalds, washing the sore with the decoction, and applying the softned bark : It is also sovereign against frozen and benumb'd limbs : The distill'd water of the green cones takes away the wrinkles of the face, dipping cloaths therein, and laying them on it becomes a cosmetic not to be despis'd. The pine, or *picea* buried in the earth never decay : From the latter transudes a very bright and pellucid gum ; hence we have likewise rosin ; also of the pine are made boxes and barrels for dry goods ; yea, and it is cloven into (*scandulæ*) shingles for the covering of houses in some places ; also hoops for wine-vessels, especially of the easily flexible wild-pine ; not to forget the kernels (this tree being always furnish'd with cones, some ripe, others green) of such admirable use in emulsions ; and for tooth-pickers, even the very leaves are commended : In sum, they are plantations which exceedingly improve the air, by their odoriferous and balsamical emissions and, for ornament, create a perpetual Spring where they are plentifully propagated. And if it could be proved that the *almugim*-trees, recorded¹ 1 *Reg.* 11, 12. (whereof pillars for that famous temple, and the royal palace, harps, and psalteries, &c. were made) were of this sort of wood (as some doubt not to assert) we should esteem it at another rate ; yet we know Josephus affirms they were a kind of pine-tree, though somewhat resembling the fig-tree wood to appearance, as of a most lustrous candor. In the 2 *Chron.* 2, 8. there is mention of almug-trees to grow in Lebanon ; and if so, methinks it should rather be (as Buxtorf

¹ Where the *LXX* calls it *ἀπελεκηρα*, *non dedolata* ; others *ligna undulata* See *Ezek.* 27. 5, 6.

thinks) a kind of cedar ; (yet we find fir also in the same period) for we have seen a whiter sort of it, even very white as well as red ; though some affirm it to be but the sap of it (so our cabinet-makers call it) I say, there were both fir and pine-trees also growing upon those mountains, and the learned Meibomius, (in that curious treatise of his *De Fabrica Triremium*) shews that there were such trees brought out of India, or Ophir. In the mean time, Mr. Purchas informs us, that Dr. Dee writ a laborious treatise almost wholly of this subject, (but I could never have the good hap to see it) wherein, as commissioner for Solomon's timber, and like a learned architect and planter, he has summon'd a jury of twelve sorts of trees ; namely, 1. the fir, 2. box, 3. cedar, 4. cypress, 5. ebony, 6. ash, 7. juniper, 8. larch, 9. olive, 10. pine, 11, oak, and 12. sandal-trees, to examine which of them were this *almugim*, and at last seems to concur with Josephus, in favour of pine or fir ; who possibly, from some antient record, or fragment of the wood it self, might learn something of it ; and 'tis believ'd, that it was some material both odoriferous to the scent, and beautiful to the eye, and of fittest temper to refract sounds ; besides its serviceableness for building ; all which properties are in the best sort of pine or *thyina*, as Pliny calls it ; or perhaps some other rare wood, of which the Eastern Indies are doubtless the best provided ; and yet I find, that those vast beams which sustain'd the roof of St. Peter's church at Rome, laid (as reported) by Constantine the Great, were made of the pitch-tree, and have lasted from *anno* 336, down to our days, above 1300 years.

13. But now whilst I am reciting the uses of these

beneficial trees,¹ Mr. Winthorp presents the Royal Society with the process of making the tar and pitch in New-England, which we thus abbreviate. Tar is made out of that sort of pine-tree, from which naturally turpentine extilleth ; and which at its first flowing out, is liquid and clear ; but being hardned by the air, either on the tree, or where-ever it falls, is not much unlike the Burgundy pitch ; and we call them pitch-pines out of which this gummy substance transudes : They grow upon the most barren plains, on rocks also, and hills rising amongst those plains, where several are found blown down, and have lain so many ages, as that the whole bodies, branches, and roots of the trees being perished, some certain knots only of the boughs have been left remaining intire, (these knots are that part where the bough is joyn'd to the body of the tree) lying at the same distance and posture, as they grew upon the tree for its whole length. The bodies of some of these trees are not corrupted through age, but quite consum'd, and reduc'd to ashes, by the annual burnings of the Indians, when they set their grounds on fire ; which yet has, it seems, no power over these hard knots, beyond a black scorching ; although being laid on heaps, they are apt enough to burn. It is of these knots they make their tar in New-England, and the country adjacent, whilst they are well impregnated with that terebinthine, and resinous matter, which like a balsom, preserves them so long from putrefaction. The rest of the tree does indeed contain the like terebinthine sap, as appears (upon any slight incision of bark on the stem, or boughs) by a small

¹ See Plin. *Nat. Hist.* lib. 16. cap. 11. or rather Theophrastus *Hist.* lib. 9. cap. 2, 3. & lib. 14. cap. 20. lib. 23. c. 1. lib. 24. c. 6.

crystalline pearl which will sweat out ; but this, for being more watery and undigested, by reason of the porosity of the wood, which exposes it to the impressions of the air and wet, renders the tree more obnoxious ; especially, if it lie prostrate with the bark on, which is a receptacle for a certain intercutaneous worm, that accelerates its decay. They are the knots then alone, which the tar-makers amass in heaps, carrying them in carts to some convenient place not far off, where finding clay or loam fit for their turn, they lay an hearth of such ordinary stone as they have at hand : This, they build to such an height from the level of the ground, that a vessel may stand a little lower than the hearth, to receive the tar as it runs out : But first, the hearth is made wide, according to the quantity of knots to be set at once, and that with a very smooth floor of clay, yet somewhat descending, or dripping from the extream parts to the middle, and thence towards one of the sides, where a gullet is left for the tar to run out at. The hearth thus finish'd, they pile the knots one upon another, after the very same manner as our colliers do their wood for charcoal ; and of a height proportionable to the breadth of the hearth ; and then cover them over with a coat of loam, or clay, (which is best) or in defect of those, with the best and most tenacious earth the place will afford ; leaving only a small spiracle at the top, whereat to put the fire in ; and making some little holes round about at several heights, for the admission of so much air, as is requisite to keep it burning, and to regulate the fire, by opening and stopping them at pleasure. The process is almost the same with that of making charcoal, as will appear in due place ; for, when it is

well on fire, that middle hole is also stopp'd, and the rest of the registers so govern'd, as the knots may keep burning, and not be suffocated with too much smoak ; whilst all being now through-heated, the tar runs down to the hearth, together with some of the more watry sap, which hasting from all parts towards the middle, is convey'd by the foremention'd gutter, into the barrel or vessel placed to receive it : Thus, the whole art of tar-making is no other, than a kind of rude distillation *per descensum*, and might therefore be as well done in furnaces of large capacity, were it worth the expence. When the tar is now all melted out, and run, they stop up all the vents very close ; and afterwards find the knots made into excellent charcoal, preferr'd by the smiths before any other whatsoever, which is made of wood ; and nothing so apt to burn out when their blast ceaseth ; neither do they sparkle in the fire, as many other sorts of coal do ; so as, in defect of sea-coal, they make choice of this, as best for their use, and give greater prices for it. Of these knots likewise do the planters split out small slivers, about the thickness of one's finger, or somewhat thinner, which serve them to burn instead of candles ; giving a very good light. This they call candle-wood, and it is in much use both in New-England, Virginia, and amongst the Dutch planters in their villages ; but for that it is something offensive, by reason of the much fuliginous smoak which comes from it, they commonly burn it in the chimney-corner, upon a flat stone or iron ; except, occasionally, they carry a single stick in their hand, as there is need of light to go about the house. It must not be conceiv'd, by what we have mention'd in the former description of the knots, that they are only to

be separated from the bodies of the trees by devouring time, or that they are the only materials, out of which tar can be extracted : For there are in these tracts, millions of trees which abound with the same sort of knots, and full of turpentine fit to make tar : But the labour of felling these trees, and of cutting out their knots, would far exceed the value of the tar ; especially, in countries where work-men are so very dear : But those knots above-mention'd, are provided to hand, without any other labour, than the gathering only. There are sometimes found of those sort of pine-trees, the lowest part of whose stems towards the root is as full of turpentine, as the knots ; and of these also may tar be made : But such trees being rarely found, are commonly preserved to split into candle-wood ; because they will be easily riven out into any lengths, and scantlings desir'd, much better than the knots. There be, who pretend an art of as fully impregnating the body of any living pine-tree, for six or eight foot high ; and some have reported that such an art is practis'd in Norway : But upon several experiments, by girdling the tree (as they call it) and cutting some of the bark round, and a little into the wood of the tree, six or eight foot distant from the ground, it has yet never succeeded ; whether the just season of the year were not observ'd, or what else omitted, were worth the disquisition ; if at least there be any such secret amongst the Norwegians, Swedes, or any other nation. Or tar, by boiling it to a sufficient height, is pitch made : And in some places where rosin is plentiful, a fit proportion of that, may be dissolv'd in the tar whilst it is boiling, and this mixture is soonest converted to pitch ; but it is of somewhat a differing kind from

that which is made of tar only, without other composition. There is a way which some ship-carpenters in those countries have us'd, to bring their tar into pitch for any sudden use ; by making the tar so very hot in an iron-kettle, that it will easily take fire, which when blazing, and set in an airy place, they let burn so long, till, by taking out some small quantity for trial, being cold, it appears of a sufficient consistence : Then, by covering the kettle close, the fire is extinguish'd, and the pitch is made without more ceremony. There is a process of making rosin also, out of the same knots, by splitting them out into thin pieces, and then boiling them in water, which will educe all the resinous matter, and gather it into a body, which (when cold) will harden into pure rosin. It is moreover to be understood, that the fir, and most coniferous trees, yield the same concretes, *lachrymæ*, turpentine, and there is a fir which exstills a gum not unlike the balm of Gilead, and a sort of *tus* ; rosins, hard, naval stone, liquid pitch, and tar for remedies against the cough, arthritic and pulmonic affections ; are well known, and the chyrurgion uses them in plaisters also ; and in a word, for mechanic and other innumerable uses ; and from the burning fuliginous vapour of these, especially the rosin, we have our lamp, and printers black, &c. I am perswaded the pine, pitch and fir trees in Scotland, might yield His Majesty plenty of excellent tar, were some industrious person employ'd about the work ; so as I wonder it has been so long neglected. But there is another process not much unlike the former, which is given us by the present archbishop of Samos, Joseph Georgirenes, in his description of that, and other islands of the Ægæan.

Their way of making pitch (says he) is thus : They take sapines, that is, that part of the fir, so far as it hath no knots ; and shaving away the extream parts, leave only that which is nearest to the middle, and the pith : That which remains, they call *dadi* (from the old Greek word $\Delta\alpha\delta\epsilon\varsigma$, whence the Latin, *taeda*) : These they split into small pieces, and laying them on a furnace, put fire to the upper part, till they are all burnt, the liquor in the mean time running from the wood, and let out from the bottom of the furnace, into a hole made in the ground, where it continues like oyl : Then they put fire to't, and stir it about till it thicken, and has a consistence : After this, putting out the fire, they cast chalk upon it, and draw it out with a vessel, and lay it in little places cut out of the ground, where it receives both its form, and a firmer body for easie transportation : Thus far the archbishop ; but it is not so instructive and methodical as what we have describ'd above.

Other processes for the extracting of these substances, may be seen in Mr. Ray's *Hist. Plant.*, already mentioned, lib. xxix. cap. 1. And as to pitch and tar, how they make it near Marselles, in France, from the pines growing about that city, see *Philos. Trans.* n. 213. p. 291. an. 1696, very well worthy the transcribing, if what is mentioned in this chapter were at all defective.

I had in the former editions of *Sylva*, plac'd the *larix* among the trees which shed their leaves in Winter (as indeed does this) but not before there is an almost immediate supply of fresh ; and may therefore, both for its similitude, stature, and productions, challenge rank among the coniferous : We raise it of seeds, and grows spontaneously in Stiria, Carinthia,

and other Alpine Countries : The change of the colour of the old leaf, made an ignorant gardiner of mine erradicate what I had brought up with much care, as dead ; let this therefore be a warning : The leaves are thin, pretty long and bristly ; the cones small, grow irregular, as do the branches, like the cypress, a very beautiful tree, the pondrous branches bending a little, which makes it differ from the Libanus cedar, to which some would have it ally'd, nor are any found in Syria. Of the deep wounded bark, exsudes the purest of our shop-turpentine, (at least as reputed) as also the drug *agaric* : That it flourishes with us, a tree of good stature (not long since to be seen about Chelmsford in Essex) sufficiently reproaches our not cultivating so useful a material for many purposes, where lasting and substantial timber is required : For we read of beams of no less than 120 foot in length, made out of this goodly tree, which is of so strange a composition, that 'twill hardly burn ; whence Mantuan, *et robusta larix igni impene-trabile lignum* : for so Cæsar found it in a castle he besieg'd, built of it ; (the story is recited at large by Vitruvius, l. 2. c. 9.) but see what Philander says upon the place, on his own experience : Yet the coals thereof were held far better than any other, for the melting of iron, and the lock-smith ; and to say the truth, we find they burn it frequently as common fuel in the Valtoline, if at least it be the true *larix*, which they now call *melere*. There is abundance of this larch timber in the buildings at Venice, especially about the palaces in Piazza San Marco, where I remember Scamozzi says he himself us'd much of it, and infinitely commends it. Nor did they only use it in houses, but in naval architecture also : The ship

mention'd by Witsen (a late Dutch writer of that useful art) to have been found not long since in the Numidian Sea, twelve fathoms under water, being chiefly built of this timber, and cypress, both reduc'd to that induration and hardness, as greatly to resist the fire, and the sharpest tool ; nor was any thing perished of it, though it had lain above a thousand and four hundred years submerg'd : The decks were cover'd with linnen, and plates of lead, fixed with nails guilt, and the intire ship (which contain'd thirty foot in length) so stanch, as not one drop of water had soaked into any room. Tiberius we find built that famous bridge to his *Naumachia* with this wood, and it seems to excel for beams, doors, windows, and masts of ships, resists the worm : Being driven into the ground, it is almost petrified, and will support an incredible weight ; which (and for its property of long resisting fire) makes Vitruvius wish, they had greater plenty of it at Rome to make goists of, where the Forum of Augustus was (it seems) built of it, and divers bridges by Tiberius ; for that being attempted with fire, it is long in taking hold, growing only black without ; and the timber of it is so exceedingly transparent, that cabanes being made of the thin boards, when in the dark night they have lighted candles in them, people, who are at a distance without doors, would imagine the whole room to be on fire, which is pretty odd, considering there is no material so (as they pretend) unapt to kindle. The *larix* bears polishing excellently well, and the turners abroad much desire it ; Vitruvius says 'tis so ponderous, that it will sink in the water : It also makes everlasting spouts, pent-houses, and featheridge, which needs neither pitch or painting to preserve them ; and so

excellent pales, posts, rails, pedaments and props for vines, &c. to which add the palats on which our painters separate and blend their colours, and were (till the use of canvas and bed-tike came) the tables on which the great Raphael, and most famous artists of the last age, eterniz'd their skill.

CHAPTER IV.

Of the Cedar, Juniper, Cypress, Savine, Thuya &c.

1. But now after all the beautiful and stately trees, clad in perpetual verdure,

Quid tibi odorato referam sudantia ligno ?

Should I forget the cedar ? which grows in all extreams ; in the moist Barbadoes, the hot Bermudas, (I speak of those trees so denominated) the cold New England, even where the snows lie, as I am told, almost half the Year ; for so it does on the mountains of Libanus, from whence I have received cones and seeds of those few remaining trees : why then should they not thrive in old England, I know not, save for want of industry and trial.

They grow in the bogs of America, and in the mountains of Asia ; so as there is, it seems, no place or clime which affrights it ; and I have frequently rais'd them from their seeds and berries, of which we have the very best in the world from the Summer-Islands, though now almost exhausted by the unaccountable negligence of the planters ; as are likewise those

of M. Libanus, by the wandring and barbarous Arabs. The cedars we have from Jamaica, are a spurious sort and of so porous a contexture, that wine will sink into it: On the contrary, that of Carolina so firm and close, that barrels, and other vessels, preserve the strongest spirits in vigour: The New England cedar is a lofty grower, and prospers into excellent timber, which being sawn into planks, make delicate floors: They shingle their houses also with it, and generally employ it in all their buildings: Why have we no more of it brought us, to raise, plant, and convert to the same uses? There is the *oxycedrus* of Lycia, which the architect Vitruvius describes, to have its leaf like cypress; but the right Phœnician resembles more the juniper, bearing a cone not so pointed as the other, as we shall come to shew.

After these, I shall not here descend to the inferior kinds, which some call dwarfs, and common juniper-like shrubs, fitter to head the borders of coronary gardeners, and to be shorn. There is yet another of the North-America, lighter than cork it self, of a fragrant scent, which is its only virtue. In short,

After all these exotics brought from our plantations, answering to the name of cedar, I should esteem that of the Vermuda, little inferior, if not superior, to the noblest Libanon, and next, that of Carolina for its many uses, and lasting.

Having spoken of their several species, we come now to the culture, best rais'd from the seeds, since it would be difficult to receive any store from abroad: To begin with that of M. Libanus; Those which seem of the greatest antiquity, are indeed majestic, extending the boughs and branches, with their cones *sursum spectantia*, as by most we are told; though a

late¹ traveller found otherwise, and depending, like other coniferous trees; the sturdy arms, though in smaller sprigs, grow in time so weighty, as often to bend the very stem, and main shaft, whilst that which is most remarkable, is the structure of the cones and seeds receptacles, tack'd and rang'd between the branch-leaves, in such order, as nothing appears more curious and artificial, and at a little distance, exceedingly beautiful: These cones have the bases rounder, shorter, or rather thicker, and with blunter points, the whole circum-zon'd, as it were, with pretty broad thick scales, which adhere together in exact series to the very top and summit, where they are somewhat smaller; but the entire lorication smoother couch'd than those of the fir-kind: Within these repositories under the scales, nestle the small nutting seeds, or rather kernels, of a pear-shape, though somewhat bigger; which how nourish'd and furnish'd from the central style, with their other integuments, is admirably describ'd by Mr. Ray, as that of the stalk of the clogs, thicker and longer, and so firmly knit to them, that it requires considerable force to part them from the branch, without splitting the arm it self. We have said nothing concerning the leaf of this tree, which much resembles those of the *larix*, but somewhat longer and closer set, erect and perpetually green, which those of the larch are not; but hanging down, drop-off, and desert the tree in Winter.

The seeds drop out of the cones as other fir, pine-kernels and nuts do, when the air, sun, or moisture open and unglue the scales, which naturally it else does not in those of the cedar till the second year; but which after all the preparations of burying in

¹ Le Bruyn.

holes made in the earth and sand (in which they are apter to rot) may more safely be done, by exposing the clogs discreetly to the sun, or before the soft and gentle fire, or I think, best of all, by soaking them in warm-water : The cones (thus discharged) the gaping seeds, together with the rest of the skeleton, adhere a long while to the branches, which not seldom hang on above two years ; as we likewise find in those of other resinous trees, though falling sooner.

The *lachrymæ*, gum, and other transudations, serving more for unguents and the chyrurgeon's box, than for other medicaments, in which we find Pliny has little faith : But that which is more remarkable, is the virtue of the famous timber of this noble tree, being proof against all putrefaction of human and other bodies, above all other ingredients and compositions of embalmers ; and that by a pretty contradiction, giving life as it were to the dead, and destroying the worms which are living ; and as it does where any goods are kept in chests and presses of the wood, excepting woollen-cloth and furs, which 'tis observ'd they corrupt. In the mean time, touching the manner of these operations, as it concerns the preservation of the dead, see more where we speak of cypress, &c. The effects being ascrib'd to the extream bitterness of the resinous juices, whilst the odor is most grateful : The worthy Mr. Ray mentions the powder and sawdust of cedar to be one of the greatest secrets us'd by our pollinctors and mountebanks, who pretend to this embalming mystery ; and indeed, that the dust and very chips are exitial to moths and worms, daily experience shews us ; tho' none in mine, than the dry'd leaves and stalks of *Marum-Syriacum*, familiarly planted in our gardens :

What therefore the late traveller Dampier speaks of cedar, which he has seen worm-eaten, could neither be that of Libanus or Bermudas, but haply of Barbados, Jamaica, or some other species : note, that the cedar is of so dry a nature, that it does not well endure to be fastened with nails, from which it usually shrinks, and therefore pins of the same wood are better. Whatever other property this noble tree is deservedly famous for, it is said to yield an oyl, which above all other, best preserves the monuments of the learned, books and writings ; whence *cedro dignus* became one of the highest eulogies : But whether that of the ingenius poet,

Notandus minio, nec cedro charta notatur,

refers not to the colour rather, which was usually red, and perhaps temper'd with this bitter oyl (as some conjecture) let our antiquaries determine : The horns and knobs at the ends of the rolling-staves, on which those sheets of parchment, &c. (before the invention of printing, and compacted covers now in use) as at present our maps and geographical charts (peeping out a little beyond the volume) were likely colour'd with this rutilant mixture.

Touching the diüternity of this material, 'tis recorded, that in the temple of Apollo Utica, there was found timber of near two thousand years old ; and at Sagunti in Spain, a beam in a certain oratory consecrated to Diana, which has been brought to Zant, two centuries before the destruction of Troy : That great Sesostris King of Egypt had built a vessel of cedar of 280 cubits, all over gilded without and within : And the Goddess in the famous Ephesine

temple, was said to be of this material also, as was most of the timber-work of that glorious structure : Though as to the idol τοῦ Διοπεροῦς mention'd in the Acts, (when the mob rose up against the apostle) some will have to be of ebony, others of a vine-tree, the most unlikely of all the rest fit for the carver. The *sittim* mention'd in Holy Writ, is thought to have been a kind of cedar of which most precious utensils were formed.

As to the magnitude of cedar-trees : We read of divers whose bodies eight or nine persons could not embrace, (as we shall shew hereafter) not here to let pass what Josephus relates Solomon planted in Judea, who doubtless try'd many experiments of this nature, none being more kingly than of planting for posterity : I do not speak of those growing on the mountains of Libanon, in the northern and colder tracts of Syria ; or what store those forests of them then afforded : But, as we are inform'd by that curious traveller¹ Ranwolsius, (since confirm'd also by the *virtuoso*, Monconys) there were not remaining above twenty five of those stately trees, and since they were there, but sixteen of that small number, as the ingenious Mr. Mandevill reports in his journey from Aleppo to Jerusalem : There was yet, he says, abundance of young trees, and a single old one of prodigious size, twelve yards and six inches in the girth ; I suppose the same describ'd by the late traveller Bruyn, who speaking of the shadow of this umbragious tree, alludes to that of Hosea, Cap. xiv. Ver. 5. which 'tis not improbable might be one of those yet remaining, where that heroick prince employ'd fourscore thousand hewers at work, for the materials of one only

¹ In Itin.

temple, and the palace he built in the city ; a pregnant instance what time, negligence and war will bring to ruin. But to return to what is said of their present number, Le Bruyn (whom just now we mention'd) makes them 35 or 36, for he could not exactly tell, and pretends (like our Stonedge on Salisbury Plain) none could ever yet agree of their number.

In short, upon reflection of what we have hitherto concerning the universal waste and destruction of timber trees, (where due regard is not taken to propagate and supply them) whole countries have suffer'd, as well as particular provinces : Thus the Apennines are stripp'd of their goodly pine and fir-trees (which formerly the naturalist commends those mountains for) to that degree, as to render not only the city of Florence, but Rome her self so expos'd to the nipping Tramontan's (for so they call the northern winds) that almost nothing which is rare and curious, will thrive without hyemation and art ; so as even thro' the most of those parts of Italy, on this side the Kingdom of Naples, flank'd by the Alpestral Hills, (clad as they perpetually are with snow) they are fain to house, and retire their orange, citron, and other delicate and tender plants, as we do in England. There remains yet one mountain among the Apennines, cover'd and crown'd with cypress ; whereof some are of considerable stature : Nor is all this indeed so great a wonder, if we find the entire species of some trees totally lost in countries, as if there never had been any such planted or growing in them : Be this applied to fir and pine, and several other trees, for want of culture, several accidents in the soil, air, &c. which we daily find produces strange alterations in our woods ; the beech almost constantly succeed-

ing the oak, to our great disadvantage ; whilst we neglect new seminations. Herodotus speaking of the palms, (plentifully growing about Delos) says the whole species was utterly lost : More I might add on this subject ; but having perhaps been too long on these remarks, and long enough on cold M. Libanus, I pass to,

1. Juniper ; let it not seem unduly plac'd, if after such gyants, we bring that humble shrub (such as abound with us being so reckon'd) to claim affinity to the tallest cedar ; since were not ours continually cropp'd, but maintain'd in single stems, we might perhaps see some of them rise to competent trees ; fit for many curious works, tables, cabinets, coffers, inlaying, floors, carvings, &c. we have of some of these trees so large, as to have made beams and rafters for a certain temple in Spain, dedicated to Diana ; nor need we question their being fit for other buildings ; celebrated for its emulating the cedar, tho' not in stature, yet in its lastingness : And such, I think, the learned Dr. Sloane mentions growing in Jamaica, little inferior to the Vermudas.

2. Of juniper, we have three or four sorts, male, female, dwarf ; whereof one is much taller, and more fit for improvement. The wood is yellow, and being cut in March, sweet as cedar, whereof it is accounted a spurious kind ; all of them difficult to remove with success ; nor prosper, they being shaded at all, or over-drip'd : The Swedish juniper (now so frequent in our new modish gardens, and shorn into pyramids) is but a taller and somewhat brighter sort of the vulgar.

3. I have rais'd them abundantly of their seeds (neither watering, nor dunging the soil) which in two months will peep, and being govern'd like the cypress,

apt for all the employments of that beautiful tree : To make it grow tall, prune, and cleanse it to the very stem ; the male best. The discreet loosening of the earth about the roots also, makes it strangely to prevent your expectations, by suddenly spreading into a bush fit for a thousand pretty employments ; for coming to be much unlike that which grows wild, and is subject to the treading and cropping of cattle, &c. it may be form'd into most beautiful and useful hedges : My late brother having formerly cut out of one only tree, an arbour capable for three to sit in, it was at my last measuring seven foot square, and eleven in height ; and would certainly have been of a much greater altitude, and farther spreading, had it not continually been kept shorn : But what is most considerable, is, the little time since it was planted, being then hardly ten years, and then it was brought out of the common a slender bush, of about two foot high : But I have experimented a proportionable improvement in my own garden, where I do mingle them with cypress, and they would perfectly become their stations, where they might enjoy the sun, and may very properly be set where cypress does not so well thrive ; namely, in such gardens and courts as are open to the eddy-winds, which indeed a little discolours our junipers when they blow easterly towards the Spring, but they constantly recover again ; and besides, the shrub is tonsile, and may be shorn into any form. I wonder Virgil should condemn its shadow. *Juniperi gravis umbra.....* I suspect him mis-reported.

In the mean time, botanists are not fully agreed to what species many noble and stately trees, passing under the names of cedar, are to be reckon'd ; and

therefore (for I cannot but mention those of the Vermuda again in this place) being so beautiful, tall, thick-set with evergreen-leaves, like the juniper, with berries indeed much larger, and may also be propagated by layers : Affording a timber close, ruddy for the most part ; easy to work, and yielding excellent flooring, fit for wainscot, and all curious cabinet-works ; keeping its agreeable odor and fragrancy longer than the rest : There is also made a pleasant and wholesome drink of the seeds, as they do of our common juniper ; of which hereafter. Nearest the Bermuda juniper, comes the Virginia, both yet exceeded by that of Carolina, for the perfections already mention'd, speaking of cedar, not forgetting the *Oxy-Cedrus*, which is reputed a sort of juniper : The berries so abounding on our uncultivated bushes, and barren heaths, always pregnant, annually ripen, tho' not all at a time ; some sticking longer, so as there will be black, green, and gray, succeeding one another.

4. And these afford (besides a tolerable pepper) one of the most universal remedies in the world, to our crazy forester : the berries swallow'd only, instantly appease the wind-collic, and in decoction most sovereign against an inveterate cough : They are of rare effect, being steeped in beer ; and in some northern countries, they use a decoction of the berries, as we do coffee and tea. The water is a most singular specific against the gravel in the reins ; but all is comprehended in the virtue of the theriacle, or electuary, which I have often made for my poor neighbours, and may well be term'd the forester's *panacea* against the stone, rheum, pthysic, dropsie, jaundies, inward imposthumes ; nay, palsie, gout, and plague it self, taken like Venice-treacle. Of the extracted

oyl (with that of nuts) is made an excellent good varnish for pictures, wood-work, and to preserve polish'd iron from the rust. The gum is good to rub on parchment or paper, to make it bear ink, and the coals, which are made of the wood, endure the longest of any ; so as live embers have been found after a year's being cover'd in the ashes : See St. Hierom *ad Fabiolam*, upon that expression, *Psal.* 120. v. 4. If it arrive to full growth, spits and spoons, imparting a grateful relish, and very wholesome, where they are us'd, are made of this wood, being well dried and season'd. And the very chips render a wholesome perfume within doors, as well as the dusty blossoms in Spring without, and excellent within to correct the air, and expel infection ; for which purpose the wood should be cut about May, and the rasures well dried.

5. And since we now mention pepper, it is by the most prudent and princely care of his late Majesty, Char. II. that I am assur'd of a late solemn Act of Council, enjoying the preserving of that incomparable spice, which comes to us from Jamaica under that denomination ; though in truth it be a mixture of so many aromatics in one, that it might as well have been call'd cinamon, nutmeg or mace, and allspice, to every of which it seems something allied : And that there is not only prohibited the destruction of these trees (for it seems some prodigals us'd to cut them down, for the more easie gathering) but order taken likewise for their propagation, and that assays, and samples be from time to time sent over, what other fruits, trees, gums, and vegetables may there be found, and which I prognostick will at last also incite the planters there, to think of procuring cinamon, cloves, and nutmeg-trees indeed, from the East-Indies,

and what other useful curiosities do not approach our northern Bear, (and that are yet incicurabiles amongst us) and to plant them in Jamaica, and other of the Western Islands, as a more safe and frugal expedient to humble our emulous neighbours ; since there is nothing in their situation, or defect of nature's benignity, which ought in the least to discourage us : And what if some of the trees of those countries (especially such as aspire to be timber, and may be of improvement amongst us) were more frequently brought to us likewise here in England ; since we daily find how many rare exotics, and strangers, with little care, become endenizon'd, and so contented to live amongst us, as may be seen in the *platanus*, Constantinople-chesnut, the greater glandiferous *ilex*, cork, *nux vesicaria* (which is an hard wood, fit for the turner, &c.) the *styrax*, bead-tree, the famous *lotus*, Virginian acacia, *guaiacum Patavinum*, *paliurus*, cypress, pines, fir, and sundry others, which grow already in our gardens, expos'd to the weather ; and so doubtless would many more : So judiciously observ'd is that of the learned author of the history of the Royal Society, part. 3. sect. 28, ' That whatever attempts
' of this nature have succeeded, they have redounded
' to the great advantage of the undertakers. The
' orange of China being of late brought into Portugal,
' has drawn a great revenue every year from London
' alone. The vine of the Rhene, taking root in the
' Canaries, has produc'd a far more delicious juice, and
' has made the rocks, and sun-burnt ashes of those
' islands, one of the richest spots of ground in the
' world. And I will also instance in that which is
' now in a good forwardness : Virginia has already
' given silk for the cloathing of our King ; and it

‘ may happen hereafter, to give cloaths to a great
‘ part of Europe, and a vast treasure to our Kings :
‘ If the silk-worms shall thrive there, (of which there
‘ seems to be no doubt) the profit will be inexpress-
‘ ible. We may guess at it, by considering what
‘ numbers of caravans, and how many great cities in
‘ Persia, are maintain’d by that manufacture alone,
‘ and what mighty customs it yearly brings unto the
‘ Sophi’s revenue. Thus he : To which we might
add ; that not only the China-orange mention’d by
the Doctor, but the whole race of orange-trees, were
strangers in Italy, and unknown at Rome ; nor grew
they nearer than Persia, whence first they travell’d
into Greece, as Athenaeus tells us. But to return to
that of China, and give some account of its propaga-
tion in Europe : The first was sent for a present to
the old Conde Mellor, then Prime Minister to the
King of Portugal : But of that whole case, (they
came to Lisbon in) there was but one only plant,
which escap’d the being so spoil’d and tainted ; that
with great care it hardly recovered, to be since be-
come the parent and progenitor of all those flourishing
trees of that name, cultivated by our gardeners, tho’
not without sensibly degenerating. Receiving this
account from the illustrious son of the Conde (suc-
cessor in title and favour) upon his being recall’d (then
an exile at our Court, where I had the honour to be
known to him) I thought fit to mention it in this
place, for an instance of what the industry we have
recommended, would questionless in less than half an
age, produce of wonders, by introduction, if not of
quite different, yet of better kinds, and such variety
for pulchritude and sweetness ; that when by some
princely example, our late pride, effeminacy, and

luxury, (which has to our vast charges, excluded all the ornaments of timber, &c. to give place to hangings, embroideries, and foreign leather) shall be put out of countenance, we may hope to see a new face of things, for the encouragement of planters (the more immediate work of God's hands) and the natural, wholesome, and ancient use of timber, for the more lasting occasions, and furniture of our dwellings : And though I do not speak all this for the sake of joyn'd-stools, benches, cup-boards, massy tables, and gigantic bed-steads, (the hospitable utensils of our fore-fathers) yet I would be glad to encourage the carpenter, and the joyner, and rejoice to see, that their work and skill do daily improve ; and that by the example and application of his Majesty's Universities, and Royal Society, the restoration and improvement of shipping, mathematical, and mechanical arts, the use of timber grows daily in more reputation. And it were well if great persons might only be indulg'd to enrich, and adorn their palaces with tapestry, damask, velvet, and Persian furniture ; whilst by some wholesome sumptuary laws, the universal excess of those costly and luxurious moveables, were prohibited meaner men, for divers politic considerations and reasons, which it were easie to produce ; but by a less influence than severer laws, it will be very difficult, if not altogether impossible, to recover our selves from a softness and vanity, which will in time not only effeminate, but undo the nation.

6. *Cupressus*, the cypress-tree is either the Sative, or garden-tree, the most pyramidal and beautiful ; or that which is call'd the male, (though somewhat preposterously) which bears the small cones, but is of a more extravagant shape : Should we reason only

from our common experience, even the cypress-tree was, but within a few years past, reputed so tender, and nice a plant, that it was cultivated with the greatest care, and to be found only amongst the curious ; whereas we see it now, in every garden, rising to as goodly a bulk and stature, as most which you shall find even in Italy it self ; for such I remember to have once seen in his late Majesty's gardens at Theobalds, before that princely seat was demolish'd. I say, if we did argue from this topic, methinks it should rather encourage our country-men to add yet to their plantations, other foreign and useful trees, and not in the least deter them, because many of them are not as yet become endenizon'd amongst us : But of this I have said enough, and yet cannot but still repeat it.

7. We may read that the peach was at first accounted so tender, and delicate a tree, as that it was believ'd to thrive only in Persia ; and even in the days of Galen, it grew no nearer than Egypt, of all the Roman provinces, but was not seen in the city, till about thirty years before Pliny's time ; whereas, there is now hardly a more common, and universal in Europe : Thus likewise, the *Avellana* from Pontus in Asia ; thence into Greece, and so Italy, to the city of Abellino in Campania.

Una tantùm litera immutata, Avellina dici, quæ prius Abellina.

I might affirm the same of our Damasco plum, quince, medlar, fig, and most ordinary pears, as well as of several other peregrine trees, fruit-bearers, and others ; for even the very damask-rose it self, (as my Lord Bacon tells us, Cent. 2. exp. 659.) is little more than

an hundred years old in England: Methinks this should be of wonderful incitement. It was 680 years after the foundation of Rome, e'er Italy had tasted a cherry of their own, which being then brought thither¹ out of Pontus (as the above-mention'd filberts were) did after 120 years, travel *ad ultimos Britannos*.

8. We had our first myrtils out of Greece, and cypress from Crete, which was yet a meer stranger in Italy, as Pliny reports, and most difficult to be raised; which made Cato to write more concerning the culture of it, than of any other tree: Notwithstanding, we have in this country of ours, no less than three sorts, which are all of them easily propagated, and prosper very well, if they are rightly ordered; and therefore I shall not omit to disclose one secret, as well to confute a popular error, as for the instruction of our gardeners.

9. The tradition is, that the cypress (being a symbol of mortality, *ferales* & *invisas*, they should say of the contrary) is never to be cut, for fear of killing it. This makes them to impale, and wind them about, like so many Ægyptian mummies; by which means, the inward parts of the tree being heated, for want of air and refreshment, it never arrives to any perfection, but is exceedingly troublesome, and chargeable to maintain; whereas indeed, there is not a more tonsile and governable plant in nature; for the cypress may be cut to the very roots, and yet spring afresh, as it does constantly in Candy, if not yielding suckers (as Bellonius affirms,) I rather think produced by the seeds, which the mother-trees shed at the motion of the stem in the felling: And this we find was the

¹ *A cerasunte*. Indeed Servius, l. 2. *Geor.* 1. says, it was earlier in Italy; but hard and wild and usually call'd *corna*, and sometimes *corno-cerosa*, perhaps the black-cherry.

husbandry in the Isle of Ænaria, where they us'd to fell it for copp'ce : For the cypress being rais'd from the nursery of seeds sown in September (or rather March,) and within two years after transplanted, should at two years standing more, have the master-stem of the middle shaft cut off some hand-breadth below the summit ; the sides, and smaller sprigs shorn into a conique, or pyramidal form, and so kept clipt from April to September, as oft as there is occasion ; and by this regiment, they will grow furnish'd to the foot, and become the most beautiful trees in the world, without binding or stake ; still remembring to abate the middle stem, and to bring up the collateral branches in its stead, to what altitude you please ; but when I speak of short'ning the middle shoot, I do not intend the dwarfing of it, and therefore it must be done discreetly, so as it may not over-hastily advance, till the foot thereof be perfectly furnished : But there is likewise another, no less commendable expedient, to dress this tree with all the former advantages ; if sparing the shaft altogether, you diligently cut away all the forked branches, reserving only such as radiate directly from the body, which being shorn, and clipt in due season, will render the tree very beautiful ; and though more subject to obey the shaking winds, yet the natural spring of it, does immediately redress it, without the least discomposure ; and this is a secret worth the learning of gardeners, who subject themselves to the trouble of stakes and binding, which is very inconvenient. Thus likewise may you form them into hedges, topiary works, limits and boundary, *metas imitata cupressus* ; or by sowing the seeds in a shallow furrow, and plucking up the supernumeraries, where they come too close

and thick : For in this work, it will suffice to leave them within a foot of each other ; and when they are risen about a yard in height, (which may be to the half of your palisado) cut off their tops, as you are taught, and keep the sides clipp'd, that they ascend but by degrees, and thicken at the bottom as they climb. Thus, they will present you (in half a dozen or eight years) with incomparable hedges ; because they are perpetually green, able to resist the winds better than most which I know, the holly only excepted, which indeed has no peer.

10. For, when I say winds, I mean their fiercest gusts, not their cold : For though it be said, *brumâque illæsa cupressus*, and that indeed no frost impeaches them (for they grow even on the snowy tops of Ida,) yet our cruel eastern winds do sometimes mortally invade them which have been late clipp'd, seldom the untouch'd or that were dressed in the Spring only : The effects of March and April winds (in the Year 1663, and 1665) accompanied with cruel frosts, and cold blasts, for the space of more than two months, night and day, did not amongst near a thousand cypresses (growing in my garden) kill above three or four, which for being very late cut to the quick (that is, the latter end of October) were raw of their wounds, took cold, and gangreen'd ; some few others which were a little smitten towards the tops, might have escaped all their blemishes, had my gardener capp'd them but with a wisp of hay or straw, as in my absence I commanded. As for the frost of those winters (than which I believe there was never known a more cruel and deadly piercing since England had a name) it did not touch a cypress of mine, till it join'd forces with that destructive wind : Therefore

for caution, clip not your cypresses late in Autumn, and cloath them (if young) against these winds ; for the frosts they only discolour them, but seldom, or never hurt them, as by long experience I have found ; nor altogether despair of the resurrection of a cypress, subverted by the wind ; for some have redress'd themselves ; and one (as Ziphilinus mentions) that rose the very next day ; which happening about the reign of the emperor Vespasian, was esteem'd an happy omen : But of such accidents, more hereafter.

11. If you affect to see your cypress in standard, and grow wild, (which may in time come to be of a large substance, fit for the most immortal of timber, and indeed are the least obnoxious to the rigours of our Winters, provided you never clip or disbranch them) plant of the reputed male-sort ; it is a tree which will prosper wonderfully ; and where the ground is hot and gravelly, though (as we said) he be nothing so beautiful ; and it is of this, that the Venetians make their greatest profit.

12. I have already shew'd how this tree is to be rais'd from the seed ; but there was another method amongst the Ancients, who (as I told you) were wont to make great plantations of them for their timber ; I have practis'd it my self, and therefore describe it.

13. If you receive your seed in the roundish small nuts, which use to be gather'd thrice a year, (but seldom ripening with us) expose them to the sun till they gape, or near a gentle fire, or put them in warm water, (as was directed in those of cedar) by which means the seeds will be easily shaken out ; for if you have them open before, they do not yield you half their crop : About the beginning of April (or before, if the weather be showery) prepare an even bed,

which being made of fine earth, clap down with your spade, as gardeners do for purselain seed (of old they roll'd it with some stone, or cylinder); upon this strew your seeds pretty thick; then sift over them some more mould, somewhat better than half an inch in height: Keep them duly watered after sunset, unless the season do it for you; and after one year's growth, (for they will be an inch high in little more than two months) you may transplant them where you please: If in the nursery, set them at a foot or 18 inches distance in even lines, kept watered and moist, 'till they are well rooted, and fit to be remov'd. In watering them, I give you this caution (which may also serve you for most tender and delicate seeds) that you bedew them rather with a broom, or spergitory, than hazard the beating them out with the common watering-pot; and when they are well come up, be but sparing of water: Be sure likewise that you cleanse them when the weeds are very young and tender, lest instead of purging, you quite eradicate your cypress: We have spoken of watering, and indeed whilst young, if well follow'd, they will make a prodigious advance. When that long and incomparable walk of cypress at Frascati near Rome, was first planted, they drew a small stream (and indeed *irrigare* is properly thus, *aquam inducere riguis* (*i. e.*) in small gutters and rills) by the foot of it, (as the water there is in abundance tractable) and made it (as I was credibly inform'd) arrive to seven or eight foot height in one year; (which does not agree with the epithet, *lenta cupressus*); but with us, we may not be too prodigal; since, being once well taken, they thrive best in our sandy, light and warmest grounds, whence Cardan says, *juxta aquas arescit*; meaning in

low and moorish places, stiff and cold earth, &c. where they never thrive.

There is also a Virginian cypress, of an enormous height, beautiful and very spreading, the branches and leaves large and regular, with the clogs resembling the cypress; and though the timber be somewhat coarse and cross-grain'd, 'tis when polish'd, very agreeable; as I can shew in a very large table, made out of the planks of a spurr only; and had experience of its lastingness, tho' expos'd both to the air and weather.

14. What the uses of this timber are, for chests, and other utensils, harps, and divers other musical instruments (it being a very sonorous wood, and therefore employ'd for organ-pipes, as heretofore for supporters of vines, poles, rails, and planks, (resisting the worm, moth, and all putrefaction to eternity) the Venetians sufficiently understood; who did every twenty year, and oftner (the Romans every thirteen) make a considerable revenue of it out of Candy: And certainly, a very gainful commodity it was, when the fell of a *cupressetum*, was heretofore reputed a good daughters portion, and the plantation it self call'd *dos filix*. But there was in Candy a vast wood of these trees, belonging to the Republique, by malice, or accident (or perhaps by solar heat, as were many woods 74 years after, even here in England) set on fire, which *anno* 1400, burning for seven years continually, before it could be quite extinguish'd, fed so long a space by the unctuous nature of the timber, of which there were to be seen at Venice planks of above four foot in breadth; and formerly the valves of St. Peter's church at Rome, were fram'd of this material, which lasted from the great Constantine, to

Pope Eugenius the Fourth's time, eleven hundred years ; and then were found as fresh, and entire as if they had been new : But this Pope would needs change them for gates of brass, which were cast by the famous Antonio Philarete ; not in my opinion so venerable, as those of cypress. It was in coffins of this material, that Thucydides tells us, the Athenians us'd to bury their heroes, and the mummy-chests brought with those condited bodies out of Egypt, are many of them of this material, which 'tis probable may have lain in those dry, and sandy *crypta*, many thousand years.

15. The timber of this wood was of infinite esteem with the Ancients : That lasting bridge built over the Euphrates by Semiramis, was made of this material ; and it is reported, Plato chose it to write his laws in, before brass it self, for the diuturnity of the matter : It is certain, that it never rifts or cleaves, but with great violence ; and the bitterness of its juice, preserves it from all worms and putrifaction. To this day those of Crete and Malta make use of it for their buildings ; because they have it in plenty, and there is nothing out-lasts it, or can be more beautiful, especially, than the root of the wilder sort, incomparable for its crisped undulations. Divers learned persons have conceiv'd the gopher mention'd in Holy Writ, *Gen. 6. 14.* (and of which the Ark was built) to have been no other than this *Κυπάρισσος*, *cupar*, or *cuper*, by the easie mutation of letters ; Aben Êzra names it a light wood apt to swim ; so does David Kimchi ; which rather seems to agree with fir or pine, and such as the Greeks call *ξύλα τετράγωνα* quadrangular trees, about which criticks have made a deal of stir : But Isa. Vossius (on the LXX. c. 11.) has

sufficiently made it out, that the timber of that denomination was of those sort of trees whose branches breaking out just opposite to one another at right angles, make it appear to have been fir, or some sort of wood whose arms grew in a uniform manner ; but surely this is not to be universally taken ; since we find yew, and divers other trees, brittle, heavy, and unapt for shipping, do often put forth in that order : The same learned author will have gopher to signifie only pitch, or bitumen, as much as if the text had said, make an ark of resinous timber. The Chaldee paraphrase translates it cedar, or as Junius and Tremellius, *cedrelaten*, a species between fir and cedar : Munster contends for the pine, and divers able divines endeavour to prove it cypress ; and besides, 'tis known, that in Crete they employ'd it for the same use in the largest contignations, and did formerly build ships of it : And Epiphanius Hæres, l. 1. tells us, some reliques of that ark (*circa campos sennaar*) lasted even to his days, and was judged to have been of cypress. Some indeed suppose that gopher was the name of a place, *à cupressis*, as Elon *à quercubus*; and might possibly be that which Strabo calls *Cupressetum*, near Adiabene in Assyria : But for the reason of its long lasting, coffins (as noted) for the dead were made of it, and thence it first became to be *diti sacra* ; and the valves, or doors of the Ephesine temple were likewise of it, as we observ'd but now, were those of St. Peters at Rome : Works of cypress-wood, *permanent ad diuturnitatem*, says Vitruvius l. 2. And the poet

..... *perpetuâ nunquam moritura cupresso.*

Mart. E. 6. 6.

The medical virtues of this tree are for all affects

of the nerves, astringent and refrigerating, for the hernia, apply'd outwardly, or taken inwardly, for the dysentary, strangury, &c.

But to resume the disquisition, whether it be truly so proper for shipping, is controverted; though we also find in Cassiodorus *Var. l. 5. ep. 16*, Theodoric (writing to the *Prætorio-præfectus*) caused store of it to be provided for that purpose; and Plato (who we told you made laws, and titles to be engraven in it) nominates it, *inter arbores ναυπηγοῖς utiles l. 4. leg.* and so does Diodorus *l. 19*. And as travellers observe, there is no other sort of timber more fit for shipping, though others think it too heavy: Aristobulus affirms that the Assyrians made all their vessels of it; and indeed the Romans prais'd it, pitch'd with Arabian pitch: And so frequent was this tree about those parts of Assyria (where the Ark is conjectur'd to have been built) that those vast Armada's, which Alexander the Great caus'd to be equipp'd and set out from Babylon, consisted only of cypress, as we learn out of Arrian in *Alex. l. 7.* and Strabo *l. 16*. Plutar. *Sympos. l. 1, prob. 2*. Vegetius *l. 14. c. 34*, &c. Paulus Colomesius (in his *κειμήλια literaria cap. 24.*) perstrings the most learned Is. Vossius, that in his *vindiciae pro LXX. interp.* he affirms cypress not fit for ships, as being none of the *τετράγωνοι*: But besides what we have produced, Fuller, Bochartus, &c. Lilius Gyraldus (*Lib. de navig. c. 4.*) and divers others sufficiently evince it, and that the vessel built by Trajan was of that material, lasting uncorrupt near 1400 years, when it was afterwards found in a certain lake; if it were not rather (as I suspect) that which Æneas Silvius reports to have been discovered in his time,

¹ *Hadrian. Junius Animadv. l. 1. c. 20.*

lying under water in the Numidian Lake, crusted over with a certain ferruginous mixture of earth and scales, as if it had been of iron ; but (as we have elsewhere noted) it was pronounced to be *larix*, and not cypress, employ'd by Tiberius : Finally (not to forget even the very chips of this precious wood, which give that flavour to muscadines, and other rich wines) I commend it for the improvement of the air, and a specific for the lungs, as sending forth most sweet, and aromattick emissions, whenever it is either clipp'd, or handled, and the chips or cones, being burnt, extinguish moths, and expels the gnats and flies, &c. not omitting the gum which it yields, not much inferior to the terebinthine or lentise.

We have often mention'd the virtue of these odori-ferous woods, for the improvement of the air ; upon which I take occasion here to add, what I have (some years since) already ¹ publish'd, concerning the meli-oration of it, in, and about this great and populous city, accidentally obnoxious to the effects of those nauseous vapours, exhaling from those many unclean places, and tainting that dismal cloud of sulphurous (if not arsenical) smoke, which we uncessantly breathe in. I know the late terrible conflagration, by the care and industry of the magistrate, in causing so many kennels, sinks, gutters, lay-stalls and other nuisances (receptacles of a stagnant filth) to be removed, must needs have exceedingly contributed to the purifying of the air ; as I am persuaded would appear upon a political observation in the bills of mortality : But what I yet cannot but deplore, is, that, (when that spacious area, was so long a *rasa tabula*) the church-yards had not been banish'd to the North-

¹ *Fumifugium.*

walls of the city, where a grated inclosure of competent breadth (for a mile in length) might have served for an universal cœmety, to all the parishes, distinguish'd by the like separations, and with ample walks of trees; the walks adorn'd with monuments, inscriptions and titles apt for contemplation and memory of the defunct; and that wise, and ancient law of the XII Tables restor'd and reviv'd: But concerning this, and hortulan buryings upon this and other weighty reasons, see cap. i. book iv. Happy in the mean time, had it been for the further purgation of this august metropolis, had they there, (or did they yet) banish and proscribe those hellish vulcanos, disgorging from the brew-houses, sope and salt-boilers, chandlers, hat-makers, glass-houses, forges, lime-kilns, and other trades, using such quantities of sea-coals, one of whose funnels vomits more smoak than all the culinary and chamber-fires of a whole parish, as I have (with no small indignation) observed, at what time they usually put out their fires, on Saturday evening, and re-kindle on Sunday night, or Monday morning; perniciously infecting the ambient air, with a black melancholy canopy, to the detriment of the most valuable moveables and furniture of the inhabitants, and the whole countrey about it. A bar of iron shall be more exeded and consum'd with rust in one year in this city, than in thrice-seven in the countrey: Why might it not therefore be worth a severe and publick edict, to remove these vulcanos and infernal houses of smoak to competent distance; some down the river, others (which require conveniency of fresh-water) up the Thames, among the streams about Wandsworth, &c? Their commodities and manufactures brought up to capacious wharfs, on the bank,

or London side, to the increase of a thousand watermen and other labourers, of which we cannot have too many ?

Now to demonstrate that not only the amoval of these unsufferable nuisances would infinitely clarify the air, and render it more wholesome, and to return to my subject of trees and plants ; the reputation they have had for contributing to the health of whole countries and cities, frequently occur in history : For instance, in the island of Cyprus, abounding with the trees of that name, and other resinous plants, curing ulcerated lungs, &c. Sardinia, melancholy and madness, replanted with true Anticyran hellebore, was famous ; whilst Thusus (especially in Summer) brought almost all the inhabitants to lunacy and distraction for want of it. And what the effects and benefit of such plantations have produc'd, is conspicuous in one of the most celebrated cities of the East, the famous Ispahan, clear'd of the pestilence, since the surrounding it with that beautiful platan, as I have already noted. To these add, the bay-tree, for abating all such infections ; of which see many famous instances in cap. vi. to which I refer. Not that there are no nociferous trees, as well as saniferous, which by removing the one, and planting other in their places, make sensible changes for the better. I give instance, when we speak of the yew ; and even that otherwise incomparably useful shrub, the elder.

Upon what therefore has been produc'd of expedients for the melioration of the air by plantations of proper trees ; I cannot but wish, that since these precious materials may now be had at such tolerable rates (as certainly they might from Cape-Florida, the Vermuda, or other parts of the West-Indies) ; I say,

I cannot but suggest that our more wealthy citizens of London, every day building and embellishing their dwellings, might be encourag'd to make use of it in their shops, at least for shelves, counters, chests, tables, and wainscot, &c. the fancerings (as they term it) and mouldings; since beside the everlastingness of the wood, enemy to worms, and those other corruption we have named, it would likewise greatly cure and reform the malignancy and corrosiveness of the air.

Sabin, or, as we call it, savine, not for dignity to be nam'd with the former; but for its being absolutely the best *Succedaneum* to cypress, (which the rigour of our climat is not so benign to): If our gardners did only increase and cultivate it for the other's defects, and bring up nurseries of them for pyramids, and other tonsile and topiary works, they would oftner use it instead of cypress: As to its other quality, it has, indeed, an ill report, (as most other things have when not rightly apply'd,) whilst there is nothing more efficacious for the destruction of worms in little children, the juice being given in a spoonful of milk, dulcified with a little sugar, which brings them away in heaps; as it does in horses and other cattel above all other remedies.

There is another berry-bearing savine in warmer climats, which also resembles the cypress, commonly taken for the Tarrentine cypress, so much celebrated by Cato, which grew to noble standards: But that, and the Melesian, worthy the culture, are rare with us, and indeed is as well supply'd by the more hardy, as well as the Swedish juniper, and other shrubs. The sabine is easily propagated by slips and cuttings sooner than by the seeds, though sometimes found in the small squamous seed-cases.

Tamaric, (growing to a considerable tree) for its aptness to be shorn and govern'd like the sabine and cypress, may be entertain'd, but not for its lasting verdure, which forsakes it in Winter, but soon again restores it. It was of old counted *infelix*, and under malediction, and therefore used to wreath, and be put on the heads of malefactors: But it has other excellent properties, in particular sovereign against the spleen, which as ¹ Camden tells us was therefore brought first into England by Grindal Archbishop of Canterbury: They also made cans to drink, out of this wood.

Thuja; by some call'd *arbor vitae*, (brought us from Canada,) is an hardy green all the Winter, (though a little tarnish'd in very sharp weather) rais'd to a tree of moderate stature, bearing a ragged leaf, not unlike the cypress, only somewhat flatter, and not so thick set and close: It bears small longish clogs and seeds, but takes much better by layers and slips, as those we have before mentioned, and may be kept into the same shapes, but most delights in the shade, where the roots running shallow, the stem needs support: The leaf being bruised between the fingers, emits a powerful scent not easily conquer'd, seeming to breathe something of a sanative unguent, and (as I am told) makes one of the best for the closure of green and fresh wounds: But that those curious utensils and works of the turners, bowls, boxes, cups, mortars, pestles, &c. are of this material (as is pretended) and pass under the name of *lignum vitae*, (or rather of some of the exotic, more close and ponderous wood) as Brasile, log-wood, &c. is a mistake: Upon recension therefore of these exotics, I cannot but encourage the more frequent raising the rest of those

¹ Elizab.

semper-vivents, especially such as are fittest for the shrubby parts, and furniture of our groves, mere gardens of pleasure, which none but the ever-green become. To these we might add (not for their verdure only) other more rare exotics, *styrax arbor*, and terebynth, noting by the way, that we have no true turpentine to be bought in our shops, but what is from the larch ; whilst apothecaries substitute that which extills from the fir-tree, instead of it : All of them minding me again of the great opportunities and encouragement we have of every day improving our stores with so many useful trees from the American plantations ; for which I have the suffrage of the often-cited Mr. Ray, who is certainly a very able judge : Might we not therefore attempt the more frequent locust, sassafras, &c. and that sort of elm, or sugar-tree, whose juice yields that sweet *halymus latifolius*, and several others for encouragement ? But

14. I produce not these particulars, and other *amæna vireta* already mentioned, as signifying any thing to timber, the main design of this treatise, (tho' I read of some myrtils so tall, as to make spear-shafts) but to exemplifie in what may be farther added to ornament and pleasure, by a cheap and most agreeable industry.

CHAPTER V.

Of the Cork, Ilex, Alaternus, Celastrus, Ligustrum, Philyrea, Myrtil, Lentiscus, Olive, Granade, Syring, Jasmine and other Exoticks.

We do not exclude this useful tree from those of the glandiferous and forest ; but being inclin'd to

gratify the curious, I have been induc'd to say something farther of such *semper virentia*, as may be made to sort with those of our own, (especially of the next Chapter.) I begin with the

1. Cork, [*suber*] of which there are two sorts (and divers more in the Indies) one of a narrow, or less jagged leaf, and perennial; the other of a broader, falling in Winter; grows in the coldest parts of Biscay, in the north of New-England, in the south-West of France, especially the second species, fittest for our climate; and in all sorts of ground, dry heaths, stony and rocky mountains, so as the roots will run even above the earth, where they have little to cover them; all which considered, methinks we should not despair. We have said where they grow plentifully in France; but by Pliny, *Nat. Hist.* l. 16. c. 8. it should seem they were since transplanted thither; for he affirms there were none either there, or in Italy, in his time: But I exceedingly wonder that Carolus Stephanus, and Cursius, should write so peremptorily, that there were none in Italy; where I my self have travell'd through vast woods of them about Pisa, Aquin, and in divers tracts between Rome, and the kingdom of Naples, and in France. The Spanish cork is a species of the *enzina*, differing chiefly in the leaf, which is not so prickly; and in the bark, which is frequently four or five inches thick: The manner of decortication thereof is once in two or three years, to strip it in a dry season; otherwise, the intercutaneous moisture endangers the tree, and therefore a rainy season is very pernicious; when the bark is off, they unwarpe it before the fire, and press it even, and that with weights upon the convex part, and so it continues, being cold.

2. The uses of cork is well known amongst us, both at sea and land, for its resisting both water and air : The fisher-men who deal in nets, and all who deal with liquors, cannot be without it : Ancient persons prefer it before leather for the soles of their shooes, being light, dry, and resisting moisture, whence the Germans name it *Pantoffel-holts* (slipper-wood) perhaps from the Greek Παντός Ἐφέλλος ; for I find it first applied to that purpose by the Grecian ladies, whence they were call'd light-footed ; I know not whether the epithet do still belong to that sex ; but from them it's likely the Venetian dames took it up for their monstrous *choppines* ; affecting, or usurping an artificial eminency above men, which nature has denied them. Of one of the sorts of cork are made pretty cups, and other vessels, esteem'd good to drink out of for hectical persons : The Egyptians made their coffins of it, which being lin'd with a resinous composition, preserv'd their dead incorrupt : The poor people in Spain, lay broad planks of it by their beds-side, to tread on (as great persons use Turkey and Persian carpets) to defend them from the floor, and sometimes they line or wainscot the walls, and inside of their houses built of stone, with this bark, which renders them very warm, and corrects the moisture of the air : Also they employ it for beehives, and to double the insides of their *contemplores*, and leather-cases, wherein they put flasquéra's with snow to refrigerate their wine. This tree has beneath the *cortex* or cork, two other coats, or *libri*, of which one is reddish, which they strip from the bole when 'tis fell'd only ; and this bears good price with the tanner ; The rest of the wood is very good firing, and applicable to many other uses of

building, palisade-work, &c. The ashes drunk, stop the bloody-flux.

3. *Ilex, major glandifera*, or great scarlet-oak of several species, and various in the shape of their leaf, pointed rounder, longer, &c. (a devoted tree of old, and therefore *incaedua*) thrives manifestly with us; witness His Majesty's privy-garden at White-hall, where once flourish'd a goodly tree, of more than fourscore years growth, and there was lately a sickly imp of it remaining: And now very many rais'd by me, have thriv'd wonderfully, braving the most severe Winters, planted either in standards or hedges, which they most beautifully become. The only difficulty is in their being dextrously removed out of the nursery, with the mould adhering to the roots; otherwise apt to miscarry; and therefore best trusting to the acorn for a goodly standard, and that may be removed without prejudice, tryals should be made by grafting the *ilex* in the oak-stock, taken out of our woods, or better, grown from the acorn to the bigness of one's little finger.

4. By what I have touch'd in the chapter of the elms, concerning the peregrination of that tree into Spain, (where even in Pliny's time there were none, and where now they are in great abundance) why should we not more generally endeavour to propagate the *ilex* amongst us; I mean, that which the Spaniards call the *enzina*, and of which they have such woods, and profitable plantations? They are an hardy sort of tree, and familiarly rais'd from the acorn, if we could have them sound, and well put up in earth or sand, as I have found by experience.

5. The wood of these *ilex's* is serviceable for many uses, as stocks of tools, mallet-heads, mall-balls, chairs,

axletrees, wedges, beetles, pins, and above all, for palisadoes us'd in fortifications. Besides, it affords so good fuel, that it supplies all Spain almost with the best, and most lasting of charcoals, in vast abundance. Of the first kind is made the painter's lac, extracted from the berries ; to speak nothing of that noble confection *alkermes*, and that noble scarlet-die the learned Mr. Ray gives us the process of at large, in his chapter of the *ilexes* ; where also of their medicinal uses : To this add that most accurate description of this tree, and the *vermicula* ; see Quinquernus, L. 2. *de laud. provid.* fol. 48. naturally abounding about Alos. The acorns of the *coccigera*, or dwarf-oak, yield excellent nourishment for rustics, sweet, and little if at all inferior to the chesnut ; and this, and not the *fagus*, was doubtless the true *esculus* of the Ancients, the food of the Golden Age. The wood of the *enzina* when old, is curiously chambletted, and embroider'd with natural vermiculations, as if it were painted. Note, that the *kermes* tree does not always produce the *coccum*, but near the sea, and where it is very hot ; nor indeed when once it comes to bear acorns ; and therefore the people do often burn down the old trees, that they may put forth fresh branches, upon which they find them : This, (as well as the oak, cork, beech, and *corylus*) is numbred amongst the *felices*, and lucky-trees : But for what reason, the *alaternus* (which I am next speaking of) together with the *agrifolium* [holly] pines, *salix*, &c. should be excommunicated, as *infelices*, I know not, unless for their being dedicated to the Infernal Deities ; of which Macrob. *Sat. lib.* 12. cap. 16. In the mean time, take this for a general rule ; that those were call'd *infelices* only, which bare no fruit ; for so Livy,

lib. 5. *nulla felix arbor, nihil frugiferum in agro relictum.*
Whence that of Phædrus, l. 3. *Fab.* upon Jupiter's
esculus :

*O nata, merito sapiens dicere omnibus
Nisi utile est quod facimus, stulta est gloria,*

reciting the ancient trees sacred to the deity, the most desirable being those that were fruitful, and for use.

6. The *alaternus*, which we have lately receiv'd from the hottest parts of Languedoc, (and that is equal with the heat of almost any country in Europe) thrives with us in England, as if it were an indigine and natural; yet sometimes yielding to a severe Winter, follow'd with a tedious eastern wind in the Spring, of all the most hostile and cruel enemies of our climate; and therefore to be artificially and timely provided against with shelter.

7. I have had the honour to be the first who brought it into use and reputation in the kingdom, for the most beautiful and useful of hedges and verdure in the world (the swiftness of the growth consider'd) and propagated it from Cornwall, even to Cumberland: The seed grows ripe with us in August; and the honey-breathing blossoms afford an early and marvellous relief to the bees.

8. The *celastrus* (of the same class) *ligustrum* and privits, so flexible and accommodate for topiary-works, and so well known, I shall need say no more of.

9. The *philyrea*, (of which there are five or six sorts, and some variegated) are sufficiently hardy, (especially the *serratifole*) which makes me wonder to find the *angustifolia* planted in cases, and so charily

set into the stoves, amongst the oranges and lemmons ; when by long experience, I have found it equalling our holley, in suffering the extreamest rigours of our cruel frosts and winds, which is doubtless (of all our English trees) the most insensible and stout.

10. They are (both *alaternus*, and this) raised of the seeds, (though those of the *philyrea* will be long under ground) and being transplanted for *espalier* hedges, or standards, are to be govern'd by the shears, as oft as there is occasion : The *alaternus* will be up in a month or two after it is sown : I was wont to wash them out of the berry, and drying them a little in a cloath, commit them to the nursery-bed. Plant it out at two years growth, and clip it after rain in the Spring, before it grows sticky, and whilst the shoots are tender ; thus will it form an hedge (though planted but in single rows, and at two foot distance) of a yard in thickness, twenty foot high (if you desire it) and furnish'd to the bottom : but for an hedge of this altitude, it would require the friendship of some wall, or a frame of lusty poles, to secure against the winds one of the most delicious objects in nature : But if we could have store of the *philyrea folio leviter serrato* (of which I have rais'd some very fine plants from the seeds) we might fear no weather, and the verdure is incomparable, and all of them tonsile, fit for cradle-work and *umbracula frondium* : a decoction of the *angustifolia* sovereign for sore mouths.

11. The myrtill. The vulgar Italian wild myrtill (though not indeed the most fragrant) grows high, and supports all weathers and climates ; they thrive abroad in Bretany, in places cold and very sharp in Winter ; and are observ'd no where to prosper so

well, as by the sea-coasts, the air of which is more propitious to them (as well as to oranges and lemons, &c.) than the inland air. I know of one near eighty years old, which has been continually expos'd; unless it be, that in some exceeding sharp seasons, a little dry straw has been thrown upon it; and where they are smitten, being cut down near the ground, they put forth and recover again; which many times they do not in pots and cases, where the roots are very obnoxious to perish with mouldiness. The shelter of a few mats, and straw, secur'd very great trees (both leaf and colour in perfection) this last Winter also, which were planted abroad; whilst those that were carried into the conserve, were most of them lost. Myrtils (which are of six or eight sorts) may be rais'd of seeds; as also may several varieties of oranges and lemons, and made (after some years attendance) to produce fruit in the cold Rhetia and Helvetick valleys; but with great caution, and after all, seldom prove worth the pains, being so abundantly multiplied of suckers, slips and layers: The double-flower (which is the most beautiful) was first discovered by the incomparable Fabr. Piereshy, which a mule had cropt from a wild shrub. Note, that you cannot give those plants too much compost or refreshing, nor clip them too often, even to the stem; which will grow tall, and prosper into any shape; so as arbours have been made of single trees of the hardy kind, protected in the Winter with sheads of straw and reeds. Both leaves and berries refrigerate, and are very astringent and drying, and therefore seldom us'd within, except in fluxes: With wine and honey it heals the noisome *polypus*, and the powder corrects the rankness of the arm-pits,

and *gousset* (as the French term it) to which divers of the female sex are subject: The berries mitigate the inflammations of the eyes, consolidate broken-bones; and a decoction of the juice, leaves, and berries, dyes the hair black, & *enecant vitiligines*, as Dioscorides says, l. 1. c. 128. And there is an excellent sweet water extracted from the distill'd leaves and flowers: To which the naturalist adds, that they us'd the berries instead of pepper, to stuff and farce with them. Hence the *mortadella a mortatula*, still so call'd by the Italians, perhaps the *μυρτίδες* of Athenæus, *deip.* l. 2. c. 12. The *vinum myrtites* so celebrated by the¹ ancients, and so the oyl; And in some places the leaves for tanning of leather: and trees have grown to such substance, as of the very wood curious cups and boxes have been turn'd.

The variety of this rare shrub, now furnishing the gardens and portico's (as long as the season and weather suits) and even in the severest Winters in the conclave, are cut and contriv'd into various figures, and of divers variegations, most likely to be produc'd by the seeds, as our learned Mr. Ray believes, rather than by layers, suckers, or slips, or from any difference of species: In the mean time, let gardeners make such trials, whilst those most worth the culture, are the small and broad-leav'd, the Tarentine, the Belgick, *latifolia*, and double-flower'd, and several more among the curious; and of old, sacred to Venus, so call'd from a virgin belov'd of Minerva, the garlands of the leaves and blossoms, impaling the brows of incruentous, and unbloody victors and ovations.

And now if here for the name only, I mention the

¹ Cato, Columella, Paladius.

myrtus Brasantica, or candle-berry shrub (which our plantations in Virginia, and other places have in plenty) let it be admitted : It bears a berry, which being boil'd in water, yields a suet or pinguid substance, of a green colour, which being scumm'd and taken off, they make candles with, in the shape of such as we use of tallow, or wax rather ; giving not only a very clear and sufficient light, but a very agreeable scent, and are now not seldom brought hither to us, but the tree it self, of which I have seen a thriving one.

12. *Lentiscus* (a very beautiful evergreen) refuses not our climate, protected with a little shelter, amongst other exposed shrubs, by suckers and layers : It is certainly an extraordinary astringent and dryer, applicable in the hernia, strangury, and to stop fluxes ; closes and cures wounds, being infus'd in red-wine, is also us'd to tinge hairs of that colour, to black and brown. Not forgetting the best tooth-pickers in the world, made of the wood ; but above all, the gum for fastning loose-teeth in the gums ; the mastick, gather'd from this profitable bush in the Island of Scio ; beside other uses : And as the lentisc, so may the

13. Olive be admitted, tho' it produce no other fruit than the verdure of the leaf ; nor will it kindly breath our air, nor the less tender *oleaster*, without the indulgent winter-house take them in. But the

14. *Granata* [*malus punica*] is nothing so nice. There are of this glorious shrub three sorts, easily enough educated under any warm shelter, even to the raising hedges of them, nor indeed affects it so much heat, as plentiful watering : They supported a very severe winter in my garden, 1663, without any

trouble or artifice ; and if they present us their blushing double flowers for the pains of recision and well pruning, (for they must diligently be purg'd of superfluous wood) it is recompence enough ; tho' placed in a very benign aspect, they have sometimes produc'd a pretty small pome : It is a *perdifolia* in Winter, and growing abroad, requires no extraordinary rich earth, but that the mould be loosen'd and eas'd about the root, and hearty compost applied in Spring and Autumn : Thus cultivated, it will rise to a pretty tree, tho' of which there is in nature none so adulterate a shrub : 'Tis best increas'd by layers, approach and inarching (as they term it) and is said to marry with laurels, the damson, ash, almond, mulberry, citron, too many I fear to hold. But after all, they do best being cas'd, the mould well mixt with rotten hogs-dung, its peculiar delight, and kept to a single stem, and treated like other plants in the Winter-shelter ; they open the bud and flower, and sometimes with a pretty small fruit ; the juice whereof is cooling ; the rest of an astringent quality : The rind may also supply the gall for making ink, and will tan leather.

15. The syring [lilac] or pipe-tree, so easily propagated by suckers or layers ; the flower of the white (emulating both colour and flavor of the orange) I am told is made use of by the perfumers ; I should not else have named it among the evergreens ; for it loses the leaf, tho' not its life, however expos'd in the Winter : There are besides this the purple, by our botanists call'd the Persian julsamine, which next leads me to the other jasmines.

16. The jasmine, especially the Spanish larger flower, far exceeding all the rest, for the agreeable

odor and use of the perfumer : The common white and yellow would flower plentifully in our groves, and climb about the trees, being as hardy as any of our *periclimena* and honey-suckles.

How 'tis increas'd by submersion and layers, every gardner skills ; and were it as much employ'd for nose-gays, &c. with us, as it is in Italy and France, they might make money enough of the flowers ; one sorry tree in Paris, where they abound, has been worth a poor woman near a *pistol* a year.

There is no small curiosity and address in obtaining the oyl, or essence (as we call it) of this delicate and evanid flower, which I leave to the chymist and the ladies who are worthy the secrets.

CHAPTER VI.

Of the Arbutus, Box, Yew, Holly, Pyracanth, Laurel, Bay, &c.

1. The *arbutus*, (by us call'd the strawberry-tree) too much I think neglected by us; making that a rarity, which grows so common and naturally in Ireland: It is indeed with some difficulty raised by seeds, but propagated by layers, if skilfully prun'd, grows to a goodly tree, patient of our clime, unless the weather be very severe : It may be contriv'd into most beautiful palisades, is ever verdant: I am told the tree grows to a huge bulk and height in Mount Athos and other countries : Virgil reports its inoculation with the nut ; and I find Bauhinus commends the coal for the goldsmiths works ; and the poet

¹ Arbutean harrows, and the mystick van.

2. *Buxus*, the box, which we begin to proscribe our gardens (and indeed bees are no friend to it) should not yet be banish'd from our care ; because the excellency of the wood does commute for the unagreeableness of its smell : Therefore let us furnish our cold and barren hills and declivities with this useful shrub, I mean the taller sort ; for dwarf and more tonsile in due place ; it will increase abundantly of slips set in March, and towards Bartholomew-tide, as also of the seeds contain'd in the cells : These trees rise naturally at Boxley in Kent in abundance, and in the county of Surrey, giving name to that Chalky Hill (near the famous Mole or Swallow) whither the ladies, gentlemen and other water-drinkers from the neighbouring Ebesham-Spaw, often resort during the heat of Summer to walk, collation and divert themselves in those *antilex* natural alleys, and shady recesses, among the box-trees ; without taking any such offence at the smell, which has of late banish'd it from our groves and gardens ; when after all, it is infinitely to be preferr'd for the bordering of flower-beds, and flat embroideries, to any sweeter les-lasting shrub whatever, subject after a year or two to grow dry, sticky and full of gaps ; which box is so little obnoxious to, that, braving all seasons, it needs not to be renew'd for 20 years together, nor kept in order with the garden-sheers, above once or twice a year, and immediately upon that, the casting water on it, hinders all those offensive emissions, which some complain of : But whilst I speak in favour of this sort of edging, I only recommend the

¹ Arbuteæ crates, & mystica vannus Iacchi.

Georg. 1.

use of the Dutch-box, (rarely found growing in England) which is a *pumil* dwarf kind, with a smaller leaf, and slow of growth, and which needs not be kept above two inches high, and yet grows so close, that beds bordered with boards, keep not the earth in better order ; beside the pleasantness of the verdure is incomparable.

One thing more I think fit to add ; That it may be convenient once in four, or five, or six years, to cut off the strings and roots which straggle into the borders, with a very sharp spade, that they may not prejudice the flowers, and what else one plants in them.

I need not speak much of the uses of this tree, (growing in time to considerable stature) so continually sought after for many utensils, being so hard, close and pondrous as to sink like lead in water, and therefore of special use for the turner, engraver, carver, mathematical-instrument, comb and pipe-makers (*si buxos inflare juvat..... Virg.*) give great prices for it by weight, as well as measure; and by the seasoning, and divers manner of cutting, vigorous insolutions, politure and grinding, the roots of this tree (as of even our common and neglected thorn) do furnish the inlayer and cabinet-makers with pieces rarely undulated, and full of variety. Also of box are made wheels or shivers (as our ship-carpenters call them) and pins for blocks and pullies ; pegs for musical instruments ; nut-crackers, weavers-shuttles, hollar-sticks, bump-sticks, and dressers for the shooe-maker, rulers, rolling-pins, pestles, mall-balls, beetles, topps, tables, chess-men, screws, male and female, bobins for bone-lace, spoons, nay the stoutest axle-trees, but above all,

¹Box-combs bear no small part
 In the militia of the female-art ;
 They tye the links which hold our gallants fast,
 And spread the nets to which fond lovers hast.

3. The chymical oyl of this wood has done the feats of the best *guajacum* (though in greater quantity) for the cure of venereal diseases, as one of the most expert physicians in Europe has confess'd. The oyl asswages the tooth-ache. But, says Rhodoginus, the honey which is made at Trevisond in box-trees, (I suppose he means gather'd among them ; for there are few, I believe, if any, so large and hollow as to lodge and hive them) renders them distracted who eat of it. Lib. xxiii. cap. 25.

v. Since the use of bows is laid aside amongst us, the propagation of the yew-tree (of which we have two sorts, and other places reckon more, as the Arcadian black and red ; the yellow of Ida, infinitely esteem'd of old) is likewise quite forborn ; but the neglect of it is to be deplor'd ; seeing that (besides the rarity of it in Italy and France, where but little of it grows) the barrenest grounds, and coldest of our mountains (for

.....*Aquilonem & frigora taxi*)

might be profitably replenish'd with them : I say, profitably, for, besides the use of the wood for bows

.....*Ityraeos taxi torquentur in arcus.*

(For which the close and more deeply dy'd is best) the forementioned artists in box, cabinet-makers,

†Non ultima belli
 Arma puellaris ; laqueos hæc nectit amantùm,
 Et venatricis disponit retia formæ. *Couleri* pl. i. 6.

inlayers, and for the parquettè-floors, most gladly employ it ; and in Germany they use to wainscot their stoves with boards of this material : Also for the cogs of mills, posts to be set in moist grounds, and everlasting axel-trees, there is none to be comparèd with it ; likewise for the bodies of lutes, theorbo's, bowles, wheels, and pins for pullies ; yea, and for tankards to drink out of ; whatever Pliny reports concerning its shade, and the stories of the air about Thasius, the fate of Cativulcus mention'd by Cæsar, and the ill report which the fruit has vulgarly obtain'd in France, Spain, and Arcadia : But

¹ How are poor trees traduc'd ?

5. The toxic quality was certainly in the liquor, which those good fellows tippl'd out of those bottles, not in the nature of the wood ; which yet he affirms is cur'd of that venenous quality, by driving a brazen-wedge into the body of it : This I have never tried, but that of the shade and fruit I have frequently, without any deadly or noxious effects : So that I am of opinion, that tree which Sestius calls *smilax*, and our historian thinks to be our yew, was some other wood ; and yet I acknowledge that it is esteem'd noxious to cattle when 'tis in the seeds, or newly sprouting ; though I marvel there appear no more such effects of it, both horses and other cattle being free to brouse on it, where it naturally grows : But what is very odd (if true) is that which the late Mr. Aubrey recounts (in his *Miscellanies*) of a gentlewoman that had long been ill, without any benefit from the physician ; who dream'd, that a friend of

¹ Quàm multa arboribus tribuuntur crimina falsa ?

hers deceased, told her mother, that if she gave her daughter a drink of yew pounded, she should recover : She accordingly gave it her, and she presently died : The mother being almost distracted for the loss of her daughter, her chambermaid, to comfort her, said, surely what she gave her was not the occasion of her death, and that she would adventure on it her self ; she did so, and died also : Whether all this be but a dream, I cannot tell, but it was haply from these lugubrious effects, that garlands of *taxus* were usually carried at funerals, as Statius implies in *Epicedium vernae* : However, to prevent all funest accidents, I commend the tree only for the usefulness of the timber, and hortulan ornament. That we find it so universally planted in our church-yards, was doubtless some symbol of immortality, the tree being so lasting, and always green : Our bee-masters banish it from about their apiaries.

One thing more, whilst I am speaking of this tree ; it minds me of that very odd story I find related by Mr. Camden, of a certain amorous clergy-man, that falling in love with a pretty maid who refus'd his addresses, cut off her head ; which being hung upon a yew-tree 'till it was rotten, the tree was reputed so sacred, not only whilst the virgin's head hung on it, but as long as the tree it self lasted ; to which the people went in pilgrimage, plucking and bearing away branches of it, as an holy relique, whilst there remain'd any of the trunk left, persuading themselves, that those small veins and filaments, (resembling hairs between the bark and the body of the tree) were the hairs of the virgin : But what is yet stranger, that the resort to this place (then call'd Houton) (from a despicable village) occasion'd the building of the now

famous town Hallifax, in York-shire, which imports holy-hair : By this, and the like, may we estimate what a world of impostures, have through craft and superstition gained the repute of holy-places, abounding with rich oblations (their *de voto's*).

Pliny speaks of an old lotus tree in a grove near Rome, which they call'd *capitale*, upon which the vestals present (as our nuns) were us'd to hang their hair cut off at their profession : Plin. lib. 16. c. 43. But that is nothing to this.

I may not in the mean time omit what has been said of the true *taxus* of the ancients, for being a mortiferous plant : Dr. Belluccio, President of the Medical Garden at Pisa in Tuscany, (where they have this curiosity) affirms, that when his gardners clip it (as sometimes they do) they are not able to work above half an hour at a time, it makes their heads so ake : But the leaves of this tree are more like the fir, and is very bushy, furnish'd with leaves from the very root, and seeming rather an hedge than a tree, tho' it grow very tall.

6. This English yew-tree is easily produc'd of the seeds, wash'd and cleans'd from their mucilage, then buried and dry'd in sand a little moist, any time in December, and so kept in some vessel in the house all Winter, and in some cool shady place abroad all the Summer, sow them the Spring after : Some bury them in the ground like haws ; it will commonly be the second Winter e're they peep, and then they rise with their caps on their heads : Being three years old, you may transplant them, and form them into standards, knobs, walks, hedges, &c. in all which works they succeed marvellous well, and are worth our patience for their perennial verdure and durable-

ness : I do again name them for hedges, preferable for beauty, and a stiff defence to any plant I have ever seen, and may upon that account (without vanity) be said to have been the first which brought it into fashion, as well for defence, as for a *succedaneum* to cypress, whether in hedges, or pyramids, conic-spires, bowls or what other shapes, adorning the parks or larger avenues, with their lofty tops 30 foot high, and braving all the efforts of the most rigid Winter, which cypress cannot weather ; I have said how long lasting they are, and easily to be shap'd and clipp'd ; nay cut down, revive : But those which are much superannuated, and perhaps of many hundred years standing, perish if so us'd.

7. He that in Winter should behold some of our highest hills in Surrey, clad with whole woods of these two last sort of trees, for divers miles in circuit (as in those delicious groves of them, belonging to the Honourable, my noble friend, the late Sir Adam Brown of Bech-worth-Castle, from Box-hill) might without the least violence to his imagination, easily fancy himself transported into some new or enchanted country ; for, if any spot of England,

¹ 'Tis here
Eternal Spring, and Summer all the year.

Of which I have already spoken in the former section.

8. But, above all the natural greens which enrich our home-born store, there is none certainly to be compar'd to the *agrifolium*, (or *acuifolium* rather) our holly so spontaneously growing here in this part of Surrey, that the large vale near my own dwelling,

¹ Hic ver perpetuum, atque alienis mensibus æstas.

was anciently call'd Holmes-Dale ; famous for the flight of the Danes : The inhabitants of great antiquity (in their manners, habits, speech) have a proverb, Holmes-Dale never won ; ne never shall. It had once a fort, call'd Homes-Dale Castle : I know not whether it might not be that of Rygate ; but leaving this uncertain, and return to the plant, I have often wonder'd at our curiosity after foreign plants, and expensive difficulties, to the neglect of the culture of this vulgar, but incomparable tree ; whether we will propagate it for use and defence, or for sight and ornament.

¹ A hedge of holly, thieves that would invade,
Repulses like a growing palizade ;
Whose numerous leaves such orient greens invest,
As in deep Winter do the Spring arrest.

Which makes me wonder why it should be reckon'd among the unfortunate trees, by Macrobius, *Sat.* lib. III. cap. 20. others among the lucky ; for so it seems they us'd to send branches of it, as well as of oak (the most fortunate, according to the Gentile theology) with their *strenae* (new-year's gifts) begun (as Symachus tells us) by K. Tatius, almost as old as Rome her self.

But to say no more of these superstitious fopperies, which are many other about this tree, we still dress up both our churches and houses, on Christmas and other festival days, with this cheerful green and rutilant berries.

¹ Mala furta hominum densis mucronibus arcens
Securum defendit inexpugnabilis hortum ;
Exornatque simul, toto spectabilis anno,
Et numero, & viridi foliorum luce nitentum.

Coulei Pl. l. 6.

9. Is there under heaven a more glorious and refreshing object of the kind, than an impregnable hedge of about four hundred foot in length, nine foot high, and five in diameter ; which I can shew in my now ruin'd gardens at Say's-Court, (thanks to the Czar of Moscovy) at any time of the year, glittering with its arm'd and varnish'd leaves ? The taller standards at orderly distances, blushing with their natural coral : It mocks at the rudest assaults of the weather, beasts, or hedge-breakers,

Et illum nemo impunè lacessit.

It is with us of two eminent kinds, the prickly, and smoother leav'd ; or as some term it, the free-holly, not unwelcome when tender, to sheep and other cattle : There is also of the white-berried, and a golden and silver, variegated in six or seven differences ; which proceeds from no difference in the species, but accidentally, and *naturae lusu*, as most such variegations do ; since we are taught how to effect it artificially, namely, by sowing the seeds, and planting in gravelly soil, mixed with store of chalk, and pressing it hard down ; it being certain, that they return to their native colour when sown in richer mould, and that all the fibers of the roots recover their natural food.

10. I have already shew'd how it is to be rais'd of the berries, (of which there is a sort bears them yellow, and propagate their colour) when they are ready to drop, this only omitted, that they would first be freed from their tenacious and glutinous mucilage by being wash'd, and a little bruised, then dry'd with a cloath ; or else bury them as you do the yew and hipps ; and let our forester receive this for no common

secret, and take notice of the effect : If you will sow them in the berry, keep them in dry sand till March; remove them also after three or four years ; but if you plant the sets (which is likewise a commendable way, and the woods will furnish enough) place'em northwards, as they do quick. Of this, might there living pales and enclosures be made, (such as the Right Honourable my Lord Dacres, somewhere in Sussex, has a park almost environ'd with, able to keep in any game, as I am credibly inform'd) and cut into square hedges, it becomes impenetrable, and will thrive in hottest, as well as the coldest places. I have seen hedges, or if you will, stout walls of holly, 20 foot in height, kept upright, and the gilded sort budded low, and in 2 or 3 places one above another, shorn and fashion'd into columns and pilasters, architectonically shap'd, and at due distance; than which nothing can possibly be more pleasant, the berry adorning the intercolumniations, with the scarlet festoons and *encarpa*. Of this noble tree one may take thousands of them four inches long, out of the woods (amongst the fall'n leaves whereof, they sow themselves) and so plant them ; but this should be before the cattle begin to crop them, especially sheep, who are greedy of them when tender : Stick them into the ground in a moist season, Spring, or early Autumn ; especially the Spring, shaded (if it prove too hot and scorching) till they begin to shoot of themselves, and in very sharp weather, and during our eastern *etesians*, cover'd with dry straw or haume ; and if any of them seem to perish, cut it close, and you shall soon see it revive. Of these seedlings, and by this culture, I have rais'd plants and hedges full four foot high in four years : The lustier and bigger the sets are, the better, and if

you can procure such as are a thumbs-breadth thick, they will soon furnish into an hedge. At Dengeness in Kent, they grow naturally amongst the very beach and pibbles ; but if your ground be stiff, loosen it with a little fine gravel : This rare hedge (the boast of my villa) was planted upon a burning gravel, expos'd to the meridian sun ; for it refuses not almost any sort of barren ground, hot or cold, and often indicates where coals are to be dug.

11. True it is, that time must bring this tree to perfection ; it does so to all things else, & *posteritati pangimus*. But what if a little culture about the roots (not dunging, which it abhors) and frequent stirring of the mould, double its growth ? We stay seven years for a tolerable quick, it is worth staying it thrice, for this, which has no competitor.

12. And yet there is an expedient to effect it more insensibly, by planting it with the quick : Let every fifth or sixth be an holly-set ; they will grow up infallibly with your quick ; and as they begin to spread, make way for them by extirpating the white-thorn, till they quite domineer : Thus was my hedge first planted, without the least interruption to the fence, by a most pleasant metamorphosis. But there is also another, not less applauded, by laying along well-rooted sets (a yard or more in length) and stripping off the leaves and branches, letting only something of the tops appear : These, cover'd with a competent depth of earth, will send forth innumerable suckers, which will suddenly advance into an hedge ; and grows as well under the shade as sun, provided you keep them weeded, and now and then loosen the earth ; towards which, if thro' extream neglect, or other accident, it grow thin, being close

cut down, it will fill and become stronger and thicker than ever.

Of this stately shrub (as some reckon it) there is lately found an holly, whose leaves are as thorny and bristly, not only at the edges, but all over, as an hedge-hog, which it may properly be call'd; and I think was first brought by Mr. London out of France.

13. The timber of the holly (besides that it is the whitest of all hard woods, and therefore us'd by the inlayer, especially under thin plates of ivory, to render it more conspicuous) is for all sturdy uses; the mill-wright, turner and engraver, prefer it to any other: It makes the best handles and stocks for tools, flails, riding rods the best, and carters-whips; bowles, shivers, and pins for blocks: Also it excels for door-bars and bolts; and as of the elm, so of this especially, they made even hinges and hooks to serve instead of iron, sinking in the water like it; and of the bark is compos'd our bird-lime thus:

14. Pill a good quantity of the bark about Midsummer, fill a vessel with it, and put to it spring-water; then boil it, till the gray and white bark rise from the green, which will require near twelve hours boiling; then taking it off the fire, separate the barks, the water first well drained from it: Then lay the green bark on the earth, in some cool vault or cellar, covering it with any sort of green and rank weeds, such as dock, thistles, hemlock, &c. to a good thickness: Thus let it continue near a fortnight, by which time 'twill become a perfect mucilage: Then pound it all exceedingly in a stone mortar, 'till it be a tough past, and so very fine, as no part of the bark be discernable: This done, wash it accurately well in

some running stream of water, as long as you perceive the least ordure or motes in it, and so reserve it in some earthen-pot, to purge and ferment, scumming it as often as any thing arises for four or five days, and when no more filth comes, change it into a fresh vessel of earth, and reserve it for use, thus : Take what quantity you please of it, and in an earthen pipkin, add a third part of capons or goose-grease to it, well clarified ; or oyl of walnuts, which is better : Incorporate these on a gentle fire, continually stirring it 'till it be cold, and thus your composition is finish'd. But to prevent frosts (which in severe weather will sometimes invade it on the rods) take a quarter of as much oyl of petroleum, as you do of grease, and no cold whatever will congeal it. The Italians make their *vischio* of the berries of the misselto of trees, (and indeed it is from this it is said of the thrush, *exitium suum cacat*, that bird being so exceeding devourers of them) treated much after the same manner ; but then they mix it with nut-oyl, an ounce to a pound of lime, and taking it from the fire, add half an ounce of turpentine, which qualifies it also for the water. Great quantities of bird-lime are brought to us out of Turkey, and from Damascus, which some conceive to be made of *sebestens*, finding sometimes the kernels : This lime is of a greener colour, subject to frosts, and impatient of wet, nor will last above a year or two good : Another sort comes also out of Syria, of a yellow hue ; likewise from Spain, whiter than the rest, which will resist the water, but is of an ill scent. I have been told that the *cortex* of our *lantana*, or wayfaring shrub, will make as good bird-lime as the best. But let these suffice, being more than as yet any one has publish'd. The superior leaves

of holly-trees, dry'd to a fine powder, and drunk in white-wine, are prevalent against the stone, and cure fluxes ; and a dozen of the mature berries, being swallow'd, purge phlegm without danger. To which the learned Mr. Ray (in *Append. Plant. Angl.*) adds a *zythogalum*, or posset made of milk and beer, in which is boil'd some of the most pointed leaves, for asswaging the torment of the collic, when nothing else has prevailed. And now I might have here planted the

15. *Pyracantha*, both for its perpetual verdure, if the fences had not already challeng'd it, chap. 20. lib. 1.

16. The *lauro-cerasus* on cherry-bay, which by the use we commonly put it to, seems as if it had been only destin'd for hedges, and to cover bare walls : Being planted upright, and kept to the standard, by cutting away the collateral branches, and maintaining one stem, will rise to a very considerable tree ; and (for the first twenty years) resembling the most beautiful-headed orange, in shape and verdure, arrive in time to emulate even some of our lusty timber-trees ; so as I dare pronounce the laurel to be one of the most proper and ornamental trees for walks and avenues, of any growing.

17. Pity it is they are so abus'd in the hedges, where the lower branches growing sticky and dry, by reason of their frequent and unseasonable cutting (with the genius of the tree, which is to spend much in wood) they never succeed, after the first six or seven years ; but are to be new-planted again, or abated to the very roots for a fresh shoot, which is best, and soon would furnish the places. In a word ; as to the pruning of evergreen-hedges, there is no small skill and address to be us'd, in forming and trimming them for beauty and stability ; by leaving

the lower parts next the ground broader (two foot were sufficient for the thickness of the tallest hedge) than the tops, gradually, so as not much to exceed a foot breadth at the upmost verge, (as architects diminish walls of stone and brick from the foundation) for they will else be apt to bend and swagg, especially laden with Winter-snows or ice; grow too thick, heat, wither, and foul within, dry and sticky especially; when it were more than time they were cut close to earth, for a fresh and verdant Spring; and this method is to be practis'd in all hedges whatsoever.

18. But would you yet improve the standard which I celebrate, to greater and more speedy exaltation? Bud your laurel on the black-cherry stock to what height you please: This I had from an ocular testimony, who was more than somewhat doubtful of such alliances; though something like it in Palladius speaks it not so impossible;

¹ A cherry graft on laurel-stock does stain
The virgin fruit in a deep double grain.

19. They are rais'd of the seeds or berries with extraordinary facility, or propagated by layers, *taleae*, and cuttings, set about the latter end of August, or earlier at St. James-tide, where-ever there is shade and moisture. Besides that of the wood, the leaves of this laurel boil'd in milk, impart a very grateful tast of the almond; and of the berry (or cherries rather, of which poultreys generally feed on) is made a wine, to some not unpleasant: I find little concerning the uses of this tree; of the wood are said to

¹ Inseritur lauro cerasus, partuque coacto
Tingit adoptivus virginis ora pudor.

be made the best plow-handles. Now that this rare tree was first brought from Civita Vecchia into England, by the Countess of Arundel, wife to that illustrious patron of arts and antiquities, Thomas Earl of Arundel and Surrey, Great Great Grand-Father to his Grace the present Duke of Norfolk, whom I left sick at Padoa, where he died ; highly displeas'd at his grand-son Philip's putting on the friars-frock, tho' afterwards the purple, when Cardinal of Norfolk : After all, I cannot easily assent to the tradition, tho' I had it from a noble hand : I rather think it might first be brought out of some more northerly clime, the nature of the tree so delighting and flourishing in the shady and colder exposures, and abhorrence of heat.

To crown this chapter then, tho' in the last place, (for so *finis coronat opus*) we reserve the bay tree.

20. Bays, [*laurus vulgaris*]. The learned Isaac Vossius and etymologists are wonderfully curious, in their conjecture concerning its derivation ; (*a laude* says Issidor,) and from the ingenious poet, we learn how it became sacred to Apollo, the patron of the wits, and ever since the meed of conquerors and heroic persons. But leaving fiction, we pass to the culture of this noble and fragrant tree, propagated both by their seeds, roots, suckers or layers : They (namely, the berries) should be gather'd dropping-ripe : Pliny has a particular process for the ordering of them, not to be rejected, which is to gather them in January, and spreading them till their sweat be over ; then he puts them in dung and sows them : As for the steeping in wine, water does altogether as well, others wash the seeds from their mucilage, by breaking and bruising glutinous berries ; then sow them in rich ground in

March, by scores in a heap ; and indeed so they will come up in clusters, but nothing so well, nor fit for transplantation, as where they are interr'd with a competent scattering, so as you would furrow pease : Both this way, and by setting them apart (which I most commend) I have rais'd multitudes, and that in the berries, kept in sand till the Spring, without any farther preparation ; only for the first two years, they would be defended from the piercing winds, which frequently destroy them ; and yet the scorching of their tender leaves ought not to make you despair, for many of them will recover beyond expectation ; nay, tho' quite cut down, they repullulate and produce young suckers : Such as are rais'd of berries, may at 3 years growth be transplanted ; which let alone too long, are difficult to take.

21. This aromatic tree greatly loves the mothers shade, (under which nothing else will prosper) yet thrives best in our hottest gravel, having once pass'd those first difficulties : Age, and culture about the roots, wonderfully augment its growth ; so as I have seen trees near thirty foot high of them, and almost two foot diameter. They make walking-staves, strait, strong and light, for old gentlemen ; and are fit also both for arbour and palisade-work, so the gardener understand when to prune and keep it from growing too woody. And here I cannot but take notice of those beautiful case-standards, which of late you have had out of Flanders, &c. with stems so even and upright ; heads so round, full, and flourishing, as seem to exceed all the topiary ornaments of the garden ; that one tree of them has been sold for more than twenty pounds ; tho' now the mystery reveal'd, the price be much abated : And doubtless as good might

be rais'd here, (without sending beyond-sea for them) were our gardeners as industrious to cultivate and shape them : Some there are, who imagine them of another species than our ordinary bay, but erroneously. I wonder we plant not whole groves of them, and abroad ; they being hardy enough, grow upright, and would make a noble *daphneon*. The berries are emollient, sovereign in affections of the nerves, collics, gargarisms, baths, salves, and perfumes : Bay-leaves dryed in a fire-pan, and reduc'd to a fine powder, as much as will cover half a crown, being drank in wine, seldom fail of curing an ague. And some have us'd the leaves instead of cloves, imparting its relish in sauce, especially of fish ; and the very dry sticks of the tree, strew'd over with a little powder or dust of sulphur, and vehemently rub'd against one another, will immediately take fire ; as will likewise the wood of an old ivy ; nay, without any intentive addition, by friction only.

21. Amongst other things, it has of old been observ'd that the bay is ominous of some funest accident, if that be so accounted which Suetonius (in *Galba*) affirms to have happen'd before the death of the monster Nero, when these trees generally wither'd to the very roots in a very mild winter: And much later, that in the year 1629, when at Padoa, preceding a great pestilence, almost all the bay-trees about that famous University grew sick and perish'd: *Certo quasi praesagio* (says my author) *Apollinem musaque subsequenti anno urbe illa bonarum literarum domicilio excessuras.* —But that this was extraordinary, we are told the emperor Claudius upon occasion of a raging pestilence, was by his physicians advis'd to remove his court to Laurentium, the aromattick emissions of that tree

being in such reputation for clearing the air, and resisting contagion ; upon which account I question not but Pliny (the nephew) was so frequently at his beloved Laurentium, so near the city. Besides, for their vertue against lightning, which Tiberius so exceedingly dreaded, that when it came with thunder, he would creep under his bed to avoid it, and shaded his head with the boughs. The story of the branch in the bill of the white-hen, let fall into the lap of Livia Drusilla, being planted, prosper'd so floridly, as made it reputed so sacred, as to use it for impaling the heads of the triumphing emperors, and to adorn the *limina* of the temples and royal palace of the great Pontiff ; and thence call'd *janitrices Caesarum* :

*Cum tandem apposita velantur limina lauro,
Cingit & Augustas arbor opaca fores !
Num quia perpetuos meruerunt ista triumphos ?*

As still at present in Rome and other cities, they use to trim up their churches and monastries on solemn festivals, when there is station and indulgences granted in honour of the saint or patron ; as also on occasion of signal victories, and other joyful tidings ; and those garlands made up with hobby-horse tinsel, make a glittering show, and rattling noise when the air moves them.

With the leaves of laurel, they made up their dispatches and letters, *laureis involutae*, wrapt in bay-leaves, which they sent to the senate from the victorious general : The spears, lances and *fascies*, nay, tents and ships, &c. were all dress'd up with laurels ; and in triumph every common-soldier carryed a sprig in their hand, as we may see in the ancient and best *bass-relievo* of the ancients, as of virtue to purge them

from blood and slaughter. And now after all this, might one conjecture by a mere inspection of those several sculps, statues, and medals yet exstant, representing the heads of emperors, poets, &c. the wreaths and coronets seem to be compos'd of a more flexible and compliant species than the common bay, and more applicable to the brows, except where the ends and stalks of the tender branch were tyed together with a *lemnisc* or ribbon. And there be yet¹ who contend for the Alexandrian laurel, and the *tinus* as more ductile; but without any good evidence. Pliny I find says nothing of this question, naming only the Cyprian and Delphic; besides, the figure, colour of the rind and leaf, crackling in the fire, which it impugns, (as 'tis said it does lightning) gives plainly the honour of it to the common bay. We say nothing of its sacred use in the Gentile lustration, purgation, and several other attributes.

To conclude;

² From laurel³ chew'd the Pythian priestess rose,
 Events of future actions to disclose.
 Laurel triumphant generals did wear,
 And laurel heralds in their hands did bear.
 Poets ambitious of unfading praise,
 Phoebus, the Muses all are crown'd with bays.
 And vertue to her sons the prize does name
 Symbol of glory, and immortal fame.

¹ Carol. *Avanti* not. in cornan' Bapt. Fiera.

² Tu sacros Phoebi tripodas, tu sidera sentis,
 Et casus aperis rerum praesaga futuros.
 Te juvat armorum strepitus, clangorque tubarum;
 Perque acies medias, saevique pericula belli,
 Accendis bellantûm animos; te Cynthius ipse,
 Te Musae, vatesque sacri optavêre coronam:
 Ipsa suis virtus te spem proponit alumnis,
 Tantûm servatus valuit pudor, & bona fama.

Rapinus.

³ *Daphnophagi* were such as after eating the leaves of the bay, became inspir'd.

I have now finish'd my planting : A word or two concerning their preservation, and the cure of their infirmities, expect in the following chapter.

CHAPTER VII.

Of the infirmities of trees, &c.

So many are the infirmities and sicknesses of trees, and indeed of the whole family of vegetables, that it were almost impossible to enumerate and make a just catalogue of them ; and as difficult to such infallible cures and remedies as could be desired ; the effects arising from so many, and such different causes : Whenever therefore our trees and plants fail and come short of the fruit and productions we expect of them, (if the fault be not in our want of care) it is certainly to be attributed to those infirmities, to which all elementary things are obnoxious, either from the nature of the things themselves, and in themselves, or from some outward injury, not only through their being unskillfully cultivated by men, and expos'd to hurtful beasts, but subject to be prey'd upon and ruin'd by the most minute and despicable insect, besides other casualties and accidents innumerable, according to the rustick rhyme,

The calf, the wind-shoc and the knot,
The canker, scab, scurf, sap and rot,

affecting the several parts : These invade the roots ; stony and rocky grounds, ivy, and all climbers, weeds,

suckers, fern, wet, mice, moles, winds, &c. to these may be added siderations, pestiferous air, fogs, excessive heat, sulphurous and arsenic smoak, and vapours, and other plagues, tumours, distortions, lacrymations, *tophi*, gouts, carbuncles, ulcers, crudities, fungosities, gangreens, and an army more, whereof some are hardly discernable, yet enemies, which not foreseen, makes many a bargain of standing-wood (though seemingly fair) very costly ware : In a word, whatsoever is exitial to men, is so to trees ; for the aversion of which, they had of old recourse to the *robigalia* and other Gentile ceremonies : but no longer abus'd by charmers and superstitious fopperies, we have in this chapter endeavoured to set down and prescribe the best and most approved remedies hitherto found out, as well natural as artificial.

And first, weeds are to be diligently pull'd up by hand after rain, whiles your seedlings are very young, and till they come to be able to kill them with shade, and over-dripping: And then are you for the obstinate, to use the haw, fork, and spade, to extirpate dog-grass, bear-bind, &c.

And here mentioning shade and dripping, though I cannot properly speak of them as infirmities of trees, they are certainly the causes of their unthriving till remov'd ; such as that of the oak and mast-holme, wall-nut, pine and fir, &c. the thickness of the leaves intercepting the sun and rain ; whilst that of other trees good, as the elm, and several other.

2. Suckers shall be duly eradicated, and with sharp spade dexterously separated from the mother roots, and transplanted in convenient places for propagation, as the season requires.

Here note, that fruit grafted upon suckers, are

more dispos'd to produce suckers, than such as are propagated upon good stocks.

3. Fern, is best destroy'd by striking off the tops, as Tarquin did the heads of the poppies : This done with a good wand, or cudgel, at the decrease in the Spring, and now and then in Summer, kills it (as also it does nettles) in a year or two, (but most infallibly, by being eaten down at its spring, by Scotch-sheep) beyond the vulgar way of mowing, or burning, which rather encreases, than diminishes it.

4. Over-much wet is to be drain'd by trenches, where it infests the roots of such kinds as require drier ground : But if a drip do fret into the body of a tree by the head (which will certainly decay it) cutting first the place smooth, stop and cover it with loam and hay, or a cerecloth, till a new bark succeed. But not only the wet, which is to be diverted by trenching the ground, is exitial to many trees, but their repletion of too abundant nourishment ; and therefore sometimes there may be as much occasion to use the lancet, as phlebotomy and venaesection to animals ; especially if the hypothesis hold, of the superfluous moisture's descent into the roots, to be re-concocted ; but where, in case it be more copious than¹ can be there elaborated, it turns to corruption, and sends up a tainted juice, which perverts the whole habit of the tree : In this exigence therefore, it were perhaps more counsellable to draw it out by a deep incision, and to depend upon a new supply, than upon confidence of correcting this evil quality, by other medications, to let it perish. Other causes of their sickness (not always taken notice of) proceed from too liberal refreshments and over-watering in dry and scorching seasons ; especially in

¹ See Cap. 3 lib. 3 sect. 25.

nurseries: The water should therefore be fitly qualify'd, neither brackish, bitter, stagnat, or putrid, sower, acrimonious, vitriolic, arenous and gravelly, churlish, harsh and lean; (I mention them promiscuously) and whatever vicious quality they are perceptibly tinctur'd and impregnate with, being by no means proper drink for plants : Wherefore a very critical examen of this so necessary an element (the very principle, as some think, and only nutriment of vegetables) ¹ is highly to be regarded, together with more than ordinary skill how to apply it : In order to which, the constitution and texture of plants and trees are philosophically to be consider'd; some affecting macerations with dung and other mixtures (which I should not much commend) others quite contrary, the quick and running spring, dangerous enough, and worse than snow-water, which is not in some cases to be rejected : Generally therefore that were to be chosen, which passing silently through ponds and other receptacles, exposed to the sun and air, nearest approaching to that of rain, dropping from the uberous cloud, is certainly the most natural and nursing : As to the quantity, some plants require plentiful watering, others, rather often, than all at once; all of them sucking it in by the root for the most part, which are their mouths, and carry it thence through all the canals, organs and members of the whole vegetable body, digested and qualified so as to maintain and supply their being and growth, for the producing of whatever they afford for the use of man, and other living creatures.

5. The bark-bound are to be released by drawing your knife rind-deep from the root, as far as you can conveniently, drawing your knife from the top downwards half-way, and at a small distance, from the bottom up-

¹ See Cap. 2 Book I.

wards, the other half; this, in more places, as the bulk of the stem requires; and if crooked, cut deep, and frequent in the ham; and if the gaping be much filling the rift with a little cow-dung; do this on each side, and at Spring, February or March : Also cutting off some branches is profitable ; especially such as are blasted, or lightning-struck : If (as sometimes also) it proceed from the baking of the earth about the stem, lighten, and stir it.

6. The *teredo*, *cossi*, and other worms, lying between the body and the bark, (which it separates) poyson that passage to the great prejudice of some trees; but the holes being once found, they are to be taken out with a light incision, the wound covered with loam; or let the dry-part of the wood (bark and all) be cut: applying only a wash of piss and vinegar twice or thrice a week during a month : The best means to find out their quarters, is to follow the wood-pecker, and other birds, often pitching upon the stem (as you may observe them) and knocking with their bills, give notice that the tree is infected, at least, between the bark. But there are divers kinds of these *ξύλόφαγοι* of which the *τερηδών* or *tarmes* we have mentioned, will sometimes make such a noise in a tree, as to awaken a sleeping man : The more rugous are the *cossi*, of old had in *deliciis* amongst the epicures, who us'd to fatten them in flower; and this, (as Tertullian, and S. Hierom tells us) was the chief food of the *hierophantae Cereris*; as they are at this day a great *regalo* in Japan : In the mean time, experience has taught us, that *millipedes* wood-lice (to be plentifully found under old timber-logs, being dry'd and reduc'd to powder, and taken in drink) are an admirable specific against the jaundies, scorbut, &c. to purifie the blood, and clarifie the sight.

There is a pestilent green-worm which hides it self in the earth, and gets into pots and cases, eating our seedlings, and gnawing the very roots, which should be searched out : And now we mention roots, overgrown toads will sometimes nestle at the roots of trees, when they make a cavern, which they infect with a poysonous vapour, of which the leaves famish'd and flagging give notice, and the enemy dug out with the spade: But this chiefly concerns the gardners mural fruit-trees ; though I question not but that even our forest-trees suffer by such pernicious vapours, rats, and other stinking vermine making their nests within them. But of all these, let our industrious planter, (especially the learned favourers of the most refined parts of horticulture) consult the Discourses and experiments of *Sign. Fran. Redi*, *Malphigius*, *Levenhock*, *Swamerdam*, &c. with our own learned Doctors, *Lyster*, *Sloane*, *Hook*, (and other sagacious naturalists) to shew, that none of these diseases and infirmities in plants proceed from any pure accidental, but real cause ; *flatus*, venemous liquor, and infections : Which some, even of the minutest animals, are provided with instruments to pierce the very solid substances of trees and plants, and infuse their pestiferous taint; where likewise they leave their eggs, boaring those nestling places with a certain *terebra*, where we find those innumerable perforations which we call worm-eaten ; the wider *latebrae* are made by *erucae*, caterpillars, ants, and bigger insects, raising morbid tumors and excrescences, and preying upon the fruit, as well as on the leaves, buds and flowers, so soon as their eggs are hatch'd, when they creep out of their little caverns in armies, like the Egyptian locusts, invading all that's green, and tender rudiments first, and then

attacking the tougher and solider parts of vegetables: To those learned persons above, we may not forget the late worthy and pious Mr. Ray, where in the second part of his treatise, of the *Wisdom of God in the Creation*, we have a brief, but ingenious account of what concerns this subject, together with what is added about spontaneous productions of these despicable animals, to which I refer the curious.

Trees (especially fruit-bearers) are infested with the measels, by being burned and scorched with the sun in great drougths: To this commonly succeeds lousiness, which is cur'd by boring an hole into the principal root, and pouring in a quantity of brandy, stopping the orifice up with a pin of the same wood.

Crooked trees are reform'd by taking off or topping the præponderers, whilst charg'd with leaves, or woody and hanging counterpoises.

Excorticated and bark-bared trees, may be preserved by nourishing up a shoot from the foot, or below the stripped place, and inserting it into a slit above the wounded part; to be done in the Spring, and secur'd from air, as you treat a graff: This I have out of the very industrious Mr. Cook, p. 48. But Dr. Merret brought us in this relation to the Royal Society, that making a square section of the rinds of ash, and sycomore (March 1664,) whereof three sides were cut, and one not, the success was, that the whole bark did unite, being bound with pack-thread, leaving only a scar: But being separated intirely from the tree, namely several parts of the bark, and at various depths, leaving on some part of the bark, others cut to the very wood it self, being tied on as the former, a new rind succeeded in their place; but what was cover'd over beyond the places of incision with

diachylon plaister, and also bound as the rest, did within the space of three weeks, unite to the tree, tho' with some shriveling and scar: The same experiment try'd about Michaelmas, and in the Winter, came to nothing : Where some branches were decorticated quite round, without any union, a withering of the branch beyond the incision, ensu'd : Also a twig separated from a branch, with a sloping cut, and fastn'd to it again in the same posture, bound and cover'd with the former plaister, wither'd in three days time : Among other easie remedies, a cere-cloth of fresh-butter and hony, apply'd whilst the wound is green, (especially in Summer) and bound about with a thrum-rope of moist hay, and rubb'd with cow-dung has healed many : But for rare and more tender trees, after pruning, take purely refined tallow, mingled and well harden'd with a little loamy earth, and horse-dung newly made.

Dr. Plot speaks of an elm growing near the bowling-green at Magdalen-College, quite round disbark'd almost for a yard near the ground, which yet flourishes exceedingly ; upon which he dilates into an accurate discourse, how it should possibly be ; all trees being held to receive their nutrition between the wood and the bark, and to perish upon their separation ; this tree being likewise hollow as a drum, and its outmost surface (where decorticated) dry, and dead. The solution of this phaenomenon (and to all appearance, from the verdant head) could not have been more philosophically resolv'd, than by the hypothesis there produc'd by the Doctor, who assures me, he was yet deliberating whether the tree being hollow, it might not possibly proceed from some other latent cause, as afterwards he discover'd when having obtain'd per-

mission to open the body of it, he found another elm, letting down its stem all the length of this empty case, and striking root when it came to the earth, from whence it deriv'd nourishment, maintains a flourishing top, and has (till now) pass'd for a little miracle, as it still may do for a thing extraordinary, and rare enough ; considering not only its passage, and how it should come there, unless haply some of the *samera*, or seed of the old tree (when pregnant) should have luckily fallen down within the hollow pipe, or (as might be conjectur'd) from some sucker springing of a juicy root : But the strange incorporating of the superior part of the bole, with the old hollow tree which embraces it, not by any perceptible roots, but as if it were but one body with it, whilst the rest of the vaginated stem touches no other part of the whole cavity, till it comes to the ground, is surprizing. This being besides very extraordinary, that a tree, which naturally grows taper as it approaches the top, should swell, and become bigger there than it is below. But this the Doctor will himself render a more minute account of in the next impression of that excellent piece of his ; nor had I anticipated it on this occasion, but to let the world know (in the mean time) how ingenuously ready he is to acknowledge the mistake, as he has been successful in discovering it.

Deer, conies, and hares, by barking the trees in hard Winters, spoil very many tender plantations : Next to the utter destroying them, there is nothing better than to anoint that part which is within their reach, with *stercus humanum*, tempered with a little water, or urine, and lightly brushed on ; this renewed after every great rain : But a cleanlier than this, and

yet which conies, and even cattle most abhor, is to water, or sprinkle them with tanners liquor, *viz.* that, which they use for dressing their hides ; or to wash with slak'd lime and water, altogether as expedient : Also to tye thumb-bands of hay and straw round them as far as they can reach.

8. Moss, (which is an adnascent plant) is to be rubb'd and scrap'd off with some fit instrument of wood, which may not excorticate the tree, or with a piece of hair-cloth after a sobbing rain ; or by setting it on fire with a wisp of straw, about the end of December, if the season be dry, as they practise it in Stafford-shire ; but the most infallible art of emuscation, is taking away the cause, (which is superfluous moisture in clayie and spewing grounds) by dressing with lime.

9. Ivy is destroy'd by digging up the roots and loosning its hold : And yet even ivy it self (the destruction of many fair trees) if very old, and where it has long invested its support, if taken off) does frequently kill the tree, by a too sudden exposure to the unaccustom'd cold : Of the roots of ivy (which with small industry may be made a beautiful standard) are made curiously polish'd, and fleck'd cups and boxes, and even tables of great value. Misselto, and other excrescences to be cut and broken off. But the *fungi* (which prognosticate a fault in the liver and entrails of trees, as we may call it) is remedied by abrasion, friction, interlucation and exposure to the sun.

10. The bodies of trees are visited with canker, hollowness, hornets, earwigs, snails, &c.

11. The wind-shock is a bruise, and shiver throughout the tree, though not constantly visible, yet leading the warp from smooth renting, caused by

over-powerful winds, when young, and perhaps, by subtil lightnings, by which the strongest oaks (and other the most robust trees) are fain to submit, and will be twisted like a rope of hemp, and therefore of old not us'd to kindle the sacrifice. The same injury trees likewise often suffer by rigorous and piercing colds and frosts ; such as in the year 1683, rived many stately timber-trees from head to foot ; which as the weather grew milder, clos'd again, so as hardly to be discern'd ; but were found at the felling miserably shatter'd, and good for little : The best prevention is shelter, choice of place for the plantation, frequent shreading, whilst they are yet in their youth. Wind-shaken is also discover'd by certain ribs, boils and swellings on the bark, beginning at the foot of the stem, and body of the tree, to the boughs. But against such frosts and fire from heaven there is no charm.

12. Cankers, of all other diseases the most pernicious, corroding and eating to the heart, and difficult to cure, whether (caused by some stroak, or galling, or by hot and burning land) are to be cut out to the quick, the scars emplastred with tar mingled with oyl, and over that, a thin spreading of loam ; or else with clay and horse-dung ; but best with hogs-dung alone, bound to it in a rag ; or by laying wood-ashes, nettles, or fern to the roots, &c. You will know if the cure be effected, by the colour of the wounds growing fresh and green, and not reddish : But if the gangreen be within, it must be cured by nitrous, sulphureous and drying applications, and by no means, by any thing of an unctious nature, which is exitial to trees : Tar, as was said, only excepted, which I have experimentally known to preserve trees from the

envenom'd teeth of goats, and other injuries ; the entire stem smear'd over, without the least prejudice, to my no small admiration : But for over-hot and torrid land, you must sadden the mould about the root with pond-mud, and neats-dung ; and by graffing fruit trees on stocks rais'd in the same mould, as being more homogeneous.

13. Hollowness, is contracted, when by reason of the ignorant, or careless lopping of a tree, the wet is suffer'd to fall perpendicularly upon a part, especially the head, or any other part or arms, in which the rain getting in, is conducted to the very heart of the stem and body of the tree, which it soon rots : In this case, if there be sufficient sound wood, cut it to the quick, and close to the body cap the hollow part with a tarpaulin, or fill it with good stiff loam, horse-dung and fine hay mingled, or with well-temper'd mortar, covering it with a piece of tarpaulin : This is one of the worst of evils, and to which the elm is most obnoxious. Old broken boughs, if very great, are to be cut off at some distance from the body, but the smaller, close.

14. Hornets and wasps, &c. by breeding in the hollowness of trees, not only infect them, but will peel them round to the very timber, as if cattle had unbark'd them, as I observed in some goodly ashes at Casioberry (near the garden of that late noble Lord, and lover of planting, the Earl of Essex), and are therefore to be destroy'd, by stopping up their entrances with tar and goose-dung, or by conveying the fumes of brimstone into their cells : *Cantharides* attack the ash above all other bobs of the betle kind : Chafers, &c. are to be shaken down and crush'd, and when they come in armies, (as sometimes in

extraordinary droughts) they are to be driven away or destroy'd with smoaks ; which also kills gnats and flies of all sorts : Note, that the rose-bug never, or very seldom, attacks any other tree, whilst that sweet bush is in flower: Whole fields have been freed from worms by the reek and smook of ox-dung wrapt in mungy straw, well soak'd with strong lie.

15. Earwigs and snails do seldom infest forest-trees, but those which are fruit-bearers ; and are destroy'd by setting boards or tiles against the walls, or the placing of neat-hoofs, or any hollow thing upon small stakes ; also by enticing them into sweet waters, and by picking the snails off betimes in the morning, and rainy evenings ; I advise you visit your cypress-trees on the first rains in April ; you shall sometimes find them cover'd with young snails no bigger than small pease: Lastly, branches, buds and leaves extreamly suffer from the blasts, jaundies, and catterpillars, locusts, rooks, &c. Note, that you should visit the boards, tiles and hoofs which you set for the retreat of those insects, &c. in the heat of the day, to shake them out, and kill them.

16. The blasted parts of trees (and so should gum) be cut away to the quick ; and to prevent it, smook them in suspicious weather, by burning moist straw with the wind, or rather the dry and superfluous cuttings of aromatic plants, such as rosemary, lavender, juniper, bays, &c. I use to whip and chastise my cypresses with a wand, after their winter-burnings, till all the mortified and scorch'd parts fly-off in dust, as long almost as any will fall, and observe that they recover and spring the better. Mice, moles and pismires cause the jaundies in trees, known by the discolour of the leaves and buds.

17. The moles do much hurt, by making hollow passages, which grow musty, but they may be taken in traps, and kill'd, as every woodman knows : It is certain that they are driven from their haunts by garlick for a time, and other heady smells, buried in their passages.

18. Mice, rats, with traps, or by sinking some vessel amost level with the surface of the ground, the vessel half full of water, upon which let there be strew'd some hulls, or chaff of oats ; also with bane, powder of orpiment in milk, and aconites mix'd with butter : *Cop'ras* or green-glass broken with honey : Morsels of sponge chopp'd small and fry'd in lard, &c. are very fit baits to destroy these nimble creatures, which else soon will ruin a semination of nuts, acorns and other kernels in a night or two, and rob the largest beds of a nursery, carrying them away by thousands to their cavernous magazines, to serve them all the Winter : I have been told, that hop-branches stuck about trees, preserve them from these theivish creatures.

19. Destroy pismires with scalding water, and disturbing their hills, or rubbing the stem with cowdung, or a decoction of *tithymale*, washing the infested parts ; and this will insinuate, and chase them quite out of the chinks and crevices, without prejudice to the tree, and is a good prevention of other infirmities ; also by laying soot, sea-coal, or saw-dust, or refuse tobacco where they haunt, often renew'd, especially after rain ; for becoming moist, the dust and powder harden, and then they march over it.

20. Caterpillars, by cutting off their webs from the twigs before the end of February, and burning them ; the sooner the better : If they be already hatched,

wash them off with water, in which some of the caterpillars themselves, and garlick have been bruis'd, or the juice of rue, decoctions of *colloquintida*, hemp-seed, worm-wood, tobacco, wall-nut-shells, when green, with the leaves of sage, urine and ashes, and the like aspersions. Take of two or three of the ingredients, of each an handful in two pails of water; make them boil in it half an hour, then strain the liquor, and sprinkle it on the trees infected with caterpillars, the black-flea, &c. in two or three times it will clear them, and should be us'd about the time of blossoming. Another, is to choak and dry them with smoak of *galbanum*, shoo-soals, hair; and some affirm that planting the pionie near them, is a certain remedy; but there is no remedy so facile, as the burning them off with small wisps of dry straw, which in a moment rids you.

21. Rooks do in time, by pinching off the buds and tops of trees for their nests, cause many trees and groves to decay: Their dung propagates nettles and choaks young seedlings: They are to be shot, and their nests demolish'd. The bullfinch and titmouse also eat off and spoil the buds of fruit-trees; prevented by clappers, or caught in the wyre mouse-trap with teeth, and baited with a piece of rusty bacon, also with lime-twigs. But if cattle break in before the time, *conclamatum est*, especially goats, whose mouths and breath is poison to trees; they never thrive well after; and Varro affirms, if they but lick the olive-tree, they become immediately barren. And now we have mention'd barrenness, we do not reckon trees to be sterile, which do not yield a fruitful burden constantly every year (as juniper and some annotines do) no more than of pregnant women: Whilst that is to be ac-

counted a fruitful tree which yields its product every second or third year, as the oak and most forresters do ; no more may we conclude that any tree or vegetable are destitute of seeds, because we see them not so perspicuously with our naked eyes, by reason of their exility, as with the nicest examination of the microscope.

22. Another touch at the winds ; for though they cannot properly be said to be infirmities of trees ; yet they are amongst the principal causes that render trees infirm. I know no surer protection against them, than (as we said) to shelter and stake them whilst they are young, till they have well establish'd roots ; and with this caution, that in case any goodly trees (which you would desire especially to preserve and redress) chance to be prostrated by some impetuous and extraordinary storm ; you be not over-hasty to carry him away, or despair of him ; (nor is it of any ominous concern at all, but the contrary) *fausti ominis*, as Pliny says ; and gives many illustrious instances : And as to other strange and unusual events following the accidental subversion of trees ; concerning omens ; and that some are portentous, others fortunate, of which see¹ Pierius, speaking of a garden of the Duke of Tuscany, belonging to a palace of his at Rome, a little before the death of Pope Leo ; and before this, about the time of our country-man, Pope Adrian the IVth. First then, let me perswade you to pole him close, and so let him lie some time ; for by this means, many vast trees have rais'd themselves by the vigour only of the remaining roots, without any other assistance ; so as people have pronounc'd it miraculous, as I could tell you by several instances, besides what

¹ *Hierog.* l. 50.

Theophrastus relates, l. 5. c. 19. of that huge *platanus*, which rose in one night in his observation ; which puts me in mind of what I remember the very learned critic Palmerius affirms of an oak, subverted by a late tempest near Breda, (where this old soldier militated under Prince Maurice, at the town when besieg'd by the famous Marq. Spinola) which tree, after it had lain prostrate about 2 months, (the side-branches par'd off) rose up of it self, and flourish'd as well as ever. Which event was thought so extraordinary, that the people reserved sprigs and boughs of it, as sacred reliques ; and this he affirms to have seen himself. I take the more notice of these accidents, that none who have trees blown down, where it may cause a deform'd gap in some avenue near their seats, may not altogether despair of their resurrection, with patience and timely freeing them. And the like to this I find happen'd in more than one tree near Bononia in Italy, *anno* 1657. when of late a turbulent gust had almost quite eradicated a very large tract of huge poplars, belonging to the Marchioness Elephantucca Spada, that universally erected themselves again, after they were beheaded, as they lay even prostrate. ¹ What says the naturalist ? *Prostratas restitui plerumque, & quadam terrae cicatrice revidiscere, vulgare est :* 'Tis familiar (says Pliny) in the *platanus*, which are very obnoxious to the winds, by reason of the thickness of their branches, which being cut off and discharged, restore themselves. This also frequently happens in wall-nuts, olive-trees, and several others, as he affirms, l. 16. c. 31. But we have farther instances than these, and so very lately as that dreadful storm happening 26 Nov. 1703, when after so many thousand oaks, and other timber-

¹ See cap. 4. lib. 2. of a cypress.

trees were quite subverted, a most famous and monstrous, oak growing at Epping in Essex, (blown down) raised it self, and withstood that hurricane. These (amongst many others) are the infirmities to which forest-trees are subject, whilst they are standing ; and when they are fell'd, to the worm ; especially if cut before the sap be perfectly at rest : But to prevent or cure it in the timber, I commend this secret as the most approv'd.

23. Let common yellow sulphur be put into a cucurbit-glass, upon which pour so much of the strongest *aqua-fortis*, as may cover it three fingers deep : distil this to dryness, which is done by two or three rectifications : Let the sulphur remaining in the bottom (being of a blackish or sad-red colour) be laid on a marble, or put into a glass, where it will easily dissolve into oil : With this, anoint what is either infected, or to be preserved of timber. It is a great and excellent *arcanum* for tinging the wood with no unpleasant colour, by no art to be washed out ; and such a preservative of all manner of woods ; nay, of many other things ; as ropes, cables, fishing-nets, masts of ships, &c. that it defends them from putrefaction, either in waters under or above the earth, in the snow, ice, air, Winter or Summer, &c. It were superfluous to describe the process of the *aqua-fortis* ; It shall be sufficient to let you know, that our common *coperas* makes this *aqua-fortis* well enough for our purpose, being drawn over by a retort : And for sulphur, the Island of St. Christophers yields enough, (which hardly needs any refining) to furnish the whole world. This secret (for the curious) I thought fit not to omit ; though a more compendious, three or four anointings with linseed-

oyl, has prov'd very effectual : It was experimented in a wall-nut-table, where it destroy'd millions of worms immediately, and is to be practis'd for tables, tubes, mathematical-instruments, boxes, bed-steads, chairs, rarities, &c. Oyl of wall-nuts will doubtless do the same, is sweeter, and a better varnish ; but above all, is commended oyl of cedar, or that of juniper ; whilst oyl of spike does the cure as effectual as any.

But after all these sweeping plagues and destructions inflicted on trees, (braving all humane remedies) such frosts as not many years ¹ since hap'ned, left such marks of their deadly effects, not sparing the goodliest and most flourishing trees, timber, and other of the stoutest kind ; as some ages will hardly repair : Nay, 'twas observ'd, that the oak in particular (counted the most valiant and sturdy of the whole forest) was more prejudic'd with this excessive cold, and the drowth of the year ensuing, than any of the most nice and tender constitution : Always here excepting (as to a universal *strages*) the hurricane of Sept. 1703, which begins the epocha of the calamities, which have since follow'd, not only by the late tempest about August ² last, but by that surprizing blast, accompany'd doubtless with a fiery spirit, which smote the most flourishing foresters and fruit trees, burning their buds and leaves to dust and powder, not sparing the very fruit. This being done in a moment, must be look'd upon as a plague not to be prevented : In the mean time, that the malignity proceed no farther, it may be advisable to cut, and top the summities of such tender mural trees, rare shrubs, &c. as have

¹ 1683.

² 1705.

most suffer'd, and are within reach, rubbing off the scorchings in order to new spring.

There was in my remembrance, certain prayers, litanies and collects, solemnly us'd by the parish-minister in the field, at the limits of their perambulations on the Rogation-days; from an ancient and laudable custom of above 1000 years, introduc'd by Avitus the pious bishop of Vienna, in a great dearth, unseasonable weather, and other calamities, (however in tract of time abus'd by many gross superstitions and insignificant rites, in imitation of the pagan *robigo*) upon which days, (about the Ascension, and beginning of Spring especially) prayers were made, as well deprecatory of epidemical evils, (amongst which blasts and smut of corn were none of the least) as supplications for propitious seasons, and blessings on the fruits of the earth. Whether there was any peculiar *Office*, (besides those for Ember-weeks) appointed, I do not know: But the pious and learned bishop of Winchester, [Andrews] has in his *Devotions*, left us a prayer so apposite and comprehensive for these emergencies, that I cannot forbear the recital.

Remember, O Lord, to renew the year with thy goodness, and the season with a promising temper: For the eyes of all wait upon thee, O Lord: Thou givest them meat; thou openest thy hand, and fillest all things living with thy bounty. Vouchsafe therefore, O Lord, the blessings of the heavens, and the dews from above: The blessings of the springs, and the deep from beneath: The returns of the sun, the conjunctions of the moon: The benefit of the rising mountains, and the lasting hills: The fullness of the earth, and all that breed therein.

A fruitful season,
 Temperate air,
 Plenty of corn,
 Abundance of fruits,
 Health of body, and
 Peaceable times,
 Good, and wise government,
 Prudent counsels,
 Just laws,
 Righteous judgments,
 Loyal obedience,
 Due execution of justice,
 Sufficient store for life,
 Happy births,
 Good, and fair plenty,
 Breeding and institution of children :

That our sons may grow up as the young plants, and our daughters may be as the polished corners of the Temple : That our garners may be full and plenteous with all manner of store : That our sheep may bring forth thousands : That our oxen may be strong to labour : That there be no decay ; no leading into captivity ; no complaining in our streets : But that every man may sit under his own vine, and under his own fig-tree, in thankfulness to thee ; sobriety and charity to his neighbour ; and in whatsoever other estate, thou wilt have him, therewith to be contented : And this for Jesus Christ his sake, to whom be glory for ever, Amen.

24. Thus hitherto I have spoken of trees, their kinds, and propagation in particular ; with such prescriptions for the cure and healing their infirmities, as from long and late experience have been found

most effectual. Now a word or two concerning the laws relating to forest-trees, casting such other accidental lessons into a few aphorisms, as could not well be more regularly inserted.

Lastly, I shall conclude with some more serious observations, in reference to the main design and project of this discourse, as it concerns the improvement of the royal forests, and other timber-trees, for the honour, security, and benefit of the whole kingdom ; with an historical account of standing-groves, which will be the subject of the next books.



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