PINACEÆ.

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PINACEÆ:

BEING A

HANDBOOK OF THE FIRS AND PINES.

BY

SENILIS.

Creation's God shall creature strain declare?
The GREAT FIRST CAUSE of water, earth and air!
Hence living fungi, lichens, musci, trees,
And germs and foes akin existences!
* * * * * *
Shine on, sweet Nature, infinite thy store!
Yet, fond I follow with my finite lore:
And here this pen thy lab'rinth path defines
As it hath trac'd it 'mid the FIRS *and* PINES.

LONDON:
PUBLISHED FOR THE AUTHOR
BY
HATCHARD AND CO., 187, PICCADILLY.
Booksellers to H.R.H. the Princess of Wales.
1866.

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JOHANNES SENILIS,

LYMINGTON, HANTS.

PREFACE.

Being a farmer's only son, I was, when a boy, tolerably well grounded in reading, writing, and arithmetic, in a country school; and just when entering my teens my parents ofttimes conferred together, and eventually decreed that I should be sent to modern Athens to obtain learning and equipment for the pulpit. The spade, however, was more consonant to my young ideas than the pen; and the country had in my estimation more charms than the town; and the mute sermons of trees, and the mellifluous songs of birds, had more endearments for the rustic boy, who, being from infancy an ardent lover of Dame Nature, elected arboriculture as a profession. Such being the case, I am, as a matter of course, a working, and, to a certain extent, a self-educated man; having no claims to the title of a proficient, either in literature or botanical science; nor is my present appearance as a public instructor chiefly of my own choice, nor my object a mercenary one: the preparation of the following pages for the press has been to me a labour of love, inasmuch as Pinaceæ have always been my especial favourites, and in my estimation the most noble, valuable, and lovable of Nature's arboral productions. My present appearance, therefore, must needs be considered as a practical writer upon this branch of the arboricultural art practically considered, although I have dared to criticise, nay, to condemn, the dicta of many learned men, and many of my literary and botanical peers; for which grave offence, no doubt, I shall incur their great displeasure, and, as a matter of course, get most severely lectured and criticised for my presumption. As, however, I write for practical readers, I care but little for what *theoretical botanists*, or *literary pedants*, may maintain against me.

No nation, and no people, whether in the ancient, mediæval, or modern ages of the world's history, have ever attained to such a high degree of proficiency, nay, perfection, in the arts of agriculture and horticulture, than is now prevalent in Great Britain; and it seems somewhat anomalous that arboriculture, in this progressive, expansive, diffusive, and utilitarian age, should still keep lagging behind the two kindred arts in the march of improvement; for it cannot be denied that much has yet to be done for arboriculture before we can raise forestry to the high rank as a cultural art which its national importance and intrinsic merits as a branch of rural economy imperatively demands.

Arboriculture has many wants. One of these is a Handbook of the Firs and Pines, giving their distinctive characteristics, and the best modes of growing them; with brief practical notes on their hardiness, and on the soils and situations most suitable for them; showing such kinds as are of economic value for their timber, and such as are useful for ornamental planting in the climate of Great Britain and Ireland: also, a natural and common-sense classification and nomenclature of them, with an alphabetical list or index of the names of all the genera, species, quasi-species, varieties, and sub-varieties, and all the synonyms or aliases by which they are at present known; comprising a brief and practical summary of all that is desirable or necessary for the British Arboriculturist to know concerning the Firs and Pines of the world to the present date; and all this in a portable form, and at a reasonable price.

This, it is universally admitted, is a desideratum which has not yet been supplied; though many very laudable endeavours have been made to accomplish the task; all of which, however, have failed in the performance, from the simple fact that it is one of those complex subjects which requires not only a theoretical, but likewise a practical knowledge, thoroughly and correctly to treat of it; and the three-score and ten, or, perchance, four-score years, allotted to us on earth, is much too short a period to learn all that pertains to the cultivation and conversion of the Firs and Pines. Hence the laudable attempts of most modern writers to remove obscurity have, in good sooth, only added to its shade. Nor is this much to be wondered at; for when we come to consider the very numerous and very variable genera and species of Pinaceæ, and the many quasi-species, varieties, and sub-varieties,

and the innumerable synomyms or aliases in which the Firs and Pines are at present confounded, no other term is so appropriate or truthful as *chaos*, which to attempt to reduce to *perfect* order were a somewhat Herculean task, and a very bold enterprize; and the author who should *perfectly* perform it would deserve well of his country, and be legitimately entitled to a niche in the temple of Fame.

Excelsior, however, not *Perfectio*, is my present motto; and you, my readers, are and shall be my judges; and in opening the case for my present client, I must needs declare to you, for I have as yet only indicated "the reason why" this volume is now placed before you at the bar of public opinion, which is simply this:—The Scottish Arboricultural Society has for some years past offered a prize for the best Essay upon "The Introduction and Cultivation of the newer Coniferæ, with special reference to the climate of Great Britain and Ireland;" and having often been requested by many of my arboricultural patrons, friends, and professional brethren, to enter the lists as a competitor, I was at last induced to do so; and, during the autumn of 1864, sent in the subject matter of the following pages, under the motto, "Wave your tops, ye Pines;" to which the Judges on Essays awarded the first prize. The Essay was, however, accompanied by a code of conditions on my part, subject to which I entered as a competitor; the chief of which was my retaining the *Copyright*. To this the Publishing Committee objected, and I was by them requested to withdraw the stipulation. This, however, I declined to do, and the consequence was, I won the *honour*, and forfeited the *gold;* and by so doing I neither propitiated nor satisfied my patrons, friends, or professional brethren; for renewed requests became common as blackberries for the publication of my new-fangled ideas upon the Firs and Pines. Again, for a time, I resisted the temptation to rush into print; but as pressure increased, I became more disposed to do so, although I had an intention, which in due course will be carried out, that much of this book should, D.V., re-appear in my more carefully compiled and elaborate works, "The Ligneous Trees and Shrubs of the World," and "The British Arboriculturist;" upon which works, in my leisure hours, I am now engaged. It has, however, occurred to many, and is suggested to me, that this volume, published in its present form, and fully treating of this particular and important

branch of the arboricultural art, will supply a present and pressing want at a nominal price, hence its present publication.

After a fair and impartial hearing, I shall, I doubt not, receive a fair and impartial sentence from you, my readers and judges, upon the merits and demerits, the accomplishment or failure, of my present endeavour to supply a HANDBOOK OF THE FIRS AND PINES, in this my transformed PRIZE ESSAY and MAIDEN VOLUME.

As this book is designed and published to supply a concise summary of, at least, so much knowledge as every British Aboriculturist ought to have concerning the Firs and Pines, the author has been careful to explain the meaning of any technical term he may employ. Simplicity of language, therefore, and brief but comprehensive descriptions, as well as concise notes respecting the habits, uses, and products of this tribe of trees and shrubs, have been necessary. In almost every case where the term or word "SEE" is used in the "Alphabetical List," it refers the name of the alias or synonym to the *species* to which it belongs; and the synonyms are only given in the Appendix, so as to save space, expense, and unnecessary repetitions; for had all the synonyms and the authorities for them been inserted in the body of the work, it would have overgrown its present dimensions, and far exceeded its present price. It will be observed that "botanical arrangement" has in every case been employed as the servitor of "alphabetical order," each in their turn and place being engaged in the service of Arboriculture as a practical art.

SENILIS.

Rinefield, Lymington, Hants,
January, 1866.

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INTRODUCTION.

In past ages of the world's history the cultivation and planting of trees was more generally the work of Nature, than the art of man as an arboriculturist, and even in our country it is but of a comparatively recent date that the art of tree culture has received much more attention from us than our forefathers were in the habit of bestowing upon it. Doubtless, there have been, in past times, nay, even in our own day, there are, many counteracting influences at work which have much retarded the progressive development of arboriculture as compared with the kindred arts agriculture and horticulture; but capital and knowledge, acted upon by perseverance, can, and eventually will, do for forestry, what has already been done for farming and gardening; for it is a good omen, in this utilitarian age of ours, when most transactions are regulated and finally perfected or exploded by the all-powerful influence of that phenomenon,—the three magical letters *L. S. D.* and when Iron *versus* Wood is so engrossing the national mind, that such *old saws* as:—"The planter of trees benefits not himself but his posterity," or:—"Tree planting is not profitable;" are one after another being consigned to the limbo of the past; and all antiquated prejudices and rule-of-thumb forestry are now fast making way for practical arboriculture.

Yes, Britain, great thou art, yet, far greater shalt thou be, in that happy day, when thou canst show the nations of the world, and their culturist, that such of thy lands as are capable of, and required for growing food for man and animals are so employed, and such as can be appropriated shall be covered with good and profitable crops of Firs, and Pines, and other woodland verdure; adding much to thy national wealth, health, and happiness, and the natural beauty of thy sea-girt isles: and when the noble Stag, the beautiful Pheasant, the leaping Hare, the moorland Grouse, the pretty Partridge, the lowland Snipe, the much-prized Woodcock, the jovial Blackcock, the plump Greyhen, and the

cunning Fox shall have in their flight or chase an ambrosial shade and chance retreat, (which methinks I hear them whisper,—are essential in all true sport;) in the scattered and unformal groups of firs and pines, or other proper arboral growths, which shall change thy dreary plains and naked hills from barren wastes to picturesque landscapes; and when thy noble and manly arts of hunting and shooting shall be practised more consonant to the instincts of a noble people, as patrician games and exhilarating work; not as now too common—plebeian battuing; or, perchance, a more appropriate phrase—a mercenary labour: and when not only the value, but likewise the pleasures derived from thy landed property, shall be greatly increased by arboriculture being elevated to its true and legitimate rank as an art; when firs and pines, and all other arboral products shall be planted in the proper place, and the right species in the right spot, whether for utility or adornment, profit or pleasure; or as shelter or food for biped or quadruped, domesticated or wild.

During the last half century no branch of arboriculture has received so great a stimulus as, or has been more popular than, the introduction and cultivation of *Coniferæ* so-called: this patronage, however, is not to be attributed to our appreciation of them as valuable timber trees; but to our admiration of them as ornamental trees. Excepting, however, the cereals, esculents, and fruits of agriculture and horticulture, there is no family of plants of more intrinsic importance or economic value to us as a nation in our present utilitarian, yet, highly refined condition.

For profitable planting in the climate, soils, and altitudes of Britain, few, if any, genera or species of trees are better adapted than some of the species of this family; inasmuch as we can here select trees which are thoroughly hardy, good and sound constitutioned; of large dimensions and very rapid growth; and not too discriminating in their choice of soils or situations: some of which produce timber the most durable, strong, elastic, close-grained, long-fibred, easily wrought and capable of receiving the highest polish; not subject to incipient decay, and free from the ravages of wood-vermin that are parasitical to all known woods: for general utility the timber of some of them is not surpassed by that of any other trees; for I know of but few architectural, arts—useful or mechanical, rural or domestic purposes to which timber can be converted but the material for such conversion can be selected from amongst the woods produced by the firs and pines.

The arts and manufactures are much indebted to **Pinaceæ** for many of their staples; for from this group we obtain the various resinous juices which in commerce we find as solid or liquid balsams, resins, turpentines, tars, oils, spirits, pitch, lamp-black, olibanum, and sandarac; and in many of the more refined and confected compounds of the chemists are to be found fir and pine juice in more or less quantity. Not a few of the species produce seeds which are good for food, and in some countries are largely consumed as such by both man and animal; while, at least one species,—the common Yew, produces fruit which acts as an irritant or poison in the stomach or intestines of man and beast. The manufacture of our national beverage gin is dependant upon the Juniper for at least one of its constituents; for it is from the berry of this genus that its most esteemed quality, its rich piquant aroma is obtained. The fibre threads of the leaves, roots, or wood of some of the Pines are now being converted into good and comfortable clothing; paper, also, is being manufactured; and many other articles for art, or use and ornament, may yet be found in the lignines produced by the firs and pines; which, if coal and iron ever run out, might be ready for service when air or electricity may supersede steam as the motive power on our planet.

For ornamental planting in this country, no trees or shrubs excel the firs and pines; and for true natural beauty, irrespective of painted floral forms, where, oh! where, in the wide, wide world shall we find such majestic forms, such symmetrical gracefulness, and such fabulous giants! such lovable pigmies! such varied and pleasing shades and tints of colour: such odorous perfumes, or such an assemblage of conspicuous dissimilants, as are to be found amongst this family of Nature's vegetable products?

"There tow'ring firs in conic form arise,
And with a pointed spear divide the skies."—PRIOR.

Or,

"Here pigmy pines by other trees forlorn,
With verdant gems the mountain peaks adorn."—NELSON.

Again,

"That growth the western north hath late unveil'd
To European eyes;* those limbs
Gigantic, threefold what one deem'd prevail'd
The loftiest stems to rise; those Anakims
Of trees have dazzled sense."—CRAIG.

* *Gigantabies Wellingtoniana*, Wellington's Giant Fir. Ycleped *Wellingtonia Gigantea*, The Gigantic Wellington. It should, at least, have been *Gigantica*.

CHAPTER I.

CULTIVATION.

As a *sine quâ non*, a timber tree, to be adapted for profitable planting in the climate and soils of Great Britain and Ireland, must have a perfectly hardy and sound constitution; be of large dimension and rapid growth; produce good and durable wood; and not be fastidious as to soil or situation. For ornamental planting the tree or shrub, whatever its peculiar beauty or usefulness, must be sufficiently hardy for our climate. The hardiness, rate of growth, and peculiar likes or dislikes of soil and situation of any of the firs and pines can in a few short years after their introduction soon be determined; not so easily, however, the quality or quantity of the timber they are likely to produce in our various soils and changeable climate. Yet, from the many and trustworthy sources of information which of late years have been afforded us, by the admirable and numerous collections of foreign specimen woods, which were shown at our International Exhibition; and from our now large and increasing imports of foreign timber, and the very numerous and fast accumulating collections of specimen woods both public and private, we have perfectly reliable data whereby we can form a very correct estimate of the quality and quantity of the timber of most of the firs and pines.

The first or primary consideration—perfect hardiness—being secured, the next in order is perfect health; and here we are at the very pith of the matter—the causes which produce the effects which we term success or failure in our introduction and cultivation of the firs and pines.

No sounder maxim is there in the arboricultural art than that to be successful in our introduction and cultivation of the firs and pines, we must have more than our first essential—perfect hardiness. Our second requisite is perfect health; and, this secured, we must then see to it that we not only collect but select healthy seed; this attended to, our next step is the preparation of the seeds to be sown, and the

sowing of the right seed in the right place: for it does not follow as a corollary that healthy seed if carelessly managed will produce healthy seedlings; nor that healthy seedlings if injudiciously cultivated will produce healthy plants; nor that healthy plants if planted in unhealthy soils will produce healthy trees. These latter conditions, however, though quite as indispensable as healthy seed, and other equally self-evident axioms; are, if admitted, not generally acted upon; inasmuch as the instances are neither few nor far between that, in our modes of raising and cultivating, such facts are completely ignored; for in most public nurseries, and, also, in most private establishments, we find that all new, rare, or high-priced firs and pines, be they hardy or tender, tree or shrub, are like most novelties amongst fair Flora's exotic beauties, first steamed in a hot-bed, then potted and transferred to an intermediate house, a second-shift and cold frame, after which, perchance, a season or two's close confinement in a larger than a thumb-pot; or it may be stuck into a big pot or tub and sent to the plunging ground in nursery-beds or garden-borders. Should such plants escape the rubbish heap—their proper sepulchre,—and eventually find their way to permanent quarters in arboretum or pinetum, wood or forest, park or plantation, lawn or shrubbery; with their roots a conglomeration of cork-screws; and each and all of the component organs of their systems in a more or less diseased condition; what can we expect of them? Or, again, as is too frequently the case, where fire, glass, and pots have been dispensed with, and the open ground system adopted; the practices are here likewise very reprehensible; for sheltered corners, stimulants, nay, prisons are the watch-words of the culturists. Moreover, it frequently happens that many of them are subjected to still more cruel treatment than I have indicated.

After such treatment can we expect that a seed, seedling, or plant of either fir or pine, will not require some considerable period of time to recover from the injuries done to its system in its infancy by such doctoring, stimulating, pampering, and mistaken kindness? In our propagation and cultivation while in a young state, I think, have we the cause which produces such effects as heart-rot, disease, decay, and premature death amongst them. Then, if profitable timber, perfect health, sound growth, and utility or ornament be our object in introducing and cultivating the firs and pines; we must take Nature and common sense for our guides, and propagate from seed, cultivate upon rational principles, feed with proper food, and plant in suitable soils. As a matter of course, where we find any of the varieties, sub-varieties, or

seminal sports from a species, which rarely if ever reproduce themselves true to their kind from seed; we must propagate them from cuttings or layers, or by grafting them on the species, or a quasi-species of the same genus to which they belong; for when, as in this case, ornamental tree branches or shrubs are what we desiderate; and when the increase and perpetuation of such things can only be accomplished by such means; such modes of propagation are pardonable and necessary; but wherever seed can be obtained, no fir nor pine which comes true to its kind from seed should ever be propagated otherwise than from seed; and this is equally true whether timber or ornament be our object in propagating them.

In the first stage of cultivation of the firs and pines, I cannot do better than give a summary of the *modus operandi* wherewith we have practised. About a dozen years ago we commenced what in professional phraseology is termed a Home-Nursery, a purely commercial undertaking, for the raising and nursing of forest plants for forest planting; our object being profitable timber; by judicious management, and strict economy. A few years later we conceived the idea, and brought forth what we term our Forest Arboretum,—a plantation or place in which from time to time we plant as we obtain new kinds of trees. Our nursery grounds were enclosed from land which had been lying as forest for at least seven centuries, for many years a browsing field for Deer: very variable and dissimilar in its composition; inasmuch as it consists of patches of good loam, light sandy loam, gravelly black and brown earths, stiff, friable, and gravelly clays, gravelly sand, soft sand, and much of it sandy peat; the subsoils gravelly, marly, and sandy clays; pure gravel, or hard and soft sands; some of which are more or less impregnated with iron. Wherever necessary the ground was effectively drained, and then trenched from one-and-a-half to two feet deep. It is thoroughly exposed to all the points of the compass. With the exception of about four acres which we use for seedling ground, any portion of which after having produced a crop is then thrown fallow for a season, and dressed with farmyard manure which has been frequently turned, and two years old before being applied to the ground; in which it again lies another year before the next sowing; excepting these four acres none else of it has ever been otherwise dressed or manured than with compost made from our annual cleanings and vegetable refuse, which is carefully collected into annual heaps; to which is added an annual collection of leaves, and the cleanings of open drains; all of which are then mixed up; and in

the following season to this is added a small proportion of lime or chalk to assist natural decomposition and the purifying of the compost; and these annual heaps are turned over every winter for five or six years; then they are ready for use. By such means we obtain natural humis, (vegetable mould,) the only safe or useful manure for the firs and pines; for all other manures, whether farmyard, as generally used and half rotten, or artificials, however useful and necessary they may be in high farming or good gardening, are in true forestry nullities; nay, worse; for in the large majority of cases, and particularly in the case of the firs and pines, such compounds are at best but injurious stimulants, and not unfrequently deadly poison. Our arboretum, and in short most of our woods and plantations, are very similar to our nursery grounds in the components or composition of their soils; and all of them are not only variable, but likewise the changes and transitions from one description to another are very remarkable, even upon comparatively small areas, and our surfaces are more undulating than flat.

As I have already indicated, we use no artificial protection: the consequence is that many, alas! too many, of the most beautiful forms of the firs and pines have had their births and deaths in our nursery-grounds, and all that now remains to remind us of their existence amongst us is the records and memoranda to be found in our register of deaths; which is often thus summarized:—"Too tender, delicate, and fastidious for the climate of Britain;" and this, be it remembered, is never registered until two or more trials of the hardiness of any tender species has been made; so that our nursery-ground is the place where we try their hardiness, and should they survive a half-dozen winters' trial, and what might be termed roughing it in the nurseries, by being well-exposed, and allowing them plenty of space from plant to plant; whether in the seed-beds, drills, rows, borders, or squares; and by frequent removal and transplanting; (but never, even in the seedling state, with those implements called dibbles); by this treatment we not only prove their hardiness, but likewise properly and thoroughly prepare them for removal to their permanent quarters, in arboretum or plantation; for, from a somewhat extensive practice in the cultivation of the firs and pines, experience has taught me that to be successful in their introduction we must not only have our essential,—healthy seed, but likewise healthy seedlings, healthy plants, healthy food, and healthy soil, and likewise healthy preparation for removal to permanent quarters; the goal of which will be arrived at

in the sequel, and can only be reached by such a start and course of procedure as I have now indicated.

In whatever soils, altitudes, and climates, whether in a natural or cultivated state, the pine tribe, when in luxuriant and perfect health, will be found in soils more or less rich in natural humis, *i.e.*, vegetable mould, alluvia, or stony *débris*, which has, throughout a series of years been accumulating, decomposing, and pulverizing; and been prepared in nature's laboratory, as pine food: and when found in their greatest pristine beauty generally found inhabiting declivitous localities, or mountainous countries, and invariably more numerous on undulating than on flat surfaces. The great majority of them will not only grow but luxuriate in sandy loam, gravelly, or gritty soils, if of sufficient depth to allow their far-spreading roots to ramify and extend along the surface soil in search of food; and many of them will succeed in almost any description of soil, excepting a soft peat or spongy marsh: but sub-soil is of more importance than surface-soil for the firs and pines; for, whatever the top, the bottom must be open and porous, so as to constitute what I term naturally dry substrata, whereby all excess of water must be carried away, or down from the roots, keeping the surface always sweet and healthy by the ready ingress of solar heat, and the speedy egress of all superfluous water; a porous substratum will always retain or draw up sufficient moisture, but a close impervious substratum will retain superabundant water until it becomes sour and stagnant; and when the supplies are for any length of time stopped the attractive force of an impervious substratum is *nil;* hence the two extremes of the surface soil—drought and drowning; than which few if any causes are more inimical to the healthy growth of most of the pines. Most of them will not succeed in thin surface-soils resting upon impervious chalk or limestone; and dislike the coal formations as a substratum, while nearly all of them do well upon sandstone formations, which still further illustrates my theory of an open, porous, or sandy substratum; for even surface soils of a close adhesive nature, such as soft clays, peats, and marshes, or other cold, wet, and sour earths, can, by proper drainage, and an opening and ventilating of the substrata be made suitable for many species of the Common and the Giant Fir, the Cypress, the Pine, and the Yew; some of which prefer over moist to over-dry surface soils, provided the sub-soil is of the right character.

Situation is a primary consideration; inasmuch as here I have to survey from an ornamental, not a profitable planter's view of the

subject; and, strictly speaking, the very beautiful, symmetrically graceful, lovely green, variegated, glaucous, and fine-foliaged kinds, may by being planted in the wrong instead of the right situation, lose half, two-thirds, or perchance all their beauty; unless, indeed, such are like in their quality to that of a nameless canine species, whose native habitat is north of the Tweed, and whose chief beauty, according to the uninitiated, consists in its extreme ugliness. Aspect, again, must not be lost sight of in this phase of the subject; for some of the Indian, South Californian, and South European species will, if sheltered, do much better in a northern than any other aspect in this country; and this holds true of most of the firs and pines from sunny climes and fertile soils, where they have contracted a predisposition to early spring growth when first introduced into this climate; and until we get them thoroughly inured to our late springs and short summers, we should give them a situation in a north aspect, so as not to induce but to retard this natural tendency of their early starting their spring growth.

Altitude, in so far as the firs and pines are concerned in the British Isles, is a phase of the subject which requires but a very brief notice; inasmuch as most of them that are sufficiently hardy for our climate will, if in soils suitable for them, and upon substratas congenial to their nature, do better on high than low altitudes; and the higher the elevation, if shelter be afforded them when young, the better they seem to thrive.

Climate, is indeed a familiar word, yet, a phenomenon, comprehending or connected with all those elements and attributes of matter and force:—animal and vegetable life; air, earth, and water;—when considered in connection with nature's active powers, and when acted upon by those mighty forces which we term light, heat, electricity, gravitation, and rotation; and the chemical and cohesive agents furnish the material of those specific, yet, compound and complex conditions of our seasons,—land and ocean winds, thunder and storm, tides and currents, hurricanes and calms, rains and dews, snow and ice, and clouds and sunshine; and although climate, in its largest or most comprehensive sense, might be thus enlarged and descanted upon, yet, when considered in relation to our own country, and as pertaining to our present subject, its vast and complex character is much circumscribed, and all philosophical speculation, and metaphysical uncertainties can be dispensed with; and by strict induction for truth in this phase of arboriculture, we can from nature's founts of pure and simple truth,

and our own practical knowledge of the firs and pines, draw deductions which are so conclusive and unerring, that it is no mere theory or speculation, but a well ascertained and established fact, that the climate of Britain is most admirably adapted for all the firs and pines which are at present hardy enough to withstand the severity of our winters. It is a remarkable fact that the fossil-beds of the British Isles contain the remains of not a few species of the Common Fir, the Giant Fir, the Cypress, the Common Pine, and the Wax Pine: and I often, when in a reflective mood, consider myself as engaged in the introduction and cultivation of firs and pines, which, in now far distant ages of our planet's history, were to be found in our own sea-girt isles, with Nature as their culturist, though now the climate be much changed from what it then was.

Wind, as a phase of climate, is another of the causes which operate against the cultivation of the firs and pines, and is one of the difficulties we have to encounter; for but few of them can withstand the assault of a cutting wind with impunity; and it matters but little whether its direction be easterly or westerly, or from north or south; but from observation I think that south-west gales and sea-side blasts are most injurious to them; yet, even in localities where winds, gales, and sea-breezes prevail, by first planting thickly those kinds which are recommended for such situations, shelter, in a short time would be afforded, when most of the newer or rare kinds might be introduced amongst them, gradually thinning out the common kinds when their services as nurses are no longer required.

Atmosphere, again, may be disposed of as a collateral of climate; and here I have only to remark that most of the pine tribe prefer, some of them demand, a pure atmosphere; and will only struggle for existence in such as are noxious or impure, where the most of them will languish and die: in cities or towns, or in close proximity to manufactories or workshops, where the atmosphere is impregnated with deleterious ingredients, or highly charged with smoke, only such kinds as are known to resist with some degree of impunity such injurious influences should be planted. For such localities some of the species of the Arbor-Vitæ, the Ground, Prototype, and Resinous-Seeded Cypresses, the Juniper, the Pine, and the Yew should be selected; while most of the species of the Araucaria, Cedar, Fir, and Larch should be rejected.

With regard to the best Season for removing or transplanting firs and pines, we ourselves prefer and practice it in the months of November

and December, all other things agreeing; and when, as in our case, they have to be planted in hundreds of thousands annually: when, however, they have only to be planted in small quantities or as ornamental trees or shrubs; and when naturally cultivated and properly prepared plants are to be had, and the land is in a healthy condition and every way ready for planting; I would have no preference for this, that, or the other month; although their resting season, late autumn, winter, and early spring is the most rational; for of late years we have planted a few hundreds of several of the species the first week in each month all round the year, upon common forest land: some of the plants of each kind and of each month were planted in pits or holes dug to receive them, others were slitted with a common garden spade, and some planted with our planting spade; and all of these plants and young trees are *cæteris paribus* as healthy, and quite as promising as others in the same plantations which were planted at our usual time, November and December; but it must be remembered that all these plants were naturally cultivated and often transplanted before removal into the plantations.

All things have their Enemies, and to this very general rule the pine tribe is no exception; but to treat of all of their enemies would be far beyond the limits to which I have confined myself in this volume; I only, therefore, enumerate a few of the more common kinds which have proved to be not only injurious but frequently destructive to them.

The Pine Beetle:—these creatures often work great havoc amongst the pines: some seasons they are very numerous; when they will seriously injure whole plantations, and not unfrequently destroy the perfect form and symmetrical gracefulness of some of our best specimens. I have found no effectual means for its practical destruction; but its ravages may be greatly reduced by persisting in cutting out the young shoots into which it has entered, and burning them; for when these insects once infest a tree it is quite astonishing with what rapidity they carry on their work; generally entering at or near the junction of the present season's terminal shoots with those of the previous season; working upwards until they reach the tops; having arrived at which, they bore their way out: and when numerous they are, indeed, destructive enemies; for so it fares from shoot to shoot, from branch to branch, and from tree to tree.

The Cocus or Scale:—of these little pests we have several species; two of which are very injurious to some of the species of

the Fir, Larch, and Pine. These insects are at work early in the season, and are enormously productive breeders, each female producing several dozen eggs at a brood, and several successive broods in the course of the season: fortunately, however, they are not of annual occurrence in this country; and during the last dozen years their numbers seem to have been gradually decreasing; and it is to be hoped that they will not again visit us in such vast numbers as they did about twenty years ago; when we had legions of them, each individual of which makes its innumerable punctures upon the young and tender shoots; thereby causing the sap to ooze out; retarding circulation, producing ulceration, and engendering consumptive or incurable disease amongst many of our fir, but more especially our larch fir plantations. I have found no practical nor effectual means for their destruction, nor for the restoration to health of a tree when it has been seriously affected in its constitution by their ravages; the best plan is at once to cut such trees down, for if left the chances are that after a few years struggling they come to their death. Where, however, trees are partially injured, by keeping them properly thinned, and clear of dead branches, admitting light and pure air, they may recover.

The Wood-Beetle:—of this we have several species, but in the case of the firs and pines, the one most to be feared is the fir beetle, pine-weavils as they are sometimes called; and though related to its congener this species must not be confounded with the Pine-Beetle, inasmuch as it is a very different creature both in its habits of life and modes of working; these, Wood-Beetle class of insects, which are so destructive to firs and pines in the growing state,—are, I think, engendered, produced, and exist by pine or fir-bark, both in the larva and perfectly matured state, and more particularly when the bark is in an advanced state of decomposition; and it will be found that it is only when and where there are large quantities of bark-scales, which may have dropped from old trees, or may have been broken off from trees in the process of felling the timber; or it may be from bark left upon the old stools or branches of a previous crop of fir or pine timber which have not been removed from the ground, or not had length of time to decay; that the ravages of these pests have to be feared; and if to "warn is to arm," then our first stratagem in a war of extermination should be to cut off our enemies' only means of subsistence, *i.e.*, to destroy or remove all decaying or decayed bark; and wherever it is intended to plant firs or pines upon ground from which a crop of the same trees has been but

recently removed, the ground should be left for two or three seasons before being again planted, so as to allow a rank, natural herbage to grow up, which in the autumn previous to the ground being replanted, should, when in a dry condition, be set fire to and carefully burned; after which, and before commencing to plant, the ground should be carefully examined; and should there then remain any appreciable quantity of bark, either scattered upon the ground or upon the old stools, or scattered fragments of the old branches, it should all be carefully collected into heaps and burned, or otherwise removed from the ground which is to be planted with firs and pines; for experience has afforded me sufficient evidence that all Wood-Beetle insects which are injurious to the pine tribe in the growing state, are dependent upon *bark, not wood*, for their existence; while several of the species live and exist upon wood; which species and varieties, however, are wood-vermin, not plant or tree enemies. After pointing out these three classes of insects, which includes all that the cultivator of firs and pines has to fear in any ordinary seasons as dangerous, I now proceed to the second order of our enemies, stepping from the animal to the vegetable kingdom.

As in the animal, so in the vegetable kingdom we find marshalled in battle array the enemies of the firs and pines; and here they are numerically far more formidable, and in their ravages equally if not more destructive; and in their natures and habits of life much more varied and mysterious, many of them being, in so far as science is concerned, in their nomenclature and classification, in a state of much obscurity. Although practically acquainted with their devastating influences upon the pine tribe, yet, I am placed in the humiliating, because defective, position of having to classify them as parasitical vegetable enemies. To serve our present purpose, however, we may divide them into two classes—External and Internal; the former such kinds as attack or live upon the external parts of the trees, and the latter such species as injure with their deleterious ingredients the internal parts of the trees.

External Parasites, then, are such species or varieties as are found growing upon the trunks, branches, or foliage of the pine tribe, and they are many; for here I include the cryptogamic mosses and lichens, and a few of those mysterious organisms, the most obscure of Nature's living products—the fungus tribe. Fortunately, however, for the writer, this numerous class of enemies, in so far as they are destructive to my present subjects, can be summarily put "hors de combat;" for, in each

and every case where firs and pines are attacked or infested by this class of their enemies, it will be found that one or other of the following causes have been in operation, and must be removed before the enemies can be eradicated. It may be that the trees are growing upon land more or less imperfectly drained, or, perchance, surcharged with water or stagnant moisture; or that the trees, not being properly thinned, are growing too closely together upon the ground, thereby more or less excluding those essential requirements, light and air; or there may be too much undergrowth amongst them; and if any or all of these causes exist, it is only to be expected that any fir or pine, or any plantation, great or small, remaining under such conditions for any length of time, will, sooner or later, and in a more or less degree, get overrun and infested by these parasites. Wherever such enemies are found, the land must be made sweet and healthy by efficient drainage, the trees properly thinned, and the undergrowth cleared away so as to allow sufficient of light, heat, and air, without which no fir nor pine, more than man or animal, can for any length of time exist, much less continue to develope itself in any perfect health; and just in the ratio that these essentials to health are supplied or withheld, will be the health or premature decay of the trees, and their consequent escape from, or attack by these parasitical enemies; for wherever the pine tribe are in sweet and healthy soils, and are properly thinned and attended to in their cultivation in plantations, little fear need ever be entertained of their being attacked or infested in any appreciable degree by this class of their enemies.

It is not so, however, with what I term the **Internal Fungoids,** for here I include those curious, most eccentric and mysterious formations of doubtful character. *Fungi,*—the lowest order of vegetable life, simple or compound, copulate or spontaneous they may be: some of them good for food, others the most deadly poisons to animal or vegetable: many of them, in their structure and affinity, as yet but imperfectly defined. Here I enter upon one of those most inviting and delightful, yet, dangerous paths of research and investigation into natural philosophy, which lead to nature's founts, to which she is constantly beckoning us onward, in our pursuit of knowledge under difficulties; which, in passing, we may affirm with Hamlet, contain more things "than are dreamt of in our philosophy." Fungi! what are they? where are they? and from whence came they? a triad of queries which who shall answer? I divine not; my own investigations, however, into this obscure branch of natural science, have led me to the belief that

Fungi are a phenomenon which was, is, and shall be coeval with matter; being, in my opinion, inseparable from, and connected with the decay or transition from one state to another, of each and all the component parts of matter, whether organic or inorganic, whether animal or vegetable, which in their elementary nature are subject to change, transition, decay, or death; and what matter is free from change?

> "Life ends in death, death ended life renews:
> Death lives by life, yet life from death ensues:
> For all must change; transition has no end;
> Thus life, thus death each help to other lend."—NELSON.

Life is a little word, but none more comprehensive; and these Fungoids are but a phase of this phenomenon, so common are they as to be found in earth, air, and water; in town or country, in house or field, in gilded-halls or mud-hovels, in cellar or larder, in kitchen or scullery, in sick-room or nursery, in the cradle, in the grave; *anywhere*, provided that *anywhere* is *where* matter is present in a transition stage, or decaying state. My present enterprise, however, is only to treat of such of them as are found ensconced in mother earth, and which are enemies to the firs and pines. In doing so I shall indicate preventatives rather than dictate cures.

The ground may be in an apparently sweet and perfectly healthy condition, the soil and substrata may be particularly well adapted, and the tree provided with sufficient heat, light, and pure air; when some fine young specimen of a fir or pine, which may have recently been planted, will begin to show symptoms of sickness, slowly but surely increasing to disease, which may be terminated by premature death, generally bewildering us, and as generally leading to very erroneous conclusions as to its true cause; for I incline to the belief that many of the charges now entered in the counts of indictment against many of the hardy new firs and pines, such as:—"weakly constitutions," "healthy one season sickly the next," "sickly foliage," "decaying branches," "disease," and "degeneracy," will, in not a few cases, be found to have been caused by their fungoid enemies, some of which, and especially when in quantity, act as deadly poison, when mixed in the food of the firs and pines. I know of no more fertile source of predisposing the soil to the production of these to the firs and pines noxious fungoids, than old roots of trees or shrubs.

Whenever it is intended to plant the pine tribe upon land which has just been cleared of a crop of timber, it will be found the best policy and in the end most economic method, for the planter patiently to wait

for a few years before replanting his ground, so as to allow time for the decay of the roots, if not the old stools of the former crop; for half-a-dozen years so spent in resting the land will be gained in the first dozen years after, as it would be found from experience that failures and premature deaths were *nil*; and the increased vigour of the plantation would soon surpass that of the one which might be planted the next season to that in which the former crop was cut and cleared. Where, however, the trees had not been very thick upon the ground, or where the object was an immediate effect from planting, or for ornament more than profit, then tolerably large pits might be made for the pine tribe; and, in making them, picking out all the old roots of the former trees, in this case a larger class of plants could be used, and fewer of them required than when planted in the ordinary way and thick upon the ground. When firs and pines are to be planted in small quantities, or upon small areas of ground full of old roots, a good, but somewhat expensive process is regularly to dig and grub them out.

Imperfectly drained land, particularly if it be naturally wet, and where water is allowed to accumulate and become stagnant or fetid, is another cause of these injurious fungoids; and all naturally wet, spongy, peaty, and close and adhesive soils should be effectively drained for at least one season before planting it with firs or pines. As I have already stated, all matter in a transitive stage or imperfectly decayed state; whether animal or vegetable, whether manural or stimulant; is equally productive of fungoids; knowing, then, all this, we should be careful in the feeding of our firs and pines, and see to it that we do not put them into soils or situations where they will be within reach of their fungoid enemies.

Pruning is a phase of forestry where many lances have been drawn, and where many duels and battles have been fought, but no victories have as yet been won; "prune," and "prune not," have each their partisans and professors, their temperate and intemperate advocates and denouncers, their reformers and conservators, with all the concomitants of *over-doers* and *under-doers*, and but few who profess that noble virtue—moderation; for opinion and practice seem to favour nothing but that dangerous vice—proneness to extremes. In the case of the firs and pines, however, I say, that if perfect health and sound timber be the objects we have in view, then I assent to "prune not"—as a general rule, with its quota of exceptions; which, as applied in this case, are indeed few; for the only instances where pruning is necessary are when more than one leader may, either in a plant or

young tree, be formed, and compete for the mastery; or when any of the horizontal or side branches are gaining such an ascendency as to interfere with the proper balance and deportment of the plant or tree; but even in such instances I use a milder term than *prune*, and practise what I call *pinching*, *i.e.*, that nothing more than a branchlet —a one year's shoot, or a two year old branch, should ever be cut from a fir or pine, if it be grown solely for its timber; for all indiscriminate branch-cutting of them, is neither more nor less than destructive to good and sound timber; and if any fir or pine tree ever arrive at such a state as to require such cutting, the best remedy is to lay the axe or saw to its base and cut it down as a cumberer of the ground, and make the most of its contents; for if it be subjected to such branch-cutting, it will never after produce good or valuable timber.

Pruning, however, when considered in connection with decoration, and when the design is to obtain ornamental firs or pines, or to cultivate them as useful trees, irrespective of the quality of their timber when matured, then we have a wider scope and more cause for branch or limb cutting. Viewed from this point, pruning is at times not only pardonable but necessary, inasmuch, as it frequently happens that some obtruding branches may prevent us from enjoying some favourite drive, footpath, or view; or, that underneath the ambrosial shade of some majestic pine or fir we have our rustic summer-house, or out-door lounge, or it may be some beautiful flower, or favourite shrub; and the hundred and one other instances, where the fir and pine boughs are intruders: Must we, indeed, because such is the case, cut down our noble and beautiful firs and pines? Nay, art and beauty are now our study, and art rules should regulate and correct art defects; for such rules, when properly applied, by a practitioner who knows *how* to correct the disorders he prunes for, will be attended with many good and few injurious results to the subjects operated upon; will increase our pleasures, and enlarge our ideas of all that is good and beautiful in wild Nature, when controlled by refined art. In this, however, as in many other fine art works, the old proverb, "a little knowledge is a dangerous thing," is often truthfully illustrated in the inelegant hacking to which ornamental firs and pines are at times subjected by some reckless pruner; for, when such is the case, methinks that the other collateral old adage, "ignorance is bliss," if a paradox, is no less an untruth.

As a matter of course, in art culture of the firs and pines; such as

forming hedges, grotesque forms, and plant statues; we must be guided by art maxims, and trim, clip, or prune our subjects; so here, again, "prune not" if not untruthful, is at least untenable. Moreover, when in a young state, many of the pine tribe require, if not pruning, at least pinching, to regulate their early growth:—"training them up in the way they should grow;" and this is especially necessary in the case of many species of the Cedar, the Common Fir, the Common Pine, the Giant Fir, the Larch, and the Wax Pine; the natural habit of all which is to produce continuous straight stems or trunks, unarticulate branches, and pyramidal or conical forms; and frequently such kinds require to have some judicious pinching of their branchlets to regulate their growth, and correct any defects in their symmetrical construction. The like is the case with all plants of these kinds, which have been artificially propagated by grafting, layering, or by cuttings; which generally, in a young state, at least, retain in a more or less marked degree, the flat tortuous, bent, and irregular form of a branch; rarely ever at first starting with a straight continuous stem and regularly disposed branches; being, in this respect, quite unlike the straight stemmed, regularly branched, symmetrically formed plant propagated from seed. It frequently happens that artificially propagated plants, of these kinds, will, for years, persist in marching upwards by echelon and quarter-circles, setting at defiance all our artful modes of staking, trimming and pruning; and at times, particularly if bent over, and also when left alone, they will throw up a new leader from their base, when all the then extraneous leaders, laterals, spray, and foliage—the produce of their former years' growths,—may be entirely cut off as no longer necessary.

Even seedling plants at times require pinching and pruning, particularly such species as have a natural tendency to make early spring or late autumn growths, thereby liable to be injured by late spring or early winter frost: Such species, also, as have a disposition to form more than one leader while in a young state, of which kinds there are many.

In so far, then, as pruning is concerned, and when considered in relation to the firs and pines, it will be observed that my dictum is:—When sound, good, and thoroughly matured timber is desiderated, "prune not" the tree when old, although you pinch its boughs when young; and that, when we cultivate them for their beauty, as ornamental trees or shrubs, or for purely art purposes, then "prune;" but, whenever we do so, let us not only know how to do it, but like-

wise for what it is done; and then do it well by timely pinching or branchlet shortening; never, unless, indeed, the case is a desperate one, by limb-cutting or branch-hacking: always remember that pinching a sprig saves many a bough.

CHAPTER II.

CLASSIFICATION.

It is a matter of much amusement to the unsophisticated lover of Nature, and student of her mysteries, to observe how utterly that class of philosophers who would reduce the knowledge of these mysteries within the limits of technicalities, are baffled or bewildered by well nigh insurmountable anomalies which present themselves in the details of nomenclature to the systems they affect to establish.

Nature, undoubtedly, has bright paths of truthfulness through her mysterious ways, if we only could discover them; but, in order to do this, laborious research is often necessary; and, in the meanwhile, in this particular branch of science she refuses to be fettered by any erroneous fastidiousness of over-done classification: and the consequence has been that, at various periods of time, systems which antiquity had received and venerated, and which modern conceit had rejected, are, at length, as it would seem, in a great degree, reinstated in their pristine supremacy.

In no department of natural science has this been more conspicuously the case than in that which is the subject of my present enterprise—the habits of the firs and pines. Let any intelligent reader take into his hands for perusal, the works of such of the ancients as Columella, Dioscorides, Hesiod, Homer, Pliny, Apuleus, and Virgil; or of another period, those of such men as Decandolle, Jussieu, Linnæus, and Tournefort; and the botanists of our own country: and he will have before him a cloud of witnesses, great and notable instances of the correctness of what I now affirm.

My present enterprise, however, is not to found a system, but to form a classification; so I leave the systems as I found them, in an awful disorder: having always observed that the best systems and the most experienced systematizers were those who dealt with Nature's vegetable products in a liberal way. I have also invariably found that the best, because the most careful, observers have been those whose vision was not clouded by the opacities of theory, and whose minds were not distorted by pedantry: for to hair-brained speculators and pedantic systematists, and the small fry who followed as their suit,—the species-mongers,—are we indebted for heterogeneous and gratuitous assumptions, and unsustained and contradictory assertions, which have so obscured the classification and nomenclature of the firs and pines, that at the present time their classification is chaos and their nomenclature cant.

Finding, then, the entirety of the literary matter appertaining to my present subjects in such a disordered condition, I will endeavour not to add to these already very discordant elements by making obscurity still more obscure; but confine myself to a compendium—a common-sense classification of them; tolerating as much as possible of this chaotic confusion, and altering or putting it in order only where imperatively demanded alike by truth and common-sense: as the most convenient *vehiculum* the *status quo* admitteth of wherein for practical suggestions to be rendered clear and intelligible. I am hereby under the necessity of apprising my readers that if I seem at any time, while treating of the classification and nomenclature of other authors, and misnomers of sundry pedants, to write inconsistently with statements I have to make when I am dealing with the notions of others, the incongruity is not mine.

As a matter of course, "before we can cook our hare, we must first catch it;" so, before we can classify or name our firs and pines, we must first secure them: therefore, to begin at the beginning of classification, I am, as it were, in duty bound to give at least a retrospective summary of the subjects to be classed; and this leads me back to their origin. "The origin of species" is a nice theme for theorizers; and many are the nice theories which this theme has originated: but although many theories have already been promulgated and revealed, science has done and is doing much to throw light upon this complex subject; yet, it cannot be denied that the whole arena of the matter is still enveloped in the hazy atmosphere of philosophical speculation.

That most erudite scholar and original philosopher—Darwin, in his

elaborate and greatest speculation—The Origin Theory, of ORGANIC NATURE; doubtless has rendered science a noble service; yet his is at best but a first offering of late-fruits; and must be sent back to Nature for enlargement and maturation; for, in the gathering in of this growth of fruitful philosophy, much laborious research and careful selection of the true and primitive grains of scientific knowledge is still necessary, ere we can have any very definite or correct ideas upon the origin of Species—whether animal or vegetable. Natural selection, artificial selection, or any other selection, may select, but can never create materials from which to select, by any known method, system, plan, or theory, which has yet been promulgated: for selection, if it means anything, means a choice of materials already extant; whose origin or creation is far antecedent to, and much older than book-lore or geological deposits; for these are but the history or remains of species, and prove nothing more than that species have prototypes, and prototypes varieties, to which there is no limit; consequently we must go further and higher than Nature, earth, and history, nay, to a more eternal and Divine wisdom—Nature's Creator, man's God. His actions, if regulated by laws, or governed by axioms, are such as far transcend the limits of finite minds; which have learned, are learning, and have yet much to learn on the origin of organic life; this in our present transient state shall never be revealed to us, any more than the mysterious and sublime plan of Creation, of which, materially considered, organic life is to us the most remarkable phase. This, now one of the most assured doctrines of revealed science, is in perfect unison with the Creator's Revealed Truth, inasmuch as—"faith is the substance of things hoped for, the evidence of things not seen;" and how literally true it is—that "the things which are seen are temporal, and *only* those which are not seen are eternal;" and that the—"things which are seen were not made of things which do appear!" With such a faith, but not for the purpose of ostentation or disputation, nor to prate and brawl in the province of the Infinite, but in all humility, and as a true student of Nature, do I come to πηγαι παλαιοι—**Ancient Founts** for information and truth in this particular branch of natural philosophy, and as appertaining to the origin of Species. It is not, however, my purpose to enter the lists as a controversialist upon the antiquity of man, nor of animals; nor vaguely to speculate upon the state of mother earth's surface when he or they first appeared upon it; nor to refer to any of the numerous types, forms, or varieties of old Adam the prototype; nor to the many types of the lower animal

prototypes which are so wonderfully formed, and so apparently unreal, that it might be questioned whether they should be classed as organic or inorganic matter; for amongst Conchal or Molluscous masses we have veritable organisms, *in posse* it may be, yet nevertheless *in esse*, jelly, or—if you like it—cream, pure and simple; and as it were minus parts, structure, or organs; yet eventually evolving the most beautiful, wonderful, and mysteriously complex forms of shells; but I desire to confine myself to as warranted though equally as speculative a subject—the antiquity and origin of Nature's vegetable organisms—more particularly of the Firs and Pines.

After acquiring a practical knowledge of phytology, and taking some practical lessons in the school of geology, we can receive instruction, inferential it may be, yet none the less true, that at different epochs of the world's history there have been produced, and deposited in mother earth, the fabrics and products of many floras and arboras, and equally numerous in cognate genera and specific prototypes, though much less numerous in varieties than are extant at the present time. Geographically and climatically considered, these genera and species are more or less changed from those now growing upon the same portions of our planet; but this only exhibits to us one of Nature's λέξις,—CHANGE; for the more recent discoveries of fossilized woods all tend to confirm the theory that cognate genera and specific prototypes are at present no more numerous than they were—"in the beginning," however much they may have "multiplied and replenished the earth" with their quasi-species, varieties, and sub-varieties; for even what in modern times have been discovered, classed and described as new genera—the existence of these, if known, had not been recorded, neither in ancient nor mediæval history; yet these supposed-to-be new genera can now be referred to their veritable prototypes in the different geological stratas; and, more remarkable still, some of these gigantic firs and pines, which have recently been discovered in north-western regions, the very Anakims of the vegetable kingdom, are now being excavated from the inner crusts of mother earth as fossilized wood; yes! the veritable lignine of the said-to-be new tree, *Gigantabies*, "Sequoia"—of most authors, (The Giant or Mammoth Fir,) has been but recently found in the fossil beds of the British Isles. We are now able to classify these vegetable fossils into four or five distinct and successive floras analogous to the kindred faunas; and how gigantic and profuse the ferns, lycopods and foliar products of the coal-formations! how much more carbonaceous their food, how much hotter their habitat!

if when growing they grew in these islands! and who, I again ask, can prove that they did not?

In the tertiary strata we have more familiar prototypes, though here again indicating more or less marked difference from the distinguishing characteristics of our present extant cognate genera or specific prototypes; showing clearly enough the long, long interval of time, and the wonderful change which must have taken place in that epoch which includes the so-called glacial period: yet most unmistakably proving that firs and pines were then the predominating forest growths; and likewise demonstrating the fact that each and all of our present prototypes of the firs and pines were then extant; and that none are now extant but which then were; though then and now their native habitats both geographically and climatically are much changed. Moreover, these fossilized lignines go still further in support of this theory; for I might refer to such as are now found in our own and other temperate climates of the globe; for instance, where iron, bronze, and stone implements are found, thence inferentially successive races of men; we have here again the same idea fully illustrated, and the same theory confirmed; for in the lower or stone strata **Pinaceæ** is predominate; in the bronze, again, old **Quercus** was monarch of the woods; while in the iron, foliar **Fagus** was forest queen. These facts, though more pertaining to northern latitudes and temperate climates, are now beginning to be as strikingly illustrated and as corroboratively demonstrated in southern latitudes and hotter climes; and as science becomes more practical, as she must inevitably become in her onward progress; our knowledge, ancient and modern, of the firs and pines, our views of the origin of species, our ideas upon soil, altitude, and climate, our modes of introduction and cultivation, and, more particularly, our classification and nomenclature of them will, in that happy and good time coming, have to undergo great changes; for all things must change; transition has no end: hence the great and wonderful variety of organic life: of which instances innumerable might be noted; but let one suffice; and let that one be one of my prototypes of the genus *Pinus;* and let the species be *strobus;* and how is it, we may ask, that of this species we have so many quasi-species, varieties, and sub-varieties; yet, each and all of them recognisable at first sight; but in all this variety, increasing in degree, however precise or appreciable it may be, we have only variety in size, form, and colour of foliage or cone;—variety within the bounds of law; whatever may be our ideas of its relationship, or however we may

speculate upon its nature or cause, we shall never more fully explain this inexplicable fact than Nature has explained it—that it is one of her axioms to produce variety; and that with her there is no such phrase as *bonâ fide* reversion to all the minute characteristics of the parent, though the well-marked and distinct character of the prototype is invariably retained; while each race and succeeding race are only so many individual races; each individual of which is only an individual form or variety of the parent quasi-species: all of them, however they may differ in degree, are but so many forms or varieties of the prototype. After what I have already indicated it would be superfluous to enter upon the discussion of such propositions as:—"Species, race, variety," "species, variety, race," or "species, varieties, races, species;" which might or might not be very amusing, but certainly such a discussion would not be very edifying or profitable; inasmuch as I have already indicated, if not disposed of, the *pro* and *con* of all such theoretical propositions.

Having now then, secured our firs and pines; and having taken our retrospective summary of our subjects; I proceed to classify them according to my theory of common sense. Most authors and writers of modern times treat of the firs and pines as an order, class, or cognate family of plants under the generic title of **Coniferæ;** which term, however, as will be seen from the sequel, is quite untenable; being, as it is, when applied to all of them half true and half false. That the firs and pines are a cognate family cannot be gainsaid; but their natural affinities consist not in their cones, nor have they any true and close affinity in their foliage, flowers, and fruit; they are, however, somewhat related in flowers and foliage: and still more so in their structure fabrics; building up, as it were, their timber in concentric layers, which are annually added with some degree of regularity, and which can ever after be recognized in the mature or aged tree; and from which in most cases we can approximate the age of a tree when felled; but even here we again encounter variety; for some of those species which are remarkable in making several and successive growths in one season will, when cut, show more concentric rings than they have years in age; amongst which kinds are both of the species of *Gigantabies*. These concentric ring-growths are also very variable in thickness, not only in different species, but, likewise, in different trees of the same species; and, moreover, are still more variable on different sides of the same tree. Again, it will frequently be found that a tree may have grown very rapidly for a series of years, and then very

slowly for another series; and, not unfrequently, that it may have repeated these serial changes during its life. In their continuous stems and inarticulate branches, as well as in their foliage, flowers, circular disks, and ligneous tissues, they are more or less related; yet, here again, we find variety; inasmuch as in *Symmorphapiteæ* we have sarmentaceous or arborescent shrubs, with jointed or articulate branches, so that in each and all of these characteristics we have no true affinity amongst them universally prevalent, although in many cases these differences are more apparent than real; yet, in some cases, there are such marked differences that neither *Abietineæ* nor *Coniferæ* are truthful or tenable as generic titles for all the species of the firs and pines. I must come, therefore, to a closer relationship, though it may not be a botanical one; and that is their consanguinity, or blood-relationship, if I may accommodate such a phrase: and here we have more real affinity than in any of their other botanical characteristics; inasmuch as in their sap or resinous juice they are each and all more or less closely related; and, this being so, I select, in preference to any other word, name, or term, PINACEÆ for the generic title, or grand family name, of one and all of the very numerous and dissimilar, fat and sappy, rich and resinous firs and pines; which are in truth a cognate family of Nature's vegetable kingdom.

Having now got my family and selected my title, I must, as a matter of course, give my reason why I select it, and that is that, genealogically considered, both my family and their title are, at least, as old as the days when Adam was on earth; yes, I have searched Time's literary archives, and the heraldry of all nations! and have found that whatever their language, whether composed of letters, monograms, signs, or symbols; whatever their phraseology, whether literal, figurative, or hieroglyphic; from the earliest to the latest ages of the world's history, the little syllables *pi*, *pin*, or *ping*; (the *i* long,) has been used, though somewhat indiscriminately, to represent or signify *richness* or *resinous*. In the old Sanscrit we have it pure and simple: the root पि *pi*, *pinguescere*, (to grow fat,) is in the participle passive पीन *pina*, (fat.) Again, in the word पीवर *pivara*, (fat or resinous,) or (by the *p* being *ph*, equivalent to *f*, and the *v* equivalent to *u*,) *fiur*, we arrive at our own term FIR. In my most cherished language,—the Greek, we have πῖαρ, (the i long,) *piar*, (fat or fatness;) convert, again, the *p* to *f*, and it is FIR. Hence, too, their πιτυς, *pitys*, a pine tree. In the Hebrew we find פִּימָה, *pimah*, (collops of fat,) Job xv,

27; and פַּנַּג *pannag*, Ezek. xxvii, 17; which word our translators have retained; which some interpret to mean "sweet rich cakes;" others "rich odoriferous balsam;" and both are, doubtless, correct; for we well know that from pine nuts they baked "cakes," and from pine juice made "balm," and their "sacred incense," and "sweet smelling savours." Some say it means "milk," and that it was the name of the lactescent juice of the India-rubber tree. In our own familiar and highly-appreciated English *pie* we have the very word itself; for who amongst us does not know that a good *pie* is a good thing, being as it is, or ought to be, a condiment of savory viands under a *rich* crust? See we not the same idea in our word *pith?* yes, and in *pig*, for its fatness?

Technicalities used in the Classification and Nomenclature.

S.D., (Sub-Division.) A cognate family containing few or many specifically distinct *species*, and of these there may be few, or many *quasi-species*, *varieties*, and *sub-varieties*.

Section, I use as a group of a *S.D.* having numerous and dissimilar *species*, and which are arranged in *sections* having some peculiarity or other, as distinguishing one *section* from another in the *S.D.* to which they belong. Sub-Section I use after the same manner as *section*.

Prototype, wherever used, is to be understood as signifying the most distinct *species* of the *S.D.* to which it belongs; and that other quasi-*species* of the same *S.D.* have more or less resemblance to it; for instance, in *Larix*, the European species is my prototype; while if there be many *species* in a *S.D.* I may adopt one, two, three, or more *prototypes:* as in Pinus I select *Strobus*, *Sylvestris*, *Corsica*, *Pinaster*, *Pinea*, etc., as prototypes.

Species, as a specifically distinct tree or plant, having one or more well marked and constant characteristics, distinguishing it from the other *species* of a *S.D.;* and which reproduces itself true from seed.

Quasi-Species, a kind more or less related to some other more distinct *species* than itself in the same *S.D.;* and although not a *true species*, yet, as it generally reproduces itself more or less true from seed, it is more than a *variety:* hence the name *quasi-species*.

Variety, a form of some *true* or *quasi-species*, which, in its distinguishing characteristics, generally reverts to the *species*, and not to its *parent*, when reproduced from seed.

Sub-Variety, a more or less altered form of a *variety*; which, again, in a greater or less degree, will revert to the *true* or *quasi-species;* more than to its own *parent* when reproduced from seed.

ARRANGEMENT.

PINACEÆ.

DIVISION I.—CONIFERÆ.—CONE-BEARING FIRS AND PINES.
DIVISION II.—BACCIFERÆ.—BERRY AND FRUIT-BEARING PINES.

CONIFERÆ.

S.D. I.—ABIETINEÆ.—The Fir Tribe.
- § 1. **Intermedia.**—The Intermediate Fir.
- § 2. **Picea.**—The Pitch or Silver Fir.
- § 3. **Vera.**—The True or Spruce Fir.

S.D. II.—CEDRUS.—The Cedar.

S.D. III.—CUPRESSINEÆ.—The Cypress Tribe.
- § 1.—**Actinostrobeæ.**—The Rayed-scaled Cypress.
  - Sub. § 1.—OCTOVALVUS.—Eight-valved.
  - Sub. § 2.—SEXAVALVUS.—Six-valved.
  - Sub. § 3.—QUARTOVALVUS.—Four-valved.
- § 2.—**Arthrotaxis.**—The Jointed-branched Cypress.
- § 3.—**Cryptomeria.**—The Cedar-like Cypress.
- § 4.—**Cupresstellata.**—The Star-coned Cypress.
- § 5.—**Cuprespinnata.**—The Feathery-sprayed Cypress.
- § 6.—**Thuriferæ.**—The Arbor Vitæ.
  - Sub. § 1.—BIOTA.—The Oriental.
  - Sub. § 2.—LIBOCEDRUS.—The very Fragrant.
  - Sub. § 3.—THUJA.—The Occidental.
- § 7.—**Veræ.**—The True Cypress.
  - Sub. § 1.—CHAMÆCYPARIS.—The Ground Cypress.
  - Sub. § 2.—CUPRESSUS.—The Prototype.
  - Sub. § 3.—RETINOSPORA.—Resinous-seeded.

S.D. IV.—GIGANTABIES.—The Giant or Mammoth Fir.

S.D. V.—LARIX.—The Larch Fir.

S.D. VI.—PINGUECERÆ.—The Wax-like Pine Tribe.
- § 1.—**Araucaria.**—The Araucarian.
- § 2.—**Dammara.**—The Indian.
- § 3.—**Raxopitys.**—The Racem-flowered.
- § 4.—**Sciadopitys.**—The Shade or Umbrella-Like.

S.D. VII.—PINUS.—The Pine.

BACCIFERÆ.

S.D. I.—DACRYDIUM.—The Gum-exuding Pine.
S.D. II.—JUNIPERINEÆ.—The Juniper Tribe.
§ 1.—**Cupressoides.**—The Cypress-like.
§ 2.—**Oxycedrus.**—The Prickly Cedar.
§ 3.—**Sabinoides.**—The Savin-like.
S.D. III.—PODOCARPEÆ.—The Fruit Foot-stalked Pine Tribe.
§ 1.—**Calophyllus.**—The Beautiful-leaved.
§ 2.—**Stachycarpus.**—The Spike-fruited.
S.D. IV.—SYMMORPHAPITEÆ.—The Allied Pine Tribe.
§ 1.—**Chætocladus.**—The Bristle-like Branched.
§ 2.—**Phyllocladus.**—The Leaf-like Branched.
§ 3.—**Pterophyllus.**—The Feather-like Leaved.
S.D. V.—TAXINEÆ.—The Yew Tribe.
§ 1.—**Cephalotaxus.**—The Cluster-flowered.
§ 2.—**Fœtataxus.**—The Strong Odored.
§ 3.—**Squamataxus.**—The Scale-fruited.
§ 4.—**Verataxus.**—The True or Prototype.

CHAPTER III.

DIVISION ONE.

CONIFERÆ.

Flowers. These are what are termed catkins, and are of the two sexes, male and female; the males are the floral organs which produce the pollen dust or fecundating powder, and after having performed their functions fade and disappear; the females have no petals or bloom-leaves, as in other more perfectly formed flowers, being minus pericarpal adornments, and composed of naked ovules or embryo-scales; which, after receiving the pollen dust from the male catkins, become fertile, and begin to grow, gradually developing themselves until the cone and its seeds are perfectly matured; so that the female flowers may in truth be termed the embryo or premature cones: in some of the

species the flowers are together, and in some they are separate; while in most of them they are upon the same plant but separate; and in others they are upon separate plants or trees.

Leaves. These are generally single or in sheaths and bundles, and very variable in the number of them in a sheath; some have two, some three, some five; while at times seven, nine, and more leaves are found in a sheath; and in those which have their leaves in bundles the same variableness is present; for the number in a bundle may range from six to sixty; and even in some of these bundle-leaved species the leaves are disposed singly upon the young shoots; and although botanists take the disposition of their leaves as one of their distinguishing characteristics; yet it is one of their most inconstant ones. In some genera the leaves are more like scales than foliage; closely inlaying or imbricated along the shoots or stems. They are also very various in size, ranging from one-eighth of an inch to one-and-a-half feet in length; variously disposed upon the branches—alternate, drooping, erect, four-rowed, opposite, scattered, spiral, solitary, spreading, three-rowed, two-rowed, and in whorls. They are also very various in form—blunt-pointed, curved, cylindrical, flat, four-sided, lanceolate, linear, needle-shaped, three-sided, two-sided, and petiolate and non-petiolate: various in texture—hard, leathery, rough, rigid, smooth, pliant, and glaucous and non-glaucous. Generally, they are perennial or evergreen; yet, in some of the genera and species annual or deciduous.

Cones. These are from one-eighth of an inch to one-and-a-half feet in length, and from one-eighth of an inch to nine inches broad; variously formed:—elliptical, egg-shaped, cylindrical, round, rhomboid, and star-like: all more or less numerously scaled, valved, and seeded; and all more or less ligneous on their exteriors or surfaces. The seeds are also of various formations, and of various sizes; some winged, some wingless, generally single, two, three, five, and seven; but rarely more numerous under each scale; generally the seeds have farinaceous albuminous kernels, not a few of which are of large size, and good for and used as food.

S.D. I. ABIETINEÆ: The Fir.

The ancient and classic name *Abies* is a term of which no certain origin or root derivation can be affirmed; yet, the Hebraic roots, אב *Ab*, and אבי *Abi*, signifying *greenness*, in the Latin Vulgate *virentia;* and, again, the Greek απιος "a pear," are each appropriate

enough, inasmuch as truthfully representing its greenness and pyramidal form; for what tree more green* and conical than the fir? There is, however, not only great diversity of opinion about this name, but equally great confusion in its application; and still more error prevalent respecting the specific qualities and quantities of the very numerous and variable species, quasi-species, varieties, and sub-varieties of this S.D. The ancients called the Silver Fir *Abies*, and the Spruce Fir *Picea;* as witness Pliny's *Picea* (our VERA,) he distinguishing it in description by the terms *tonsili faciliata;* a veritable fact when applied to the Spruce Fir, but the very reverse when applied to the Silver Fir; which latter will *not* endure with impunity to be clipped and shorn into hedges or other grotesque forms. Linnæus, again, reversed the names, hence much of the present confusion in their nomenclature.

§ 1. INTERMEDIA: The Intermediate Firs.

In this section I include those kinds which are, as it were intermediate, inasmuch as they differ in one or more of their permanent and distinguishing characteristics from *Picea* and *Vera*. Their **Flowers** are, like those of their congeners, male and female, and on the same plant or tree, but separate; so the botanists call them *monœcious* inasmuch, as though the floral organs or catkins are of the two sexes, yet, the plants and trees properly speaking are not so. Their **Leaves** are flat, more or less two-rowed, and more or less glaucous and silvery on their under surface; agreeing with *Picea* and differing from *Vera*. Their **Cones** are pendulous, and their seeds small; agreeing with *Vera* and differing from *Picea*. In their resinous juices, and likewise in their ligneous tissues, they also differ in a more or less marked degree from those of the species comprising our second and third section of *Abietineæ*. The beautiful Hemlock Spruce, *Abies Canadensis*, and the majestic and valuable Columbian Fir, *Abies Douglasii*, are my prototypes in this section.

ABIES CANADENSIS: The Canadian or Hemlock Spruce Fir.

Leaves. These are solitary, flat, blunt-pointed, and from one-half to one inch long, and nearly one line broad; rough margined, when first formed somewhat downy, and more or less irregularly disposed in two

* UHLAND'S fantasy, as translated from the German, by the Rev. Waller W. Skeat, late F.C.C.C., is indeed very beautiful:—

O fir tree, thy rejoicing spray
Throughout the year is *green;*
Like thee, my love for many a day
Hath fresh and hopeful been.

rows on the branch stems: bright, vivid green above, and silvery green banded below.

Cones, these are from one-half to one inch long, and from one-quarter to one-half inch broad; pendulous, generally on the tips of the branches; oval in shape; when young they are green in colour, changing to a greenish brown as they arrive at maturity: the scales are entire edged, smooth and rounded, and from one-and-a-half to two-and-a-half dozen to each cone; the seeds are small and light brown in colour, and are furnished with a wing appendage about a quarter of an inch long, which is yellowish-white in colour.

Branches, these are slender, numerous, spreading, flat, and when young somewhat downy; the bark when young is smooth and yellowish-green, changing to a yellowish-brown when old, and when thoroughly matured it assumes an ashy brown colour.

Tree, bushy-headed, uniform stemmed, and attaining heights of from fifty to one hundred feet.

It was introduced from America about 1736. It is perfectly hardy, of slow growth; it dislikes dry soils, and luxuriates in sweet moist earth and a sheltered situation; and will never succeed in localities where a smoky or impure atmosphere prevails; its timber when compared with some of its congeners is very inferior; but its bark contains a greater percentage of tannin than any firs I have yet examined. It has no claims to entitle it to be classed as a profitable timber tree; but its rich silvery green foliage, its pendent plum-like branches, and its graceful form and habit of growth, place it in the first rank as an ornamental one.

Its *Quasi-species* are :—

Albertiana: Prince Albert's Californian Hemlock Spruce.

This kind, in none of its distinguishing botanical characteristics differs in any appreciable degree from the prototype; but, practically considered, it is a much better plant, inasmuch as it is better constitutioned; consequently a better grower, and less fastidious as to soil, situation, or shelter; and will doubtless prove equally beautiful, and a much more useful tree in this country than the common or Canadian kind.

Brunoniana: The Indian Hemlock Spruce.

This has larger and more sparse foliage, and is much more capricious, and delicate than the prototype; and of but little if any use in this country.

Hookeriana: Hooker's; and **Mertensiana;** Mertens's Hemlock Spruce Firs.

As sometimes found in catalogues and collections; are, at best, but very slightly altered forms, or sub-varieties of Prince Albert's Californian Hemlock Spruce.

Tsuja: The Yew-leaved Chinese Hemlock Spruce.

This is merely a diminutive depapurated form of the prototype.

Of the varieties and sub-varieties of the Hemlock Spruce, the only ones worth notice or cultivating are *Argentea*, the silver variegated, *Aurea*, the golden variegated, *Gracilis*, the slender branched, *Microphylla* the small leaved, and *Nana*, the dwarf.

ABIES DOUGLASII: Douglas's Columbian Fir.

Leaves. These are flat, entire, linear, and from one to two inches long, and from one-half to one line broad, generally more or less blunt-pointed, exceptionally sharp-pointed; bright glossy green above, and generally lighter green, with a silvery band on each side of the mid-rib on their under surface, on the young shoots, and when first formed, the leaves are disposed more or less spirally all round the stems; but as they increase in age and become adult branches, the leaves then become more or less irregularly arranged in two horizontal rows.

Cones. These are from two to six inches long, and from one to two inches in diameter, ovate or oblong in form, generally pendent, irregularly disposed, generally solitary, frequently in pairs, sometimes in threes, fives, or sevens, more or less clustered together, occasionally in gregarious clusters of six, five of which may be pendent, and the remaining one on the upper side of the shoot, lying flat and straight along the branch-stem, with its apex pointing to the tip of the shoot; but, however disposed, each cone has its own individual footstalk, and the cones will generally be found upon the upper branches at or near their extremities; they are at first pea-green in colour, rarely greenish-purple, changing to yellowish-brown as they arrive at maturity. The scales are irregular in number, imbricated, concave, rounded, and although persistent, yet loosely disposed on the base of the cone or centre stem. The bracteas are long, and project and overlay the scales, trident-pointed—the centre tooth or prong much the longest, narrowest, and most pointed, the two side or outer ones being equal in size and broader. These bracts give the cone a feathery appearance: the seeds are comparatively small, and their wing appendage about a quarter of an inch long. This fir is quite remarkable in its tendency to produce cones which in size, shape, scales, bracts, seed-shells, and wings, are perfectly formed, yet, abortive or non-seeded, both in young plants and old trees; doubtless this arises from imperfect impregnation, and when quality and quantity of seed is desiderated, we should impregnate the female organs with the pollen dust from the male catkins.

Branches, these are numerous and irregularly disposed, generally

spreading horizontally, mostly ascending, though at their extremities more or less recurved and pendent. The branchlets are also numerous, long, and slender, and generally somewhat irregularly disposed in two rows on the branches, and also more or less recurved and drooping, particularly when young, giving the branches a twiggy appearance and flat form. The buds are, compared with the length of the annual shoots, few and distant, irregularly disposed along the shoots, and most numerous near the tops, the tip or point bud being the largest, and all of them somewhat oval in form, bluntly pointed, covered with fringed scales of a brownish colour, and comparatively non-resinous.

Bark, this when young is yellowish-green in colour, and surcharged with resinous juice; when old and matured, rough and rugged, and greyish, or ashy-brown coloured, and upon aged trees it is comparatively very thick, being from six to twelve inches in diameter.

In this fir we have combined utility and beauty, gigantic stature and perfect symmetry, graceful form and pleasing colour, varying from light to dark, and making its changes through all the shades and tints of verdant green, as spring, summer, autumn, and winter in turn complete the year.

This fir was discovered by and named after Douglas, the persevering explorer and plant-collector, who from the north-west sent home so many of these noble trees which now adorn our landscape; and this majestic fir will perpetuate his name to future ages, for he well deserves to be remembered: He it was who surrounded by danger on every side, and amid the most exciting scenes noted such notes in his journal as:—"New or strange things seldom fail to make great impressions, and we are often at first liable to overrate them," again,—"lest I should never see my friends to tell them verbally, of these most beautiful and immensely large trees." Poor Douglas seems in this paragraph to have anticipated his fate, for his untimely death, and melancholy end in a buffalo-pit in the far west, prevented him from ever "seeing his friends to tell them verbally of these trees."

This fir is one of the most distinct, beautiful, and valuable ever introduced into Britain. It is thoroughly hardy, sound in constitution, of large dimensions, and very rapid in its growth; not particularly fastidious as to soil or situation, provided always the soil be in a sweet and healthy condition, and the sub-soil cool and porous; for even now we have it growing, nay luxuriating, alike in the forests and parks of England, in the alluvial vales and humid clime of Hibernia, in the romantic glens and mountain dells of old Scotland, and in the debris

of the slate rocks of Wales; and in its native habitats in the north-west it is equally as accommodating, for it is to be found on the highest peaks of the Rocky Mountains, a knarled bush about a yard high, while along the river's banks, and in the Columbian valleys, and at the mountain bases, it produces trunks of timber two hundred feet in length and ten feet in diameter at base: but much larger logs have been obtained from it when grown under very favourable conditions, for the tree from which the specimens of its wood were exhibited at our International Exhibition (1862,) in the British Columbian Court, was over three hundred feet in height; and, judging from its concentric ring-growths, its age was computed as approximating to a dozen-and-a-half score years. Amongst the specimens shown of its converted timber were a six feet diameter of a horizontal section, as sound at its circumference as at its centre; the heavy planks, quartering, and flooring, were, indeed, admirable examples of valuable timber; and the split pales and shingles most clearly proved the fact, that for ease in splitting, freedom from loss in the process, and less loss of strength in proportion to the dimensions split, if for such a purpose it has equals, it has indeed but few superiors. In common parlance it may be said to rend like a ribbon; and this everyone engaged in the growth of timber, and more particularly those who have to convert it, will admit is a most valuable quality in a good and generally useful wood.

Its timber may truly be termed first class, A 1; being, as it is, fine-grained, elastic, heavy, strong, free from knots, easily wrought, and capable of receiving a high polish; not very resinous, yet, very durable, not subject to warp or splinter, and its only defect is that in trees which may be felled ere they have become aged and thoroughly matured, or have stopped growing, as we phrase it, it will be found that about one-third of its outer or circumference wood is more white, porous, and tough, and consequently less durable; while about two-thirds of its diameter, the centre or spine wood, is reddish in colour and most excellent in quality. Our best recommendation of this fir is to state the fact that we are now cultivating and planting it in thousands annually, as a general forest tree; confident it will never disappoint us, although the opinion we have formed of it is indeed a high one. As an ornamental tree it only requires to be seen to be appreciated, and much more extensively planted, both for use and beauty, whether for profit or pleasure.

The species-mongers have not been able to manufacture a new species from this specifically distinct fir, although we have many

tolerably well marked and distinct varieties of it, some of which, for purely ornamental purposes, deserve notice but the only forms of it which I have seen, or which we possess worthy of commendation, are *Fastigiata*, *Gregiana*, *Pendula*, *Standishiana*, *Taxifolia*, by some called *Drummondii*, and *Variegata*.

Before leaving this, my intermediate Section of the S.D. *Abietineæ*, I have to notice:—

ABIES ALCOQUIANA: Alcock's Chinese Spruce Fir.

This, said to be new species, from what I have seen of it I term a nondescript, and, doubtless, a manufactured article of John Chinaman, from Nature's staples,—*Abies Excelsa*, and *Picea Pectinata*; entitled to be classed as a quasi-species, until time and experience prove to us what it is; my present opinion of it, however, is, that it may be a botanical curiosity, but it certainly is not a new species of fir. I place it here, inasmuch as it seems to be as consonant to this, as to either of the other two sections of *Abietineæ*.

ABIES MICROSPERMA: Small-seeded Spruce.

This I term a small-seeded form of the aforesaid *Abies Alcoquiana*: Both of them sufficiently hardy for our climate.

§ 2. PICEA: The Pitch or Silver Firs.

Flowers. Male and female on the same plant, but separate.

Leaves, flat, solitary, from one-half to two inches long; rich dark green in colour, and on each side the mid-rib on their under surface they have a conspicuous silvery band; generally blunt-pointed, some sharp and dagger-like, others have their leaves two-clift or divided at the points; they are generally somewhat irregularly disposed in two rows, some alternate, some scattered, some more or less four-rowed, some spirally disposed all round the shoots; persistent and perennial.

Cones. Generally large, ranging from two to seven inches in length, and from one to four inches in diameter; generally more or less cylindrical in form, some egg-shaped, some oblong, some oval, and all more or less blunt-pointed; generally erect or nearly so; the scales are comparatively thin and deciduous, and the bracts in some species are larger and in others smaller than the scales, at first generally green, changing to a brownish-purple as they arrive at maturity; the seeds are large and pitchy, as are also all the component parts of the tree; hence the name.

Amongst the Silver Firs are to be found some of the most noble, majestic, symmetrical, and truly beautiful productions of the vegetable kingdom.

The seulptors may ply their chisels, the painters their pencils, the literati their pens, or the poets sing to us their laudatory strains; but all their statues, paintings, portraitures, or laudations, are at best finite arts, and can no more give us a perfect representation of a perfect specimen of such a tree as *Picea Nobilis*—the Noble Silver Fir—than they can transfer to stone, canvas, or paper the transient and transforming glistening silvery dew-drops of early morn ere they amalgamate with the adjacent atmosphere and superincumbent earth, losing their globules each the other in, while the sun, in his transcendent glory, is preparing to mark our diurnal meridian on the dial of time. "A thing of beauty is a joy for ever:" however true the fantasy may be, no less true is the fact, that beauty and quality, or use and adornment, are respectively very different things; for so it happens that in this section of the firs we have an assemblage all beautiful, and that in the very highest degree; yet, few of them can lay claim to even second-class certificates as profitable timber trees.

It will be observed, from what I have already stated, that the chief value of the Silver Firs in this country is their beauty and usefulness as ornamental trees; yet some of them, as will be seen from the sequel, produce tolerably good wood; and, irrespective of their utility as decorators, we should cultivate them on a more or less extended scale for their timber. All of them require a good deep soil, and a more or less sheltered situation fully to develop themselves; but in most ordinary soils they will do tolerably well, and will invariably produce better quality though less quantity of timber when on high altitudes and in poor soils, than when in low-lying situations and good soils where their beauty and dimensions would be greater, and their timber inferior. Almost all of them are sufficiently hardy for our climate, and grow freely, particularly in a young state, and after having established themselves in the soil. For all kinds of ornamental planting they are, indeed, well adapted; but all the most distinct and beautiful kinds will be specially noticed, and all the less distinct and similar kinds referred to the species to which they are allied.

PICEA AMABILIS: The Lovely Silver Fir.

This is a Californian kind, varying from 150 to 250 feet in height; with flat linear leaves about an inch long, irregularly but densely two-rowed, bright green above, and glaucous below; and cones about six inches long and from two to three inches broad. A beautiful hardy kind; but vastly inferior to its "QUEEN" **Nobilis**; and whoever may possess the Noble Silver Fir needs care but little for the Lovely Silver Fir; unless,

indeed, they must needs have more variety. There is of this again an altered form called *Magnifica* or *Robusta.*

PICEA APOLLINIS: The Silver Fir of Apollo.

This is a sportive-foliaged, smooth-barked, small-sized, quasi form of the beautiful *Pinsapo;* hardy and useful enough for adding variety to a pinetum.

PICEA BALSAMEA: The Balm of Gilead Fir.

This is a North American, and the prototype of the Dwarf Silver Firs; attaining heights of from twenty-five to thirty feet, with leaves from half to one inch long, entire, spreading, solitary, scattered on the leading shoots, and more or less irregularly two-rowed on the laterals, green above and silvery below. The cones are from three to four inches long, and from one to two inches broad, greenish purple when young, when matured violet purple; the seeds are very small and large winged.

This is a useful little tree, hardy, compact-growing, and well adapted for planting where small sized ornamental trees are desired. There are the following varieties of it:—*Brevifolia,* (short-leaved,) *Longifolia,* (long-leaved,) *Nana* or *Fraseri,* (the Dwarf, and of this there is again a sub-variety, *Hudsonica,* scarcely ever growing more than a yard high,) and *Variegata,* (the variegated.)

PICEA BRACTEATA: Leafy-Bracted Silver Fir.

This is another Californian, partaking somewhat of the nature of its congener *Nobilis,* (though a much less beautiful tree,) and of that of the common kind *Pectinata;* it attains heights of from eighty to one hundred and twenty feet with a straight slender trunk; with leaves from two to three inches long, and cones from three to four inches long, and two inches broad; generally in clusters. It is tolerably hardy, but particular as to soil and situation, and predisposed to start growing early, consequently frequently injured from spring frost. Wherever it is desired to plant it in a pinetum in this country, it should have a northern rather than a southern aspect assigned to it.

PICEA CEPHALONICA: Mount Enos Fir.

This is the Greek form of the Pinsapo Silver Fir; an *alter ego;*—having larger leaves and more conspicuous silvery bands on their under face; more prominent buds, with the branches less liberally clothed with foliage, and more fastidious as to soil and situation, early in its growth, and consequent injury in our climate; and whoever may have *Picea Pinsapo,* requires not *Picea Cephalonica,* unless indeed for variety, for it is but a quasi- species of that most distinct and lovely Silver Fir.

PICEA CILICICA: The Cilician Silver Fir.

A slightly altered form of the prototype—*Pectinata;* which has, doubtless, been caused by the climate and soil of Asia Minor. It is found plentifully on the Taurian mountain chains, and has been again and again introduced into this country as a new species. This Fir is the "*Chadsura*" (green and white fir,) of the Mongolians; and the "*Tchugatskoy*" (strong-scented fir,) of the Russians. It is perfectly hardy, and useful enough as a variety in a pinetum.

PICEA FIRMA: The Japan Silver Fir.

This again is only an altered form of the prototype *Pectinata;* and somewhat related to the Himalayan kind, *Webbiana;* and doubtless the Orientals had their Silver Firs from the Hindoos, for *Bifida*, *Fortuni*, and *Homolepis* indicate the same origin; and the same might be said of *Veitchi*, although I place it as a small-coned variety, it may prove to be a quasi-species, of *Pectinata:* but all the differences in *Firma*, *Bifida*, *Fortuni*, and *Homolepis* are at best but hairs, and even then we would have to split them, and use the microscope to determine the degree of variation in size or form of leaf or cone. Be this as it may, time and experience will hereafter prove that these said to be four species are at best but four inferior constitutioned quasi-species, or, more probably, varieties of the common Silver Fir.

PICEA GRANDIS: The Great or Grand Silver Fir.

In this we have something to talk about and admire; an appreciable reality, a species if not a prototype of the Silver Firs.

Leaves, variable in size and disposition, somewhat irregularly arranged in two horizontal rows, on each side the branch stems; the upper tier ones from half to one inch long, the lower tier ones from one to two inches long; but all of them equally broad; in form linear, flat, some of them very slightly notched at point, others entire and more or less sharp; all channelled above and having the conspicuous silvery bands below; deep glossy green on their upper face, and bright green and silvery on their under surface; all have their margins thickened, and their footstalks short and more or less twisted.

Cones, from three to five inches long, and from one to two inches broad; cylindrical in form and erectly disposed; the scales broad, rounded, and more or less downy externally; curved at the edges, closely disposed, equal in size, and when ripe deciduous; the seeds comparatively small, soft, angular, with persistent wings from half to one inch long.

Branches, in whorls, flat, spreading, and comparatively distant; branchlets in two horizontal rows, and short and compact; the bark when young glossy golden green, and smooth and varnished-like;

when older, slightly scared and ashy-green; and when matured more or less rough, fissured, and scaly, and reddish-grey; and when aged ashy-grey in colour.

This tree is most appropriately named, for it is indeed a grand Fir. First discovered and introduced to us by poor Douglas, from Northern California, but it has since been found in British Columbia and Vancouver's Island, both in the true and quasi form, for it is now plentiful in this country as a *Quasi-Grandis* (*Lowiana*, of some, *Magnifica* of others;) which, at least in their young state, are in so far as foliage goes distinct from the original; having leaves duller green above, and less conspicuously marked with the glaucous silvery bands below; and the branchlets more spreading and lighter coloured, and nothing like the glossy, smooth, and varnished young growths of the true species.

Most of the young specimens and trees of it, at least of any size, in this country have been propagated by grafting, layering, or cuttings; consequently many *branches* of it are to be found, no doubt many of them beautiful; but far inferior in grandeur to what they would have been, if raised from seed.

It prefers moist (not wet, nor sour) soils; and alluvial valleys are its choice of situation: it is perfectly hardy, not predisposed to early growth; and well deserves to be much more extensively planted in the beautifying of our landscapes than it now is; and as many young plants of it raised from seed are now extant, it will no doubt ere long be more highly appreciated, and eventually find its way into every plantation of beautiful trees.

PICEA NOBILIS: The Noble Silver Fir.

APOSTROPHISED BY THE FIRS AND PINES.

Hail! *Nobilis;* thy sceptre sway
O'er *Picea's* silver train:
Our homage, Beauty's due, we pay,
To thy all verdant reign.

Hail! empress of the Firs and Pines!
Grand giants! pigmies green!
What Pine, what Fir its vow declines,
To crown thee *Picea's* QUEEN?

Leaves, from one-half to two inches long, solitary, flat, linear, falcate, compressed, turned upwards, and very closely disposed on the branch stems, particularly on the sides and tops; but as the branchlets become adult branches, the leaves become more or less irregularly arranged in two rows: rich blueish green above, and silvery below; and when viewed at a short distance the spray appears a beautiful combination, a conglomerate mass, as it were, of rich silvery green, and glaucous violet shades and tints.

Cones, these are generally solitary, and growing upon the upper

side of the branches; from five to eight inches in length, and from two to three broad; at first yellowish green, changing to yellowish purple as they arrive at maturity: the scales are somewhat triangular, more or less incurved, and entire margined; the bracts project, the scales are jagged round the edges, and furnished with a comparatively long broad point, or rather tail, as they are more or less reflexed backwards: the seeds are not very large, and their wing appendage rather more than an inch long.

Its branches are disposed in whorls, and the branchlets numerous and regular, and well clothed with foliage; the bark when young is yellowish green, changing to a yellowish purple, and when matured of a rich cinnamon colour.

This is another of Douglas's "beautiful and immensely large trees," of it he says, "I spent weeks in a forest composed of it, and day by day ceased not to admire it." It has also been found by other travellers in several localities of California and Columbia since Douglas first discovered it. It attains heights of from one hundred and fifty to two hundred feet, and three to four feet in diameter. It is thoroughly hardy, sound in constitution, of tolerably rapid growth, not particularly fastidious as to soil and situation; but fully to develop itself it requires a good, deep, loamy soil, and sheltered locality in this country. Its timber may be termed *almost* second-class; ornament, however, is its quality, and in that it takes the very highest rank. Its quasis are *Amabilis*, *Magnifica*, and *Robusta*, all of them noble and beautiful.

PICEA NORDMANNIANA: Nordmann's Silver Fir.

This kind, although partaking somewhat of the prototype and the great Silver Fir, is nevertheless distinct from either of them, and requires a description.

Leaves, these are solitary, flat, thick-margined, smooth, linear, emarginate, equal in breadth from apex to base, somewhat twisted at bottom; rich light, or yellowish green above, and darker green, with the silvery bands, and likewise grooved below.

Cones, from four to six inches long, and from two to three inches in diameter; egg-shaped, and blunt pointed; with short footstalks, growing erect on the upper side of the branches; the scales are cupped, smooth, obtuse, entire, somewhat recurved, closely adpressed and falling off when the seeds are thoroughly ripe: the bracts at first adhere to the scales, but as they mature become free, and extend the scales, and eventually more or less reflexed at their apex; seeds trian-

gular and soft, generally two under each scale; and the wing appendage comparatively large.

Branches, these are numerous, dense, and regularly disposed; the upper ones aspiring, the lower ones horizontal; the branchlets are also numerous and regularly disposed; the bark on the young plants smooth and glossy, and even on old trees and when matured, it is comparatively smooth and fine for fir bark, hence it is sometimes called *Picea Leioclada*, (smooth-branched Pitch Fir.) It is found common on the Crimean Mountains, and the Alpine regions east of the Black Sea, attaining heights of from seventy to ninety feet; generally straight stemmed, and from two to three feet in diameter. It is thoroughly hardy, sturdy, iron constitutioned, and seems to do well in almost any soil, if in a healthy condition, in this country. Situations cold or hot, high or low, will suit it, for it seems to thrive in all kinds and degrees of them. The timber of *Nordmanniana* and *Pinsapo* I consider the best of those of any of the silver firs, not excepting, even, the prototype *Pectinata*. It well deserves to be extensively planted in Britain, as a most beautiful small-sized ornamental tree, producing tolerably good timber.

PICEA PECTINATA: The Pectinate Leaved Fir.

So called from its leaves being disposed in two rows like the teeth of a comb.

This I take as the original prototype and present representative of this *Picea*, or my second section of the S.D. *Abietineæ*, inasmuch as it has in a more or less marked degree all the distinguishing characteristics of the Silver Firs.

Leaves, solitary, flat, stiff, leathery, obtuse; their points curved and aspiring, from one-half, to one-and-a-half inch long; dark shining green above, with the two silver bands below.

Cones, from five to eight inches long, and from one to two inches broad; cylindrical in form, growing erect and axillary on the branches; at first yellowish green, changing to greenish red, and when matured brown in colour: the scales are rounded and thin margined; the bracts longer than the scales, and sharp though flat pointed; the seeds angular, soft, and surcharged with resinous juice, surmounted by a membranaceous wing appendage.

Branches, regularly disposed in horizontal whorls; the branchlets are all also regularly disposed and uniformly clothed with foliage. This fir was introduced into this country about the beginning of the sixteenth century; and it may be termed an European tree; inasmuch

as it is found more or less plentiful all over the mountain chains of the Alps, Appennines, and Pyrenees; and on most of the higher table lands of Mid-Europe; yet, very rarely in Northern Europe; while it extends to North and West Asia, and is very common on the higher mountains of Greece. Wherever found in a natural state it is generally located on elevations ranging from two thousand to five thousand feet.

It is thoroughly hardy, sound in constitution, of rapid growth, particularly after it has established itself; and not particularly fastidious in its choice of soil or situation; doing tolerably well in any ordinary soil, if in a sweet and healthy condition; but requires a good deep soil and sheltered locality fully to develop itself in this country. It attains heights of from eighty to one hundred and twenty feet; and will in Britain, when planted in a soil and situation congenial to its growth, reach one hundred feet in height.

Its timber is what I term second-class, being rather soft and porous, of a creamy whiteness, tinged or shaded with rose; and when free from knots easily wrought, but not very durable, and a bad weather-stander, yet useful for many domestic purposes. I have invariably found that it produces better quality of timber when grown upon high than low altitudes, and in hard and poor than in soft and rich soil, though the quantity be less.

No fir is more useful in this country; either for mixed plantations, groups, belts, or specimen park trees; and for game-preserves, thickets, or shelter clumps, few trees are better adapted; for in such situations, where a close humid atmosphere, and drip and shade prevail, it is quite at home.

Of the innumerable varieties and sub-varieties of this fir, worthy notice or cultivation for their use or beauty as ornamental trees or shrubs, I enumerate the following:—*Argentea*, (silvery variegated,) *Aurea*, (golden variegated,) *Fastigiata*, (fastigiate-branched,) *Microcarpa*, (small-coned,) *Nana*, (the dwarf,) *Pendula*, (the pendulous-branched,) *Pyramidalia*, (the pyramidal var.,) *Tortuosa*, (the tortuous-branched var.)

PICEA PICHTA: The Siberian Pitch Fir.

This is merely a depapurated and more pitchy form of the quasi-species *Cilicica*: which characteristic is no doubt the effect produced by the soil and climate of Siberia. This, moreover, is a much slower grower and a less beautiful plant or tree than the Cilician. There is also a *variegata* form of it.

PICEA PINDROW: The Indian Silver Fir.

This is the Indian form of the Silver fir, and no doubt its native and universal name is derived from the Sanscrit words *Pind*, "incense-cake," and *Rud*, "to weep;" inasmuch as it was much used in sacrifices, and burnt offerings to their deities; the numerous globules of resinous matter which are found exuding, like "the shedding of tears," from the cones and axillary parts of the stems being made into cakes for offerings. Major Madden, however, calls it a "local and barbarous term," and gives to this tree the name *Herbertiana*; in compliment to the late Captain Herbert, who rendered the natural history of India such good service: but when I see so much truth and beauty in this the Major's "barbarous term," of a barbarous people, who, in their own barbarous way, generally applied more correct and significant names to their trees, than we fine folk who are under the banner of civilization; I have no compunction as a Christian in selecting the "barbarous," and rejecting the civilized, term as the specific name of the Indian form of the Silver Fir.

Leaves, varying in size from one to three inches in length, and about one line broad; dark green when young, increasing in degree as they mature, when they assume a black-green colour, and on their under face the silvery bands; which, however, are less conspicuous than in the European or North American kinds. The leaves are at first disposed regularly all round the young shoots; but as they increase in age and become adult branches, the leaves then form themselves into two horizontal rows on the branch stems; all of them more or less bidented or bifid, that is two-toothed or double-pointed.

Cones, generally from four to six inches long, and two to four inches broad; solitary and erect on the upper side of the branch stems; at first yellowish green, changing to greenish purple as they increase in age, and when matured a rich dark purple colour; scales wedge-shaped, stiff, and leathery; deciduous when matured; seeds angular or oblong in form, soft and resinous, the wing appendage thin, long, and broad.

Branches, these are disposed in horizontal whorls, and are spreading; the branchlets are generally in two rows upon the branches, and in opposite pairs, and the buds oval in form, greenish purple in colour, and resinous and scaly.

This fir, when young and growing, forms a tapering, or tall conical pyramid; but when matured and aged it is a dark and dismal looking, flat-headed tree.

It attains heights of from fifty to one hundred and fifty feet; and it

is found more or less plentiful on the snow-capped mountains and alpine heights of north-western India, at elevations ranging from seven thousand to thirteen thousand feet; and like all the other firs and pines, is much influenced in its stature and dimensions, and likewise in the size of its foliage and cones, by the soil, climate, and altitude in which it may be found growing; hence the many conflicting and contradictory descriptions which have been from time to time given us of the Indian Silver Fir.

This fir is sufficiently hardy for our climate; but it is very fastidious as to soil and situation; and is predisposed to early spring growth, and consequently is liable to injury from late spring frosts; and whenever it is intended to plant it, the best soil and most sheltered situation in the most northern aspect of the pinetum or plantation should be assigned to it; for a southern aspect and early or meridian sun are the causes of its dislikes to Albion's Isles.

As a timber tree it has no claims; for its best specimens are soft and spongy and of mushroom durability: as an ornamental tree it is only useful as a variety in a large collection where a suitable soil and situation can be afforded it.

PICEA PINSAPO: The Pinsapo or Spanish Silver Fir.

Hail! *Pinsapo!* thou goodly tree!
Thou art all grace and symmetry,
Gem of Iberia's land.
A pitchy wood though we confess,
Yet, perfect lignine these hath less;
And well thy charms demand
That thee in rank our strains address
As next our Queen,—our fair PRINCESS.

Leaves, comparatively small, being from a quarter to one inch in length; somewhat flat on their upper face, and more or less rounded below, and almost minus the conspicuous silvery bands, the distingushing characteristic so much appreciated in the Silver Fir or *Picea* section;—for in this species it is at most but very imperfectly illustrated: no two-toothed leaves do we find, but sharp needle-pointed little lancets or daggers, so closely and regularly disposed on the branch stems at right angles, that from a cylinder sprig an ordinary mathematician might define by angles, if not square the circle: when young, the foliage is pea-green, when matured, rich green, and when aged, bright shining green.

Cones, from four to six inches long, and from one-and-a-half to three inches broad; cylindrical in form, but ovate at base and apex; minus

footstalks, or with very short ones; erect and numerous, growing upon the upper side of the branches; at first yellowish green, changing to greenish purple; and when matured brownish purple in colour: the scales are wedge-shaped at base, rounded externally, and entire at apex; bracts comparatively small; the seeds angular, soft, and winged.

Branches, regularly disposed in whorls, not far distant; and the branchlets are equally as numerous and geometrical, even to the base of the branches, and the branches the same to the base of the tree, rendering a cylinder instead of a pyramid; quite in keeping with its other parts—the foliage and cones, in their formation of cylinders by mathematical angles: a rather remarkable characteristic in a fir. The bark, when young, is yellowish green, changing to greenish brown, and when old brownish purple, and more or less furrowed, rough, and scaly.

Tree, when young, is a paragon of beauty, a model of symmetry, and an object of never satiating pleasure; when old and matured it is a stately dame, 'neath whose branching head and dense ambrosial shade, we might court the muses and improve the mind, by reading lessons from the leaves, the branches, cones, and scaly trunk.

It is thoroughly hardy, of moderate growth, and not dainty as to soil or situation. It attains heights of from fifty to seventy feet, and produces wood equally as good, and for texture and durability, I think superior, to that of any of the species of the silver firs; and if it has not it ought to have, a place in every collection of trees, whether great or small. Of its varieties the only one worthy of notice is *variegata;* differing, however, in nothing but the colour of a portion of its leaves and spray which are yellow, straw or creamy-white; and which, mixed with the common or bright green ones, are very showy if not pretty; rendering it useful as an ornamental plant where variety and contrast of colour are desired; but it must be remembered that variegation is not an indication of health; and this variety is more particular and fastidious about soil and situation than its parent, to whose characteristics it sometimes reverts, even when propagated by grafts, cuttings, or layers; and, doubtless, always, when, if ever, we raise it from seed. Its quasis are *Apollinis*, *Cephalonica*, and *Reginæ Amaleæ;* all beautiful, but in a less degree than the Princess *Pinsapo.*

PICEA RELIGIOSA: The Sacred Silver Fir.

This is the Mexican form of Picea; a kind somewhat distinct from all its congeners.

Leaves, solitary, linear, flat, from a quarter to two inches long; irregularly disposed; on the leading or stem shoot thinly set and

recurved backwards; on the laterals somewhat two rowed and recurved downwards; on the lower side very few indeed; and on the upper side a few small-sized ones pointing to the top of the shoot; deep green above and silvery banded when young; but, when old, most of the silver disappears, and the leaves assume a darker shade.

Cones, from four to six inches long, and from two to three inches broad; somewhat egg-shaped, erect on the shoots; at first greenish purple, increasing in darkness as they increase in age: scales rounded, broad, entire, and thick margined; bracts large, projecting and reflexing over the scales; seeds large, angular, soft, and winged.

Branches, the leading shoots rampant, soft, and spongy, the laterals more regular and uniform in growth; and all of them very irregularly disposed; when young sometimes more or less downy or hairy; but when old generally all smooth and clean: bark brown and smooth; buds inclined to start growing in autumn, and often injured by early and hard winter frosts.

It attains heights of from one hundred to one hundred and fifty feet; and forms a handsome thin and irregular branched tree with smooth dark brown bark. It has quasis few, but synonyms many, all of which will be found in the Appendix.

It requires the best soils, warmest and best situations in this country; and is, even then, frequently injured as it grows late; its young growths are often killed in severe winters. It is of no value as a timber tree, and but little as an ornamental one; unless, indeed, for curiosity as a peculiar form of the Silver Fir.

PICEA VEITCHI: Veitch's Silver Fir.

This is a said-to-be new species from China; but all of them which I have yet seen as young plants, show nothing distinct from the prototype when cultivated under the same conditions; and the specimens of its cones and leaves now extant show nothing but depapurated cones and leaves of the common kind, for as small cones of the Silver Fir are extant produced in Britain; so for the present I refer it to *Pectinata*, var. *Microcarpa*.

PICEA WEBBIANA: Webb's Indian Silver Fir.

This, although a quasi-species of *Pindrow*, is nevertheless a better constitutioned, equally, if not more beautiful, less fastidious in its choice of soil and situation, and in every respect better adapted for the soils and climate of Great Britain and Ireland.

§ 3. VERA: The true or Spruce Firs.

Leaves, generally four-sided, irregularly disposed, and scattered all

round the shoots; but becoming more or less two-sided, and somewhat two-rowed upon old trees.

Their **Cones** are pendent, or nearly so, and terminate with comparatively thin persistent scales, their seeds small, with a bony shell. All of them abound in turpentine.

ABIES ALBA: The White Spruce Fir.

Leaves, one-half to one inch long, incurved, four-sided, scattered; and glaucous, or whitish-green in colour.

Cones, two to three inches long, one-half to one inch broad, and pendulous; the scales thin, smooth, and rounded.

Branches, compact and dense; bark, light coloured.

A native of Canada and North America, its range extending to the coasts of the Arctic Sea; attaining heights of from twenty-five to fifty feet, and one to two feet in diameter at base. It is thoroughly hardy, free growing, not particular about soil, but prefers moist to dry situations, and is partial to a shady locality.

A most useful ornamental tree, and a most useless timber one.

The only varieties worth notice are:—*cærulea*, (blueish-leaved,) *echinoformis*, (the hedgehog-like,) *glauca*, (the glaucous-leaved,) *nana*, (the dwarf,) and *variegata*, (the variegated.)

ABIES EXCELSA: The Lofty or Common Spruce.

This is the prototype of this section, and a well-known tree.

Leaves, scattered. four-sided, curved, stiff, and sharp-pointed; from one-half to one inch in length, and rich deep green in colour.

Cones, from four to eight inches long, and from one to two inches broad, growing near the tips of the branches, and when matured pendent; yellowish-green at first, changing to brownish-purple as they arrive at maturity: scales somewhat rounded, incurved, and toothed; seeds very small, with the wing appendage from one-half to one inch long.

Branches, in whorls, on young trees horizontal, but in old trees drooping: young trees clothed to their base, but old trees lose their lower branches; bark at first yellowish-green, when old rough and rugged, and brownish-purple.

It has been more or less extensively cultivated by us for three-and-a-half centuries, and may be termed an Alpine European species, but it is now to be found either indigenous or exotic in most temperate countries of the globe; this being the case it has of late years been found in as many quasi-species, and varieties, as it has native habitats, and has been introduced to us as a fine *new species*, from North America, California, China, or other parts of the world.

It is thoroughly hardy, good in constitution, of rapid growth, and large dimensions, and grows freely in almost every description of soil; and is a most useful tree for planting in low-lying, damp, and marshy soils, where most of its congeners would starve and die; yet, fully to develop itself it requires a good deep moist loam, and a sheltered situation, where it would attain a height of over one hundred feet in these isles.

Its timber is light, elastic, sub-resinous, and when free from knots easily wrought; tolerably durable, and useful for many purposes, and enters very largely into our imports of foreign deal, logs, spars, &c., and forms no inconsiderable portion of the world's timber trade. It is, moreover, a most useful tree for ornamental and decorative planting, either for forming large hedges, shelter belts, mixed plantations, or specimen trees. Of its numerous forms and varieties, which are useful as ornamental trees, plants, or shrubs, the only ones worthy of notice are :—*Clanbrasiliana*, (Lord Claubrasil's dwarf Spruce,) and of this there are two sub-varieties :—*stricta*, (erect growing,) and *variegata*, (variegated-leaved,) all three of them never exceeding a couple of yards in height; *denudata*, (naked-stemmed or twiggy-branched,) *elegans*, (the pretty dwarf,) *Finedonensis*, (Finedon yellow-leaved var.,) *monstrosa*, (rustic, or monstrous-branched,) *nigra*, (very dark-green var.,) *oocarpa*, (egg-shaped-coned,) *polita*, (the neaté,) *pygmæa*, (the dwarf,) *pyramidalis*, (erect, or compact growing,) *Sangii*, (Sang's variety,) *stricta*, (conical dwarf var.,) *tenuifolia*, (slender-leaved var.,) *variegata*, (variegated-leaved,) and *pendula*, (weeping-branched,) of which latter there are several sub-varieties, such as *inverta* and *recurvata*.

ABIES ENGELMANI: Engleman's Spruce Fir.

This is a smaller coned, and smaller leaved form of *Menziesii;* found on the Rocky Mountains a knarled bush, while in the valleys of New Mexico it forms a stately tree.

ABIES JEZOENSIS: The Jezo Spruce Fir.

This is merely an altered form of *Menziesii.*

ABIES MENZIESII: Menzie's Spruce Fir.

This beautiful, ornamental, and valuable timber tree, was first introduced to our notice by Douglas, who sent it home in 1831.

Leaves, from one-half to one inch long, solitary, thickly scattered on the young shoots; narrow, linear, sharp-pointed, incurved, and rigid; rich vivid green above, and quite silvery below; after they are twelve months old many of them fall off, leaving the old inner branch stems naked and warted.

Cones, from two to three inches long, and from one to one-and-a-half inches broad; cylindrical in form, blunt-pointed, pendulous, at first yellowish-green, and changing to reddish-purple when ripe; scales elliptical, loosely disposed, thin-margined, and slightly toothed; seeds very small, having an ample wing appendage.

Branches, numerous, dense, and well-clothed with foliage externally; but the inner stems more or less naked and jointed-like.

It attains heights of from fifty to one hundred feet, and forms a pyramidal, thickly-branched, dense-headed tree; when young a symmetrical cone of silvery green. It is thoroughly hardy, of very rapid growth, and luxuriates in moist, loamy, gravelly, or clay soils; but in peat, sandy-gravel, or warm dry soils it gets sickly and subject to be killed by red spiders. From examination of specimens of its matured timber, and likewise of its home-grown, but imperfectly matured wood, I think it will surpass the common Spruce Fir, as a valuable timber for home use and growth. If it has not, it ought to have, a place in every wood or forest, pinetum or plantation. It is not yet much encumbered with varieties, but there are in existence a *Crispa*, (curled-scaled,) *Fastigiata*, (fastigiate-branched,) *Nana*, (dwarf,) and *Variegata*, (variegated-leaved.) There are many quasi-species of it, as will be seen from the many kinds referred to it in the appendix.

ABIES MORINDA: The Himalayan Fir.

From among the many Christian and barbarous names by which this fir is known, I select its native one, and though one of the barbarous ones yet I like it :—*Morinda* in the native dialect means "Nectar drops," or "honey tears," from the resinous drops or tears upon the cones and bark resembling honey. It is also named *Khutrow*, which is, doubtless, a misnomer of the Silma vernacular "Khudrow," or "Noodrow," (weeping fir,) from its long and pendulous branchlets.

Leaves, from one to two inches long, very sharp-pointed, four-sided, somewhat curved, regularly disposed all round the shoots; at first a soft, light green, changing to dark green when matured.

Cones, from three to six inches long, and from one-and-a-half to three inches broad; somewhat ovate in form, at first erect, when matured pendent, at first yellowish-brown and glaucous, when matured purplish-brown; scales even and obovate; seeds very small; wing appendage small, and dark purple in colour.

Branches, horizontal, spreading, at base of tree drooping; and the laterals very numerous, slender, and drooping. It attains heights of from one hundred to one hundred and fifty feet, and forms a most

graceful tree when in a good, sweet, moist soil and northern aspect or shady situation. It is sufficiently hardy for our climate, and is a distinct kind for ornament, but of no use for its timber, which is white, soft, and spongy, and of mushroom durability.

ABIES NIGRA: The Black Spruce Fir.

This is a most beautiful little tree; and whether from its leaves or cones it has been named *Nigra* matters little, for it is indeed, if not a "nigger," at least a "darkie."

Leaves, from a quarter to half an inch long, thickly set all round the stems, four-sided, stiff, and straight, and very dark sombre green in colour.

Cones, from one to two inches long, and from one-half to one inch broad, egg-shaped and pendent, rich, deep purple when young, when old, reddish-brown; scales thin, rounded, wavy, and jagged on the edges; seeds small, with their wing appendage stiff.

Branches, horizontal, numerous, more or less pendent at their tips; the branchlets are also numerous; bark, also, dark purple in colour.

A most distinct, hardy, and useful tree; attaining heights of from fifty to eighty feet, with trunk diameters of from one to two feet, producing good, strong, light, and elastic wood; and from its buds and spray the Americans make most of their "Spruce Beer." Like most of its congeners it prefers moist to dry soils, and gets sickly and infested by red spiders in dry, warm soils.

In every collection of trees, where a moist soil can be assigned to it, this tree ought to be planted, for no fir would form a more ornamental one; and from its dark, glaucous, and silvery-like foliage, its rich purple cones, and its black bark, it is well adapted for contrast and commingling of colours in decorative planting. There is a *Variegata* form of it useful enough as an ornamental plant while it keeps variegated.

ABIES ORIENTALIS: The Chinese Spruce Fir.

Leaves, from a quarter to half an inch long, somewhat four-sided, narrow, stout, slightly blunt-pointed, very thickly set on the branches, and rich deep green in colour.

Cones, from two to three inches long, and from one-half to one inch broad at base, tapering to apex; scales thin, rounded, loose, wedge-shaped, slightly pointed, and uneven edged; seeds very small and dark in colour, with the wing appendage short and broad.

Branches, straight, slender, and well covered with foliage.

A most beautiful, distinct, hardy, slow-growing, and useful kind;

attaining heights of from fifty to eighty feet, with a base diameter of from one to two feet, producing good timber which is as tough, elastic, and durable as that of any of the Spruce Firs; for all ornamental purposes, and likewise on account of the quality of its wood, it ought to be more extensively planted. There is a *Variegata* form of it, an interesting and pretty plant when got and kept variegated.

ABIES PATTONII: Patton's Spruce Fir.

This was lately introduced from California by Jeffrey of Oregon celebrity. It appears to have timber, cones, and seeds like *Menziesii*, though in its foliage and branches more related to *Excelsa;* so for the present I give it a place as a quasi-species; hardy and useful enough as a variety of the Spruce Fir.

ABIES RUBRA: The Red Spruce Fir.

This is the North American form of the Spruce Fir, attaining heights of from forty to eighty feet; having leaves of a glaucous pale green when young, changing to a sombre reddish-green when old; they are rather slender, somewhat four-sided, rigid, sharp-pointed, and regularly disposed all round the stem shoots, and from one-quarter to three-quarters of an inch in length; the cones are from three-quarters of an inch to one-and-a-half inches long, and about half as broad as long, tapering to apex and base. Its timber is good for its class; it is thoroughly hardy, and prefers a moist to a dry soil, as in dry burning soils it soon gets sickly and infested with red spiders.

Its only use in this country is as a small-sized, compact-growing form of the Spruce Fir, for ornamental planting. There are the following varieties of it:—*Cærulea*, (bluish-leaved,) *Cærulea Ericoides*, (heath-like-leaved,) and *Variegata*, (variegated-sprayed;) pretty little trees for ornamentators.

S.D. II. CEDRUS: The Cedar.

Doubtless the term is from the Greek, Κεδρος. The Hebrew words *Erez* and *Shittah* are, indeed, received by some as designating the cedar, but the Hebrew root קדר, the origin of the name of the brook *Cedron*, or *Cidron*,—over which David passed in his exile, (2 Sam. xv, 23,) and over which the true David passed, (John xviii, 1,) at the time of His "great humility,"—signifies "*deep shade*," and is, most probably, the origin, therefore, of the name of this genus of firs, which are distinguished by their umbrageous character. The New Testament passage adds the words "where there was a garden." The "glory of Kedar," (Isaiah xxi, 16, 17,) may have been its cedars; it seemeth

to have been black with shade;—"I am black but comely as the tents of Kedar:" (Song of Solomon i, 5.)

Flowers male and female, generally on the same plant but separate; rarely indeed upon separate plants: male catkins more or less numerous, solitary disposed, cylindrical in form, erect and terminal; female ones generally solitary, oval-obtuse in form, erect, and sometimes in twin pairs.

Leaves, needle-shaped, or four-sided, from one-half to two inches long; stiff, persistent, evergreen or perennial; on the twigs or young shoots they are singly and thinly scattered round the stems; on the adult branches or old trees they are in gregarious clusters or bundles, of from five to fifty in number to each bud-like leaf sprig, acute-pointed, pungent, and of a rich glaucous or shining green colour: seed-leaves generally nine, sometimes seven, sometimes five.

Cones, comparatively large, being from two-and-a-half to five inches long, and from one-and-a-half to two-and-a-half inches broad; oval—obtuse in form, growing erect upon the upper side of the branches; smooth and leathery on their surface, and at first greenish-yellow, changing to yellowish-brown, and when matured assuming a rusty-brown color: scales very closely imbricated, very persistent when young, growing, and ripe; but after remaining upon the tree for a time, or sometimes after being collected, they become more or less deciduous and easily opened: seeds angular in form, soft and surcharged with resinous juice; with the wing appendage large, obovate in form, persistent, and membranaceous.

This genus is composed of the prototype *Deodar*, and the two quasi-species, *Atlantica* and *Libani*, and their varieties and sub-varieties.

CEDRUS ATLANTICA: The Mount Atlas Cedar.

This form of the cedar is of comparatively recent introduction, (about 1843;) yet, from what I have seen of it, I incline to the belief that it will prove a useful tree in this country, inasmuch as it is thoroughly hardy, free growing, not particular as to soil or situation; and its timber, though vastly inferior to that of *Deodara*, is greatly superior to that of *Libani*. In all its distinguishing characteristics it is half the one and half the other, possessing half the good qualities of the Deodar, and half the bad qualities of the Lebanon; both as an ornamental and timber tree it well deserves to be more extensively planted in this country. The remarks made upon the soil, situation, and cultivation of the *Deodara* are equally appropriate for *Atlantica*. It is as yet not much encumbered with varieties, but has often been re-christened.

CEDRUS DEODARA: The Sacred Cedar.

The specific name of this cedar is doubtless from the Sanscrit word देव (*Deva,*) God; Latin, *Deus.* The latter moiety of the word being either from the Sanscrit word दा (*da,*) Latin, *do,* to give; as it were, Gift of God; or from दार (*Dara,*) a wife; as though Spouse of God; or again, from दारु (*Daru,*) wood; Greek, δρυς, *drus;* hence *Druids;* as a Divine tree. However contrary to generally received opinion, I pin my faith on *Deodara* as the most ancient, revered, endurable, fragrant, ever-verdant, most beautiful of all the species of the firs and pines; notwithstanding that in former ages of the world's history, as well as in these latter times, many learned dissertations and philosophical speculations have been spent upon the cedar. After much careful research and laborious investigation, I have, however, come to the inevitable conclusion that we, yes, even we, in this the latter half of the nineteenth century of the Christian era, are labouring under the most erroneous ideas concerning the trees and the ligneous tissues, and fabrics of them, which have been descanted upon and recorded by the ancient historians and natural philosophers, both sacred and profane. Be it not, however, inferred that by this statement I impugn the truthfulness of the ancients; nay, rather be it understood that I consider their descriptions of their trees, and the accounts given of their woods and juices, as a sublime *prosopopœia*—truth itself, pure and simple. "Make thee an ark of *gopher-wood;* rooms, (*nests,*) shalt thou make in it, and shalt *pitch* it within and without with *pitch.*" B.C. 2448! Yes, here is the *wood* and the *paint;* but the tree which produced the timber and the juice are what we dispute about. This, however, is subject matter of such magnitude, and comprehending so many genera and species, and such an array of extraneous, yet essential considerations, that in this my present enterprise I have no alternative but to defer it until the issue of my more elaborate Work, THE LIGNEOUS TREES AND SHRUBS OF THE WORLD. As pertaining to **Cedrus,** however, I may here state that my examination of specimens, and my research and investigation into its past and present history, have led me to believe that most of such world-renowned woods as those of the temples of Diana at Ephesus, of Apollo at Utica, of the first and second temples at Jerusalem, as well as those of Solomon's own palaces, and the palaces of the heathen princes; likewise most of such woods as those of St. Peter's Church at Rome, of many of the Egyptian coffins and mummy cases, Raphael's picture woods, the

heathen idols, the greater portion of the original Venice pillars, and the wood from which the old Romans made their tiger, leopard, or peacock tables, upon which were spread the viands and drinks for their great feasts in the banqueting halls in days of yore, when Rome was the greatest and most powerful nation on the face of our planet; when Tiberius was mighty, and graciously condescended to accept as a propitiatory offering a superlatively beautiful table—so fragrant, veined, and variegated, so rich in natural colours, and so elaborately plated and ornamented by the artificers in Ophir's finest gold; yes, methinks that many of these, and many other woods mentioned both in Scripture and natural history, were the ligneous tissue produced by my prototype *Deodara;* for *Libani* is as untenable as it is untruthful as the virtuous Lebanon wood of Scripture, and likewise as the venerable Κεδρος of Homer and Hesiod, the most ancient of natural philosophic books extant, most probably as old as the days of the Judges in Israel; Virgil's *Cedrosque*, Pliny's "costly, red, and odorous, it burneth not, nor yieldeth carbon, and is no more combustible than stones; evergreen and indestructible;" and then most truly he adds, "neither are they easily distinguished by their foliage even by skilful men:" *vide* "Natural History," book xvi. This he states concerning his *Larix*, which certainly cannot be our *Larix*, nay, but doubtless our *Cedrus*, and a true word picture of my prototype *Deodara*, the venerated *Devadara* of the heathen Hindoo.

This remarkable tree, however, was only introduced into this country from Nepal about half a century ago, and it is only very recently that its intrinsic merits as a timber tree have been appreciated; and in only a very few instances has it, up to the present time, been planted upon anything like an extensive scale with a view to good or profitable timber; nor is it likely to be so until practical experience takes the place of theoretical speculation, and common sense the place of prejudice, when sound practice in matters of forestry shall exchange places with rule of thumb, and arboriculture be elevated to her place as an art; then, but not until then, will this tree take the high rank which it must eventually take as a British timber tree.

Its wood is strong, compact, close-grained, long-fibred, not liable to warp, delightfully fragrant, never subject to the ravages of wood-vermin, tolerably resinous, and durable; so much so that proof is not wanting to corroborate the fact that it will continue sound, not for hundreds, but for tens of hundreds of years, without decay or destruction from wood-moths. Yes, a practical chemist is the Deodar, extracting from

mother earth all that is necessary of the metallic salts, for the preservation of her matured wood—be these sulphate of copper, chloride of zinc, sugar of lead, corrosive sublimate, carbonic acid, or creosote; or, again, all the essentials of enduring and incorruptible resin, and all the indestructible essences of earth oils are known and confected by her; hence it is one of the most enduring and indestructible of woods, consequently non-carbonaceous.

It is so capable of receiving a high polish that its highly wrought specimens as much resemble a slab of agate as a plank of timber. This some will say is an encomium; so say I, but nevertheless a true one; not founded upon specimens of its lignine obtained from the Deodar grafted upon the Lebanon, nor from cuttings or layers; nor from pot-bound plants; but from its native wood, and its yet immature timber produced in this country by young trees in luxuriant health, which, from the seed to the tree, have been raised, nursed, and cultivated in a natural and common sense way—by proper food and proper treatment for a timber tree.

The Deodar is thoroughly hardy, sound in constitution, of very rapid growth, particularly after it has established itself; and not very fastidious as to soil or situation, provided the soil be naturally sweet and healthy, or artificially made so; for it seems to have no particular favour for geological distinctions, such as clay, loam, sand, peat, or other special descriptions of earth; nor for gneiss, mica-slate, or clay-slate, granite-stone or dolomatic-stone, sand-stone, or quartz-stone; but any compound or commixture of earth, and any compound or commixture of stones, provided these be in such a state of porosity and pulverosity as to render them available as its food, it will assimilate and economise. From a somewhat extensive practice in the cultivation of this cedar, for general planting as a forest or timber tree, I have found that the grand secret of success lies in its being very frequently transplanted while in a young state in the nurseries—thinly sown and thinly grown upon the ground, thereby thoroughly hardened and acclimatized before being finally transplanted to its permanent place in wood or plantation. Plants so prepared may be planted out in any ordinary soils if in a sweet and healthy condition, and in any situation however exposed. This is not the case, however, with plants which may have been propagated by grafts or cuttings, or which may ever have been cultivated under glass, or grown in pots, or in highly-manured land, or over-sheltered corners, or too closely grown together upon the ground, and which have been but seldom transplanted in the

nurseries; but I think when once we can obtain a supply of seed from some of the many noble young specimens which are now beginning to develop themselves in this country, such *modus operandi* will be less necessary. Its present native habitat may be said to be the Himalayas, where it is found on elevations ranging up to as high as twelve thousand feet; attaining heights of from one hundred to two hundred feet, with a twenty to forty feet girth of trunk. But the *Devadara*—the Queen of Cedars, no doubt in former ages of the world's history occupied a wide range of native habitats, as I have already indicated from ancient literature; and I may here further add in corroboration of this my theory that geology has now demonstrated the fact that in her fossil beds has been ensconced for ages the ligneous tissue of *Deodara*, but not of Himalayan growth; but the fabric produced by it in other countries and other climes, coeval with or antecedent to the days when there were giants, when Noah built the ark, and Adam was on earth.

As a timber tree it is in every respect, and all things considered, fully entitled to take first-class rank; as an ornamental one it has no superior; and only such kinds as *Araucaria Imbricata*, *Gigantabies Wellingtoniana* and *Picea Nobilis* can be classed amongst its compeers.

There are several varieties and sub-varieties of the Deodar; the only forms, however, which I consider as worthy of commendation are—*Argentea*, (silvery-variegated,) *Aurea*, (golden-variegated,) *Crassifolia*, (thick-leaved,) *Fastigiata*, (fastigiate-branched,) *Prostrata*, (dwarf spreading,) *Robusta*, (strong-branched,) and *Viridis*, (very green-leaved;) all of which are more or less beautiful and useful as ornamental plants, but of no economic value as timber trees.

CEDRUS LIBANI: The Lebanon Cedar.

This is said to be the patriarch of the family, and its general appearance and deportment argues strongly in favour of such an assumption; for it is a remarkable senile-like monarch; but its greatness was at first obtained by mistaken identity for the prototypical cedar; so the ex-monarch *Libani* has been legitimately dethroned, and must henceforth take rank as a subject of the true prototype—the reigning sovereign of the cedars, Queen Deodara.

The timber of the Lebanon is in every respect vastly inferior to that of the Deodar; and is, even, far surpassed by that of the Mount Atlas Cdear. The Cedar of Lebanon was introduced into this country from the Levant nearly two centuries ago, and has been somewhat extensively planted in Britain as an ornamental tree; and many fine

specimens of it are now extant. Asia Minor is its present native habitat. It attains heights of from fifty to eighty feet, and forms a massive, sombre, and monarchical-looking tree.

As a timber tree it should never be planted; as an ornamental one it should have a place in every collection. Like its congeners it is to be found in several forms or varieties; but the only ones deserving notice are: *Glauca*, (the glaucous-leaved,) *Nana*, (the dwarf,) *Pendula*, (the drooping-branched,) and *Variegata*, (the variegated-leaved.)

S.D. III. CUPRESSINEÆ: The Cypress Tribe.

The Hebraic תִּרְזָה *Tirzah*, Greek Κυπαρισσος; hence Latin *Cupressus*. *Arbor Diti sacra, et ideo funebri signo ad domos posita;—frondem ejus funeream;—lignum ejus;* inasmuch as some of the Cypress trees were much used by the ancients for planting their burial grounds; and many of the species were much esteemed by them on account of their rich resinous juices, or the fragrant oils and perfumes they obtained from them.

The name of this Cypress family being clearly enough derived from the Greek κυπαρισσος, (cyparissus;) Latin *cupressus;* hence we have the Greek word κυπελλον, a small cup, and the Latin *cupa*, a cup; because frequently made of this wood. Most certainly the word is not derived from the isle of Cyprus, or Ceos; nor from Cyparissus, the beautiful youth who was transformed into a cypress; as traditional mythology (Ovid's Metamorphoses, x, 21) would have us believe.

Be that as it may, however, this is the most numerous in sections, and the only S.D. of our great family **Pinaceæ** which I have been, though somewhat reluctantly, forced, as it were, to divide into Sub-Sections: for although we have here a cognate family more or less closely related, yet, in their distinguishing characteristics, flowers, leaves, cones, and seeds: also in their ligneous tissues, and resinous juices, they are as dissimilar as they are numerous; inasmuch as in some of the Sections and Sub-Sections are to be found species producing comparatively hard, strong, tough, durable, indestructible, incombustible, fragrant and resinous woods; while in others the wood is soft, brittle, spongy, not durable, combustible, scentless, and non-resinous: few if any of them, however, can be classed as profitable timber trees for the climate and soils of Great Britain and Ireland; their proper designation being ornamental trees and shrubs.

§ 1. ACTINOSTROBEÆ: The Rayed-Scaled Cypress.

From *ακτις*, (*aktis*,) ray; and *στρεφω*, (*strepho*,) to turn; their cones being formed of curved or cup-like scales: some having four, some six, and some eight convex valves, or cup-like scales; hence my three Sub-Sections, *Octovalvus*, *Sexovalvus*, and *Quartovalvus*.

Flowers, male and female, generally on the same plant, but separate; yet, exceptionally on separate plants.

Leaves, these are generally scale-formed, in some species linear, needle-shaped, ternate, or in whorls; in some more or less imbricated; but generally small and acute-pointed; seed-leaves generally in twos or threes.

Cones, these are woody, globular in form, with their scales more or less rayed externally, and more or less convex or cupped internally: seeds winged on both sides.

This Section contains nothing of any economic value, or utility either for ornament or profit, in this country; although it includes many distinct and beautiful shrubs, and a few small-sized trees.

Sub. § 1. OCTOVALVUS: Eight-Valved.

This Sub-Section includes the New South Wales Cypresses. Handsome small trees, and large and small shrubs; but each and all of which are too tender for our climate.

Sub. § 2. SEXOVALVUS: Six Valved.

This Sub-Section comprises the New Holland Cypresses. A numerous family of interesting and beautiful shrubs, or small trees; but much too tender for such a climate as ours.

Sub. § 3. QUARTOVALVUS: Four Valved.

This Sub-Section comprehends the African Cypresses. A group of pretty shrubs, and a small-sized tree or two; all of which are too delicate in constitution for an English winter.

§ 2. ARTHROTAXIS: The Jointed-branched Cypress.

From *αρθρον*, a joint; and *ταξις*, arrangement; the branches being regularly jointed.

Flowers, male and female, generally on the same plant, but separate, terminal, and solitary; yet exceptionally found on separate and distinct plants.

Leaves, these are scale-formed, small, ranging from one to six lines long, closely inlaid or imbricated along the stems, somewhat keeled, and minus footstalks; and bright, glossy, or shining green in colour.

Cones, small, ranging from acorns to walnuts in size, and roundish or globular in form: scales entire, minus bracts, imbricated, uneven surfaced, and somewhat wedge-shaped; seeds in twos, threes, or fives under each scale, with their wing appendage small, and the shell thin and rispid.

ARTHROTAXIS CUPRESSOIDES: The Cypress-like.

This attains heights of from fifteen to thirty feet in Tasmania, and forms a numerously-branched, straight-stemmed, little tree; with slender, spreading, and pendent branchlets, which are thickly clothed with the small, thick, smooth, shining, and scale-like leaves. There are several forms of it; two of which, *Laxifolia*, (open or loose-leaved,) and *Imbricata*, (imbricated-leaved,) may or may not be quasi-species; but all of them being from Van Dieman's Land, are somewhat too tender and delicate for our climate. Yet, in a good healthy soil, and warm locality, or sheltered situation, it deserves a place as a distinct and interesting conifer.

ARTHROTAXIS SELAGINOIDES: The Selago-like Cypress.

This also is a native of Tasmania; an *alter ego* of *Cupressoides:* a spreading evergreen bush, with forked or trident-like branches, and the branchlets covered with small, ovate, leathery, incurved scale-like leaves, which are somewhat convex and keeled; at first light, changing to dark glossy green. It is somewhat too tender for the climate of Britain, and so is the *quasi Tetragona.*

§ 3. CRYPTOMERIA: The Cedar-like Cypress.

From Κρυπτος, hidden, and Μερος, a part; in some of its distinguishing characteristics obscurely related to the Cedar, while in most more related to the Cypress.

Flowers, male and female, upon the same plant, but separate.

Leaves, generally disposed in five rows, alternate, sickle-shaped, somewhat four-sided, acute-pointed, persistent, and comparatively small, and minus footstalks; seed-leaves generally in threes, sometimes in twos, sometimes in fours.

Cones, small, globular, loosely imbricated, singly or in gregarious clusters on the branches; minus footstalks; seeds generally from three to seven under each scale and crustaceous.

CRYPTOMERIA JAPONICA: The Japan Cedar.

This is a Japanese, and a most distinct conifer, but it is all that can be advanced in its favour; for although hardy enough for our ordinary winters, it is much too dainty and fastidious in its likes and dislikes of soil and situation; and will never succeed, much less luxu-

riate, unless in good, sweet, moist soils, or in a warm locality or well sheltered situation, where, if the sub-strata were basaltic, granitic, or stony debris, it would form a most handsome ornamental tree, and attain a height of fifty to seventy feet. Its wood is soft, short-fibred, very white, brittle, easily wrought, but not durable unless kept dry, or preserved by paint, and it is of no economic value as a timber tree; but most useful as an ornamental one.

There are several varieties of it; the most noticeable being *Araucaroides*, (araucaria-like,) *Nana*, (the dwarf,) *Variegata*, (variegated-leaved), and *Viridis*, (the very green-leaved.) There is also an *Elegans*, a misnamed but somewhat distinct quasi-species, and a much less elegant plant than *Japonica*.

§ 4. CUPRESSTELLATA: The Star-coned Cypress.

From Latin *cupressus*, the cypress, and *stella*, a star; a compound word, used to suit my purpose in an adopted term for the classification and nomenclature of this section of the numerous species of the S.D. *Cupressineæ*. Their star-formed cones, and the construction of them, being the distinguishing characteristic.

Leaves, generally in whorls of three, exceptionally in twos or fours; disposed at acute angles, ovate-oblong, tapering to apex, but somewhat blunt-pointed; broad at base, and minus footstalks; small, but of various sizes, being from one to six lines in length, more or less spreading on young shoots, on adult branches closely imbricated: when young deep green, with two conspicuous silvery bands on both faces, but when old the glaucous hue and silvery stripes disappear, and the leaves assume a lighter, or yellowish-green colour.

Cones, these are small star-like formations, being composed of soft glands or club scales; generally the three upper ones the most conspicuous, the three lower ones the smallest, the three middle ones intermediate and generally fertile or seed producing; but sometimes there are only six scales to a cone. Seeds, these are also very irregularly disposed: generally three seeds are found under each fertile scale, sometimes the centre one attached to the scale, and the other two to the axil, while sometimes two are on the scale and three on the axil; the seeds are generally erect, with an ample wing appendage.

CUPRESSTELLATA PATAGONICA: The Patagonian Star-coned Cypress.

This is of recent introduction, a very distinct conifer, and botanically considered a very interesting tree. It attains heights of from fifty to one hunded feet, but it is somewhat too delicate in constitution for

our climate, and of no economic value as a timber tree; but in a good healthy soil, a warm locality, and well-sheltered situation, it would form a very interesting and most graceful pendulous-branched specimen, in any collection of the firs and pines.

§ 5. CUPRESPINNATA: The Quilled or Feathery-sprayed Cypress.

From Latin *cupressus*, the cypress, and *pinna*, a quill or feather; resemblance of their foliage or spray. A technically compounded term, used to classify and distinguish this section of the S.D. *Cupressineæ*.

Flowers, male and female, generally on the same plant, but separate; exceptionally together.

Leaves, flat, linear, trigonal, awl-shaped, or scale-formed; in one species generally two-rowed, in the other generally scattered; in the one species they are deciduous or annual, in the other they are sub-evergreen or perennial.

Cones, egg-shaped, globular, or oblong; more or less rough surfaced and ligneous; seeds generally two or five under a scale; variously shaped and winged.

In this section we have two specifically distinct conifers; a sub-evergreen and a deciduous species; again, we have a small-sized tree and a dwarf shrub.

CUPRESPINNATA DISTICHA: The Deciduous Feathery-sprayed Cypress.

Leaves, quilled or feather-like, having from one to three dozen leaves on each side of the quill or feather stem; and on the shoots or branch stems the leaves are thinly scattered all round, while on the feather stems they are regularly disposed in two horizontal rows and closely set, somewhat overlapping each other, gradually diminishing in size as they near the point, forming a perfect feather; the true or individual leaves are flat, linear, slightly twisted at base, tapering to a somewhat sharp point, thin-edged, and showing a small mid-rib on each face, but without silvery bands, of various sizes, from one-eighth to six-eighths of an inch long, and from one-half to one-and-a-half lines broad; at first soft, light green, changing in autumn to reddish-green, and before falling off assuming a dull, sombre red.

Cones, roundish-ovate in form, and from one to two inches broad; hard and uneven surfaced; the scales are thick, raised in the centre, dull brown in colour, but somewhat striped with yellowish-brown; the seeds are generally compressed, and two under each scale.

This is a most distinct and beautiful tree, and popularly known in

this country as the "Deciduous Cypress," and was introduced into Britain from North America two-and-a-quarter centuries ago; but it has been more recently sent to us from Mexico, China, and other countries as a new species; but in no case do these forms differ in any appreciable degree from the American form, so I place them as quasi-species of *Disticha*.

This tree is found more or less plentiful in the low-lying grounds and swamps of the more southern states of North America, from the Delaware to Florida; also in Carolina, Georgia, Louisiana, Maryland, and Virginia; and in Chapultipec in Mexico, where it attains heights of from sixty to one hundred and twenty feet; while in the Chinese swamps it only attains to heights of from fifteen to thirty feet. Its timber is tolerably good, being strong, fine-grained, light, and, though non-resinous, yet somewhat durable; but its slow rate of growth, and the limited dimensions it attains in this country, will ever prevent it taking rank as a timber tree in it. As an ornamental tree it takes high rank; its beautiful and peculiar foliage, which, during summer, is of a rich bright green, gradually changing, as autumn advances, to ruby or sombre red before it falls off at winter's approach. It is at any time when in foliage a tree of beauty, and materially increases the scenic effect of any landscape, however picturesque. I often think that had Dame Nature allowed this tree to retain its leaves throughout the year, still transforming the colours, she would have given a good illustration of—"A thing of beauty is a joy for ever;" or at least a perpetual pleasure, in an ever-pleasing, never-satiating, perennial-leaved tree. It will do tolerably well in any ordinary soils, but prefers moist to dry ones, and likes the valleys and the rivers' banks, a humid atmosphere, and shade.

Its quasi-species, *Mexicana*, retains its foliage longer, yet it is not evergreen, but deciduous, and somewhat too tender for our climate. Its other quasi, *Sinensis*, is only an *alter ego* of its dwarf variety *Nana:* Of its varieties I mention *Fastigiata*, (fastigiate-branched,) *Denudata*, (sparse-branched,) *Microphylla*, (small-leaved,) *Nana*, (the dwarf,) *Pendula*, (the pendent-branched,) and *Variegata*, (the variegated, when found and kept so,) as hardy and useful for decorative planting.

CUPRESPINNATA HETEROPHYLLA: The Various-leaved.

Leaves, very various:—awl-shaped, ovate, scale-formed, oblong, triangular, and somewhat linear, can all be seen upon the same plant; in size various, ranging from two to eight lines in length: equally variously disposed, alternate, two-rowed, imbricated, and spreading; acute and obtuse pointed, curved and straight, erect and decurrent, and

flat and round: all of these variable leaves, are, however, more constant in their colours, being of an ashy-green, or glaucous-grey.

Cones, somewhat egg-shaped, tapering to base and apex; scales all rising from the base of the cone, the lower ones small, those extending to the top being, of course, larger; all of them having a stout blunt point on their outer face, more or less curved.

This tree, nay, rather shrub, (for it never exceeds a dozen feet in height,) I term an oriental curiosity; sub-aquatic, sub-evergreen, sub-everything; and in a sub-wet soil, sub-warm locality, sub-sheltered situation, it would stand a sub-English winter; and be found a sub-superlative addition to a large collection of the firs and pines. Its sub-varieties are *nil*, but its sub-synonyms are numerous, to which I have now added one more in designating it *Cuprespinnata Heterophylla.*

§ 6. **THURIFERÆ:** The Arbor-Vitæ.

From Latin *Thus*, Frankincense, and *Fero*, To bring forth; derived from the Greek Θυον, (*thuon,*) and φερω, (*phero,*) or λιβανος, (*libanus,*) doubtless from Hebrew, לְבֹנָה. Hence the many Scripture names for Incense, its production, and use; likewise the many compounded terms employed in the classification and nomenclature of this and the other sections, and sub-sections of the S.D. *Cupressineæ:* for it is from the leaves, spray, and juices of *Thuriferæ*, when submitted to pressure or heat, that the most peculiarly exhilarating and fragrant odours are brought forth or produced: and which were so much esteemed by the ancients, and by them so extensively employed in their burnt-offerings, thank-offerings, and other religious and festive celebrations.

Flowers, male and female, on the same plant, but separate.

Leaves, generally in opposite pairs, four-rowed, small, scale-like, and inlaid or imbricated; seed-leaves from two to twelve in number.

Cones, ovate-oblong, round, or squarrose, with from four to ten scales to a cone; seeds from two to five under each scale, and in some species the seeds are winged, and in some they are wingless.

Sub. § 1. **BIOTA:** The Oriental Arbor-Vitæ.

From Greek, βιοτη, life, Latin, *Vita*, Tree of Life.

The disposition of their foliage is by couples,—two and two, alternate on the stems. The name is also employed to distinguish the Chinese or Eastern, from the American or Western Arbor-Vitæs,

there being two kinds; so, again, a new idea, two and two, or doubles:—*Bino Tata*,—*Biota*, one of the *Paters*.

Flowers, male and female, on the same plant, but separate; males numerous, somewhat oval in form, females globular in form and generally solitary.

Leaves, minute scale-like formations, disposed in opposite cross pairs, closely overlaying each other, or imbricated in four rows; bright green and slightly glaucous, or silvery on their lower face; seed-leaves generally in twos.

Cones, squarrose, rounded, or oblong: generally having from six to eight scales to a cone, the scales being disposed like the leaves in opposite cross pairs; spiny and leathery; seeds two under a scale, oblong but bulged, and when ripe minus wings.

In this sub-section we have a numerous and beautiful group of small trees and shrubs, all of them tolerably hardy, and not fastidious as to soil or situation; most useful plants for ornamental planting whether in town or country.

BIOTA ORIENTALIS: The Eastern Arbor-Vitæ.

This is the prototype of the group, a small, pyramidal, handsome, evergreen tree, attaining heights of from ten to twenty feet, and most useful for decorative planting, and garden embellishment. Of its many varieties and sub-varieties, the following kinds include all that is distinct, or worthy of commendation:—*Argentea*, (silvery-variegated,) *Aurea*, (golden-sprayed,) *Compacta*, (compact or fan-formed,) *Elegantissima*, (a sub-variety of *Aurea*,) *Glauca*, (glaucous,) *Gracilis*, (slender-branched,) *Monstrosa*, (rustic-branched,) *Nana*, (the dwarf,) *Pyramidalis*, (the pyramidal-branched,) *Pendula*, (the pendulous-branched,) *Pendula Variegata*, (the variegated weeping,) *Variegata*, (yellow and green-leaved,) and *Viridis*, (the very green-leaved;) all hardy and useful as ornamental shrubs.

Sub. § 2. LIBOCEDRUS: The very Fragrant.

From λιβανος, frankincense; and Κεδρος, cedar: its fragrance being so rich that it freely imparts it to the balmy air.

Flowers, male and female, on the same plant, but separate; males somewhat cylindrical, females globular.

Leaves, generally scale-formed, disposed in opposite pairs; flat and glaucous, and silvery bands on both faces; the two horizontal or side rows of leaves the largest; the opposite or upper and lower rows much the smallest, being very minute scale-like formations.

Cones, oval-obtuse, woody, having from four to ten scales, which

are flat externally and concave internally; with a small spine on their apex; the opposite base pairs small, the upper pairs larger, forming a small cone about half an inch long. Seeds small and two winged, but unequal; one, two, three, or five seeds may be found under a scale.

In this Sub-Section we have four real beauties, all so hardy as to enable them to stand the severity of an ordinary English winter, when grown in healthy soils, and in warm or well sheltered situations. The timber they produce is hard, tough, resinous, durable, and fragrant, yellowish and ruby coloured: but they are of too delicate a constitution to be classed as timber trees for our climate. Beautiful shrubs or small-sized trees with us they are; but profitable timber trees they never will be.

LIBOCEDRUS CHILIENSIS: The Chilian.

A most beautiful tree attaining heights of from fifty to seventy feet in the Andes of Chili: sometimes found branched to its base, at times with a clear straight stem and conical shaped head; it has rustic, furrowed, ashy-brown bark. Young plants or trees of it with us are remarkable for their rich glaucous and silvery-green foliage, and their symmetrical gracefulness.

There are also two varieties of it worthy of commendation—*variegata* and *viridis*, the former for its variegated leaves and spray, the latter for its rich green and non-glaucous foliage.

LIBOCEDRUS DOLOBRATA: The Hatchet-Leaved.

This is a most loveable Fir, and was sent to us from Japan, where it attains heights of from twenty-five to fifty feet, having vertical branches, gracefully drooping at their tips. Its foliage and spray is of the richest glossy-green and shining silvery-white, rendering it a most truly beautiful shrub or small tree. It is tolerably hardy, but a good sweet moist soil, a warm locality, and a well sheltered situation are its indispensables in this country; warmth, humidity, and shade are its likes; cold, drought, and exposure its dislikes: it well deserves a place in every collection of ornamental trees or shrubs where conditions necessary to its growth and development can be assigned to it.

Like most of the Firs and Pines it is of a sportive character; for we already possess *Argentea*, (silvery variegated,) *Atrovirens*, (dark green-leaved,) *Aurea*, (golden-variegated,) *Glauca*, (very glaucous-leaved,) *Gracilis*, (slender-branched, and small-leaved variety,) and *Nana*, (the very dwarf,) all of which are beautiful, and that in the highest degree.

LIBOCEDEUS DONIANA: Don's New Zealand Arbor-Vitæ.

In its native habitat attaining heights of from twenty to sixty feet:

and although somewhat too tender and delicate in constitution, yet, in a good healthy soil, warm locality, or well sheltered situation, it will stand an ordinary English winter. Its under leaves are covered with a glaucous bloom, while the upper ones are bright glossy green in colour.

LIBOCEDRUS TETRAGONA: The Tetragonal.

This tree in its native habitats, the Andes of Chili and Patagonia, and Valdivia, is to be found a pretty bush or a stately tree, ranging from ten to one hundred feet in height. It forms a more horizontal, four-sided, and irregular-branched plant than *Chiliensis*, and its foliage and spray are less glaucous and silvery, and somewhat lighter green coloured. Like its congeners, it requires the best soils, warmest localities, and most sheltered situations to ensure its growth in this country.

Sub. § 3. THUJA: The Occidental Arbor-Vitæ.

From Greek θυα, (*thua*) *arbor*, θυος, (*thuos*) *odor*:—from its being ever fresh and fragrant, and evergreen and verdant.

Flowers, male and female, on the same plant, but separate.

Leaves, very small scale-like formations of various shapes: awl-like, angular, rhomboid, flat, lanceolate, thick, sharp-pointed, blunt-pointed, or rounded; of various sizes, from one-twelfth to three-eighths of an inch long, by one-twenty-fourth to one-eighth of an inch broad: all of them more or less imbricated and disposed in four rows: seed-leaves generally in twos.

Cones, generally oblong, from one-half to one inch long, and from a quarter to half an inch broad: scales fleshy, double-margined, blunt-pointed, but somewhat reflexed at apex. Seeds angular, soft, and their wing transparent and elliptical: the scales are from four to eight in number, and unequal in size; and the seeds are generally two under each scale.

This Sub-Section includes the Occidental or Western Arbor-Vitæs: and all the species and quasi-species thereof are natives of western and northern regions of the globe. Consequently, all of them are perfectly hardy, sturdy, strong constitutioned, and quite at home in the British Isles. Few if any of them are capricious as to soil or situation, nay, they are rather accommodating, doing well in almost every description of soil if in a healthy condition; and in any situation where plants or trees will grow: most of them, however, prefer and luxuriate in a rich, moist, loamy soil, and sheltered situation.

Their timber is, with few exceptions, tolerably good; but most of

them are too small in stature and dimensions ever to be of any economic value as timber trees in this country: two of them, however, we have upon probation, which give fair promise of proving hereafter that they deserve to be grown for their timber, *Gigantea* and *Menziesii;* for although their timber is somewhat soft in texture, yet it will be found to be tolerably tough and durable.

THUJA ANTARCTICA: The Dwarf Antarctic.

This is a small-sized quasi-species of the prototype; a curious, tufted, spreading bush, never exceeding a yard or two in height; thoroughly hardy, and useful as an ornamental shrub.

THUJA GIGANTEA: The Giant Arbor-Vitæ.

This is somewhat distinct, though related to its congeners, and likewise to that arbor-vitæ-like cypress *Lawsoniana.* It is the "Noo-wy-as" (Cedar) of the North-West American Indians; and the natives of Nootka Sound make their cloaks from its inner bark; which are soft, pliable, comfortable, and waterproof; its bark is also used in making their mats, ropes, sails, and for other domestic purposes.

It is found more or less plentiful on the north-west coast of America, California, Columbia, and other parts, both in high and low situations; attaining heights of from forty to one hundred and forty feet, with trunks from two to five feet in diameter. Its wood is fine-grained, tough, porous, non-resinous, yet durable; when young, white; when matured and seasoned, bright yellow in colour.

It is thoroughly hardy, not fastidious as to soil, and no situation is too exposed or cold for it; but it is of somewhat moderate annual growth. As a timber tree of the small-sized class it deserves to be planted in more or less limited quantity on trial, and it may be safely planted anywhere in Britain as an ornamental tree.

THUJA MENZIESII: Menzies' Arbor-Vitæ.

This is one of Douglas's good things which he discovered on the north-west coast of America and California, growing to a height of fifty feet, having long flexible branches, thickly clothed with laterals well covered with foliage; young trees of it in this country bid fair to rival our common forest trees in their annual rate of growth; and from its hardiness and accommodating nature it seems doing well wherever planted in a healthy soil; and it is undoubtedly the best grower of all the Arbor-Vitæs, and a fine graceful ornamental tree. Though its timber be somewhat soft and porous when green, yet, I think, from its texture, that when matured and seasoned it will be tough and durable, and it well deserves to be planted upon trial as a

timber tree; and if it has not, it ought to have, a place in every pinetum or arboretum, and collection of trees, whether for use or ornament.

THUJA OCCIDENTALIS: The Western or American Arbor-Vitæ.

This is the prototype of the Arbor-Vitæs; a well-known, hardy, useful, and accommodating little tree, and has been more or less cultivated in Britain for the past two hundred and seventy years. It attains heights of from twenty to fifty feet, and may be usefully employed in every description of ornamental planting, whether in arboretum or pinetum, park or pleasure ground, plantation or shrubbery. The country is its situation, where it will make itself at home; and for forming shelter or ornamental hedges, for domestic planting as screens or blinds, or for manipulation into rustics, grotesques, or plant statues, it is admirably adapted, for it endures to be cut and shorn with impunity. There are, as a matter of course, many varieties, and sub-varieties of it, but the only ones I consider worthy commendation are—*Aurea*, (the golden,) *Argentea*, (the silvery-variegated,) *Densa*, (dense-branched,) *Monstrosa*, (rustic-branched,) *Pendula*, (drooping-branched,) and *Pendula variegata*, (variegated pendent-branched.)

THUJA PLICATA: The Plaited Arbor-Vitæ.

This is merely an altered form of *Antarctica*; having more tufted and stouter branches and shorter branchlets, which are more densely covered with small, ovate, blunt-pointed leaves; which are disposed in four rows, but so arranged on the stems as to give the branches a plaited appearance; hence the name and the variety. There are of this kind a *Pygmæ*, (very dwarf,) and a *Variegata*, (variegated-leaved.) The parent, *Plicata*, is a native of North-West America; plentiful at Nootka Sound, also in Northern Mexico; it is hardy and useful as a small shrub, and so are its two varieties.

THUJA SIBERICA: The Siberian Arbor-Vitæ.

This is a thoroughly hardy, sturdy, compact, well-built little tree, attaining heights of from eight to fifteen feet. It deserves to be more extensively planted as a generally useful shrub, for it is better adapted for many purposes than the prototype *Occidentalis*. There are several varieties of it, but I only recognise three, *Gracilis*, (slender-branched,) *Pendula*, (drooping-branched,) and *Variegata*, (variegated-leaved.)

§ 7. VERÆ: The True Cypress.

In this section we have the Cypress in its true or original form—the trees which the ancients recognised as their cypress; and all the

sections and sub-sections of my S.D. *Cupressineæ* are more or less closely related to them.

Flowers, male and female, on the same plant, but separate; in clusters or solitary.

Leaves, scale-formed, linear, and spreading; in threes, opposite pairs, and singly; persistent, four-rowed, and imbricated.

Cones, small, globular, or shield-shaped; ligneous, and generally solitary; some more or less clustered together on the branches; the scales are from six to twelve in number, and the seeds are more or less resinous, with membranaceous wings.

Sub. § 1. CHAMÆCYPARIS: The Ground Cypress.

From Greek χαμαι, (*Chamai,*) on the ground, and Κυπαρισσος, the Cypress tree. They are found in their native habitats in marshes, swamps, or moist low-lying ground; hence they are called Ground-Cypress, Marsh-Cypress, or Water-Cypress, and popularly known in this country as the White Cedar.

CHAMÆCYPARIS SPHŒROIDES: The Spherical Cypress.

A most beautiful and distinct tree, attaining heights of from twenty to eighty feet, with trunks one to three feet in diameter. It is found more or less plentiful in the wet or marsh lands, and maritime districts of Maryland, New Jersey, Virginia, and extending so far as Carolina. This tree was introduced into this country about 130 years ago; it is, however, but little planted, though it be perfectly hardy, and not very fastidious as to soil and situation, and a most useful ornamental tree. As I have stated, it delights in moist and low-lying healthy soils. Its wood is soft, light, easily wrought, but not durable; however, for standing the injurious effects of alternations of moisture and dryness, it has indeed few equals.

There are several varieties and sub-varieties of it, but the only ones I commend are *Atrovirens,* (the dark green,) *Argentea,* (the silvery-variegated,) *Aurea,* (the golden-variegated,) *Fastigiata,* (fastigiate or upright-growing,) *Glauca,* (glaucous-leaved,) *Gracilis,* (slender-branched,) *Nana,* (very dwarf,) and *Pendula,* (pendulous-branched,) all of them more or less beautiful and useful for ornamental purposes.

CHAMÆCYPARIS THURIFERA: Frankincense-bearing Cedar.

According to Endlicher, and other species-mongers, this is a tall, horizontal, and pendent-branched tree, found on the mountains of Mexico; but, as I have not yet been to the said mountains, I can neither affirm nor contradict the existence of such a species or variety of the

"Marsh Cypress." Be this as it may, I have had plants and specimens of branches, leaves, and cones, furnished to me, and amongst these I found the old species *Sphæroides;* likewise, some of the specimens were *Cupressus Thurifera*, *Biota Orientalis*, or some of their varieties; and some of the specimens were *Juniperus* of sorts; until, therefore, I find it, I leave it as it is, in the domain of fantasy.

Sub. § 2. CUPRESSUS: The Prototypical Cypress.

Flowers, male and female, on the same plant, but separate; males numerous and cylindrical, females roundish and solitary, or in clusters.

Leaves, scale-formed, awl-shaped, ovate, linear, needle-shaped, flat, or angular; also variously disposed, generally imbricated in four rows, in some spreading and sharp-pointed, in others spiral and blunt-pointed; of various sizes and all shades of light and dark, silvery and glaucous, powdery and shining, and of yellowish and blueish-green colours: and in some species, particularly on the adult branches, the leaves become brown and rusty.

Cones, generally globular in form, from one-eighth to one inch broad, and one-quarter to one-and-a-half inches long; in clusters or singly, scales from four to twelve in number, angular, four-sided, five-sided, or rounded, generally with a more or less curved point at their apex; seeds numerous, angular, obovate, or rounded; with bony shells and membranaceous wings.

Here we have a very numerous and dissimilar group, ranging from three feet to one hundred feet in height, nearly all of them sufficiently hardy for our climate; and most beautiful trees and shrubs for ornamental planting. The timber of most of them is close-grained, hard, high-coloured, fragrant, capable of receiving a high polish, and not subject to the ravages of wood-moths: in some species it is non-carbonaceous to a high degree, consequently very durable and indestructible. Their small dimension and moderate rate of growth, however, detract greatly from their otherwise good qualities as timber trees; though, as will be seen from what follows, there are three of them that we have upon probation, as profitable timber trees, suitable for the climate and soils of Britain.

CUPRESSUS CALIFORNICA GRACILIS: The Slender-branched.

This is a graceful, small-sized tree or shrub, ranging from five to fifteen feet in height, being much influenced in its stature and general deportment by the soils and situations where it may be grown; and also in the young state by the modes of propagation by which it may

have been produced. It has, again and again, been sent home as a fine new species by travellers and collectors, who may have chanced to find it in some new or before unknown habitat in the north-western regions; and, consequently, somewhat altered in appearance, but time and experience will eventually correct all this; and many of the said-to-be species of Californian Cypresses will hereafter have to be referred to this or *Macrocarpa*.

Attenuata, *Glandulosa*, *Goveniana*, *Mac-Nabbiana*, and *Nivea*, are at best but *alter egos* of *California gracilis*.

There are also many forms or varieties of it, such as *Fastigiata*, (fastigiate-branched,) *Nana*, (dwarf,) *Pendula*, (pendent-branched,) and *Variegata*, (variegated-leaved,) all useful and beautiful as ornamental shrubs.

CUPRESSUS CORNEYANA: Corney's Cypress.

This is a Chinese kind, and forms a very graceful little tree, a dozen or a dozen-and-a-half feet in height; having bright green and more or less glaucous foliage, and slender drooping branches. It is much used by the orientals in their burial-grounds and around their temples; it is the "Weeping Cypress" of the natives; and a very useful and beautiful shrub or small tree for ornamental purposes in this country.

CUPRESSUS EXCELSA: The Lofty Cypress.

A native of Guatemala, where it is often found one hundred feet high; beautiful and delicate, but it requires the best soils and warmest localities in Albion's Isles to ensure its growth or development; yet, where conditions favourable to its growth can be afforded to it, useful would it be for its ornament and profitable for its timber.

CUPRESSUS FUNEBRIS: The Funereal Cypress.

This kind is of Chinese origin, and, doubtless, has been imported into that country from India. I have no objection to the name, seeing that any pendent-branched Cypress may appropriately enough be termed "Funereal" or *Funebris;* but that this kind (at best but a quasi of *Torulosa*, more probably a hybrid, or, perchance, a seminal variety; when its history is published, or its character determined in this country) should retain this name, or be classed as a species I cannot understand: I care, however, but little, knowing, as I already know, that it will never be of any value for its timber, and of but little for its beauty as an ornamental plant in this country; for, from all that I have seen of it, in the best soils and warmest localities, even in the "sunny south," I find it much too tender and delicate in constitution for a severe English winter.

CUPRESSUS KNIGHTIANA: Knight's Cypress.

This is a Mexican; where it is said to attain a height of one hundred and twenty feet, and a trunk diameter of three feet, and that its timber is excellent. From my experience of it under cultivation, and examinations of its ligneous tissue, I am satisfied it will falsify both these statements in Britain; for, although tolerably hardy, it requires the best soils, warmest localities, and most sheltered situations to induce it to grow, much less to develop itself fully; yet, in situations favourable to it, a handsome, free-growing tree, with glaucous green leaves, brownish spreading branches, and feathery, glaucous and plum-coloured branchlets would reward its planter.

CUPRESSUS LAWSONIANA: Lawson's Cypress.

This is a distinct kind, though somewhat related to its congener, the "Nootka Sound Cypress," both of which partake much of the Arbor-Vitæ character. It is found in the valleys of Northern California, where it attains a height of one hundred feet: the wood produced by it is compact, tolerably close-grained, clean-fibred, somewhat resinous, easily wrought, and when matured and seasoned, no doubt it will prove durable. This Cypress is thoroughly hardy, and seems to grow freely in most soils and situations; and young plants of it grow so rapidly that we are planting it out, on a small scale, as a forest tree, in the hope that when it becomes matured, and is felled by the succeeding generation, it will be found to be good and profitable timber: few, if any, of the firs and pines are more easily propagated or increased, inasmuch as it is a most abundant seeder, producing cones as freely as foliage, even on young plants less than a yard in height. This, indeed, might fairly be assumed as an indication of constitutional weakness: but the apparently vigorous growth and robust habit of the plant, argue very strongly against such a supposition, and it roots most freely from cuttings. These characteristics will, doubtless, be the means of its being largely employed as an ornamental tree or shrub in this country; and for such a purpose it is well suited, being, as it is, a most handsome tree, and when young a most beautiful shrub, since its branches are numerous and well-clothed with foliage; and though inclined to grow erect, yet the leading annual shoots and the branchlets are drooping, and slender, and regularly disposed, rendering most symmetrical pyramids of rich green spray; or graceful pillars of plumes and feathers, particularly pleasing when thickly studded with the yellow, ruby, and green catkins in spring; and with the green and dappled brown cones in summer and autumn. There are already several

varieties of it, the only ones, however, worthy of commendation being :—*Argentea*, (silvery-variegated,) *Aurea*, (golden-variegated,) *Fastigiata*, (compact-branched,) *Glauca*, (very glaucous-leaved,) *Nana*, (very dwarf,) and *Viridis*, (very green-leaved,) all beautiful ornamental plants.

CUPRESSUS LUSITANICA: The Portugal Cypress.

This, although introduced into this country, from Goa, nearly two hundred years ago, was but little known until a more recent date, when it was sent to us from Cintra, Spain, and Portugal, China, and, more recently still, from California, Mexico, and other countries, as a new species. From its being found in so many countries it is not to be wondered at that we should find it very diverse in its appearance and deportment; and moreover, it is a most variable kind, and very inconstant in its distinguishing characteristics; for, when raised from seed, the plants will be apparently very different from plants propagated from cuttings of the same tree.

It is a somewhat difficult plant to describe, inasmuch as it may be grown to one two three or four dozen feet in height; and although generally a green and glaucous-looking, pendulous-branched tree, yet, in a young state, its branches may be spreading, flexuose, pendent, or erect, distant or close, brittle or pliant; while its branches may be either flat or rounded, few or many, twiggy or smooth, spreading or erect, incurved or pendulous: and its foliage may be of all real, or fancied shades and tints, from the dullest green, to the most glaucous or silvery-white. It is also found in the variegated forms, so that to enumerate the varieties of the "Cedar of Goa," which is in itself a conglomeration of varieties, would serve no purpose here. This Cypress, though distinct and beautiful, is somewhat too tender and delicate for our climate, but in good soil and sheltered situations, it is doing tolerably well with us here in the south of Hampshire.

CUPRESSUS MACROCARPA: Large-Coned Cypress.

This is a beautiful and likely to be a useful kind; it attains heights of from fifty to seventy feet, with a trunk circumference of from six to ten feet. It is sufficiently hardy for the climate of Britain, and will do tolerably well in most kinds of soil if in a sweet and healthy condition; and ought to have a place in every collection of ornamental trees. It is to be found in two forms. *Macrocarpa*, when raised from seed, has a distinct, continuous, and erect leader with the side branches regularly disposed, and gracefully drooping, with very light

vivid green foliage: and *Macrocarpa*, when propagated from cuttings, is *Lambertiana*, which has *not* a distinct and continuous leader, but in the young state forms a more horizontal, spreading-branched, and bushy-headed plant with the foliage of a somewhat darker shade. There are likewise two varieties:—*Fastigiata*, (fastigiate-branched,) and *Variegata*, (variegated-leaved.) It is a native of North-West America, and has been found plentiful in California.

CUPRESSUS NUTKAENSIS: The Nootka Sound Cypress.

This is thoroughly hardy, sturdy, good in constitution, and in every respect well adapted for our climate, soils, and altitudes; and a useful ornamental plant: somewhat resembling its congener *Lawsoniana;* and, like it, partaking a good deal of the Arbor-Vitæ character. It is found more or less plentiful along the west coast of North America, more particularly at "Nootka Sound," hence the name, where it attains a height of one hundred feet. Its wood is white when fresh cut, yellowish when seasoned, soft and porous, and highly fragrant and juicy, but not very durable. It is well adapted as an ornamental plant for cold and exposed localities; since even under such conditions it would form a nice, erect-stemmed, spreading-branched, drooping-twigged, glaucous, or silvery-green, conical shrub or small tree; fragrant and aromatic as the Savin Juniper. There is a *Fragrans* form, which is also a beautiful plant.

CUPRESSUS SEMPERVIRENS: The Evergreen Cyprus.

This tree is well known by this name, though it might be termed a misnomer, inasmuch as *semper*—always, and *virens*—green, are the characteristics of all the Cypresses in this Section; nay, in all the Sections and Sub-Sections of *Cupressineæ*, with the exception of *Cupresspinnata.*

It is found more or less plentifully in Asia, Greece, Persia, and Southern Europe; also in India, and was much esteemed by the ancients both for its timber and ornament: in Italy it is much cultivated, where some of the finest and largest trees of it yet found have been grown; some of which are one hundred and twenty-five feet high, but from twenty-five to fifty feet are the heights it attains in Britain. The wood is comparatively fine-grained, compact, easily wrought, capable of receiving a good polish, and tolerably resinous, consequently durable. Like many of its congeners it is to be found in many forms, the most noticeable being the "Upright" and the "Horizontal-branched;" while of each of these again there are several varieties and sub-varieties; some remarkable for their rustic, robust,

bushy growth; others for the erect, and closely inlaying or stem-pressing tendency of their branches: while some are drooping-branched, particularly at their extremities, with the branchlets more or less recurved and pendent: there are also the silvery and golden variegated varieties of it.

It is somewhat delicate and tender, particularly when young; yet, sufficiently hardy, after it has established itself, to stand the severity of our winters; the Indian plants, however, which are found in catalogues and collections, named—*Australis*, *Doniana*, *Sempervirens Indica*, and *Whittleyana* are, when first introduced, more fastidious and impatient in our climate and soils.

CUPRESSUS THURIFERA: The Arbor-Vitæ-like.

This is a Mexican kind, growing to a height of fifty feet, having dark green foliage, which is more or less glaucous when young, with long, spreading, flat branches; the tree when old is generally found with the trunk clear of branches, having an ample, dense, rounded, and spreading head. Its wood is fine-grained, tough, tolerably resinous, and easily wrought; but only moderately durable. A good dry soil, warm locality, and well sheltered situation, are indispensable to its life and growth in this country; for it is only under such conditions that it would be of any use to us in adding variety or number to our collections of **Pinaceæ.**

CUPRESSUS TORULOSA: The Twisted-branched.

This is the Nepal or Bhootan Cypress. It is a most beautiful tree, attaining heights of from twenty-five to one hundred and twenty-five feet: pendent and twisted-branched, straight-stemmed; having numerous branchlets well covered with foliage, which is rich and glaucous, and greyish-green in colour; forming a perfect cone: the wood is close-grained, long-fibred, elastic, somewhat too flexible, tough, resinous, easily wrought, capable of receiving a good polish, fragrant, and durable; it is of a creamy-white tinged with rose colour when matured and seasoned. The best soils, warmest localities, and the dryest and most sheltered situations in this country are necessary to ensure its growing. There are several varieties, but I only commend three, viz:—*Nana*, (very dwarf,) *Variegata*, (variegated-leaved,) and *Viridis*, (very green-leaved.)

CUPRESSUS UHDEANA: Uhde's Cypress.

This is a quasi-species of *Thurifera*, having somewhat smaller and more glandulous, and lighter coloured foliage; and it is somewhat more hardy, and better constitutioned. In a good dry soil, warm locality,

and well sheltered situation, it would form a handsome small-sized tree, or large shrub in these isles.

Sub. § 3. RETINOSPORA: Resinous-Seeded Cypress.

From Greek ρητινη, *retine;* Latin *resina*, resin; and σπορα, *spora*, seed: their seeds being regularly coated with a resinous pitch.

Flowers, male and female, on the same plant, but separate; males cylindrical in form; females small and rounded, generally both on the same branches and terminal.

Leaves, linear, scale-formed, sickle-shaped, angular, flat, ovate, rhomboid, or rounded; some acute and some blunt-pointed, some spiral, some reflexed, generally in opposite pairs and four-rowed, in some in threes or fours in whorls: some spreading, others closely pressed to the stems; from one-twelfth to three-eighths of an inch long; rich green in colour, and with more or less conspicuous silvery bands, some on the upper face, others have them on their lower face: all the leaves are very persistent, generally remaining on the plant for five or seven years.

Cones, about the size of peas or small beans, ovate or globular in form; at first yellowish-green, changing to yellowish-brown as they arrive at maturity: scales from six to twelve in number, wedge-shaped, angular, ovate, rhomboid, and woody: seeds small, resinous, and winged, generally two under each scale.

We have, in this Sub-Section, a small group of real beauties, some of which are said to attain a height of one hundred feet in their native habitat, Japan; yet, although, they produce good timber, none of them will ever be of any economic value as timber trees in this country. They are, however, most beautiful shrubs or small trees while in the young state; but all of them require the best soils, warmest localities, and best sheltered situations to ensure their life or growth in this country.

RETINOSPORA ERICIODES: The Heath-like.

This is a most beautiful, compact, conical, slender-branched, little evergreen bush, never exceeding a couple of yards in height.

RETINOSPORA OBTUSA: The Obtuse.

This is the largest sized of the group, but it will never attain anything more than a large shrub or small tree stature in this country; in a good soil, warm and sheltered situation, it will form a nice compact growing shrub. There are the following varieties of it:—*Argentea*, (the silvery,) *Aurea*, (the golden,) *Lycopodioides*, (clubmoss-like,)

and *Pygmæa*, (the dwarf,) all of them useful for ornamental purposes, in soils and situations suitable for them.

RETINOSPORA PISIFERA: The Pea-Fruited.

This kind is smaller in size, with slenderer branchlets, and darker coloured bark than the preceding one; rich in its spray and foliage, and graceful in form. Its varieties are: *Argentea*, (the silvery,) *Aurea*, (the golden,) and *Pygmæa*, (the dwarf,) all of them the prettiest little beauties the eye can look upon; but good soil, warmth, and shelter are necessary to their life and growth in our islands.

RETINOSPORA SQUARROSA: The Squarrose.

This is a large bush, rich in its glaucous green foliage, and gracefully curved spray; symmetrical in form, and a most beautiful shrub. Its varieties are:—*Argentea*, (the silvery,) *Aurea*, (the golden,) *Leptocladus*, (the small-branched.) All of which are pretty shrubs, but, like their congeners in this Sub-Section, all dainty in their choice of soil, and very particular about warmth and shelter, which are essentials to their development in the British Isles.

S.D. IV. GIGANTABIES: The Giant or Mammoth Fir.

From Hebrew דָּפְנָא, אֵמִים, or כְּפִדִים; Greek γιγας; Latin *Gigas;* English "Giant:" and Hebrew אבו, Greek απιος, Latin *Abies*, English "Fir:"—hence GIGANTABIES: the Giant or Mammoth Fir.

Homer's fantasy.—ελατη ουρανομηκης, "the Fir reaching heaven in height!" (Odyssey lib. v, 222,) is, indeed, a παραφρασις of *fiction*, if not a προσωποποια of *fact;* be this as it may, however, imagination, poetic fancy, and love for the Firs and Pines would well nigh indulge the *idea* that Homer well knew our Giant Fir.

In this S.D. we have two specifically distinct, yet closely allied and cognate Firs: in their habit of growth, construction of ligneous tissue, formation of concentric growth, and in their floral organs, development and construction of cones and seeds, and their annual deposits of wood, longitudinally and transversally closely related to each other; but differing in a more or less marked degree, in these characteristics, from the other genera of **Pinaceæ**; for, however truthful and correct the theory of "annual concentric ring growths," in conjecturing the age of most of the Firs and Pines, it is as untruthful as it is untenable, in computing the age of **Gigantabies**—the very "Giants"—the veritable "Anakims" of **Pinaceæ**.

GIGANTABIES TAXIFOLIA: The Yew-leaved Giant Fir.

Flowers, male and female, on the same plant, but separate; generally solitary and terminal.

Leaves, the *cotyledons*, (seed-leaves,) generally *two*, exceptionally three or more ; the perfect leaves are various—those on the main stems or leading shoots, distant, strong, and acute-pointed ; those on the cone or flower-bearing branches, close and thickly set, small, short, somewhat imbricated or closely spiral ; those on the lateral branches, linear, straight, flat, leathery, persistent, somewhat blunt-pointed, and more or less irregularly disposed, in two horizontal rows on the stems ; shining, smooth, and green above, and more or less channelled, silvery-banded, and glaucous green below : of various sizes,—ranging from one-eighth of an inch to one-and-a-half inches in length.

Cones, egg-shaped, rounded at base and apex; solitary and terminal, and from half an inch to one-and-a-half inches long : scales from one to two dozen to a perfect cone, irregularly shaped,—angular, wedge-formed, keeled, grooved, rough, and wrinkled : the seeds are also variously shaped and winged, and from two to six under each scale.

This tree is a native of the North-West. The earliest published accounts of it that I have are by "Menzies," who records its existence in 1796. "Douglas" in 1836 mentions it, but for its introduction into this country we are indebted to the Russians, who sent it us about two dozen years ago ; it has recently been found plentiful in California, particularly on the Santa Cruz range, where "Hartweg" found that its average height was two hundred feet, with trunks from one-and-a-half to two dozen feet in circumference, straight, and clear of boughs for sixty feet from ground ; and one tree, called by the American settlers, "The Giant of the Forest," was two hundred and seventy feet in height, and fifty-five feet in circumference, at two yards from ground. Specimens of its timber have been exhibited as horizontal slabs fifteen feet in diameter, and showing more than one thousand ring growths, which has been taken as indicating its age ; but, as I have already stated, this theoretical rule, like most others, has its exceptions ; and this is one of those firs, which, from their peculiar mode of growth, making several and successive growths in a season, the ring-growths cannot be relied upon in determining, or even correctly conjecturing the age of the tree from its concentric rings.

Its timber is close-grained, short-fibred, and very brittle, light, and not durable, unless kept dry or preserved by paint, yet it is not subject

to be infected with wood-moths: it is rich ruby red in colour, somewhat resembling mahogany in appearance. It is hardy, and when under conditions favourable to its growth, it makes rapid progress; yet, strange to say, I would not award to it even a third-class certificate as a timber tree for the climate of Great Britain and Ireland. It has some most serious constitutional defects, some of which it may yet overcome, after it has become thoroughly acclimatized, and if once we could obtain seeds from home-grown and healthy trees. I doubt much, however, if ever it will get naturalized to our variable climate, inasmuch, as it seems to have no particular liking to a fixed season for growth and rest; always growing late in the autumn, and seldom maturing its summer growths in time to encounter our early winters; being thereby always more or less injured, and predisposed in each succeeding season to produce a mass of spongy growths. Moreover, it is very irregular in starting, and likewise in making its annual growths; and but few perfectly healthy or handsome specimens of it have I yet seen; for, even in the best soils, warmest localities, and most sheltered situations, which are indispensable to its growth in Albion's Isles, it is rampant and somewhat coarse in its deportment. It must needs, therefore, have a nurse properly qualified, a nursery specially constructed, a cook to prepare its food, and a doctor to correct any errors which may perchance be committed in "training it up in the way it should grow," before we can expect to find much true beauty, much less to find real utility or profit in cultivating this distinct and gigantic fir.

It has no *quasis*, but varieties are beginning to appear, amongst which may be mentioned *Compacta*, (compact-branched var.,) *Lawsoniana*, (Lawson's large thick-leaved var.,) and *Variegata*, (variegated-sprayed var.)

GIGANTABIES WELLINGTONIANA: Wellington's Giant Fir.

Flowers, male and female, on the same plant, but separate; generally solitary and terminal.

Leaves, the *cotyledons*, (seed-leaves,) generally *four*, exceptionally three or more; the perfect leaves are various; on young plants they are somewhat needle-shaped, spirally alternate, spreading, and of a light green colour; and upon adult plants or trees they are scale-formed, closely inlaid, more rounded on the back, and more concave on their inner face, while on the larger branches or stem-shoots, they are longer, looser, more acute pointed, more decurrent at base, and even at times obtuse; on the branchlets the leaves are much shorter, and heath-like,

more closely and regularly imbricated, and of various shades of light and dark green, or yellowish and rusty-brown colour, according to their youth, maturity, or old age.

Cones, these are from one-and-a-half to two-and-a-half inches long, by one to one-and-a-half inches broad; woody, single or in opposite pairs, rarely in gregarious clusters, and generally at the tips of the previous season's growth; ovate in form, tapering to apex and base, with the scales in series at right angles, wedge-shaped, and persistent at first, but somewhat deciduous when old. The seeds are generally in fives under each scale, particularly in perfectly matured cones; they are, however, sometimes found in threes and fours; the seed-leaves are generally in fours, but in some individual seedlings there are from three to six.

Branches, these are numerous, regularly disposed; much divided, and abundantly furnished with laterals; the branchlets more cylindrical in form, and somewhat pendent, having the smallest, lightest green, and most glaucous foliage, while the cone-bearing branchlets are more thickened and thickly covered with the scale-formed leaves, which are very closely and regularly imbricated. The bark on the branchlets for the first season is entirely covered with the foliage, and in the second year is only partially visible, and in the third and succeeding seasons it becomes more and more visible, until the branches are five or six years old, when the leaves gradually disappear, leaving the bark somewhat rough surfaced; and on the leading or stem shoot of young trees, the leaves, before disappearing, become much elongated, frequently from one to two inches, more like scales than leaves; only free from the bark at their apex. On adult branches the bark is prone to peel off in thin, scaly flakes, particularly on the stem or trunk, showing in the rends or fissures the smooth polished surface of the inner rind. When matured and aged, the bark becomes very thick, varying according to age from nine to eighteen inches in diameter, and externally rough and rustic.

Young trees of it form the most beautiful, symmetrical, and conical pyramids the eye can look upon; while the pleasure is much enhanced by the ample spray and foliage, so harmonious in all the shades and tints of pale blue, yellow, and bright green colour.

The existence of this tree was recorded thirty years ago; but the sensational epoch of its modern history must be dated more recently; and to Mr. G. L. Trask, who exhibited specimens of it, particularly "The Bark" of the "Mammoth Tree," both in America and England, are

we indebted for many of the apparently fabulous stories which have been told and published about it. This world-renowned "Bark" is now to be seen in the north transept of the Crystal Palace, where it is neatly and very naturally arranged on a prepared skeleton frame; and the tree, called the "Mother of the Forest," from which this bark was peeled, we are told, though then dead, still stood more than three hundred and fifty feet high, one hundred and forty feet to the first limb, ninety-three feet the circumference at base, and forty-five feet circumference at one hundred feet high; be this as it may, however, the bark is about eighteen inches thick, and clearly shows that the tree which produced it must indeed have been a giant. Much has likewise been told us about the age to which this fir will live and grow; but the only test or proof of this that can be given is the concentric ring growths, which, as I have already stated, like most general rules, has its exceptions; and this fir is one of those few kinds concerning which I am quite satisfied that, a few tens of years hence, trees of it will be cut in Britain which, according to their concentric rings, will show an age much greater than the date of its modern discovery; for although generally true and correct as a rule for computing the age of most of the firs and pines, yet, in this, and in the other species, *Taxifolia*, it is the reverse. Mooty though its age be, there is little of the mystic about its dimensions; for with such a cloud of witnesses, including such men as Murray, Black, Grosvenor, Renny, and others who have visited the grove in Calaveras County, on the slopes of the Sierra Nevada, near the source of the San Antonia, about two hundred and twenty-five miles from San Francisco, in Upper California, where there lately were from six to seven dozen of these trees, ranging in heights from two hundred to four hundred and fifty feet, with trunk diameters at base of from ten to thirty feet, we have proof enough to establish the fact that it is, if not the giant of the vegetable kingdom, at least the giant of the firs; hence my name *Gigantabies;* and as I have dared to re-christen this big tree, I must needs give my reason for so doing. *Wellingtonia Gigantea* is at best but *The Gigantic Wellington*, and a lamentable misnomer for such a mammoth of a tree, and a compliment servilely paid to so great and good a man as the departed hero of Waterloo. That he was great the world knows, and history is not likely to forget the fact; but that he was a corporeal giant I never fancied, though I never doubted that he was indeed a mental one; much less would one believe him to have been a tree! As, however, firs are matter, not mind, I treat of them in a material-

istic way; and knowing well that had the chieftain of the chiefs in battle, the man of men in the arts of warfare, whose greatness consisted in his sense and system, who made men for places not places for men, who generally put the right man in the right place, and when right kept him there; and who generally called a sword a sword; who scarcely ever put the rider before the horse, or the private before the sergeant, or the sergeant before the captain, but had a place for every one and every one in his place; had he, I say, been consulted upon this *casus belli*, *Wellingtonia Gigantea versus Gigantabies Wellingtoniana*, he would have decided in favour of the latter appellation for this tree; and so methinks will all my readers of the practical and common sense class. Be that as it may, however, this naming of trees seems from the modern *modus operandi* to favour the idea that, that which we call "a rose by any other name would smell as sweet;" which being so, it may be inferred that, the mammoth fir by any other name would grow as big; for our American cousins call it *Americanus Giganteus* and *Washingtonia Americana;* such nomenclature of the vegetable kingdom is pardonable, and may induce a smile, in the land of "Shoddy" and "Oil Springs," where they "beat creation out of time;" but that *Wellingtonia Gigantea* should be tolerated by such a utilitarian people, so thoroughly practical, and so professedly learned and refined as the British, seems a little paradoxical; for such latinizing of a tree into a man or a man into a tree, or the egregious blunder of canonizing a departed hero into a giant who never was one, could scarcely have been perpetrated, unless the hyperbolic author of such a caricature was in the mental mood where pedantry is rampant; for methinks that *Gigantabies Wellingtoniana*, (Wellington's Giant Fir,) is not only more euphonical, but more in keeping with that oft despised virtue, common sense; and more consonant with my ideas of the great and good, or the true and beautiful. The naming *species* or *varieties* of trees after men or women, or as complimentary tribute to a departed hero, I can perfectly understand and fully appreciate; but to behold science, as it were, dethroned, and not unlike a sycophant crouching on flattery's footstool, and language prostituted in such servile truckling of Generic Titles; which I consider the highest attributes; nay, the natural birthright; heaven's own gift; and this alike with all names of genera, whether of the animal, vegetable, or mineral kingdoms: such trafficking in Generic Names I cannot appreciate.

This tree, then, is thoroughly hardy, though showing slight symptoms of constitutional disease or decay; which, however, I am

inclined to think will be temporary and transient; and that its introduction into and cultivation in this country will be the means of imparting to it an invigorated constitution and a renewed term of existence. It is of very regular and rapid growth; and does well in any ordinary description of soil; but prefers rather moist to very dry ones, in which latter it will not succeed; it luxuriates in a good, deep, moist, loamy soil and a sheltered situation.

Its timber is inferior to many of its congeners: with the wood of such a tree as the Deodar it cannot be compared; to that of the Douglas Fir it is vastly inferior; and is, even, far surpassed by that of the Corsican Pine: for it is short-fibred, light and soft, porous and brittle, non-resinous and non-fragrant, particularly when matured; and it is not durable, nor free from incipient decay or wood-vermin: yet, notwithstanding these defects, I incline to the belief that it will eventually take rank as a third-class timber tree in the British Isles, since its wood, when compared with that of many of the soft, light, and brittle-wooded trees we now cultivate for their timber, will bear a very favourable comparison; and, though I have no data, yet, I think that the quality of its ligneous tissue, grown and matured in this country, will prove better and more durable than that it produces in the richer soils and more congenial climate of California: moreover, its large dimensions afford strong presumptive evidence that it will produce at least quantity if not quality. For the purpose of testing its capabilities as a timber tree, adapted for general planting as such in these latitudes, and for affording the next or succeeding generation the materials for proving its value as a British timber tree, we have for some years past been planting it out in limited quantities amongst other common forest trees: and most of these young trees are now beginning to develop themselves, and are rivalling the Larch, Spruce, and Silver Firs, and most of the common Pines, in their luxuriance and rate of growth.

As an ornamental tree it takes equal rank with *Araucaria Imbricata*, *Cedrus Deodara*, and *Picea Nobilis;* and no collection of trees can be considered complete without it.

Although somewhat related to the S.D. *Cupressineæ*, it is nevertheless generically and specifically distinct from this and all the other genera and species of **Pinaceæ**; and is a noble representative or prototype of my S.D. IV. *Gigantabies*. It has at present no known quasi-species, and but few varieties; but it is beginning to show a sportive tendency, and, no doubt, we will soon have *elegantissimas* or

nobilissimas, as we already have an *argentea*, an *aurea*, a *compacta*, and a *viridis* of Wellington's Giant Fir.

S.D. V. LARIX: The Larch Fir.

No certain origin nor sure derivation do I offer for this name; and after much careful research, I venture no further back than the Latin *Larix*, the which, however, I consider an appropriate, correct, and tenable term for this S.D.

Flowers, male and female, on the same plant, but separate: the male catkins small and numerous, egg-shaped, minus footstalks; the females larger, ovate, solitary, and generally erect; the female catkins are generally red in colour, but there is a white-flowered variety of the prototype; and at the present time there are to be found plants having white, yellow, straw, orange, and yellowish or whitish-green blooms; and red, purple, brown, and reddish or brownish-green shades.

Leaves, deciduous, soft, linear, flat, obtuse; produced singly on the young shoots of young plants, and in bundles or clusters upon adult branches and old trees; being disposed in gregarious groups round a central bud, ranging from a quarter to three inches long; at first bright grassy-green, more or less glaucous, and in the autumn, before they fall off, they alternate through many shades of golden, yellow, red, and brown colours.

Cones, these are of various sizes, ranging in some species from a quarter to one inch long, in others from one-and-a-half to three inches; in form oblong, oval-obtuse, cylindrical, or roundish; at first red, purple, yellow, or brownish-green, changing to yellowish-green; and, when they arrive at maturity, all of them become of a brownish colour: the scales of most of them are persistent, while in a few they are deciduous; the seeds of some have a soft skin-like covering, while they most of them have a leathery or ligneous covering: and all of them are furnished with a winged appendage though comparatively small.

LARIX ALTAICA: The Mountain or Siberian Larch.

This is merely an altered form of the common Larch Fir; sometimes found much diminished in its stature, and in the size of its leaves and cones, often reduced to a scrubby bush; while it is, in some more favoured habitat, a very handsome stately tree, closely resembling the prototype; all of which forms or variations are produced by the soil, altitude, and climate in which it is grown.

LARIX AMABILIS: The Lovely Larch Fir.

This is a Fir, *una e multis*, which has caused no little consternation,

and much disputation amongst botanic pedants, particularly the hair-splitters; for according to some of them it is a nondescript; while others say it is *Abies Kæmpferi*, and some that it is neither a Larch nor a Fir, but *Pseudo Larix*. That *Abies*, *Cedrus*, and *Larix* have more or less specific affinity no sane person disputes; but as decency and gallantry alike should prompt us to courtesy, I do not insult beauty with such a barbarous appellation as *Pseudo Larix Kæmpferi!* for although the theorists say it is *in posse;* I say *in esse* it is a Larch; and a lovely one it is; hence my present address to it is *Larix Amabilis*. It is a most beautiful and somewhat remarkable tree; inasmuch as, though like the prototype in its leaves, which are deciduous, single upon the young shoots, and in clusters or bundles on the branches; yet, they are larger and broader, ranging from one to three inches long, and from one-half to one line broad; they are likewise more flat and delicate in texture: and in spring and summer are of a pale pea-green, gradually changing, as autumn approaches, to a rich golden-yellow, and as winter advances they drop off. The branches are of a pale brown, while the branchlets or young shoots are of a rich yellowish-green, and its trunk of a dark or blackish-brown colour.

In its general deportment and distinguishing characteristics it is undoubtedly a true Larch Fir, somewhat related to the Cedar in its bark, and to the Silver Fir in its seeds; while in the formation of its cones it is to a certain extent related to the Spruce Fir; yet, such nice drawn lines of demarcation and dexterous feats of hair-splitting in the scale of a cone, or in the angularity of a seed, or in the ineffable thickness of the membrane, or in the elongation or rotundation thereof, will never transform a deciduous Larch into an evergreen Cedar, nor a verdant Cedar into a Silver Fir; much less all three into one tree to be ycleped *Pseudo Larix*.

In China, its native habitat, it is said to attain heights of from eighty to one hundred and thirty feet, and that its wood is excellent in quality; but such results will never be obtained by its cultivation in Britain; its utility in our climate and soils will only be for ornament; and in every collection where a good healthy moist, rather than too dry soil, a warm locality, and a well sheltered situation, where declivitous rather than flat surfaces can be afforded to it, with shade and a more or less humid atmosphere while in a young state, it would form a most graceful and amiable object in any group, park, or plantation of beautiful trees; but, as I have indicated, the very best soils and warmest localities in Albion's Isle are indispensable to its growth, for it is more

fastidious than, and prefers somewhat different soils and situations to, the prototype, or any of the other kinds.

LARIX AMERICANA: The American Larch Fir.

This tree was introduced to us early in the eighteenth century; but even in the present it is but rarely to be found in any plantation, wood, or forest, in this country; which may be accounted for by the mania for the European Larch Fir, which has run so high amongst us of late years. Compared with the European, the American is inferior in the quality of its timber, and is a less beautiful tree; but a diseased European Larch and a healthy American Larch will bear a more favourable comparison; and as I hold that the common Larch Fir, in its present diseased condition, cannot be depended upon to produce good, sound, and perfectly matured timber in this country, and that it can only be profitably cultivated with a view to quick returns in the shape of hop-poles, fencing rails or palings, pit props, railway sleepers, temporary buildings, or other ordinary rural purposes, so, until we can obtain a new and healthy progeny of the European Larch, I give a place to the American Larch as a useful and profitable, though coarse-wooded tree, for the climate of Great Britain and Ireland. It is equally hardy, and of equally rapid growth, and, *cæteris paribus*, more so; and quite as accommodating as to soil and situation; and would produce equally quick returns in poles, &c., as the common kind, though, as I have stated, the wood is somewhat coarser. Its cones and foliage are smaller than those of the common Larch, and its branches longer and less regularly disposed. There are several forms or varieties of it, the whole of which are comprehended in *Microcarpa* (very small-coned,) *Pendula* (pendulous-branched,) and *Rubra* (red-coloured,) which are hardy and useful enough in elaborate ornamental planting.

LARIX EUROPÆA: The European Larch Fir.

This most beautiful, and at one time valuable, and, even now, profitable timber tree, though so plentiful on the European Alps, did not find its way into Britain until the beginning of the sixteenth century, and for about a century afterwards continued scarce, and was but little known or planted as a timber tree, for at first it was treated as we now treat tender exotics—fixed into flowerpots and placed in a glasshouse. Popular tradition relates some good stories about how our forefathers managed it. The well-known and magnificent pair of Larches at Dunkeld, in Scotland, which were the first sent to the Duke of Athol, and were treated as tradition tells, soon became sickly, withered, and at length they were supposed to be dead; when, like

most other plants so maltreated and mismanaged, they were consigned to their sepulchre—the "rubbish heap;" but being only in a dying condition, and not, as had been supposed, dead, by this unnatural treatment; and being now a little more at home, with a semblance of their native air, and favoured by a showery season, they revived, pushed forth new leaves, were again planted; but this time it was in the earth, and minus a glass canopy; henceforth they became vigorous-growing young trees; and getting "fat and full of sap," they grew and flourished until they were the best specimens extant in this country.

So early however as 1629, Parkinson informs us that this tree was cultivated in England; and of the flowers he states that they were "very beautiful and delectable, being of an excellent fine crimson colour;" a true enough description of the female catkins of the red-flowered, or most common variety. Miller states, in 1731, that it was "common in English gardens, trees at Wimbledon producing annually a great quantity of cones." He mentions both the red and white-flowered varieties.

In the introduction and cultivation of the Larch as a timber tree, however, Scotland takes priority, and James, Duke of Athol, precedency. Yet, exact data is wanting as to the quantities and dates in which he first planted it; but it is a well-known and authenticated fact that between 1730 and 1760 he planted nearly two thousand trees, and that during his lifetime he planted more than fifteen thousand five hundred acres, which may safely be estimated to have required at least twenty-five million plants. The Earl of Fife planted nearly two hundred thousand plants of it, about the close of the last century, and many other Scotch proprietors planted very large quantities of it about the same date; of which, however, I have found no accurate accounts. The earliest English planters of it of whom I have authentic records are the Bishop of Llandaff, who, in the seasons 1787 and 1788, planted in Westmoreland nearly fifty thousand; and John Sneyd, Esq., who between 1784 and 1795 planted about twenty-five thousand in Staffordshire. During the last ten years of the eighteenth century we find that other English planters, of whom we have less accurate accounts, planted at least five hundred thousand of this tree. Yet, great though this number be, I hazard the opinion that it is not more than one-quarter of the actual number planted during the period referred to; and out of this vast number, in the present year of grace it would be difficult to say how many of these trees may now be extant:

units, most probably, would represent the thousands, and *tens* the millions, were the actual truth known.

As I have already indicated, it is a beautiful and useful Fir, attaining heights of from eighty to one hundred and thirty feet, with trunk diameters of from two to five feet. It is perfectly hardy, though constitutionally delicate, and of very rapid growth; but it should never be planted unless in a sweet, healthy soil, rather moist than dry; it prefers loamy, light mould, and porous, gravelly soils; and dislikes heavy or wet clay; and will only starve and die in close, peat, or spongy marsh. A pure atmosphere, and declivitous rather than flat surface for its situation, so as to secure thorough ventilation, are essential to its growth in its best estate, much more so in its present diseased condition.

Its timber is good, but it has been much overrated in its quality, even the best specimens which I ever examined, were very coarse grained, and though tolerably long-fibred, not very elastic, and most difficult to be wrought; very subject to warp, not capable of receiving a high polish; one of the very worst woods to season, and most certainly not an economically valuable timber, although, when sound, tolerably durable. Yet, for fencing purposes, pit-props, hop-poles, railway-sleepers, and temporary purposes, where unwrought timbers are required, it may be usefully employed; but now that there is scarcely a perfectly healthy or sound and matured tree of it in this country, it is a most objectionable and dangerous wood to employ for architectural purposes, either in roofing or flooring; for its fungoid disease will not only soon rot its own timber, but will soon infest and destroy all other woods contiguous to it in the same building, even to the furniture therein.

An appreciable difference exists in plants raised from home-grown seed, and such as are the produce of Tyrolese-grown seed. For high altitudes and exposed situations plants from home-grown seed should have the preference; while in low-lying localities and sheltered situations the Tyrolese will be the most suitable, as it is more free and rapid in its growth, and produces equally good timber, though the plants and trees have a tendency to start their growth earlier in the spring, and are thereby more likely to get injured by late spring frosts. There is, moreover, an appreciable difference in the colour of the wood, when seasoned, of the red and white varieties; the former is more ruby and yellow, the latter more creamy and white; while both kinds, again, are much influenced by the soil and situation in which they have been grown.

This Fir I take as the prototype or representative of the S.D. *Larix*, and excepting the Chinese form, *Amabilis*,—it is the most beautiful tree in the group. Of its varieties, the only ones worth notice are *Alba*, the white, and its many varieties; and *Rubra*, the red, and its sub-varieties; but all of these only differ from the species in the colour of the flowers and cones when young. There is also a *Pendula*, (pendent-branched,) *Nana*, (very dwarf,) and *Rustica*, (the rustic, or monstrous-branched variety.) No tree ever introduced into this country has been more extensively planted, and none has more quickly repaid the planter for capital and interest; which fact, doubtless, is the true cause of the Larch Fir mania, which for some time ran so high, and which reached its culminating point about the beginning of the present century, when its merits were so highly extolled, its accommodating nature so freely abused, its rapid growth so injudiciously accelerated by every description of artificial stimulants; for Larch! Larch!! Larch!!! was the arboriculture password from Land's End to John O'Groat's; and even our antiquarians and botanic pedants became affected with raving symptoms, and referred us to the world-renowned woods of our venerated and enduring *Cedrus Deodara*, as the lignine produced by *Larix Europœa*. Theory and practice, however, did not here agree; and practice in this, as in many other departments of the cultural arts, has put theory to the blush; for we are now returning to the paths of moderation and common sense, and even descanting upon certain causes which have produced certain effects, which are popularly comprehended under the heading, "Larch Disease;" a subject now so thoroughly hackneyed that it has become perfectly nauseous. I hold, and have always held, that the Larch is not only delicate in its constitution, but, to use a familiar phrase, likewise predisposed to scorbutic disease, or that it is what might be termed a scrofulous-juiced Fir. Yes; even in its pristine beauty, in its native habitats, and when in its best health, the symptoms of this disease will be found, and in such a degree as to be unmistakably visible, oozing to the tree's surface, whether in bark or foliage, and, as a matter of course, circulating throughout the entire system of the plant. Need we wonder, then, that this tree, so constituted, from such a climate, and such soils and altitudes, and treated as it has been since its introduction into this country: planted indifferently in any kind of soil, in any situation; the demand for it for a time far exceeding the supply; every means resorted to to obtain seed, no matter from what tree, altitude, or soil; no questions asked, nor instructions given the collectors as to quality,

but many as to quantity—good, bad, and indifferent, all cones were indiscriminately received—the seeds taken out, and all sown; every means employed to stimulate and push the seedlings forward in highly-manured land, and in sheltered corners, where the seed was so thickly sown that after braiding one half the plants were generally smothered, the other half so drawn up and imperfectly matured before the winter set in, that their growth was generally prematurely stopped, and thereby induced to start early a sickly growth, and get injured by cold and frost in spring; then much too thickly drilled out into nursery lines, and generally left there for two years, or perhaps three or four; then sent afield into the country, planted anywhere and everywhere, and again left to smother each other in the young plantations, thereby causing this originally delicate tree to be attacked by all and sundry of the enemies, whether animal or vegetable, to which it is subject? Whatever we may say to the contrary, or whatever theories we may promulgate as to the cause of the "Larch Disease," no other solution than *unnatural treatment* will tell the truth; for to no other cause can it be ascribed but to injudicious nursing, and unnatural cultivation in stimulating a naturally excitable tree; over-feeding the plants and stimulating and smothering the young trees, which before dying spent their remaining vitality to produce cones to leave behind them to perpetuate the species. These diseased and dying trees were too eagerly sought after by the seed-collectors, whose only object was so many bushels of cones, no matter what the quality of the seeds they contained. After, then, such treatment in the first instance, and after so frequently repeating it from diseased seed, can we reasonably expect that there should be any matured, aged, and perfectly healthy Larch Firs in this country at the present time? I do not deny that, so long as this Fir deteriorates no further, it may be grown, and that very profitably, for many ordinary purposes where coarse unwrought timber is desired, but this is all that can be obtained from it; for in its best estate it is, though a useful and profitable wood, yet, coarse and inferior in quality; and even for quick returns, *cæteris paribus*, such a species of the S.D. *Pinus* as *Corsica*, is superior to it. There is, too, but little prospect of improvement; for it will require a long series of years before we can show a perfectly matured and sound specimen of Larch timber of home-growth. Still, a supply of *se*lected not *col*lected seed, from healthy, sound, and matured trees, and a rational system of propagation and cultivation, and judicious management in the plantations, might do much to mitigate, though it might

not entirely remove, the "Larch Disease;" for, however contrary to generally received opinion, I hold, that unless in the best and sweetest soils, the most undulating and high altitudes, and where the purest atmosphere prevails, even a healthy and perfectly sound plant would, if not planted out under conditions congenial to it, soon become a diseased tree.

LARIX GRIFFITHII: Griffith's Larch Fir.

This kind is merely an altered form of the European species, found in Sikkim in India, where it sometimes is dwarfed to a large sprawling-branched bush, while in other soils, altitudes, and localities, it is found attaining heights of from thirty to sixty feet. It is of no economic value for its timber, and but little use for ornament in this country.

LARIX LEPTOLEPIS: The Japan Larch Fir.

A botanical curiosity, sent to us from Japan; where these 'cute culturists can show it as a nice, medium-sized tree, from thirty to forty feet, or a perfect pigmy in a lacquered box, or china flower pot, which they term priceless, being, as they say, *Sapins à deniers d'or*, (Golden penny firs;) and *Mats nummularia*, (Money pine;) it is of no economic value for its timber, and but little, if any, for its ornamental qualities in the climate of Britain.

LARIX OCCIDENTALIS: The Western Larch Fir.

This is at best but a quasi-species of the prototype, found in North-western regions, either a scrubby bush or a tall handsome tree, like the common kind; such varieties are the effects produced by the soil, altitude, and climate, in which it may be grown, and in none of its distinguishing characteristics does it differ from the European Larch Fir.

S.D. VI. PINGUECERÆ: The Wax Pine Tribe.

From Latin *Pinguis*, fat or resinous, and *Cerea*, wax: which latter is clearly from the Greek κηρος. The Hebrew, דונג, *ceræ*; or Sanskrit, मक्षड *mákshada*, are the terms for "WAX," and the Hebrew מִשְׁמַן, *pingue*; and Greek, παχυς, Latin, *pinguis*, fat or fatness; inasmuch as their juices are richer and more waxy, or amber-like, than any of the other S.D. of **Pinaceæ**: and, moreover, the species in this S.D. are all more or less related in their ligneous tissues and juices, and rich, ample, and massive foliage; though in their floral organs and modes of fructification they are not so closely related to each other; yet, particularly in their wax or amber-like secretions, more or less specifically distinct from the other genera of **Coniferæ.**

Flowers, male and female, in most species on separate plants, yet, in some species on the same plant, but separate.

Leaves, from half an inch to six inches long, lanceolate, ovate, flat, broad, awl-shaped, and generally sharp-pointed, imbricated, spreading, rigid, and perennial or evergreen; and of the very richest shades and tints of light or dark green, more or less glaucous, glossy, or shining and polished, while in a few of the species they are, particularly when old, of a dark sombre brown or rusty colour.

Cones, generally large, but ranging from one to nine inches long, singly or in clusters, globular or spherical in form and generally terminal; seeds large and numerous, sometimes three hundred in a cone of some of the species, some of which are large, nutritious, and good for and used as food; some species have winged and some wingless seeds, while some are free and some attached.

§ 1. ARAUCARIA: The Chilian Wax Pine.

So named from the prototype, *Imbricata*, being found in such large numbers as to form vast forests on the Chilian Andes, where the Araucanians use its seeds as food.

Flowers, male and female, on separate plants.

Leaves, from half an inch to two inches long; scale-like, persistent, and broadest at base, in some species awl-shaped, in others linear or lanceolate; in some alternate, others somewhat two-rowed, and some in whorls and imbricated, some round, some needle-shaped, others flat, straight, smooth, and very sharp-pointed; some dark green, some light green, some shining, others glaucous.

Cones, those of the broad-leaved species are large, from six to nine inches long, and nearly as broad as long; seeds from one to three inches long, and about half as broad as long. Those of the needle-leaved species are smaller, from three to six inches long, and nearly as broad as long.

ARAUCARIA BIDWILLI: Bidwell's Araucaria.

This kind is a quasi-species of the broad-leaved Chilian, differing from its congeners in the disposition of its leaves, which are from one-and-a-half to two inches long on young plants, and generally disposed in two rows on the shoots; while they are from one-half to one inch long on adults, those on the stems alternate, those on the branchlets somewhat two-rowed. In its native habitat, Australia, it forms a beautiful tree, from one hundred to one hundred and fifty feet in height, producing good durable timber; but it is much too delicate and tender to stand unprotected in Britain.

ARAUCARIA BRASILIENSIS: The Brazil Araucaria.

Another handsome kind, having lanceolate sharp-pointed leaves, one to two inches long, glaucous below and bright shining green above, with whorled branches forming a pyramidal tree, ranging from fifty to one hundred feet. There is also a more robust form of it, (*Ridolfiana*,) and likewise a more slender-branched variety, *(Gracilis,)* but all of them are much too tender for our English climate.

ARAUCARIA EXCELSA: The Lofty Araucaria.

This is the prototype of the small or needle-leaved kinds.

Leaves, somewhat awl-shaped, four-sided, compressed, curved, and thick; from half to one inch long, generally obtuse-pointed, and when old somewhat imbricated, and of a rich light green colour.

Cones, globular in form, large, erect, long footstalked, brown in colour, and from four to six inches diameter at their broadest part; seeds large, thick at top, and thin on the edges, with the wing appendage broad.

Branches, in regular verticillate whorls, straight and spreading, but slightly curved at the tips, the laterals opposite or alternate, somewhat in two rows along the branch stems, slender, undivided, drooping or horizontal.

This most noble and majestic pine is at present found in Australia; most plentiful, however, on Norfolk Island; hence its popular English name, "Norfolk Island Pine." It attains heights of from one hundred to two hundred feet, with trunk diameters of from six to twelve feet, forming a handsome tree, with a clear stem, and somewhat rounded but tapering head. Of this species there are two quasi-species, viz:—*Cookii*, (Captain Cook's Araucaria,) which has somewhat smaller cones, and less regularly disposed foliage, and is found in Aniteura, New Hebrides, and New Caledonia; and *Cunninghamii*, (Cunningham's Araucaria,) which has more sharp-pointed, rigid, smooth, shining, and dark green leaves, disposed all round the branch stems, with cones of a round or globular form about three inches in diameter. Of these quasi-species there are, again, some varieties, such as *Glauca*, (glaucous-leaved,) and *Longifolia*, (long-leaved;) all of them beautiful, but unfortunately much too delicate and tender for an ordinary English winter; but when in a young state they are most useful plants for the decoration of Crystal Palaces, Glass Mansions, or Conservatories; and are well deserving a place in such structures in this country where fine-foliaged or remarkably beautiful plants are cultivated.

ARAUCARIA IMBRICATA: The Imbricated Araucaria.

So named from the disposition of its noble and ample foliage. It is the prototype of the large or broad-leaved Araucarias.

Leaves, in whorls of from six to nine in number, ovate-lanceolate, spiral, rigid, straight, concave, smooth, polished, very sharp-pointed, and of a shining, deep, rich green in colour; from one-half to two inches long, minus footstalks, and persistent, remaining on the tree for many years; most beautifully and regularly imbricated on the branch stems, and in texture tough and gristly.

Cones, large, globular, dark brown in colour; from six to nine inches broad, and nearly as long as broad, having numerous scales, which are wedge-shaped, curved at the ends, and when ripe deciduous; seeds large, somewhat rhomboid in form, from one to two inches long, having a long tapering tail; each cone produces from two hundred to three hundred seeds, which generally are found in twos under each scale.

This most remarkable pine is, in so far as beauty or grandeur is concerned, if not king of the pines, at least one of the greatest nobles of **Pinaceæ.** If I might use a suggestive and not inapplicable comparison, I would say that in majesty and mien it as far transcends its congeners in the vegetable kingdom as man does his simial caricatures in the animal kingdom. Unlike all its kindred in this section, whether small or broad-leaved, it is perfectly hardy, sturdy, good in constitution, and quite at home in Albion's Isles and climes; not capricious as to soil or situation, but rather accommodating; doing well in most kinds of soil if in a sweet and healthy condition, unless, indeed, in such as are marshy, sour, wet, or stagnant. Nature evidently intended this tree for a country life, inasmuch as we seldom see a perfectly healthy, rich-coloured, massy-foliaged, clean and shining-faced specimen of it in towns or cities, or where there is a smoky or impure atmosphere. It is a native of the Andes of Southern Chili, where the Araucano Indians call it *Pehuen* or "Monkey Puzzle Pine," as these animals are prevented from climbing the trees by the branches being so thickly clothed with the sharp-pointed and rigid leaves. The natives of Chili use the seed-kernels as food, fresh, roasted, and boiled; they are also ground into flour, and a spirituous liquor is distilled from the seeds, all of which staples or manufactures are not only consumed by themselves, but are likewise sent to Valdivia and Valparaiso. It attains heights of from one hundred to one hundred and fifty feet, and its wood is tolerably good, being hard, fibrous, easily wrought, capable of receiving a good polish, comparatively durable; and a creamy-white in colour,

somewhat striated with yellowish-ruby veins or bands; but for general utility it is rather too heavy. In its annual growths it generally produces its terminal or leading shoots in alternate years, and the same in its laterals or side shoots, each series of growths being in alternate seasons, which gives the branches and branchlets of this tree their regular and uniform disposition on the tree; and the branches being arranged in verticillate whorls, with their stems horizontal and their tips ascending, their laterals long, somewhat slender, regularly divided, and generally in opposite pairs, their branchlets undivided, cylindrical, and well covered with the gorgeous green foliage; all this gives us a perfect model of an open-branched, fine-foliaged, and symmetrically beautiful pine. Ornament is its use, however, for its wood would not prove to be profitable in this country; and any collection of ornamental trees, great or small, where one or more specimens of this tree is not found cannot be worthy the name of a fine collection of trees; for this is indeed one of the very finest and most ornamental trees in the vegetable kingdom. It is to be found in several forms or varieties, particularly when in a young state; but the only constant or truly distinct varieties of it I have yet seen are the *Femina*, female, and *Mascula*, male; and its *Variegata*, or variegated variety,—a most superlatively beautiful plant.

ARAUCARIA RULEI: Rules' Araucaria.

This kind has but recently been discovered in Australia, and is at best but a quasi-species of the Chilian or prototype *Imbricata*, to which it is more closely related than to either of its congeners Bidwell's and the Brazil Araucaria, but a much smaller-sized tree than any of them, attaining heights of from forty to fifty feet, with its branches extending from twenty to twenty-five feet in diameter.

It may be summarized as a small-sized, numerous-branched, dense-formed variety of the Chilian Pine. Being, as it is, thoroughly tender, it is of no economic value in this country, neither for profitable nor ornamental planting.

§ 2. DAMMARA: The Indian Wax Pine.

Dammar, or *Dammar-puti*, or *Dammar-batu* are the names applied to this pine by the native Malays; which may be from the Sanscrit द्दा, *Da;* or, देव, *Deva;* and अम्र, *Amra*, or आम्र, *Ahmra*, from its being esteemed as a "Sacred Tree" by the Ambonians; or it may be from "*Damma*," an ancient town of Serica; and "*Amra*," a tree, a

name applied by the *Seris* or primitive settlers from Catay or China; while the natives of New Zealand call their Wax Pines "Kouri;" and the settlers call it "Cowrie Pine;" all of which vernacular designations are again found in as many dialects as the countries where the wax pines have their habitats, whether in the East India or the Feejee Islands, or New Guinea or New Zealand. All however, of which names are traceable to *ceraceous resine;* and which may be from Greek Κερος "wax," or Sanscrit *Makshada*, "wax," and *Amra*, "a tree," or *Ahmra*, "immortal;" from the large quantity of soft, transparent, glutinous, and *ceraceous* juice which these pines produce, and which when dried is hard as adamant, and amber or wax-like; hence my name *Pingueceræ* for the S.D. to which *Dammara* belongs.

Flowers, male and female, solitary and on separate plants.

Leaves, of various sizes, from one to seven inches long, lanceolate, linear, oblong, or elliptic; somewhat sessile; opposite or alternate, sharp or blunt-pointed, and more or less flat and leathery; of various degrees of light and dark, and of yellowish or brownish-green shades of colour.

Cones, ovate or globular in form, from two to four inches long, axillary and with footstalks, scales thick and persistent, seeds generally free, singly, or in pairs, more or less winged, and of a brownish colour.

DAMMARA AUSTRALIS: The New Zealand Kouri.

A large, handsome tree, attaining heights of from one hundred to one hundred and fifty feet, being surcharged with a very hard, brittle, copal-like juice. It has also a *Glauca*, (glaucous-leaved,) and *Obtusa*, (obtuse-leaved form;) all of which are much too tender for an English winter.

DAMMARA MOORI: Moore's Dammara.

This is said to be a small-sized, erect-stemmed, and compact-growing kind; with long, slender, lanceolate leaves, found in New Caledonia. Never having seen it, I can neither assent nor dissent to its being either a species, quasi-species, variety, or sub-variety; but methinks whatever it may be, it will be thoroughly tender in such a climate as ours.

DAMMARA ORIENTALIS: The Western or Amboyna Kouri.

This is a large spreading tree, in the Molucca Islands, Java, and Borneo, attaining heights of from eighty to one hundred and thirty feet; with its branches vertically disposed, and tolerably well clothed with thick, glabrous, and glaucous green foliage: remarkable for its abundance of transparent wax-like resin, which is frequently found hanging from the branch-stems and trunks like icicles. This tree is

much esteemed by the Malay tribes, and there are the following quasi-species and varieties of it, viz:—*Alba*, (the whitish-leaved and ashy-grey-barked,) *Macrophylla*, (the large or long-leaved,) and *Ovata*, (the ovate-leaved,) one and all of which are too tender for our latitudes.

DAMMARA VITIENSIS: The Feejee Wax Pine.

A kind of which I have seen nothing but the published accounts of our botanical instructors; and should it prove to be distinct, it will likewise prove to be delicate; as one and all of them are so in the climate of Great Britain and Ireland.

§ 3. RAXOPITYS: The Racem-Flowered Wax Pine.

From ραξο, a racem or cluster; and πιτυς, a pine tree; its male catkins being produced in racems or clusters.

This species and its varieties cannot be classed with any of the other three Sections of the Wax Pines, inasmuch as, although closely related to the Araucarias; yet, in its floral organs, and in the formation and disposition of its cones, scales, bracts, and seeds, it is distinct from any of them.

Flowers, male and female on the same plant, but generally on separate branches; male catkins numerous, in close clusters on the tips of the branches: the females terminal, generally in vertical clusters round the tips of the branches, but frequently found solitary or twos together.

Leaves, from one to two inches long; alternate, lanceolate, acuminate, coriaceous, flat, and rigid; of a bright yellowish-green colour, and more or less glaucous and shining, more particularly on their under surface.

Cones, from one to two inches long, and nearly as broad; persistent, ovate or globular in form; the scales or quasi-scales, bracts or quasi-bracts, *squamous* or *quasi-squamous* of this cone are a puzzle which is still *in posse* amongst botanic savans, but *in esse* the cone has scales like other cones, and under each of these scales will generally be found three ovate-elliptic seeds, with the wing appendage surrounding the shell, and the kernel composed of two oblong lobes or cotyledons.

RAXOPITYS CUNNINGHAMII: Cunningham's Racem-Flowered Pine.

This Pine was introduced to us from China, about the beginning of the present century. It attains heights of from twenty-five to fifty

feet, having numerous and irregularly disposed branches. It somewhat resembles the *Araucaria Imbricata*, having lanceolate, flat, spreading, pungent, and glossy green foliage; but it is a much less majestic tree, and more delicate in constitution. There are some nice specimens of it extant in this country at the present time, the best of which are in warm localities, but in cool and shady situations, and in sweet sandy loam, or moist sandy soils; but it will only languish and die in low-lying or wet places. As a timber tree it cannot be classed, but where a soil and situation congenial to its nature can be afforded to it, then would it be found a useful addition to any collection of ornamental trees. There is a *glauca*, (glaucous-leaved variety,) which is also useful enough as an ornamental plant.

§ 4. SCIADOPITYS: The Whorl-Leaved or Umbrella Pine.

From Greek σκιας, signifying "shade," from the leaves being disposed in umbragenous whorls on the branch stems; and πιτυς, a "pine."

Flowers, male and female, on the same plant, but separate; male catkins terminal, females solitary, amid the scaly buds.

Leaves, from two to four inches long, smooth, persistent, linear, flat, and obtuse-pointed; in regular whorls of from twenty-five to fifty in number at the branch knots, the nodes formed by each season's growth; their upper face is smooth and minus stomata or breathing-pores, while their under surface is channelled and thickly dotted with epidermous pores: at first yellowish-green, and as they arrive at maturity they become of a sombre green colour.

Cones, from two to three inches long, and about half as broad as long; scales wedge-shaped, persistent, thin, leathery, and imbricated; seeds elliptic in form, with a membranaceous brown wing; and from five to nine seeds under each scale; the cones are of a dingy brown colour; require two years' growth to mature and ripen the seeds.

Branches, alternate and verticillate, horizontal and spreading, having cylindrical branchlets, with a whorl of leaves at their tips; and the laterals have two, three, or four of these whorls of leaves at the terminations or junctions of the last two, three, or four years' growth: and when in the fifth year's growth of the branch the four-year-old umbrella, parasol, or whorl of leaves generally falls off: the buds are terminal, and covered with imbricated scales, which, after the buds expand and form the season's whorl of leaves, fall off.

SCIADOPITYS VERTICILLATA: Whorl-Leaved Pine.

If puffing were a good guarantee, and a legal tender for the qualifications of a new Pine, we should have had no reason to doubt that this was to be a first-class timber, and a *ne plus ultra* ornamental tree. It is, however, only a few years since it was introduced to us from China and Japan; and all that has been said about it for home utility or decoration is merely matter of conjecture. We have it, however, upon its trial; and as opinions are free contributions, I give mine, which is:—that it is not so constitutionally hardy, nor so accommodating in its choice of soil or situation as ever to be of any economic value as a timber tree in this country; and that to be of utility as an ornamental Pine, we must give it the most sweet and healthy, loamy, sandy, gravelly, or porous soils, and an open free substratum; a warm locality, and a well sheltered situation, so as to grow and develop itself in Albion's Isles; for in cold, wet, or sour soils, it will languish and perish; and in burning sands, or very dry places it soon dies: it is fastidious to a degree as to dryness or moisture, exposure or over shelter, and soil or substrata. It is, nevertheless, a most distinct Pine, and ought to be tried by all planters who may have a soil and situation in their pinetums or arboretums congenial to it; for if it can be induced to grow, it would add much to the interest and variety of any collection of the Firs and Pines, however rich in genera, species, or varieties it might be. Travellers and botanists who have treated of this tree, inform us that it attains heights of from fifteen to one hundred and fifty feet, and that the Chinese and Japanese have several varieties, both in the giant and pigmy forms; also large and small-leaved kinds; and some very beautifully variegated-leaved forms; a few of which are now extant in this country.

S.D. VII. PINUS: The Pine.

The derivation of this term has already been given at page 25.

Flowers, male and female, on the same plant, but separate; the males generally in masses, clusters, or spikes, rarely solitary; the female catkins solitary, in opposite pairs, in whorls, or in gregarious clusters, and generally terminal.

Leaves, these are of various sizes, ranging from under one inch to over one foot in length, variously disposed, but generally in sheaths of twos, threes, and fives, yet exceptionally found in various numbers up to nine, and in some cases I have found more in a sheath; while at times and in a few species some are found singly, and minus sheaths,

and even on the same tree they may be found in bud-like clusters or bundles, each containing various numbers of leaves; their seed-leaves are also very variable in number.

Cones, of various sizes, ranging from less than an inch to over a foot in length, and from half an inch to six inches broad; they are also variously formed: conical, cylindrical, oblong, or roundish and ligneous; scales numerous and imbricated; the seeds being somewhat oval in form, having hard, bony shells, and farinaceous albuminous kernels; in some species winged, and in some they are wingless.

This is the most numerous in species and quasi-species, and amongst themselves as a family or **S.D.,** excepting perhaps *Cupressineæ.* the most apparently dissimilar yet cognate group of **Pinaceæ.** In their native habitats they have a wide range, for they are to be found north and south, east and west; at all altitudes, high and low; in all kinds of situations, from the most warm and sheltered to the most cold and exposed. Not unfrequently, a particular or given species may be found in some particular part of the world, where, under conditions favourable to its healthy growth and full development, it may attain heights of from one hundred to two hundred feet; whereas, when found in other parts, and under conditions uncongenial to its healthy growth and full development, the very same species may be discovered struggling for existence; making, it may be, all but imperceptible annual growth. Yet, even under such adverse circumstances, by indomitable perseverance for many years, it may reach a good old age, though from the hardships it has to undergo it may be reduced to a sprawling, scrubby bush; while, had fate or fortune given it a place in some more favoured clime, a richer or more congenial soil and situation, it might have formed in the same number of years a handsome and majestic pine. This fact is one of the chief causes which have led inexperienced tree-collectors to send home so many said-to-be new species of pines, and coupled with the equally patent one—the present endeavour to send out some "Fine New Conifer," to which too many unscrupulous plant vendors have lately been in the habit of resorting, and encouraged by the high encomium of some botanic pedant, or the "first-class certificate" of some wise savans, who know much about pinks and peas, but little if anything about firs and pines; and the *sine qua non* a good sale for the "Fine New Pine," may in some measure account for the sad lack of precision wherewith the species of this genus are at present found named and described.

According to the dictates of our botanical instructors, and the nostrums of our popular writers upon the Conifers, we are given to understand (and it might be inferred from their pedantic modes of supplying to us practical cultivators their descriptive verbiage that we are to believe and implicitly rely on what they teach us), that of this genus *Pinus*, in this year of grace, 1865, there have been discovered, descanted upon, and most elaborately described, about *One Half Thousand* different species. Be this as it may, however, with botanical theorists and hair-splitting doctors, the practical culturists, for whom I write, will find this number much reduced; yet, not so much so as it will yet have to be when time and experience have proved to us what many of the quasi-species and varieties recently discovered and introduced really are; for in the following enumeration several so-called species are allowed a place either as a recognized species or as a quasi-species, until they have more fully developed themselves in this country. It will be observed that I have discarded all such botanical distinctions as *Binæ*, (two-leaved,) *Ternæ*, (three-leaved,) and *Quinæ*, (five-leaved,) which although generally correct, are nevertheless so frequently incorrect, untruthful, and untenable, as to be of no value whatever, either for science or practice; and that I also dissent from such divisions as *Cembra*, *Strobus*, *Pseudo-Strobus?* (only a quasi-*Strobus?*) *Pinea*, *Pinaster*, and *Tæda*, though I take at least four of them as prototypes; experience having convinced me that all such divisions are, at their highest value, only very nullities or legerdemain tricks at proving a distinction without a difference; for all such botanical enactments, like some few of our class-legislative ones, do very much resemble each the other, particularly the botanical, for the driving a coach-and-four through them is a feat easily performed by the most inexperienced driver. I have, therefore, lopped off all such distinctions and divisions of this genus as so much extraneous lumber, as unnecessary as it is untenable, retaining only *Pinus*, pure and simple.

As a general rule, with the ordinary quota of exceptions, the Pines may be thus summarily characterized:—Timber elastic, resinous, tolerably durable, combustible, and, when well grown and free from knots, easily wrought, and generally useful. The most of them will grow in any ordinary soils if in a healthy condition; some of the species in the most sandy, heathy, gravelly, or barren kinds; while not one of them will thrive or produce good timber in such as are thoroughly wet and marshy, soft peat, or other sour, undrained, wet land. All of them, however, will not only grow, but luxuriate, in

a sandy loam, or gravelly earth, with a sandy, gravelly, or porous subsoil. Generally, when young, and when grown singly, they are regularly furnished with branches to their base; but when old, and thoroughly matured, particularly when grown in groups or masses, the under branches die off gradually, as the trees increase in age, so that eventually they are generally clear of branches for one-half or two-thirds their height; having conic, rhomboid, spreading, or umbrella-like branched heads.

PINUS ALBICUALIS: An Alpine *Species* from the Cascade Mountains in Oregon, may be a western form of the Cembra-like Pine, though I am inclined to consider it as different, and intermediate between *Pinus Flexilis* (even this is not a species, but a quasi-*Cembri-Pinea)*; and *Cembra* distinguished by its pubescent branches, few scattered teeth on the edges of the leaves, and especially by the short, oval cones, with squarrose scales, pointed with a knob. The name is suggested by the colour of the bark of the tree, which is "*as white as milk.*" *Englemann in Trans. Accd. Sc. of Philadelphia.*

'Cute suggestion this, of Dr. Englemann, but rather more transparent than "*milk*," and of a different colour than "*white*," at least to a practical cultivator. He might quite as appropriately have suggested "*blue as milk and water*," for the bark of his thought-to-be *new*, but, indeed, very *old* Pine—the *quasi* of *quasi Cambroides.*

Be this as it may, however, this is the way in which too many of our said or thought-to-be new Pines are introduced to us, and fully illustrates my prefatory remarks on the genus *Pinus.*

All that can be said of this Pine in this book is that a variety it certainly is, a species it certainly is not; a quasi-species it may be; but at best only useful for adding numbers to, and increasing the ineffable variety of an already large or extensive pinetum.

PINUS APULCENSIS: The Apulco Pine.

This was introduced to us from Mexico in 1839. A small-sized tree, thirty to fifty feet, with robust branches irregularly disposed, and on young growths of a glaucous violet colour; leaves from five to seven inches long, generally five in a sheath, slender, undulating, and of a rich and deep glaucous green; its cones are ovate, three to five inches long, and about half as broad as long. Its wood is white, soft, and porous. It is somewhat too delicate and tender for the climate of Britain, and is of no use but for adding number and variety to a pinetum, the soil of which is a good loam, and the locality of which is warm, and the situation assigned to this Pine a well sheltered one.

PINUS ARISTATA: The Awned-scaled Pine.

This is another of the said-to-be new Pines; its existence was recorded by Captain Gunnison in 1853, he having found it on Pike's Peak, Snowy Mountains, in North America, attaining heights of from thirty to fifty feet. It was, however, only introduced into this country in 1861-62, by Dr. Parry, and has been described by that *'cute suggester*, Dr. Englemann, who says of it:—"Its leaves are generally five in a sheath, one to two inches long, and light green on both sides; branchlets spreading and twisted; with thin, smooth bark, of a light greyish-brown colour; cones oval-obtuse, two to three inches long, one to two broad, of a purplish-brown colour; timber white, tough, and not very resinous." That it may have *awned scales* may be true, for this is not a remarkable feature in some Pines, but not having seen its scales, which, too, we profitable or ornamental planters value but little, all that I have seen of this said-to-be new Pine being its seeds and seedlings, and young plants of it; these already have shown me enough to satisfy me that it is none else than an altered form of these now numerous intermediate *subs* or *quasi*-species of *Cembra-Strobus*, which are becoming as plentiful as new ferns, and which are creating so much confusion and annoyance in our futile attempts to rectify and correct the classification and nomenclature of the Firs and Pines. This kind, however, will never be of any economic value in this country, but it may prove to be useful as a variety in a large collection of Pinaceæ.

PINUS AUSTRALIS: The Southern Pine.

This was introduced from America, 1730, where, in the Southern States, it is called "Broom Pine;" in the Northern States, "Red Pine," "Pitch Pine," and "Yellow Pine;" "Broom," evidently from its broomy or bushy growth when young; "Red," from its long, red, bud-like young shoots; "Pitch," from its abundance in resinous juice; and "Yellow," from its old and matured trunks. It attains heights of from forty to eighty feet, with robust, distant, and irregularly disposed branches; leaves from six to twelve inches long; stout, and somewhat reflexed when old; a brilliant green in colour, and generally three in a sheath; cones from six to nine inches long, cylindrical in form, tapering to base and apex, two to three inches diameter at the broadest part, and chesnut or rich brown in colour. The timber is of fair average pine quality, the tree is somewhat distinct and ornamental, but rather too delicate in constitution for our climate, and fastidious as to soil and situation. It is of no economic value to us as

a timber tree, and unless in a good loam, or free, moist, sandy soil, a warm locality, and tolerably well sheltered situation, it is of but little use for ornament. There is also a larger growing and larger leaved form of it, called *Pinus Palustris Excelsa.*

PINUS AUSTRIACA: The Austrian Pine.

This, although only a quasi-*Corsica*, is, nevertheless, a somewhat distinct kind, and constant in its distinguishing characteristics; vastly inferior to its prototype as a timber tree, yet, a most useful, hardy, free growing Pine; well adapted for planting either in inland or maritime districts, where shelter and ornament are desired; and one which might be often turned to good account as a back-ground tree in elaborate or extensive ornamental plantations. Its dark green foliage, blackish to appearance, strong branches, and rampant style of growth have not been fully appreciated by us; although its merits as a timber tree have been much overrated, and for this purpose it has been, and is at the present time, too much planted. There is a *variegata*, (variegated-leaved variety,) of it, a useful ornamental plant.

PINUS BALFOURIANA: Balfour's Pine.

This is one of Jeffrey's introductions from California; although I have seen nothing but young plants of it, yet, I give it a place here, inasmuch as in a young state it seems to be something more than a variety, most probably a quasi of the Californian *Ponderosa.* Its leaves are in sheaths, generally five, frequently in threes and fours, sometimes in twos, sixes, or sevens; from one to two inches long, stout, rigid, and glaucous below, and bright green above: the branches are somewhat flexible and pendent, having smoothish bark of a greenish-brown colour. Hardy enough, and growing tolerably well where in a good and sweet sandy loam, and tolerably sheltered situation.

PINUS BANKSIANA: Sir Joseph Banks's Pine.

Introduced from North America, 1785. A hardy, distinct, curious miniature Pine; a scrubby bush it might be termed, having somewhat slender and twisted branches, with few laterals, resinous buds, and persistent dull ashy-green leaves, about an inch long: and horn-shaped cones from one to two inches long, persistent and ashy-grey in colour. It attains heights of two to six yards, and is somewhat related to the dwarf forms of *Sylvestris*, such as *Mugho.* It is useful enough as an ornamental shrub, or as a variety in a pinetum or arboretum.

PINUS BENTHAMIANA: Bentham's Pine.

This is a gigantic form of Douglas's *Ponderosa*,—my prototype of

this class of the Californian Pines. It has numerous, stout, spreading, and somewhat irregularly disposed branches, with large, dark brown, imbricated, and non-resinous buds: the leaves from eight to twelve inches in length, dark green in colour, and generally three in a sheath: cones generally in clusters of from three to five in number, straight, and minus foot-stalks; from five to seven inches in length, and about half as broad (at their thickest part,) as long. The timber is comparatively good, and durable for pine wood; and lighter and more elastic than that of *Ponderosa*, and the tree is hardy, and useful either for its wood or beauty in the woods and plantations of Great Britain and Ireland, where a good loam, or sandy free soil can be given it.

PINUS BONAPARTEA: The Bonaparte Pine.

This was discovered by that prince of impostors in the Pine line—Roezl; and is fully descanted upon, and described by Gordon in his book, "*The Pinetum.*" I have seen nothing of it but seed, seedlings, and young plants, which seem hardy enough for ordinary winters in the south of England; yet, from what I have seen of it, I think it will have to be referred to that now numerous group the *Cembra-Strobus* type. It will never be of any economic value for its timber in this country, and but little for its beauty or ornamental qualities, seeing we already possess many kinds in the same group more hardy and distinct.

PINUS BRACHYPTERA: The Short-Wing Seeded Pine.

"Leaves in twos, threes, or fours, dark green, three to six inches long; branches horizontal. Cones two to three inches long, and one to two inches broad; scales elevated, recurved, and spiny-pointed. Seeds three lines long, and two lines broad, with the wing shorter than the seeds." So says Mr. Gordon.

Messrs. Wislizenus and Englemann, state that it is:—"A handsome tree, eighty to one hundred feet high, and two to three feet in diameter; found abundantly on the mountains of New Mexico." This is all I have as yet seen of this "The Short-Wing Seeded Pine."

PINUS BRUTIA: The Fragrant-Juiced Pine.

This is a Calabrian form of the many quasi-species of the Aleppo Pine; and like all of them vastly inferior to the prototype *Corsica* as a timber tree; but from its hardiness, and accommodating nature as to soil and situation, it is useful enough for ornamental or shelter plantations, or for adding number and variety to a pinetum or arboretum.

PINUS BUNGEANA: The Epidermis-Barked Pine.

This is a puerile phrase, a bad metaphor, and an ugly name for so

beautiful a Pine. I retain it, however, as this tree is now generally known by this name. It is a native of China, and one of the many good things which Mr. Fortune sent home from that country. Coming as it does from the most north-western hills, most desolate districts and coldest climates of the celestial empire, it will doubtless prove to be sufficiently hardy in this country, for it has stood unprotected with us in the south of England these past half-dozen years. It is a most peculiarly distinct Pine, inasmuch, as in a young state, its bark as much resembles the skin of a pea as the bark of a Pine. As the plants increase in age the thin outer epidermis peels off in silken-like scales, leaving the branch, stems, and trunks with a greyish-white surface. Another peculiar characteristic of this Pine is, that, in its annual production of young growths, its new leaves are at first furnished with perfectly formed sheaths, which soon fall off, leaving the leaves sheathless, as the outer bark does the branch, stems, and trunk. It is also affirmed by Eastern travellers, that this Pine produces no leading or continuous main stem, but several branch stems, not horizontal as in other Pines, but as it were all rushing straight up to a great height and pollard-like; only that they all grow straight up instead of horizontal; ultimately forming a many stemmed top to the tree. This latter statement is not borne out, however, by young plants of it in this country; nor did I ever endorse such a bill, but business-like dishonoured it as a spurious and illegal tender drawn upon the Bank of Fiction, (Limited,) as I did a few years ago one of the same kind entitled *Picea Reginæ Amaliæ:* and I may here remark, that all such hydra-pines are manufactured by man's arts from nature's staples or raw materials; any practical cultivator by resorting to artificial modes, could produce a Pine Copse as he now does an Oak, Ash, or Hazel one; differing only in the process and periods of cutting and pruning. Its leaves are from one-and-a-half to three inches long, stiff, convex, and keeled; thickly set on the branches; frequently in bundles at the tips, and disposed in whorls; it is what is termed a three-leaved Pine: and its cones are somewhat ovate in form, from two to three inches long, and about half as broad as long, obtuse-pointed, and rounded at base. It attains heights of from twenty-five to fifty feet; and will be found useful for adding number and variety to our pinetums and arboretums; but it is of no value as a timber tree.

PINUS CANARIENSIS: The Canary Islands Pine.

This Pine was introduced into this country in 1815. It attains heights of from fifty to seventy feet, with numerous and irregularly

disposed branches, and slender and somewhat drooping branchlets; the branch stems and trunks with short spur-like shoots, with tufts of leaves; sometimes there are two, but generally three leaves in a sheath, they are of a shining grassy-green colour, and from five to eight inches long. Cones from three to six inches long, and from one-and-a-half to three inches broad. It is too delicate in constitution, and fastidious to a degree as to soil and situation, to be of much, if of any, value in this country, either for use or ornament.

PINUS CEMBRA: The Siberian Stone Pine.

Leaves, generally five in a sheath, from one to four inches long, three sided, two of the faces being silvery-banded, and the other shining green, sharp pointed, and rich silvery-green in colour.

Cones, from two to four inches long, and one-and-a-half to three inches broad; ovate in form, erect, and of a rich violet colour.

This Pine was introduced into this country about a century and a quarter ago. It attains heights of from twenty-five to fifty feet, and forms an erect pyramid, well furnished with branches to its base, the branches well clothed with the silvery-green foliage, and the buds few, solitary, and at the tips of the branches; broad, globose in form, with a long point, and of a whitish colour, and non-resinous.

It is distinct and interesting in the highest degree, and a beautiful little tree. A thoroughly hardy, sturdy, conical, small-sized Pine. Its slow rate of growth, however, completely disqualifies it from ever taking rank as a profitable timber tree; nevertheless, in every collection of ornamental trees or large shrubs it ought to have a place, as it will succeed in any ordinary soil if in a healthy condition, and in any situation, whether sheltered or exposed.

This Pine has recently been found in many other countries, and in many other latitudes, than Siberia, and not unfrequently much changed in its distinguishing characteristics by soil, climate, and altitude, which, as a matter of course, has caused it to be again and again re-introduced as a new species.

Of its many varieties and sub-varieties I select *Alba*, (the very white,) *Glauca*, (the very glaucous,) *Japonica*, (the Japan form,) *Monophylla*, (the single-leaved), *Pumila*, (the very dwarf,) *Pendula*, (the slender drooping-branched,) and *Variegata*, (the variegated-leaved,) all of them hardy and useful shrubs or small ornamental trees.

PINUS CEMBROIDES: The Cembra-like Pine.

This was introduced from Mexico in 1845, and one of the intermediate quasi-species—*Cembra-Strobus*, and *Cembra-Pinea*, I term them,

inasmuch as in their distinguishing characteristics they partake more or less of the character of *Cembra*, *Strobus*, and *Pinea*; while in their seeds they are what are popularly termed stone-pines, of which kinds *Cembra* and *Pinea* are the representatives. This Pine is of no economic value in this country, though in large arboretums or extensive pinetums, where a good soil, a warm locality, and a sheltered situation can be given to it, then might it add one more to the number, and slightly increase the variety of a large collection of **Pinaceæ.**

PINUS CONTORTA: The Twisted-Branched Pine.

The North American Pine generally found under this name is a quasi-species of *Inops*; while of the most of the prototypes, particularly *Corsica*, *Strobus*, and *Sylvestris*, there are several contortas, or twisted-branched forms. So when we find, or desire to find, a *Pinus Contorta*, we must first determine which species of Pine it is we have found, or which we may desire to possess.

PINUS CORSICA: The Corsican Pine.

Leaves, generally from four to six inches long, but to be found ranging from two to eight inches; generally two in a sheath; somewhat twisted and slender, with comparatively short sheaths, and of a rich, dark, yet bright and shining, green colour.

Cones, generally from three to four inches long, and from one to two inches broad; but to be found ranging from two to six inches long, and one-half to three inches broad; conical in form, straight, and sometimes curved at their points: scales elliptic in form, somewhat elevated, not very angular, convex on the back, and of a yellowish-brown colour.

Branches, regular but distant; in horizontal whorls; laterals not very numerous, but regularly disposed; buds ovate in form, with a long point, hoary and resinous.

Trees, pyramidal in shape, handsome, free, and open, in its mode of growth; and very beautiful in its rich green foliage and general deportment.

This Fir, although a European species, and the prototype of many quasi-species, was only introduced into this country about fifty years ago, and, all things considered, it is one of the most valuable and generally useful species of the genus *Pinus* which has yet been planted in the British Isles, being thoroughly hardy, sound in constitution, of tolerably large dimensions, and of a very rapid and regular growth; and will not only grow, but will produce both quantity and quality of

timber equal to any, and superior to many of its congeners, when grown under the same conditions. We have it in almost every description of loam, clay, sand, gravel, peat, and compound earths; all, of course, made sweet and healthy by efficient drainage; and in situations the most sheltered and exposed, in maritime and inland localities, on high and low altitudes, and everywhere—unless, indeed, in close, soft peat, and spongy marsh—it is doing well. I know of no Pine less subject to the attacks or ravages of insects, fungoid enemies, game, or vermin; for frequently have I seen its congeners, the Austrian and the Scotch Pines, crooped by hares, mooped by conies, and disbudded by black cocks and grey hens, while the Corsican remained untouched. This, doubtless, is accounted for by the peculiarly bitter, aromatic flavour, with which its sap is impregnated, and should this be found to be the case everywhere, as it is with us, what a most important and valuable addition were this to its other numerous and good qualities as a profitable timber tree. Its wood is somewhat coarse-grained, yet long-fibred, elastic, tough as hemp, easily wrought, capable of receiving a good polish, resinous, creamy-white and yellowish-brown in colour, and when matured and seasoned, a very durable timber for a Pine.

Amongst culturists there is a prejudice against this Pine, it being what in common parlance is termed a "carroty-rooter" and a "bad transplanter." That it is a sparse or non-fibrous rooting plant, I do indeed admit; but that it is difficult to transplant I do *in toto* deny, inasmuch as we have during the past half-dozen years transplanted several thousands of it annually; and our mode of cultivating this and all the very sparse rooting Pines is to transplant or bed-out the seedlings the first season, and to transplant them again every succeeding season until large enough to be put out in the plantations; by this means ensuring the lives of ninety and nine of every hundred of the plants planted out; and our failures by such frequent transplanting in the nurseries are *nil*. No doubt this incurs an additional expense in cultivation, and some theorists say injures the health and enfeebles the constitution of the plant, but we have clearly proved, and can show our proofs over thousands of acres of Firs and Pines, that the nursery expenses in the first planting of a plantation are more than recovered; and that our stunted, yet sturdy plants, the first season after being put out, soon excel in vigour, health, and beauty, the nice, clean, and apparently healthy, but seldom transplanted plants, which the inexperienced arboriculturist thinks are fine plants, while his experienced brother would, in his selection of plants, be more parti-

cular about what they were underground, than what they appeared to be above ground.

The Corsican Pine is indigenous in Greece and Spain; nay, throughout eastern and southern Europe; and, found as it is in so many different and very dissimilar altitudes, climates, and soils, it varies much in its dimensions, and is to be found ranging in heights from thirty to one hundred and fifty feet; arriving at maturity in from fifty to eighty years; but will, under favourable conditions, produce both quality and quantity of timber fit for any purpose, even the architecture of ships and houses, in from thirty to forty years; and for more temporary or ordinary rural purposes in from twenty to thirty years. It seems somewhat predisposed to inconstancy in the size, form, and colour of its leaves and cones; which, doubtless, has been induced by the soils and climates in which they have been produced; and which cause has led to much confusion in its cultivation and nomenclature, for it is to be found in catalogues and collections under many specific names, and in many quasi-species, varieties, and sub-varieties.

Whenever, therefore, it is intended to plant this tree for profitable or good timber, great care should be used in selecting the supply of the seed from the prototype or true kind, and, whenever practicable, to select our cones from trees upon the highest altitudes, and in the coldest climates of which it has a native habitat, until we have it in such quantity, and of such an age, as to enable us to obtain our supplies of seed from home-grown trees, for when we can do this, I am perfectly satisfied that, for general utility as a forest tree, this Pine, if it did not surpass, would at least equal, our native Scotch Pine, and be found to be one of the best and most suitable species of the genus *Pinus* for the planting the many thousands of acres of waste and unprofitable, nay, sadly neglected lands, so frequently to be met with in Albion's Isles.

Of its many quasi-species I may here mention *Calabrica*, *Carmanica*, *Pallasiana*, etc., which are frequently confounded with *Corsica*, and sometimes substituted for it, but all of which should never be planted for producing profitable or good timber while the prototype or true kind can be obtained; and of its many varieties I select for commendation: *Contorta*, (twisted-branched,) *Pendula*, (pendulous-branched,) *Pygmæa*, (very dwarf,) *Sub-vindis*, (very light green leaved,) and *Variegata*, (the variegated leaved,) as hardy, useful, and ornamental shrubs and trees. I may also remark, that this Pine is very generally known as *Pinus Laricio*.

Pinus Densiflora: The Dense-Flowered Pine.

This Pine has been recently introduced from China, and all that I have yet seen of it have been, seed, seedlings, and young plants. A distinct species it is not; a quasi-species it may be; a variety it certainly is, somewhat related to the quasi-species *Massoniana*, and also, like this again, to the prototype *Pinaster*. Its leaves are from three to six inches long, generally two in a sheath, remaining on the plant for three years, stiff, though somewhat slender, light green, and slightly glaucous, and acute pointed. It has stood with us here (South Hants) for the past five years quite unprotected, and seems hardy enough for our climate. It will never be of any value for its timber, but it may be found useful for adding one more variety of a small-sized Pine to an already large collection of **Pinaceæ**.

Pinus Devoniana: The Duke of Devonshire's Pine.

This was introduced in 1839; a Mexican beauty, a *quasi-Strobus*, somewhat too tender for the best soils, warmest localities, and best situations we have in the south of England.

Pinus Excelsa: The Lofty Pine.

This, although a quasi-species of *Strobus*, is, nevertheless, a useful, ornamental tree, and hardy enough for the climate of Great Britain and Ireland; grows freely in any loamy or sandy free soil, and is one of the very best of the many *Strobus* forms for this climate. It was introduced in 1823, from the Himalayas, where it is found more or less plentiful along the central range, extending east to Bhootan, and west to Kafiristan, at elevations of from five thousand to twelve thousand feet; attaining heights of from fifty to one hundred and fifty feet; having spreading branches, which are disposed on the stems in regular whorls, the upper ones somewhat ascending, the lower ones more or less pendent; rendering a spreading-branched conical Pine; with glaucous bluish-green foliage; the leaves from four to nine inches long, slender and drooping; generally five in a sheath. The cones are solitary, in twos, threes, or more together, generally on the leading shoots or branch stems; from four to nine inches long, and from one-and-a-half to three inches broad near the base; tapering to the point at first, somewhat erect, and a rich pea-green in colour; when matured quite pendent, and a pale brown colour; and when completely ripe so full of resinous juice as to cause to exude numerous transparent drops of it. Its wood is compact in texture, white in colour, fragrant and resinous; but soft and not very durable. It is as an ornamental Pine that it should be planted in Britain, and there are, even now, some fine

specimens of it extant in these islands. There is a *Microphylla*, (small-leaved,) likewise a *Microcarpha*, (small-coned,) variety of it.

PINUS FILIFOLIA: The Thread-like-Leaved Pine.

This was introduced from Guatemala about twenty years ago. It attains heights of from thirty-five to seventy-five feet, having few, irregular, and stout branches, clothed with leaves of a dull green colour, from ten to fifteen inches long, and cones from five to nine inches long. It is somewhat too tender and delicate in constitution for the very best soils and situations in which we have yet tried it here, in South Hants.

PINUS FLEXILIS: The Contorted-Branched Pine.

A said-to-be new species, from which I dissent; it has been found in California and Mexico; and all that I have yet seen of its seeds, seedlings, and young plants, shows it to be a quasi-species, which will have to be classed with these now numerous quasi *Cembra-Pinea* kinds; which are useful for nothing, unless indeed for making confusion worse confounded, in the classification and nomenclature of the Pines; and this very Pine were it named *Pinus Mutabilis*, the variable Pine, might be used as the representative of these quasi kinds of *Cembra* and *Pinea*, inasmuch as it could be described:—Leaves variable, from one to five inches long, light or dark green, in twos, threes, fours, or fives, in a sheath; stout or slender, curved or straight. Cones ovate, oblong, or round, from one-and-a-half to four inches long, and from one to two inches broad, having large seeds. Branches horizontal, stout, and twisted, straight, or curved, and ascending or drooping at their extremities. Tree from twenty-five to fifty feet, or, when starved, reduced to a knarled bush a yard high, or a big shrub, from one-half dozen to a dozen feet in height.

PINUS FREMONTIANA: Fremont's Pine.

This is merely a quasi of the preceding: having straighter, and more regularly disposed branches; a tolerably hardy, but very tardy and slow growing nut Pine, with its leaves generally in threes, frequently in twos, rarely in fives, exceptionally singly: and also from California.

PINUS GERARDIANA: Gerard's Pine.

Introduced from the Himalayas in 1815, though it had been discovered long previous to that date. It is a distinct Pine, remarkable for its smooth silvery-grey bark, which, like *Bungeana*, peels off in silken flakes. Its leaves are from two to six inches long, glaucous when young, and bluish-green in colour: the cones are ovate in form, from five to nine inches long, and from nine to fifteen inches in cir-

cumference near the base; the seeds are from one-half to one inch long; palatable, and dark brown in colour; the branches are generally ascending, but the lower ones spreading, and the branchlets short, somewhat slender and irregularly disposed. It attains heights of from thirty to fifty feet; is tolerably hardy, and of very tardy and slow growth, and of no value in this country but for adding number and variety to our arboretums or pinetums.

PINUS GORDONIANA: Gordon's Pine.

A Mexican beauty; a quasi long-leaved Pine, having its foliage from twelve to eighteen inches long; but, like too many of its congeners from that sunny clime, it is much too tender and delicate for such a climate as ours.

PINUS GRENVILLEÆ: Lady Granville's Pine.

This is another delicate beauty from the same country; and closely related to the preceding; but of a somewhat more robust habit of growth; having stronger leaves, which are generally in fives, and more than a foot in length: though it has much larger cones, which are from one to one-and-a-half feet long, but less numerous. The Mexicans call our Lady Granville's Pine *Ocote macho*, or male Pine; and our Mr. Gordon's Pine, *Ocote hembre*, or female Pine; but our botanic pedants reversed the terms: hence another of their ungallant and stupid tricks! This Pine, like the preceding, is too delicate for general planting in England, though it is rather more hardy, being found rather higher up on the Saddle Mountains of Mexico.

PINUS HALEPENSIS: The Aleppo Pine.

This Pine has been known in Britain for nearly two hundred years. It is tolerably hardy, attaining heights of from twenty to forty feet; and is useful as a small-sized ornamental tree in this country. Its leaves are from two to four inches long, and deep green in colour. Its cones are from two to four inches long, and pyramidal in form.

PINUS HARTWEGII: Hartweg's Pine.

This was introduced from Mexico in 1839, but it has since been found in the north-west regions. It is a robust-branched, fine-foliaged, small-sized Pine: the leaves being from five to seven inches long, four or five in a sheath: and the cones from four to six inches long, oblong in form, and about half as broad as long. It is hardy enough for this country, and a useful small-sized Pine for ornamental planting in Britain, but of no economic value for its timber.

PINUS INOPS: The Poor Pine.

So called from its native habitat—the poor sandy and barren soils

in which it is found. It is a very variable Pine, both in the size and disposition of its leaves, cones, and branches, and, also, in its stature and dimensions, according to the soils or climates in which it is grown. Its leaves are from a quarter of an inch to four inches long, light or dark green in colour, generally two in a sheath, sometimes three, rarely five, exceptionally singly; cones from two to four inches long, and from one to two inches broad at swell; glossy, and yellowish-brown in colour; branches irregularly disposed, some very twisted, some comparatively straight, some horizontal, some drooping. The bark at first and on the young shoots is of a fine violet colour, with a glaucous bloom, or yellowish-green, when old rough and rustic, and very dark and resinous. It attains heights of from twenty-five to fifty feet, and was introduced into this country from North America about a century and a quarter ago; it is hardy, distinct, and inelegant, and useful only as a distinct Pine to relieve the dull monotony of so many of the quasi-species of the Pines. There are several forms of it amongst us, which, as an interesting ornamental plant, or Pine curiosity, may be mentioned:—*Procumbens*, a kind not growing erect, but forming a trunk stem furnished with lateral branches, and crawling, as it were, along the surface of the ground; and *Læocarpa*, the smooth-coned poor pine.

PINUS INSIGNIS: The Remarkable Pine.

This was introduced from California, by Douglas, in 1833. It is very appropriately named, for it is indeed a remarkable and very distinct Pine: attaining heights of from fifty to one hundred feet; feathered to the ground with branches, which are clothed with deep grassy-green foliage.

Leaves, irregularly disposed, but very thickly set on the branches, from one-and-a-half to seven inches long, generally in threes or fives, but frequently found in fours, sevens, nines, and sometimes more in a sheath; and not unfrequently in bundles or clusters, while many of them are minus sheaths, and growing singly upon the branch stem, without footstalks, and broad at base, and tapering to a sharp apex.

Cones, ovate, but tapering, and much pointed at apex, from two to four inches long, and from one-and-a-half to two-and-a-half inches broad; at first yellowish-green, when ripe of a pale yellowish-brown, hard, smooth, and glossy, having the scales somewhat radiated, thick at base, tapering to a four-sided blunt apex, with a centre scar and short spine at point. The seeds are comparatively middle-sized Pine

seeds, dark in colour, and furnished with an ample wing-appendage. Like most of the Pines, it takes two years to mature its cones and seeds. This Pine is perfectly hardy, and of very rapid growth, but it has a tendency to make autumnal growths, which is its only defect as an ornamental tree in this country, for it cannot be called a profitable timber-tree: it should, therefore, never be planted in very low-lying places, where there is a close and humid atmosphere, but in loamy, or sharp sandy soils, and well exposed situations where sun and air abound; when from its free, unformal, and irregular branched habit of growth, and its golden grassy-green foliage, it would form a loveable object, a living statue which would materially increase the grandeur of the richest landscape, and add much to the scenic effect of any picture, in arboretum, park, or plantation.

PINUS JEFFREYI: Jeffrey's Pine.

Discovered in and introduced from California by Jeffrey, after whom it has been named. I have only seen and only possess seeds, seedlings, and young plants of it. Its leaves are from three to nine inches long, generally three in a sheath, somewhat twisted at base, keeled on their inner face, rounded at back, and very sharp-pointed, and of a rich deep green in colour. The branches are somewhat irregularly disposed, slender, rather declining though horizontal, and slightly pointing upwards at their extremities; buds few, short, stout, pointed, imbricated, and resinous; the bark yellowish-green, but at first reddish, or of a violet green in colour. Its juices and secretions are strongly scented with a balsamic odour. Young plants of it have stood unprotected with us, here, in South Hants, for the past half-dozen years; and it seems, if not a species, at least a quasi-species, inasmuch as young plants of it appear to be something distinct for a Californian Pine; though nearly related to *Ponderosa*.

PINUS KORAIENSIS: The Corean Pine.

This is one of the quasi-*Cembra-Strobus* kinds about which so much conceited conjectural matter has lately been published. I merely here allow its name a place, remarking that it is of no economic value for its timber, and of but little use as an ornamental tree, unless for adding one more to the number, and slightly increasing the variety of a large collection of **Pinaceæ**.

PINUS LAMBERTIANA: Lambert's Pine.

This is another quasi-species of old *Strobus;* introduced from North America in 1827, but it has more recently been found in California and Mexico; though in each country somewhat altered in the size of

its foliage and cones. It attains heights of from one hundred to two hundred feet, but its wood is inferior to that of the prototype when grown under the same conditions. When from California or North Western habitats, it is sufficiently hardy for the climate of Britain, where its only use is to add number and variety to a pinetum or arboretum.

PINUS LAWSONII: Lawson's Pine.

This, Mr. Gordon states, is "a distinct kind, having the leaves mostly in threes, but sometimes in fours, six inches long: cones from two to two-and-a-half inches long, and one-and-a-half inches broad near the base, very much resembling those of *Pinus Sylvestris*." I merely add that it was discovered by that impostor Roezl, in Mexico. And that if the describer tells truth it may be something distinct; but as yet I have not seen a new species in *Pinus Lawsonii*. Although I have more than once seen it offered, I have not yet obtained it, but have often been supplied with plants and specimens of old Pines for this said-to-be new Mexican one.

PINUS LEIOPHYLLA: The Smooth-Leaved Pine.

This has soft, slender, smooth, drooping, pale glaucous green foliage, from three to six inches long, with the leaves generally five in a sheath, and thickly disposed on the tips of the branches. The cones are from one-and-a-half to three inches long, and from one to one-and-a-half inches broad near the base, on short footstalks, depressed at bottom, and ovate at top. It is found on the Mexican mountains at an elevation of seven thousand feet. Its timber is hard and resinous, and it attains heights of from fifty to one hundred feet. Although it will live and grow in the best soils, and warmest localities, with us here in the South of England, it is too tender and delicate for cold latitudes and exposed situations, and is of no value in this country, unless for increasing the number and variety of our Pines.

PINUS LINDLEYANA: Lindley's Pine.

This is one of the Montezumæ forms of the large or robust-leaved Mexican Pine. It is a bushy, strong-branched, tolerably hardy, interesting curiosity in a pinetum or arboretum; having the leaves generally five in a sheath, from six to nine inches long, strong and sharp-pointed; when young somewhat glaucous, and deep green in colour; cones from five to eight inches long, and from one-and-a-half to three inches broad at the swell, slightly curved and tapering to a point, attaining heights of from twenty-five to fifty feet.

PINUS LLAVEANA: La Llave's Pine.

This is another Mexican: a *quasi-Pinea*, introduced in 1830, a

much less useful or beautiful tree in this country than its prototype *Pinea*.

PINUS LONGIFOLIA: The Long-Leaved Pine.

This is an Indian, the Sanscrit word *tan*, thin, or slender, and *tantu*, thread; hence their "*Tansa*," or "Needle Tree;" its leaves being from nine to fifteen inches long, generally three in a sheath, slender, and needle-like, bright glossy green in colour: its cones are from four to six inches long, and from a half to one-and-a-half inches broad at swell, but ovate in form, and hard, smooth, and glossy on their surface. It attains heights of from thirty to one hundred and thirty feet, and is found so low as one thousand feet elevation in the Bhootan valleys; while it is found plentiful in the Punjab at two to four thousand feet; and in the forests of Almora and Kamoon it produces long-fibred, compact, tough, straight, resinous, fragrant, and ruby-coloured timber; while in the low altitudes and damp valleys it produces white, soft, porous, and short, or twisted fibred wood: and at such a height as Simla, or seven thousand feet elevation, it is reduced to a stunted bush, and higher up it is but rarely found. From whatever habitat, it is too tender and delicate for an ordinary English winter.

PINUS LOPHOSPERMA: The Crest-Seeded Pine.

This is a quasi-species of *Sabiniana*, having its leaves generally five in a sheath, and exceptionally three in a sheath; while in Sabine's Pine the leaves are generally three in a sheath, and exceptionally more. Its cones are only from four to six inches long, and from two to four inches broad; while those of *Sabiniana* are from six to twelve inches long, and from three to six inches broad. My experience of *Lophosperma* has been confined to a few dozen plants, some of which were planted in good deep loam, some in sandy gravel, some in clay soils, and some in sandy peat; some of which were sheltered, some exposed, but in warm situations, and some thoroughly exposed and in cold localities; but they have "grown small by degrees." So all that I can say of it is, that it is a Southern Californian, related to *Sabiniana;* too delicate and fastidious for South Hants.—*Anno Domini* 1865.

PINUS LOUDONIANA: Loudon's Pine.

A Mexican, and a *quasi-Strobus*, one of its beautiful, majestic, and delicate forms; too tender for an English winter, and too impatient of cold for our latitudes.

PINUS MACROCARPA: The Large-Coned Pine.

This was introduced from California in 1832. As its name implies its cones are larger than those of its congeners, being from ten to

fifteen inches long, and from four to eight inches broad at swell; weighing from three to five pounds each; hard, smooth, and polished on their surface, and of a pale yellowish-brown in colour. Seeds, from a quarter to three-quarters of an inch long, flat, dark, and broad winged. Leaves, generally in threes, from ten to fifteen inches long, stiff, strong, flat, incurved, pointed, glaucous, and greyish-green in colour. Branches, in regular whorls, horizontal, but ascending at their extremities; and the young shoots are at first of a violet colour. Attaining heights of from seventy to one hundred and twenty feet, with trunks from two to four feet in diameter. It is capricious to a degree in its choice of soil, and requires a good loam, or rich sandy, or gravelly earth, free, sweet, and porous, and an open substratum in a tolerably warm or sheltered situation to develop itself in this country; where, however, it will never be of any economic value as a timber tree; though, when under conditions favourable to its growth, it will be found to be a distinct, and interesting ornamental Pine, deserving a place in every collection.

PINUS MACROPHYLLA: The Large-Leaved Pine.

Introduced from Mexico in 1839. Remarkable only for its large, ample, and beautiful foliage; the leaves are from ten to fifteen inches long, generally five in a sheath, very stout, straight when young, somewhat reflexed when old, blunt-pointed, and deep green in colour. Cones, five to seven inches long, and from two-and-a-half to three-and-a-half inches broad at swell, elongate, straight, and tapering to the point, rounded at base, with a stout, short footstalk: the scales being elevated, hooked, four-sided, hard, and glossy. Attaining heights of from fifteen to thirty feet, and when old with a densely branched top. In an arboretum or pinetum where a good loam, or rich and deep sandy soil, an open subsoil, a warm locality, and well sheltered situation can be assigned to it, then, but not otherwise, need it be planted in this country.

PINUS MASSONIANA: Mason's Pine.

Introduced from China about the beginning of the present century, and frequently since as a fine new Pine, always more or less metamorphosed: for it is one of nature's *rarœ aves* that plays at *alter ego*, and one of those quasi-species about which so much thrasonic brag has of late years been published; and being a good target in a safe range for amateur practice, I load, and present its prototype, *Pinaster*, which is indigenous in Algeria, Greece, Italy, Portugal, Spain, Turkey, the Mediterranean coast, and in short more or less plentiful over Southern

Europe; and, no doubt, has been introduced into China, France, Great Britain, Japan, Nepal, New Zealand, North and South America, St. Helena, and many other parts of the globe where it is now to be found more or less plentiful in a cultivated state, and not unfrequently in an apparently naturalized condition. This *Massoniana*, then, is from China, where John Chinaman, the knowing one in the arts of Pine culture, cuts and clips it into every conceivable shape or form, where he trains the branches into fan-forms, or flat China-plate-like shapes, and at times plants it under favourable conditions, and in suitable soils and situations, where it of course becomes a stately Pine: or, again, in a miniature China flower pot, rustic, or lacquered box, where it is starved and reduced to a perfect pigmy, or the smallest shrub we can possibly imagine.

Need we wonder then, when our botanical instructors inform us that *Massoniana* is a new species, and that—"Its cones and leaves are very different from, and much smaller than, *Pinaster*"? No, for so say I, when the "Star," or any other Pine produces its cones or leaves in a thumb-pot, where depapurated, they, before being starved to death, make their dying efforts to perpetuate themselves by producing a batch of small cones; for, common sense asks—how could such plants produce large ones?

These Orientals are also great experts in the artful modes of budding, grafting, and inarching Pines, which modes the Chinese term "*Sessiho*," and the Japanese "*Iswgiki*," and not unfrequently, in their flowery lands and sunny climes, several species or varieties of the pines are to be found upon a common species as a stock, presenting to the eye of the inexperienced the most grotesque forms it is possible to conceive.

Now after knowing that the Orientals resort to such artifices in the cultivation of their Firs and Pines, we have but little cause for wonder at the many kinds they are said to possess; for even of this so-called *Massoniana* the following list of sorts can be supplied to any liberal foreigner who may visit them, with his purse well replenished and his hobby "*new Pines*:"—*Aka-matsu* (red Pine), *Fama-matsu* (elegant Pine), *Fitots-matsu* (single-leaved Pine), *Fon-matsu* (true Pine), *He-matsu* (female Pine), *Kier-matsu* (large Pine), *Ko-matsu* (small Pine), *Kok-sung-matsu* (common black Pine), *Siruga-matsu* (variegated Pine), *Wo-matsu* (male Pine), and *Wumi-matsu* (sea coast Pine), *ad infinitum*.

In the quasi-*Massoniana* and the prototype *Pinaster* there is a difference, and not unfrequently a plurality of distinctions; but that natural

variety, particularly when acted upon by art-culture, should be a reason for elevating even a quasi-species, much less a variety, to the rank of a *true species*, I cannot for the life of me understand. Be this as it may, time and experience will prove that *Massoniana* is at best but a quasi, or perchance but a variety of *Pinaster*, and of no economic value in this country, but only as a variety, which it undoubtedly is.

PINUS MERKUSII: Merkus's Pine.

This kind is found in Borneo, Cochin China, Sumatra, and the other Islands of the Indian Archipelago; but every batch of seedlings we have yet raised were invariably killed by the first night's hard frost. We find, therefore, on referring to our Register:—"The Sumatra Pine is a very delicate and thoroughly tender Indian beauty, killed by the first frosts of 1859, '60, and '62, and at present not in stock-book." —*Anno Domini* 1865.

PINUS MONTEZUMÆ: Montezuma Pine.

Discovered early in the present century in Mexico, but more recently introduced and distributed in this country. Its leaves are from three to six inches long, generally five in a sheath; the sheaths are persistent, long, rough, scaly, lacerated, and sharp-pointed. The leaves when young are of a rich light green above, and somewhat glaucous below; when matured and old they become of a rich dark green on both faces. The cones are from three to six inches long, and from one to two inches broad at the swell; tapering to base and apex, and somewhat oblong, though slightly incurved at point. Attaining heights of from twenty-five to fifty feet; forming a spreading-headed, sparse-branched, rough-barked, little Pine. Tolerably hardy, but fastidious as to soil and situation; and, unless in a good loam, or sweet, sandy soil, warm locality, and sheltered situation, it will be of little use as an ornamental Pine, for it is of no economical value as a timber in this country.

PINUS MONTICOLA: The Strobus Mountain Pine.

Introduced from California in 1831, but it has since been found in other habitats. It is an intermediate *Cembra-Strobus*, tolerably hardy and good-looking, and in a moist, sweet, peaty, or cool and porous soil, in this country, it would form a handsome, dense-headed, short and glaucous-leaved *Strobus;* or when starved and depapurated an *altera Cembra.* It deserves a place in every pinetum.

PINUS MUGHO: The European Mountain Pine.

Introduced into this country from Austria about the beginning of the present century, but it extends from the Pyrenees eastwards to the

Alps of south-western and central Europe, where it is finally superseded and represented by its *alter ego Pumilio*, on the eastern mountain chains of Austria and Hungary. Its leaves are generally two in a sheath, from one to two inches long; stiff, broad, spreading, and twisted; and dull green in colour. The cones are from one-and-a-half to three inches long; ovate in form, unequal-sided, somewhat hooked or tuberculated on the outer side; generally two or three together, and with very short footstalks. It attains heights of from fifteen to fifty feet, with numerous branches on its trunk stem; the upper ones somewhat ascending, the lower ones more horizontal; all of them well clothed with foliage.

It is thoroughly hardy, not fastidious as to soil or situation, and useful for cover, shelter, or the ornamentation of bleak districts, or for hill planting in this country; but it is at best but a quasi-species of its prototype, *Sylvestris;* and so is *Pumilio*, its congener. *Mugho* is found in many forms or varieties, the most noticeable being:—*Brevifolia* (short-leaved), *Nana* (very dwarf), *Rotundata* (round-coned), *Rostrata* (beaked-scaled), and *Variegata* (variegated-leaved).

PINUS MURICATA: The Prickly-Coned Pine.

This is the "O'Bispo," or Bishop's Pine, of the Californians, introduced into this country about twenty years ago. It attains heights of from fifteen to thirty feet. Its leaves are generally two in a sheath; from three to five inches long; stiff, somewhat broad, blunt-pointed, and deep green in colour. The cones are from two to four inches long, and from one to two inches broad, at the swell, and tapering to the point, which is blunt; when young of a reddish-brown, when old ashy-grey in colour. Branches, irregular, few, and stout. It is perfectly hardy, and though somewhat related to its congener, *Insignis*, it is nevertheless distinct, and useful as a small-sized ornamental Pine in this country.

PINUS OCCIDENTALIS: The West Indian Pine.

Leaves, generally five in a sheath, from five to ten inches long; slender but stiff, thinly set on the branches, sharp-pointed, and bright green in colour. Cones, three to four inches long, and from one to two inches broad at the swell; rounded at base, with long footstalks; conical in form, and tapering to apex. In port somewhat resembling *Halepensis*, but it is much too tender and delicate for an ordinary English winter, and of no economic value in this country either for its timber or its beauty.

PINUS OOCARPA: The Egg-shaped-Coned Pine.

This kind is found both in India and Mexico, attaining heights of from thirty to fifty feet. Leaves, generally five in a sheath, from five to seven inches long; smooth and slender, pendulous, angular, and sharp-pointed, and bright green in colour. Cones, as its name implies, egg-shaped; from three to four inches long, and from two to three inches broad at the swell, which is near the base; hard, glossy, and shining, and of a yellowish colour when ripe. Forming a pendulous-branched and spreading-headed Pine. Much too tender and delicate for the climate of Britain. There is also a small-coned form of it.

PINUS PATULA: The Spreading Pine.

Introduced from Mexico about a quarter of a century ago. A very peculiar and highly interesting Pine; in a young state as like a green fountain as a green Pine. Leaves, in threes, fours, or fives, in a sheath; from six to ten inches long; slender, soft, spreading, recurved, channelled above, convex below; and rich light green in colour. Cones, from three to five inches long, and from one to two inches broad, somewhat incurved, and of a pale brown colour. In any pinetum or arboretum where a good loam, sweet, moist, or sandy soil, where warmth and shelter can be afforded it, and where sun and air abound, there should it have a place in this country. There are *Macrocarpa* (large-coned), and *Stricta* (erect-growing), varieties of it.

PINUS PEUCE:—"We have received from Messrs. Haage and Schmidt, of Erfurt, fine specimens of this rare Fir, which is nearly related to *Strobus*, and by no means to *Cembra*. It is the πευκη of the Greeks, and grows wild in Macedonia, on the sides of Mount Peristeri, on granite soils, at an elevation of two thousand yards; at which heights, however, it becomes a scrubby, knarled tree. Gordon's account of it is a miserable mess of blunders." *Vide Gardener's Chronicle*, page 128, vol. 1864.

Mr. Gordon's "mess of blunders," however, is more of a singularity than a plurality, inasmuch as he says nothing about *Pinus Peuce* in the "Pinetum," for he merely places the name under *Pinus Cembra Pygmæa;* and such a blunder is much less injurious to the best interests of true science in relation to the cultural arts, or the advancement of true knowledge in this utilitarian age, than this *uncommon-sense* about this "rare pine." It is most distressing to behold the very monarchs of scholarship and botanical science, in this, the latter half of the nineteenth century, so persistently persisting in their pedantic

czarism; ignoring all freedom of speech or action which is not of their own dictation, and which is not expressed by all other writers as serfs; for the first commandment of all such czaric savans, in all their codes or catechisms, is, *Ego solus sum sapiens;* and the second very much resembles the first, *sapiens sum solus Ego.* Such theories, however, are things of the past, for in the present age subjects as well as rulers have a voice, and mooty questions have to be aired and ventilated in the cosmopolite arena of "public opinion." Happy the people where such is the case! prosperous the nation where freedom reigns! great the arts and sciences where practical men as well as theorists can sail in one boat when fishing for knowledge, and especially so in this department of Natural Philosophy—the arboricultural art!

This rare Grecian Pine, then, is, according to the *Chronicle's* own showing, at best but a *quasi-species* of old *Strobus*, caused by—the granite soil, the two thousand yards' height, the knarled tree, and the climatic effects of ancient Macedonia. Although, therefore, I have here given this much space to this quasi or variety it will serve to show how so many new Pines are foisted upon us, for it is at best but a depapurated form of old *Strobus.*

PINUS PINASTER: The Star-like Cluster-Coned Pine.

This is an old Pine, doubtless coeval with, and extant when Adam was in Paradise, and most certainly one of the original prototypes of this genus *Pinus;* though I do not here enter upon its origin, age, or decay; nevertheless, I may say that its origin was not according to the "Darwinian theory," its age is not yet a settled question, and its decay will, I think, be *when*, if ever, time is no more.

Leaves, generally two in a sheath, from three to nine inches long, stout, rigid, broad, slightly serrated, and rich dark green in colour; disposed in whorls, and thickly set on the branches.

Cones, from two to six inches long, and from one to three inches broad; ovate in form; when young a bright shining green, and when matured they assume a brownish, or ashy colour. Generally found in whorls of from four to eight, disposed horizontally on the stems; but frequently in large clusters of from ten to fifteen together, sometimes from one to two dozen in a cluster, and not unfrequently singly or in pairs: and the same gregarious disposition of the male catkins is another characteristic of this Pine and its quasi-species, inasmuch as they are generally found in more or less dense and numerous clusters on the branch stems, occupying spaces varying from half an inch to half a foot in length, to the entire exclusion of the leaves from the parts

of the branch stems occupied by the male catkins. The seeds are oblong in form, with wings from one to two inches long, and from a quarter to half an inch broad.

It was introduced into Britain more than two-and-a-half centuries ago, and it is to be found, either in a natural or cultivated state, in most parts of the habitable globe; differing much in its stature or dimensions, and likewise in the size, form, and colour, of its leaves and cones, by the soils and climates in which these are produced; which diversity has led to much confusion in its nomenclature, and to its being so frequently re-introduced into this country as a new species of Pine. But one after another of these altered forms of it are being identified, and referred to the prototype. It attains heights of from twenty to eighty feet, with its branches in regular whorls, somewhat curved upwards, and ascending at their extremities. The bark, when matured and old, is very rough, and deeply furrowed. Pliny truthfully remarks: "The *Pinaster* is none else than the Pinus Sylvestris (not our Sylvestris), the wild Pine; wonderful in height, and branching from its middle parts as the other Pines do more from their upper; this yields resin more copiously; it grows in the plains."

It is thoroughly hardy, sound in constitution, of very rapid growth, particularly when young; and one of the most accommodating of the Pines as to soil and situation, and although producing somewhat coarse wood, yet it is useful for many rural and domestic purposes, and likewise in some of the branches of arts and manufactures, and in trade and commerce. All things considered, in relation to the climate of Great Britain and Ireland, it is a most serviceable tree, inasmuch as in any loamy, sandy, gravelly, or dry soils, it grows freely, no matter how poor or barren, sandy or dry: but it will not succeed in wet, close, or calcareous soils, with hard or impervious substrata; and it is well adapted for maritime and exposed districts, where the soil may chiefly be composed of sand. It may, however, be termed more of a useful than economically, valuable timber, or beautiful ornamental Pine. It is a sparse rooter, and should be frequently transplanted in the first few seasons of its growth, before being planted where it is to remain.

As I have already indicated, it is to be found in many forms or varieties, but the only ones which require notice here are:—*Hamiltonii* (Lord Aberdeen's Pinaster), *Lemoniana* (Sir C. Lemon's), *Minor* (small-coned), *Monophylla* (single-leaved), *Nana* (dwarf), *Pendula* (pendent-branched), *Tortuosa* (twisted-branched), and *Variegata* (the (variegated-leaved).

PINUS PINCEANA: Pince's Mexican Pine.

Vide "Pinetum," by George Gordon, A.L.S., page 204, No. 40.

PINUS PINEA: The Nut, or Stone Pine.

This, although an useless Pine in Britain, is one of my prototypes, and must needs be described.

Leaves, generally two in a sheath, from three to nine inches long; strong, straight, and of a deep shining green in colour; on young plants the primary leaves are disposed in single bracts, or scale-like formations, minus sheaths, thickly covering the branchlets, and from amongst this primitive spray the perfect leaves gradually emerge; which, when young, and for a time, are white and glaucous-like; which presents a very striking contrast to their form, size, colour, and disposition, when old and matured.

Cones, from four to six inches in length; ovate or round in form; solid, somewhat reflexed; glossy and pale brown in colour. The scales are large, thick, angular, four-ribbed or six-sided, with a blunt spine on their apex. The seeds also are large, ovate-oblong in form, white, sweet, and palatable. The shell hardy, woody, from half an inch to an inch long, with a broad but short wing, and brownish-red in colour.

Branches, spreading, and, when old, well clothed with deep green foliage, forming a round or bushy tree, with a reddish-coloured bark, which is sometimes cracked and furrowed.

It is an European species, its present native habitat being the South, along the Mediterranean coast, at elevations ranging up to fifteen hundred feet; and it is much cultivated in Italy, and other European countries, in many of which the seeds or nuts form an article of commerce.

It attains heights of from fifteen to fifty feet; its wood is of indifferent quality; it is of slow and tardy growth, and requires a dry, sandy soil, a warm locality, and a sheltered situation in this country, as an ornamental Pine, for it is of no use as a timber tree. It was introduced more than three centuries ago, and, like most of the prototypes, it is not only encumbered with quasi-species, but likewise with varieties, amongst which are:—*Arctica* (dwarf mountain form), *Brevifolia* (short-leaved), *Chinensis* (Chinese form), *Fragilis*, (thin shell seeded), and *Variegata* (the variegated).

PINUS PONDEROSA: The Heavy-Wooded Pine.

Introduced from North America nearly forty years ago.

Leaves, generally three in a sheath, from six to twelve inches long;

at first straight, when old sometimes they are twisted; broad, flexible, sharp-pointed, thickly set, and of a rich deep green in colour.

Cones, from two to four inches long, and from one to two inches broad at swell; tapering to base, but more so to apex. Singly, or in twos, threes, or whorled clusters; having short footstalks, and somewhat drooping.

It attains heights of from fifty to one hundred and fifty feet; with few branches, which are disposed in regular whorls on the stem, horizontal, but when old, drooping; and old trees of it are generally free of branches from one-third to half of their height. It is sufficiently hardy for the climate of Britain, and of tolerably rapid growth, but somewhat capricious in its likes of soil and situation. Its wood is so heavy that it sinks in water, hence its name; but it is coarse-grained, not elastic, not durable, and incapable of being polished; its use in this country, therefore, will be as a large-sized, free-growing, ornamental Pine, for a good soil and situation in any pinetum or arboretum.

PINUS PROTUBRANS: The Protuberant-Scaled Pine.

This is merely a quasi-*Montezumæ*, and in nothing different from it; unless, indeed, in its cones, which are a little smaller, and its scales, which are a little more angular and elevated.

PINUS PSEUDO-STROBUS: The False or Bastard Strobus Pine.

This perverse phrase, and barbarous term, is a very convenient one for hair-splitting doctors when in difficulties, one which was originally applied to a quasi-species of *Strobus*, introduced into Britain from Mexico nearly thirty years ago; but of late years so many altered forms of this quasi have been found in that country, and also in other parts of the globe, that this quasi is now elevated to the rank of a queen, and rules over a numerous progeny of Strobus-like varieties; but it is at best, only a long-leaved form of *Pinus Strobus*, which I call *Strobus Longifolia;* and although a very beautiful tree, yet it is too delicate and fastidious for general planting in the climate and soils of Britain: for even in a good loamy soil, on free or gravelly substrata, in a warm locality, and sheltered situation, it does not succeed.

PINUS PUMILIO: The Dwarf Mountain Pine.

This little tree was introduced into Britain from Carniola nearly a hundred years ago: but it has since been found more or less plentiful on all the mountain ranges of central Europe. It is useful for planting as a cover plant upon high or very exposed localities, or in chalky soils where it would do better than most of the Pines. Its only distinguish-

ing characteristic from *Mugho*, is that it forms no main or leading and continuous stem; but produces numerous rival stems, which, from their creeping and spreading habit, render this pine a spreading bush, rather than a stemmed tree. Both *Pumilio* and *Mugho*, be it remembered, are but quasi-species or dwarf forms of their prototype *Sylvestris*. Of *Pumilio* we have several varieties; two of which I mention:—*Rotundata* (small round-coned), and *Variegata* (variegated).

PINUS PUNGENS: The Bitter-Juiced Pine.

This Pine was introduced from the Table Mountains of North America early in the present century: and being of no use whatever in this country, it may be here disposed of as a coarse-wooded, not glaucous-leaved, and inelegant Pine; which but for its not glaucous leaves, and old persistent cones, could scarcely be distinguished from a common Scotch Pine—Pinus *Sylvestris*.

PINUS PYRENAICA: The Pyrenean Pine.

This was introduced from the Pyrenees about seventy years ago.

Leaves, generally in twos; exceptionally in threes; from five to eight inches long; straight, fine, stiff, sharp-pointed, and of a very bright green colour.

Cones, from two to three inches long, and one to two inches broad; conical in form, but tapering to apex and slightly so to base: scales small, rounded externally, elevated centrally, angular and depressed in the middle: seeds small, with the wing-appendage long and narrow. The cones when ripe are of a pale yellow, or yellowish-brown colour.

Branches, numerous, regular, spreading, stout, and well furnished with laterals, regularly covering and spreading in all directions round the stem, all of which are well clothed with the bright green foliage.

It attains heights of from fifty to eighty feet: the wood is comparatively good for Pine timber; but its use in Britain is ornament; and for this it is indeed well adapted; being thoroughly hardy, of free growth, not particularly fastidious as to soil and situation: and its bright orange-coloured branchlets, its candelabrum branches, its picturesque form, and perfect symmetry, place it in the first rank as a beautiful Pine for ornamental purposes in the climate of Great Britain and Ireland. There are more forms of it than one, which will be found in the alphabetical list or index.

PINUS RADIATA: The Radiated-Coned Pine.

Introduced from California about a quarter of a century ago, and although a quasi-species of *Insignis* yet it is more constant in the disposition of its leaves; which are very generally three in a sheath,

slender and twisted, and from three to five inches long: while its cones are very much larger, being from five to seven inches long, and from two to four inches broad at the swell. It attains heights of from eighty to a hundred feet; is perfectly hardy for our climate; its timber is good; and although not so beautiful as *Insignis*, yet it is a useful ornamental Pine for the climate and soil of these islands.

PINUS REGELEANA: Regel's Pine.

Discovered by Roezl, and described by Gordon as a new, nay, *quite new* Pine from Mexico; and all that I at present know is what these gentlemen state about it, for it happens to be one of the "New Mexican Pines," discovered and sent out by that impostor that I never got hold of.

PINUS RESINOSA: The Resinous Pine.

This is a quasi-species or American form of the Corsican pine, producing good timber, but inferior in quality to the Corsican, and in appearance it differs but little, unless in its more open and distantly placed whorls of branches on the trunk stem, its somewhat smaller cones, and its lighter or yellowish green leaves. It is not so good in constitution, nor so accommodating as to soil and situation as the Corsican Pine; and should never be planted in preference to it, nor as a profitable timber-tree in this country, while we have the prototype. Being perfectly hardy it is useful enough as a variety in mixed ornamental plantations; and its open-branched habit of growth is a good contrast to the compact-branched forms of many of the Pines.

PINUS RIGIDA: The Stiff-Leaved and Rigid-Coned Pine.

This Pine has been more or less cultivated in Britain for the last hundred years. It is a native of the United States of America. Its leaves are generally three in a sheath, two and a half to five inches long, stiff, broad, spreading, somewhat twisted, sharp-pointed, and light green in colour; the cones are from two to four inches long, and from one to two inches broad at the swell, tapering to point and rounded at base, on short footstalks, and very persistent, remaining on the tree for several years; the branches very numerous but irregularly disposed; the laterals are also numerous, and all of them well clothed with foliage. It is of no economic value for its timber, but a most useful, hardy, accommodating, free-growing, precocicus-coned, sturdy, medium-sized ornamental pine; for the soil and climate of Great Britain and Ireland well adapted.

PINUS RUSSELLIANA: Duke of Bedford's Pine.

Leaves generally five in a sheath, from six to nine inches long,

somewhat angular, rather stout, slightly curved, of a bright yellowish-green in colour.

Cones, six to eight inches long, and from one-and-a-half to two inches broad at base; elongate, straight, and pointed, on short foot-stalks, somewhat drooping, but horizontal and in whorls; non-resinous, hard and shining.

Branches, very stout, not numerous, and irregularly disposed though frequently in whorls. Attaining heights of from fifty to eighty feet; a medium-sized, large-leaved, robust-branched, large-coned, and beautiful Pine: introduced from Mexico nearly twenty years ago. It produces soft, even-grained, and non-durable wood. In our best soils, warmest localities, and most sheltered situations, it may grow and survive the rigours of a British winter, which if it does it will be found a beautiful ornamental Pine.

PINUS SABINIANA: Sabins' Pine.

Leaves, generally in threes, from nine to fifteen inches long, slender, twisted, drooping, and a glaucous or silvery grey colour.

Cones, from eight to twelve inches long, and from four to six inches broad at the swell, ovate in form, generally in whorled clusters on the branches, and persistent, remaining for years on the tree.

Seeds, larger than those of *Macrocarpa*, being about an inch long, hard-shelled, short-winged, and the kernels edible.

Branches, numerous, somewhat slender, when young covered with a silvery bloom, and violet in colour; and unless at their extremities they are bare of leaves.

Introduced from California, 1832; where it attains heights of from eighty to one hundred and fifty feet. Its wood is soft in texture, even-grained, non-durable, and white in colour. It is tolerably hardy, but quite particular as to soil and situation; requiring alluvial vales, or mountain dells, where humis or aqueous deposits have for years been accumulating, and a warm locality; when this Pine would form a most beautiful and remarkable object; but in ordinary soils, particularly such as are not rich in vegetable matter, and exposed localities it will make but little progress, and show but little beauty.

PINUS SEROTINA: The Late-Seeding Pine.

Leaves, generally in threes, frequently in fours; from five to nine inches long, slender but stiff, sharp-pointed, thickly set on the branches, frequently in tufts and a bright light green in colour.

Cones, from two to three inches long, and from one-and-a-half to two inches broad, ovate in form; generally on the branches in opposite

pairs, ripening when two years old, but not dropping their seeds until three or four years old.

Branches, numerous, and irregularly disposed, much covered with spray-like sprigs, and tufts, or bundles of leaves; with bright yellowish-brown bark.

This Pine is a native of the United States of America, and was introduced into this country more than one hundred and fifty years ago; it attains heights of from twenty-five to fifty feet; produces mushroom wood, which when dried and seasoned may be burnt, but it is of no other use; the tree is hardy enough for our climate, and may be useful for planting miry, marshy, peaty, or moist sandy soils, (of course made sweet and healthy,) where shelter or ornament is the planter's object, but for its timber never.

PINUS SINENSIS: The Chinese Pine.

This is a quasi-species, or more probably a depapurated form of *Pinus Canariensis;* and like it too delicate and tender for the climate and soils of our islands. It is found on the Chinese hills, and in Assam and Nepal.

PINUS STROBUS: The Rope-like-Coned Pine.

Who shall unearth the remains, or fetch from the ensconced records of the world's archives, the moot and dusty memoranda of the past history of the Strobus Pine? Who shall wield the pen or ply the pencil, to give a true and correct portraiture or historical epitome of the tree Strobus? It is, methinks, as old as the time when—"In the beginning God created the heaven and the earth," and so well has it fulfilled the injunction, "Multiply and replenish the earth;" that it is now to be found in so many quasi-species, varieties, and sub-varieties, as are still forthcoming, and which are now so numerous, that a much larger volume than the present might be filled with the subject matter of these two little words, *Pinus Strobus.* This name *Strobus*, it appears from the ancient literati, was applied to a tree; but what particular tree is not so evident. The term, however, is of ancient, and noble Greek extraction, στρεφα *Strepha*, to twist or twirl; and στροφος, *Strophos*, is, purely and simply the Greek word for *a rope:* the former truthful of the verticillate disposition of the branches; the latter a correct metaphor of its rope-like cones. My oracle—Pliny, in his twelfth book, c. 17, writes thus:—"*Petunt et in Carmanos arborem strobum ad suffitus, perfusam vineo palmes accendentes.*" They seek for the tree *Strobus* in Carmania (a country in Asia;) for the purpose of fumigation, burning it with palm oil and wine. He then goes on to state that, an exhilarating odour is

thus obtained from the retorts, which, by oppressing the head, though without pain, produces sleep; and is used for this purpose for the sick. Sundry ancient writers make mention of it; suffice it here that I refer my reader to two more of them, Dioscorides, l. i, c. 87; and Plutarch in his "Symposiaca," l. iii, c. 2, says:—"Mountainous and windy and snowy places produce woods of a pitchy nature, suitable for torches, especially 'πευκας και ζροβιλοι;'" *Pycæ* and *Strobili;* doubtless our Silver Fir, and highly resinous, odoriferous, Strobus Pine.

The tree *Strobus* of the ancients, so called "*Quai rami ejus tortiles:*" whereof perfumes were made, mixed with the wine of dates, may or may not be our "*Pinus Strobus;*" yet, I take it as such, inasmuch as all of their descriptions of the tree, their dissertations upon its juice, wood, foliage, cones, or branches, and all the derivations and translations of the term στροφο, are not only significant, but truthful to a degree, as representing this Pine; either in the disposition of its verticillate branches, its twisted or twirled leaves, its rope-like cones, or its rich and highly odoriferous resinous juices.

The "Strobus Pine" was introduced into this country about the beginning of the 18th century, and was sent to us from America; but it, or some of its quasi-species or varieties, has more recently been sent to Britain from most parts of the habitable globe, for it is now to be found in most countries either in an indigenous or exotic state. The prototype is popularly known in this country as the "Weymouth Pine," Lord Weymouth having been the first extensive planter of it as a timber tree, upon his Wiltshire estate.

It is the prototype of nearly one-half the quasi-species and varieties of the Pines at present extant; and being, as it is, so very much affected in its stature and dimensions, and so much influenced in the size of its cones and foliage, as well as in the quality and quantity of its ligneous tissue and resinous juice, by the soil and climate in which it may produce them; and being, moreover, one of the best constitutioned and most accommodating of the pines, this accounts for its now numerous forms; which, as time rolls on, and change transforms, are still increasing in number and degree of ineffable differences; nevertheless without any real or well marked distinctions; for of the extant forms the exact size of cone and foliage is all of the products that is not to be found in the fossil-graves of the extinct forms—nay rather of the extant prototype.

But even amid all this variety in degree, great in number though it be, it is only variety within the bounds of natural law; for in all the

forms or varieties of the Strobus Pine there is something so very appreciable in the port and features, something so characteristic in the disposition of the branches, something so peculiar in the summer and winter disposition of the leaves, and something so yet more remarkable in the ligneous tissues and resinous juices of all of them when produced under precisely the same conditions; that by a summary system of stenography they can all be described at once.

Leaves, generally five in a sheath, exceptionally three, four, six, or seven; rarely more or less in number; from three to fifteen inches long, generally spreading in summer, and drooping in winter; more or less slender, soft, glaucous, silvery, curved, twisted, and channelled; and in colour light, dark, greyish, bluish, whitish, silvery, or shining green.

Cones, from three to fifteen inches long, and from one to four inches diameter at broadest part; cylindrical in form, long and rope-like, slightly tapering to the point; singly, twos, threes, or in whorls or clusters upon the branches; more or less curved, exceptionally straight, but very rarely entirely so; some horizontally disposed, but most of them drooping; green when young, but transforming themselves to a brownish colour when they arrive at maturity: the scales are thin, numerous, and beautifully overlaying or imbricated; the seeds generally small, but of various sizes, and all of them furnished with a comparatively large winged appendage.

Branches, in whorls, verticillately disposed on the stem, but somewhat enlarged and twisted at the junction; rather thinly clothed with foliage; the bark smooth and shining when young, when old smooth and ashy-coloured.

The *Leaves* of the prototype *Strobus* are from three to five inches long, of a light bluish-green colour: the *Cones* are from five to seven inches long, and from one to one-and-a-half inches broad, cylindrical in form but tapering to point. There is not one of the quasi-species, or varieties of it so thoroughly hardy, and accommodating as to soil and situation, and so well adapted for general planting as a timber tree in this country, as is this Strobus Pine itself; though it, and all its progeny are vastly inferior to such a pine as the Corsican. Of its quasi-species none is better adapted for general planting than its Indian form *excelsa;* which grows well in a variety of soils and is sufficiently hardy for our climate: most of its large and most beautiful forms and varieties are much too tender for the British Isles; while some of the more dwarf and mountain forms, are more hardy and accommodating.

All the Strobus Pines produce a pure and limpid resin, which is rich in saccharine; and which when roasted and refined is used by the natives of some parts of the world as sugar: this resin or juice is also highly odoriferous, perfuming each and all of the component parts of the tree with a sweet-smelling fragrance.

The timber, when grown in temperate or cold climates, declivitous localities, and medium or high altitudes; and in loamy, gravelly, porous, or sandy soils, or stony debris; where the mineral constituents and earth oils, and granite, quartz, sand, or silex-stone are present in the substrata, would be tolerably hard, fine-grained, compact, light, tough, easily wrought, capable of a good polish, resinous, fragrant, tolerably durable; and creamy-white, or yellowish; and shaded with brown when matured and seasoned; while if grown in valleys, low-lying lands, warm localities, and sheltered situations, where the soil were a rich loam or clay; or in any soil rich in vegetable humis or aqueous deposits; then the size and beauty of the tree would be increased and the quality of the timber reduced to soft, porous, spongy, mushroom wood: while in cold, close, peaty, or marshy soils, if wet; or where the surface soil was very thin and shallow, the substrata hard and impervious; where lime-stone pure and simple, or as alkaline or dolomite, in a liquid or powdered state was present in quantity; where coal was in inclined strata and crop-out, or the upper strata charged with carboniferous matter; then would the Strobus Pines produce but little timber, and add but little to the landscape's beauty; for the probability would be that after a few years languishing they would soon die.

The greater portion of the woods of commerce as known and vended by such names as :—white deal, yellow deal, Canadian Pine, pumpkin Pine, Virginian Pine; also, much of the Indian "Kaeel," "Leem," and "Yari;" likewise much of the Mexican "Blanco-Pine," "Ocote-Chino Pine," and "Real Pine," are the timber produced by our Pinus Strobus and its quasi-species.

From what has already been stated it will be inferred that Strobus is a Pine of various heights and diameters; individually, the prototype may be described as ranging from one hundred to two hundred feet, when grown under favourable conditions; while the mean of this may be taken as the average maximum, and the same may be said of its few large or gigantic forms or quasi-species; but the most of these as well as the varieties and sub-varieties range from forty to eighty feet in height; and some of them from twenty to forty feet; while a few of

its dwarf varieties never reach the stature of a man. Of the numerous quasi-species and varieties I here give a place to the following:—*Argentea*, (the very silvery-leaved,) *Aurea*, (the yellowish-green-leaved,) *Brevifolia*, (the short-leaved,) *Carmanica*, (the Asiatic form,) *Cornea*, (horn-coned,) *Elegans*, (slender-branched,) *Erecta*, (compact-branched,) *Excelsa*, (the tall Indian form,) *Gigantea*, (the large or giant form,) *Longicarpa*, (long-coned,) *Longifolia*, (long-leaved,) *Microcarpa*, (small-coned,) *Montana*, (mountain form,) *Nana*, (the very dwarf,) *Nivea*, (the snowy-white,) *Pendula*, (the drooping-branched,) *Robusta*, (the strong-branched,) *Tortuosa*, (the twisted-branched,) and *Variegata*, (the variegated-leaved variety.)

PINUS SYLVESTRIS: The Wood or Scotch Pine.

This is the only Pine indigenous to Britain, and being found originally in the highlands of old Caledonia, in natural woods and forests, it is popularly known in this country as the "Scotch Fir." But it is now found either in a wild or cultivated state in most European countries, in a great variety of soils, altitudes, and climates: and in many forms or varieties in the shape, size, and colour of its cones and foliage; but in the quality of their timber there are two specific and distinct kinds, each of which requires its own particular characteristic description.

Sylvestris Alba: The White Scotch Pine.

Leaves, generally two in a sheath, from one to three inches long, waved or curved, more or less concave above, and convex below; finely serrated on the edges, and bluish or greyish-green in colour.

Cones, from two to four inches long, and from one to three broad at base, some egg-shaped, some roundish, some conical, and some globular, but all more or less tapering to the point; some straight, some curved, particularly near the apex, some rough surfaced, others comparatively smooth surfaced: the scales are from half-an-inch to one-and-a-half inches long, having a somewhat angular or four-sided apex, they are sometimes straight and sometimes recurved: the seeds are small, with their wing appendage large.

Branches, irregularly disposed, more or less spreading and aspiring, with numerous branchlets, some ascending, some drooping; and the bark comparatively rough and furrowed.

Wood, creamy-white in colour.

Sylvestris Rubra: The Red Scotch Pine.

Leaves, generally two in a sheath, from one to two inches long, leathery, rigid, more or less flat or two-sided, comparatively broad, and dark green in colour though somewhat glaucous.

Cones, generally from one-and-a-half to two inches long, more regularly formed than those of the White Scotch Pine, being thicker, broader, and less pointed at their apex.

Branches, regularly disposed in horizontal whorls; and the branchlets when young somewhat aspiring; but as they increase in age becoming, like the branches, quite horizontal: the bark is smoother and less furrowed than in the White Scotch Pine.

Wood, yellowish-brown in colour; when grown in congenial soils, and when matured and seasoned, it is darker and richer coloured.

The Red is superior to the White as a valuable timber tree; inasmuch as in whatever soil, altitude, or climate, its wood is finer in texture, closer grained, more resinous, more durable, and richer coloured than the White Pine, when grown in the same soil, altitude, and climate: and *Rubra* is somewhat more moderate in its rate of growth, of rather smaller dimensions; more thoroughly hardy, sturdy, and better constitutioned; and easily distinguished from *Alba* by its shorter, stouter, and more green and glaucous-like foliage, horizontal and closely set branches, smoother and more shining bark, broader and less pointed cones; and its rounded and umbrella-like head and clean trunk; even when grown singly its lower branches gradually fall off, so that when it arrives at maturity it will be found clear of branches for one-half or two-thirds of its height. In nearly all of the plantations and natural woods of the Scotch Pine which I have yet examined, either in Britain or continental Europe, I have almost invariably found them more or less mixed; yet, as a general rule the "Red" predominates in the natural Scotch forests; while in almost all cultivated woods or plantations of it in England, Ireland, and even Scotland, the two kinds are to be found: and, moreover, in young plantations there will be found much larger leaved seminal varieties than either of the parents. On the continent of Europe, the "White" is much the most plentiful either in a naturalized or cultivated state; while in some woods and forests we have observed in particular localities many of the red Scotch Pine.

Both of these kinds, however, are much influenced in their dimensions, and particularly in the quality of their timber, by the soils, altitudes, and climates in which they are grown; as well as in the size of their cones and foliage: but excepting a soft peat, stagnant marsh, wet clay or very chalky soil; they will thrive in almost every other description of soils if in a sweet and healthy condition and not too wet. For general planting as a timber tree in this country no pine yet introduced is better adapted than our native pine; the only one likely

to equal it for general planting and general utility, and to excel it in the rate of growth, and quality of timber, if we once had it thoroughly inured and naturalized, is *Corsica*—the Queen of Pine nurses, and the chief of utilitarians in the genus *Pinus* for Albion's Isles.

Of the many varieties of *Sylvestris*, the only ones deserving notice here are :—*Alba* and *Rubra*, already disposed of, and *Argentea*, (the silvery-green leaved,) *Fastigiata*, (the compact or pyramidal-branched,) *Latifolia*, (large-leaved,) *Monophylla*, (single-leaved,) *Nana*, (the very dwarf,) *Pendula*, (the pendent-branched,) and *Variegata*, (the variegated-leaved,) all of them interesting and useful for ornamental planting in this country.

PINUS TÆDA: The Torch-Wood Pine.

Its leaves are generally three in a sheath from three to six inches long, slender, rigid, somewhat two-sided, channelled on the inner face and rounded on the outer surface ; with many single scale-like leaves without a footstalk, and broad at base, tapering to a sharp point, solitary on the stem shoots, and generally one close to and below, the base of the sheath-leaves ; similar to those of *Insignis* and this class of the Pines ; and like its congeners light green in colour.

The Cones are from two to four inches long, and from one to two inches broad ; having very short footstalks ; generally in pairs, ovate-oblong in form, and tapering though blunt-pointed : with long, somewhat recurved, and prickly-pointed scales : the seeds are small and furnished with a long winged appendage.

It was introduced into this country about the beginning of the eighteenth century from America, where in Carolina, Florida, and Virginia it forms large forests ; attaining heights of from sixty to eighty feet, a clear stemmed, spreading headed tree ; hardy enough for our climate ; and grows freely in a variety of soils, either moist or dry. It may at times be usefully employed as an ornamental pine, but never as a timber tree ; inasmuch as its wood is of the very coarsest description, and fit for nothing but fuel : hence its name—"Torch Pine."

PINUS TENUIFOLIA: The Slender-Leaved Pine.

Leaves, generally five in a sheath, from eight to ten inches long, angular, wavy, sharp-pointed, and shining green in colour.

Cones, oval in form, from one-and-a-half to two-and-a-half inches long, and about half as broad as long ; the scales numerous ; seeds small ; and all of a dark brown colour when ripe.

It is found about Guatemala, attaining heights of from sixty to eighty feet ; and is one of the quasi-species of the long and slender-

leaved and egg-coned Pines ; but somewhat distinct from its congeners *Longifolia* and *Oocarpoides*, and it is much too tender and delicate for an English winter.

PINUS TEOCOTE : The Candle-Wood Pine.

Leaves, generally three in a sheath, from three to five inches long, and light-green in colour.

Cones, from two to three inches long, and about one inch broad ; rounded at base and tapering to point.

Introduced from Mexico early in the present century, where it attains heights of from sixty to one hundred feet : and being more fastidious and tender than its congener *Tæda*—the American "Torch Wood," it is of no use in this country, where gaseous, carbonaceous, and spirituous lights have superseded torch and candle-woods.

PINUS TIMORIENSIS : The Timor Island Pine.

This Pine is found in the Philippine Islands, and on the Island of Timor ; but from all that I have seen of its specimen cones and foliage I think it is only a quasi of the other quasi, the Guatemala form of the egg-coned pine—*Oocarpa*, and no doubt thoroughly tender in this country, as I have not yet seen a living plant of it.

PINUS TUBERCULATA : The Tuberculated-Coned Pine.

This is of the same origin and class as *Radiata* and *Insignis;* and although a quasi-species still it is entitled to a description.

Leaves, generally three in a sheath, thickly disposed on the branch stems, from four to six inches long, and bright green in colour.

Cones, from four to six inches in length, and about half as broad near the base, at which they are rounded, and tapering to the apex ; curved on the outer face, and straight on the inner ; and silvery-brown in colour, glossy, resinous ; and persistent, remaining on the trees for many years.

It was introduced from California about twenty years ago, and though hardy enough for the climate of Britain, it is of very tardy growth ; and in height from thirty to forty feet ; so it will never be of any economic value in this country as a timber tree ; though it may be usefully employed as an ornamental Pine for beautifying our landscapes and increasing the number and varieties in our pinetums.

PINUS WINCHESTERIANA : The Marquis of Winchester's Pine.

Introduced from Mexico in 1846 along with the other two quasi-species *Gordoniana* and *Granvilleæ* ; and like them but another quasi long-leaved Pine ; much too delicate and fastidious for the climate of Britain.

And now, kind and indulgent reader, if you are acquainted with the individual members of this genus *Pinus*, or if not, and have followed me through this summary, enumeration, and description of them, you will observe, that though *few distinct species* are recognized, many *quasi-species* are treated of; and I need not tell you that this great reduction of the species of the Pine is even here not so much carried out as it ought to be, inasmuch as many are now admitted to a place which will hereafter have to be discarded when they have developed themselves in this country, and when time and experience have given us more knowledge of them. In concluding this, my first sub-division of PINACEÆ, and this my last S.D. or family of **Coniferæ,** I desire to add the following remarks :—Something like a half-dozen years ago, while busily engaged in my cultivation and study of the Pines, one morning I received a circular, announcing that one man, his name Roezl, had discovered in one country, and that known as Mexico, *one hundred and a score of new Pines!* I perused the circular, reperused it, and often referred to it; and I do confess that it was some time afterwards before I recovered from the effects of this sensational shock to my nervous system, and again found myself in my usual sober mood. I at the time, however, raised my voice against the announcement as an imposition; but "No, no, no," said those who swear by "New Pines;" and the species-mongers re-echoed the sound; so the trick was a decided hit, had a successful run, became quite popular, and created quite a sensation amongst arborists. My prediction, however, was soon proved to be a true one, as the following laconic note will show, and which was published so soon after their introduction as an opinion of them could be formed, inasmuch as I had seen neither cones nor foliage of them :— "*Mexican Pines.* How is it that we hear so little about the collection of New Mexican Pines, seeds of which were sent out in 1858 and 1859, by Messrs. Roezl and Company, of Mexico, or their agents? Out of the lot I have not ten per cent. now alive; and, as regards novelty, I hazard the opinion, *that with few, if any exceptions,* they are neither more nor less than old acquaintances with new names. Not a few of them, too, appear in more characters than one. Perhaps some of your correspondents who have been fortunate enough to keep them alive without protection, will give us their experience respecting them—SENILIS." *Vide Gardener's Chronicle*, page 116, vol. 1861. This feeler, being a ticklish one, produced no information, for it never, so far as I am aware, received a reply, and I may here refer the reader to the foregoing enu-

meration, where will be found all that remains of these "one hundred and twenty new pines." *Bonapartea* and *Protrubrans:* not as species, however, but as quasi-forms; and *Lawsonii* and *Relegeana*, which latter brace I have not yet seen, nor been able to get hold of; and for the other 116 of these "New Pines" I refer the reader to the alphabetical list, where their names will be found; and where they are referred to as synonyms of the species to which they belong.

CHAPTER III.

DIVISION TWO.

BACCIFERÆ.

Berry and Fruit-bearing Pines.

Flowers, male and female, in some species they are together, in some they are separate; in some species on the same plant, while in others they are upon separate plants; in most species they are solitary, in some in bunches, in others in spikes.

Leaves, variously formed: awl-shaped, needle-shaped, fan-shaped, flat, lanceolate, linear, three-sided, or scale-formed, variously disposed; alternate, opposite, scattered, four-rowed, five-rowed, spreading, solitary, two-rowed, ternate, or in whorls; some closely inlaying or imbricated along the stem-shoots, having long, medium, or short footstalks; while in some species they are minus footstalks.

Berries or **Fruits,** these are in most of the species *baccæ*, or berries; in some they are *nuces*, or nuts; and in others *cupelli*, or acorns; some with succulent and some with dry, leathery carpels; and in at least one species the fruit is composed of consolidated, yet free scales, forming a solid, fleshy berry. Some have crustaceous, or bony shells; some have their tops bare and their base ensconced in cups; others, again, have smooth, fleshy exteriors, while some have their fruit rough and dry on the surface. In form various: globular, conic, ovate, round, oblong, squarrose, drupaceous. Generally singly; yet, in several species they are in twos, threes, and sometimes more together in a bunch; while in a few they are in clusters.

The **Seeds** are variously formed, having crustaceous, or bony shells;

singly, two, three, five, or more seeds in a fruit or berry; in some species connected, in others unconnected.

S.D. I. DACRYDIUM: The Gum-exuding Pine.

From Greek, δακρυ, a tear; hence "a weeping or shedding of Gum," this pine being full to exudation of gummy juice.

Flowers, male and female, on separate plants.

Leaves, variously formed: awl-shaped, needle-shaped, linear, obtuse, ovate, rhomboid, more or less four-sided, blunt or acute pointed; some scale-formed, variously disposed: alternate, spreading, four-rowed, imbricated; and generally a rich, deep, glossy green, when young; when old they become yellowish-green, or brownish in colour.

Fruit, drupaceous, small, terminal, erect, solitary; ovate in form, though somewhat squarrose in shape; and edible.

In this genus we have *Dacrydium Cupressinum*, (the cypress-like,) *Colensoi*, (Colenso's,) *Elatum*, (the lofty,) *Franklinii*, (Franklin's,) and *Laxifolium*, (loose-leaved,) which are to be found in catalogues and collections in about a dozen and a half of different names. These five kinds, however, constitute and comprise this very peculiar and somewhat distinct genus of **Pinaceæ.** Their native habitats are the East Indies, New Zealand, and Tasmania, where the first-named is found growing to nearly two hundred feet; while the last-named is a creeping bush, never rising above a yard high. The wood they produce is hard and durable, and much used, and highly esteemed by the Indian tribes. But excepting *Franklinii*—a tree growing one hundred feet high, and found on the banks of the Huon, Van Dieman's Land—and *Laxifolium*, found in New Zealand, they are much too tender for a sharp night's frost in this country; and even these two kinds will not stand unprotected an ordinary winter in Britain; though in the best soils and warmest localities in the south of England they may, or may not, be induced to grow; so that none of them are of any economic value in Albion's Isles.

S.D. II. JUNIPERINEÆ: The Juniper Tribe.

Many derivations have been given for this name; but most probably it takes its rise from the Latin *Juvénis* and *Pario;* hence *quia juniores fructus foliis parit, antiquis, maturescentibus;*—young and old leaves and berries are on the plant at the same time.

Neither the Hebrew nor the Greek appear to help us in this word. Elijah sits under a juniper tree. The Hebrew word is רֹתֶם *Rothem*,

which the Septuagint Greek does not attempt to interpret, but gives the word itself in Greek characters ραθμεν, *rathmen*. It is possible that the Sanscrit word *Gûn* or *Jûn*, (the u short,) may be the root of it, signifying, as it does, *good qualities*, and, likewise, *shelter*. The prophet found the shelter; and as for the good qualities, even in Pliny's time they are profusely recorded by him. In his Sixteenth Book, cap. 18, its praise is that it is verdure for mountains, and yields resinous juice: cap. 21, that its leaf doth not fade: cap. 39, that in common with the cedar it yields an oil which preserves what is rubbed with it from moth or rotting: cap. 40, that on account of the indestructible nature of its wood it is adapted for porticos and other subdial erections, having like durability with the cedar. Further, in his Twenty-fourth Book, cap. 8, he enumerates most valuable medicinal virtues which the juniper was believed to possess, in some respects more than any other tree. He attributes these properties to its seeds, its berries, its inner bark, and its juices:—"*Serpentes fugat; doloribus utile; tusses coneoquit; tumores sistit; urinas ciet;* &c., &c."

Flowers, Generally dicœcious, *i. e.*, male and female on different plants; yet exceptionally found on the same plant; male catkins small ovate bodies, either at the ends of the branchlets, or in the axil of the leaves; having from four to eight celled anthers at the back of each scale: the female or fertile catkins are small bud-like bodies, composed of fine, thin, fleshy scales, which at first are nearly concealed by imbricated bracts, from which they eventually emerge as the fruit approaches maturity.

Leaves, these are variously formed and disposed; simple, or scale-formed; lanceolate or linear, mostly sharp-pointed; generally in whorls of threes; closely imbricated in four rows; sometimes opposite, sometimes ternate; both simple and scale-formed leaves are to be found on the same plant, in the different stages of its growth.

Berries, these are small fibrous, fleshy formations, or *galbules*, externally furnished with more or less numerous scales; though generally globular in form, yet, in some species angular, and naked at the apex; having a glossy surface or skin. When ripe they are of a deep purple, black, brown, or red colour: seeds, generally there are three, yet frequently found in various numbers from one to five, rarely more, in a berry; which are more or less concave on one of their sides, and angular on the other. The berries, when pressed or bruised, emit a strong piquant odour, and this more particularly in the resin of some species; especially in those of § 3, (*Sabinoides*,) which is incompletely oxygenized, and is, therefore, more fragrant and, also, more stimulant.

§ 1. CUPRESSOIDES: The Cypress-like Juniper.

Leaves, variously formed: lanceolate, egg-shaped, needle-shaped, scale-formed or rounded; and variously disposed: in whorls of threes or fives, solitary, in twos; scattered, imbricated, two-rowed, or four-rowed; of various shades of colour: light, dark, greyish, yellowish, or brownish-green; some glaucous and silvery, and some smooth and shining.

Berries, egg-shaped, elongated, round, globular, angular, or oblong, externally furnished with bract-like humps; and of various colours: purple, brown, red, violet, or yellow; some covered with a glaucous bloom, some with a silvery powder, others polished and shining.

JUNIPERUS CHINENSIS: The Chinese Juniper.

This attains heights of from twelve to twenty feet; and it is a hardy, handsome, pyramidal little tree or large shrub: and is found in two forms; the male, *(mascula,)* and the female, *(fœmina,)* the former, has its leaves generally three in a whorl, lance-shaped, spreading, and stiff; while, the mature or old ones are like those of the female form, being small, scale-like, and imbricated; they are numerous, more or less glaucous; and bright green in colour. Its branches are somewhat irregularly disposed, generally alternate, numerous and spreading; furnished with numerous straight branchlets: and in the blooming season, when the flowers are fully expanded, the plant is literally covered with bright yellow or orange-green blossoms, rendering it a superlatively beautiful little tree. The female form has its leaves generally in opposite pairs, more or less four-rowed, scale-formed and closely imbricated; while the open or young leaves are more like those of the male form: the *berries* are of course produced by this form and are small, and violet brown in colour, and containing one, two, or three seeds in each fruit, rarely more. Both of these forms of the Chinese Juniper are most useful and beautiful large shrubs or small trees for ornamental planting in this country, where they grow freely in a variety of soils if healthy, and dry rather than moist.

JUNIPERUS OCCIDENTALIS: The Western Juniper.

This was sent us from British Columbia, the valleys of the Rocky Mountains, the Oregon country, and also from Northern Europe. It attains heights of from ten to eighty feet, being much influenced in its stature by the soil and climate where it is grown. It is a densely branched, dark-barked, powdery, glaucous, silvery, bluish-green foliaged, strongly scented, purple berried, tolerably hardy, and variable kind.

JUNIPERUS PHŒNICEA: The Phœnicean Juniper.

This is of a very sportive character, and it is to be found in many forms or varieties. There is a male and a female form of it; and not unfrequently both the male and female flowers are found upon the same plant. It occupies a wide range of native habitats, being found in most of the Mediterranean coasts, the Adriatic, and Ionian shores: in Greece, Italy, Spain, Siberia, and the Levant; and in a cultivated state in most parts of the known world. It attains heights of from five to twenty-five feet, in form pyramidal, bright or dark green foliaged which is more or less glaucous; densely branched, and variously fruited; some of the berries being fibrous and dry in the pulp, some soft and glaucous, some pale yellow, some brownish-yellow, while others are yellowish-purple. This Juniper in its Lycian form is the "Cypress-leaved Cedar" of the Greeks, from which they obtain most of the "Olibanum" used as incense in religious celebrations in countries where Catholicity prevails. It has also been found in the Oriental regions in an enlarged form; and it is to be found in catalogues and collections in various forms or varieties; and under many names; for its synonyms are numerous. This Juniper is hardy, and will thrive in any ordinary soil, and in most situations; and forms a most distinct and beautiful, drooping-branched, evergreen, and ever-pleasing shrub or small tree.

JUNIPERUS SPHÆRICA: The Globular Juniper.

This kind was originally sent to us from China, but it has more recently been found in other parts of the world. It attains heights of from ten to thirty feet; and it is very variable in all its parts; having its leaves generally scale-formed, and of a bright shining green in colour; in some of its forms or varieties very glaucous and silvery; the branches numerous, slender, more or less curved; the berries comparatively large, spherical, glaucous and purplish-violet in colour. It is to be found in many forms, and under many names, one of the most common of which is *Smithiana*. It is hardy, and will thrive in most kinds of dry and healthy soils; and forms a beautiful slender-branched vivid green, and slightly silvered-foliaged shrub in this country.

JUNIPERUS TETRAGONA: The Tetragonal Juniper.

A native of Mexico, a dwarf-spreading bush, scarcely ever exceeding two yards in height; having small, thick, fleshy, obtuse, or egg-shaped leaves, which are closely imbricated, and disposed in four rows; glaucous when young, and dull green when old. The branches are flat-formed and spreading, with numerous branchlets, which are four-sided,

dense, stiff, and patulous. The berries are small, globular, scaly-surfaced; dark purple in colour, and when ripe more or less glaucous. It is hardy enough for our climate, and distinct from the other Mexican Junipers; and unlike them it produces no sandarac.

§ 2. **Oxycedrus:** The Prickly, Cedar-like Juniper.

From *ὀξυς*, sharp; and *κεδρος*, cedar; the resemblance of their leaves.

Leaves, generally in whorls of three, spreading on old growths, jointed at the base, minus glands, sharp-pointed, linear, lanceolate, awl-shaped, ovate, concave, decurrent, stiff, rigid, and some of them ribbed and keeled; some gray and glaucous on their upper face, most of them light and dark green.

Berries, ovate-globular, of various colours; light or dark purple, blue, brown, red, violet, or yellow; some shining and glaucous; scaly or uneven surfaced; and the seeds are one, two, three, and exceptionally more, in a fruit.

Juniperus Canadensis: The Canadian Juniper.

This is the American form of the common Juniper, or European species; and it is found in many parts of North America, Greenland, the Island of Sitcha, and other north-western habitats: forming an open spreading bush, from three to nine feet high; having small, lanceolate leaves, pale green in colour, with a white or silvery band on their upper surface; the branches are spreading, somewhat slender, rather short, and well clothed with foliage, which is very pungent. The berries are ovate, globular, or roundish; smooth, shining, and dark purple in colour. A hardy, dwarf, and inelegant shrub.

Juniperus Communis: The Common Juniper.

This is the most common, most numerous in forms and varieties, of any of the Junipers. It is found in England, Ireland, and Scotland; the Alps, Apennines, and Azores; also in Austria, the Caucasus, Denmark, France, Greece, Greenland, Italy, Lapland, Norway, Portugal, Pyrenees, Russia, Spain, and Sweden, and in many other parts of the world, in a cultivated state. It attains heights of from two to twenty feet; in valleys, mountain dells, or moist and shady woods, it forms a spreading though somewhat pyramidal little tree; while on high altitudes, very exposed maritime localities, rocky mountains, open downs, poor sandy, or very chalky soils, it is dwarfed down to a hedgehog-like bush. The following summary characteristics of the foliage are applicable to the prototype, as well as to all the quasi-species and varieties:—

Leaves, awl-shaped, lanceolate, sharp-pointed, and spreading; light or dark greyish, glaucous, silvery, or shining green, in colour.

Berries, comparatively small, roundish, oblong, or conic; and light or dark purple in colour.

The only forms or varieties of it requiring notice here are the following:—

ECHINOFORMIS: The Hedgehog-like Juniper.

A very pretty, dwarf, dense, little bush; healthy young plants of it much resembling a hedgehog in appearance.

HIBERNICA: The Irish Juniper.

This is a handsome, compact-growing, pyramidal, large shrub, or small tree. And of this, again, we have a *Compressa*, or Spanish form, which is still more erect and compact in its habit of growth, and likewise darker in the colour of its bark. Also a *Variegata*, having some of the leaves and spray variegated. Useful, hardy, and beautiful shrubs.

NANA: The Dwarf Common Juniper.

This is the Alpine or mountain form: a curious, spreading, creeping, pygmy, scarcely ever rising higher than half a yard from the ground.

RUFESCENS: The Shining-Berried Common Juniper.

This is most plentiful in Southern Europe. It forms a pretty bush, from five to ten feet high, and brownish-green in appearance. There is of this, again, a *Brevifolia*, or smaller-leaved form, found in the Azores and contiguous Islands.

SUECICA: The Swedish Common Juniper.

This is closely related to the Irish and Spanish Junipers, but somewhat less compressed in its branches, and more conical in form, and growing to heights ranging from ten to twenty feet; and of this kind there is also a *Variegata* variety, having some of its leaves and spray variegated.

JUNIPERUS DRUPACEA: The Plum-Fruited Juniper.

This is one of the most distinct, constant, and beautiful of the genus, inasmuch as its leaves are linear, lanceolate, sharp-pointed, spreading, minus footstalks, concave above, with a silvery band on each side of the mid-rib; convex below, with a conspicuous nerve, and rich green in colour. Generally large, being from a half to one inch long; while the leaves on the lower sides of the branch stems are the smallest and broadest, and more oval than those on the upper sides, and very regularly disposed in six rows on the stem. The berries are from three-quarters to an inch and a quarter long, and from a half to one inch broad; globular in form, and a rich dark purple in colour, covered

with a powdery or glaucous bloom; the fruit is furrowed by the projecting fleshy scales, particularly near the apex. It forms a very ornamental shrub or small tree growing from six to twelve feet in height; when old it has a straight stem, but when young it is much branched; the branchlets numerous, and the branches short, spreading, and more or less cylindrical. Its native habitat is Asia Minor and Syria, and like most of the junipers, it is sufficiently hardy for the climate of Britain.

JUNIPERUS MACROCARPA: The Large-Fruited Juniper.

This is a large-leaved and large-fruited form of the common Juniper, having its leaves in whorls of threes, lanceolate, comparatively broad, keeled on their under face, with two furrows or groves on the upper face; and glaucous grey in colour. The berries are comparatively large, plum-like, dark purple in colour, and covered with a glaucous violet bloom when ripe. It attains to heights of from five to ten feet; and is found on the coasts of Barbary and the Mediterranean, and is more or less plentiful in Austria, Greece, Spain, and Sicily, and hardy enough for cultivation in this country.

JUNIPERUS OXYCEDRUS: The Prickly-Cedar Juniper.

This, again, is only an altered form of the common European Juniper, and found more or less plentiful in the Azores, the Canary Islands, Spain, and Portugal. The Indians call it "Cedro," the French "Genievre, or Genevrier," the Spaniards "Ebra," and the Italians "Ginepro." It grows to heights of from five to ten feet, but in the warm valleys of Teneriffe it attains much larger dimensions, and being found in so many and dissimilar soils, altitudes, and climates, it is, as a matter of course, much influenced in its stature as well as in the size of its leaves and berries. In all of its distinguishing characteristics, however, it is more nearly related to the quasi-species *Macrocarpa* than to the prototype *Communis*. When from the Mediterranean coasts it is sufficiently hardy for the climate of Britain; but when from the Canary Islands, or Teneriffe valleys, it is at first and for a time, somewhat delicate and tender, in this country.

JUNIPERUS RIGIDA: The Rigid-Leaved Juniper.

This might be termed the Chinese form of the common Juniper. It attains heights of from ten to twenty feet, forming a very handsome little tree; and in a young state a very beautiful and graceful looking shrub, with somewhat drooping branches, and slender pendent branchlets. It is hardy enough for our climate.

The Caucasian or Taurian Juniper—by some called—*Communis*

Oblonga, and the Japan kind named *Taxifolia*, I place here as, at best, but quasi-species, and more nearly related to *Rigida* than to *Communis;* for I cannot admit either of them as distinct species : and moreover, I incline to the belief that even *Rigida* is at best but a quasi-species of the common Juniper; and, doubtless, if we knew its history we would know that it was introduced into, and was not originally indigenous in, China or Japan; though we are informed that it is indigenous in those countries; yet, we must remember that naturalization, by cultivation and length of time, may constitute this or any other plant, what we are pleased to term a native or indigenous plant; particularly in countries whose history is comparatively speaking, unknown to us; and whose vegetable products are so numerous in quasi-species and varieties; many of which are so superlatively beautiful, that the fact is evident, that for ages past the secluded and little known Orientals, had been well up in the theory and practice of all the cultural arts; for their present proficiency in plant growing is not a newly acquired knowledge, but an old growth of many years; not for scores, nor hundreds of years, but more probably for thousands were the truth known : and doubtless many of their metamorphosed forms, quasi-species, varieties and sub-varieties of **Pinaceæ** which we have lately received from these ancient and knowing culturists, whose innate knowledge of vegetable phytology, and practice of all the arts of hybridization, and artful modes of cultivation, owe their origin not so much to natural selection, as to cultural perfection; the manufactures of man from nature's staples, rather than the lineal descendants, of the prototype or original species of the firs and pines.

§ 3. SABINOIDES: The Savin-like Junipers.

The "Savins" are wrongly called "herbs" by some ancient and medical authors : they are indeed, small trees or large shrubs with, frequently, a large and strong stem. The ancients mention two kinds of them, *Sterilis* and *Baccifera*,—our male and female forms; and by some writers they are frequently confounded with the "Tamarisk."

It has been disputed whether they should be classed as Junipers, Cypresses, or Arbor-Vitæs; but doubtless, the disputants' learning was of the meretricious and superficial kind; certainly not of the practical character, inasmuch as a Juniper is a *Baccifer*, and the Cypress and Arbor-Vitæ are *Conifers*. Our *Juniperus Sabina* is the Greek βραθυ, *brathu*, which Pliny latinizes by *bruta* and gives a very full description of, lib. xii, c. 17,—"like to a cypress, and its odour nearly

equal to that of the cedar:" again, lib. xxiv, c. 11,—"The herb *Sabina*, called by the Greeks *brathy*, is of two kinds: the one in its leaf like to the tamarisk, the other to the cypress; wherefore some have called it the Cretan cypress. It is used by many for frankincense." Apuleius in Libr. de Nomia et Virtut. Herb. and Dioscorides in lib. i, c. 105, also make mention of it.

In this *Sabinoides*, or Savin-like section, of the Junipers, are included all those kinds which are closely related in the quality of their resinous juices, strong and piquant flavour; being, as it were, in an incompletely oxygenised state,—it is very fragrant and stimulant; all the component parts of the plants—foliage, spray, branches, or berries, when submitted to heat or pressure emit a peculiarly pungent odour.

Leaves, mostly awl-shaped, some are ovate, others lanceolate, some needle-shaped, others scale-like; some blunt, some acute, in opposite pairs, or in whorls of threes or more, some imbricated, some four-rowed; generally they are more or less rigid, ribbed, and keeled; and of various shades of blue, grey, light or dark green colour: some glaucous, some shining, and some powdery.

Berries, generally small and numerous, round, globular, or egg-shaped; of various colours: black, brown, red, purple, or violet; some with a glaucous bloom, smooth and shining, others powdery; having their surfaces more or less scaly, humpy, furrowed, or tuberculated; seeds one, two, three, or more in a fruit.

JUNIPERUS DENSA: The Bushy Juniper.

This kind, though somewhat like its congeners *Recurva* and *Squamata* is distinct. Its leaves are generally in whorls of threes, somewhat spreading, linear, lanceolate, acute, pungent, and dusty or yellowish-green in colour: the berries are small, dark blue and glaucous, resinous and aromatic; and generally containing three seeds in each fruit. It forms a dense dwarf bush from one to two yards high; and has been found in many localities in India, generally at elevations ranging from 9,000 to 15,000 feet. It is much used by the Hindoos in their temples as incense; also for making yeast, or for the fermentation of their stimulating and intoxicating drinks. Moist rather than dry soils, and shady situations are necessary for its growth in this country, as in dry soils, and exposed situations, it gets sickly and soon infested by spiders of a red colour, and rust of a deadly shade: it is hardy enough to stand our winters. And though sometimes supplied to us as *Recurva Densa*, it is nevertheless distinct from the male or *mas.* form of the Weeping Indian Juniper.

JUNIPERUS EXCELSA: The Lofty Juniper.

This is a very distinct, compact, handsome, and very ornamental tree, attaining heights of from twenty-five to fifty feet: forming a most beautiful tree, either in arboretum or pinetum, park or plantation; alike conspicuous in groups or singly. But it requires the best soils, warmest localities, and most sheltered situations fully to develope itself in Albion's Isles. It is found more or less plentiful in Armenia and Georgia, in Persia, in Taurica and Syria; also in the Crimea, and most of the Islands in the Grecian Archipelago. Its leaves are variously formed—generally in pairs, small, short, thick, ovate, and acute; spreading on young growths, and on old branches imbricated, the two pairs of leaves form four rows: the berries are globular, about half an inch in diameter, glaucous and deep purple when ripe. Its branches are numerous and well clothed with the glaucous grey foliage, when young the branches are very compact and ascending, when old they become somewhat pendent; the branchlets are straight and rigid. There is a *mas.* or male form, and a *fœmina* or female form; also a quasi form called *Procera* having smaller berries, and in Abyssinia forming a large tree: moreover, a *Variegata* variety is sometimes seen.

JUNIPERUS MEXICANA: The Mexican Juniper.

This is the "Cedro" of the Mexicans; attaining heights of from ten to twenty feet; forming a bushy pyramid; full to exudation of an amber-like resinous yellow matter, so abundant as to be found in icicle-like forms on the branch stems and trunk, and much resembling pure Sandarac. It is tolerably hardy, but requires the best soils, and warmest situations to enable it to grow and develope itself, and to survive the effects of our most severe winters. Its leaves on young growths are generally in threes, needle-like, rigid, spreading, glaucous, and dull green; on adult plants in pairs, ovate, blunt-pointed, imbricated, four-rowed, and greyish-green. Its berries are ovate or globular, about half an inch in diameter, dark purple, and when ripe glaucous and powdery. It is also found in a *Flaccida* or *Gracilis* a more open-branched, and drooping form.

JUNIPERUS PROSTRATA: The Prostrate Juniper.

A creeping, crawling, spreading curiosity; never rising above a foot from the ground: useful only for rockwork. Its leaves are generally in opposite pairs, small, numerous, sharp-pointed, overlaying each other, dull, but shining green in colour. Its berries are also small, globular in form; very dark violet, or blackish in colour and glaucous.

From the United States of America and like most of the Junipers thoroughly hardy; but at best only a quasi-species of *Sabina*.

JUNIPERUS RECURVA: The Weeping Indian Juniper.

This is the "Aroo," or rock-inhabiting Juniper of Bhootan and Nepal; attaining heights of from five to ten feet, forming a very distinct and elegant little tree, or large bush; with recurved and pendular branches, rough, curling, scaling, dark brown bark; and its young leaves being greenish-grey, while the old ones are rusty-brown, decayed, chaffy, or withered-like; which gives the plant a very peculiar and drooping sickly-like appearance. Its berries are oval, very dark purple, or blackish-violet in colour; smooth and shining when ripe. The plant is perfectly hardy in this country, but unless in cool, moist soils, and shady situations, or where a humid atmosphere prevails, it should not be planted; for in warm dry soils, and much exposed, or sunny situations it gets awfully rusty, unhealthy, and inelegant; useless for any purpose, unless, indeed, for supplying food for parasitical insects or rusty fungoids. This juniper, like many of its congeners, is found in a *mas.* (male form,) and *fœm.* (female form,) the former the more dense-branched and dwarfer variety; and the latter the most common, taller, loose, and open-branched; more drooping and graceful in its habit of growth. The male form is frequently confounded with *Densa*, the Bushy Indian Juniper; but this is a very different and distinct plant.

JUNIPERUS RELIGIOSA: The Sacred or Incense Juniper.

This is the "Dhoop Newr," or Incense Juniper, of India, much esteemed for its first-class timber, and highly venerated, and much used by the Hindoos in their religious ceremonies, and burnt as incense in the temples on festive occasions. It is found more or less plentiful, in many parts of India, generally on the highest altitudes ranging from 10,000 to 16,000 feet, never found below 9,000 feet in a natural habitat. In general appearance it much resembles the Bhootan Cypress, *Torulosa;* and is frequently confounded with it; but it must be remembered that the one produces cones, the other berries, it also somewhat resembles the Chinese Juniper, *Chinensis*, but from this also it is quite distinct. Its timber is close-grained, compact, resinous, durable, aromatic, free from the ravages of wood-vermin, capable of a good polish, and rich ruby-red in colour; its wood is also vended and known in the timber trade as pencil-wood, or Kooloo-wood. In its stature or dimensions it varies much. On high altitudes it is dwarfed to a sprawling bush, while, on the mountains' slopes, or in valleys where the soil is chiefly composed of rock-debris, and rich in humis or alluvial

deposits, it attains heights of from forty to eighty feet, with trunk circumferences of from six to twelve feet. It is tolerably hardy, but somewhat fastidious as to soil and situation in our soils and climate. It leaves are disposed in threes, or in opposite pairs, some acute, some blunt-pointed; generally spreading on young growths; while they are more or less imbricated and four-rowed when matured, or upon old branches; branches numerous and compact. Its berries are rounded, smooth, two-lobed, about the size of a pea, and purplish in colour. Generally one or two seeds are in each fruit, which are dry, but very resinous, strongly aromatic, and highly pungent, and somewhat nauseous in flavour. The male and female organs are generally on separate, yet, exceptionally found on the same plant.

JUNIPERUS SABINA: The Savin or Brathy Juniper.

This is the representative or prototype of our third, or *Sabinoides* section, the *Sabina Altera Cupressoides* of the ancients. It, in some one or other of its many forms, is to be found in many countries in a natural, and in most parts of the world in a cultivated state. Its leaves are variously formed, some being scale-like, some needle-like, some awl-shaped, and others rounded; some, again, are very sharp-pointed, while others are blunt-pointed; some spreading and some imbricated, some bright, while others are dark or dull green; some yellowish-white, others are bluish-green; some smooth and shining, while others are glaucous or powdery. Its berries are blackish-purple or dark violet, in colour; some smooth and shining, some glaucous or powdery; all of them small, round, or oval; about the size of small-fruited currants; and generally one-seeded. Its branches are spreading, dense, much ramified, and abundantly furnished with short, straight, tufted branchlets; which are well clothed with foliage. It forms a dense-branched, spreading bush, from one to two yards high; growing freely in almost any kind of soil, if in a healthy condition, and luxuriates in rocky debris, and is very much accelerated in its growth by lime, brick, or other hard, stony, or earthy rubbish; wine-lees, or kitchen or laundry wash or slops in a diluted state: it seems to relish a slightly brackish, or soapy food and drink. Found in a natural state in most parts of Southern Europe, also on the Alps, Appennines, and Pyrenees; and more or less plentiful in Lombardy, Greece, Spain, and Tauria; and thoroughly hardy, though of very slow growth. Its most striking forms or varieties are:—*Nana*, (the dwarf,) *Prostrata*, (the creeping,) *Tamariscifolia*, (the *Sabina Altera Tamariscoides* of the ancients,) and *Tamariscifolia Variegata*, (the

variegated Tamarisk-like-leaved form,) and *Variegata*, (the common variegated-leaved.) Each and all of which are, in all their component parts, highly fragrant and stimulant: and thoroughly hardy.

JUNIPERUS SQUAMATA: The Scaly Juniper.

This kind is called "*Pappinja*," (creeping juniper,) "Googgul," (incense juniper,) "*Theloo*," (spirituous-juiced juniper,) and "*Bhedara*," (yeast-producing juniper,) by the Indian tribes. In its ligneous tissue it is closely allied to its congeners, *Densa*, *Recurva*, and *Religiosa*, but in its leaves, fruit, and habit of growth, it is distinct from each and all of them; and more particularly in its products of resinous juice, which is much less bitter or pungent. It forms a large, spreading, many-branched, creeping or decumbent bush, about a yard high. Its leaves are generally in threes, ovate or oblong in form; some acute, some obtuse; comparatively large; various shades of green colour, and all of them, young and old, more or less glaucous; while on young growths they are linear or lanceolate, some bright green, and others green above and white or silvery below; and on all branches they are more scale-formed and imbricated. Its berries are also ovate or oblong; some light blue, some dark purple, and some nearly black in colour; all of them glossy or shining, and more or less scaly-surfaced and generally one-seeded. It is hardy enough for the climate of Britain.

JUNIPERUS THURIFERA: The Frankincense Juniper.

This is a distinct, beautiful, and ornamental kind; forming a most graceful, dense, conical, and perfectly symmetrical little pyramidal tree; branched to the ground, and regularly tapering to a sharp and finely-rounded point, or top; attaining heights of from twenty to forty feet. It is a native of Spain and Portugal; and hardy enough for our English winters, though somewhat delicate in cold, or much exposed localities. It well deserves a place in every collection of ornamental, handsome, or beautiful trees or shrubs. Its leaves are small, narrow, rigid, sharp-pointed, rich glaucous grey, or silvery-green in colour; and generally in opposite pairs, somewhat stem-clasping or loosely imbricated and glandless on the under side. Its berries are comparatively large, ovate, changing from bright green to ruby shades as they increase in maturity; transforming themselves to violet tints, and when ripe assuming a rich, glaucous, dark purple, or black colour. It was formerly much used by Southern Europeans, as one of their incense plants or trees, hence its name *Thurifera*.*

* When any of the genera or species of Pinaceæ in European Roman Catholic countries, or under the Greek Church, are called "THURIFERA," be it understood

JUNIPERUS VIRGINIANA: The Virginian Juniper.

So-called from its having been introduced into this country from North America more than two centuries ago: and popularly known as the "Red Cedar," a name applied to it on account of its beautiful red-coloured wood; which is correct and appropriate enough when it is thoroughly matured or seasoned; but its young, immature, or sap-wood is creamy-white in colour. This juniper, in a more or less metamorphosed or altered form, is also to be found in many parts of India, in Mexico, and recently in more North-western latitudes of the globe. Some of these when first imported appear quite distinct species; but, when cultivated in the same soils, climates, and altitudes, gradually revert to the prototype. It attains heights of from twenty-five to fifty feet; and is thoroughly hardy, though its Indian forms named *Barbadensis* and *Gossainthanea*, and their varieties, are more or less tender and delicate in this country; so is its Mexican form. Its leaves are of various forms, and very irregularly disposed upon the branches, some being scale-formed, some needle-shaped, some lanceolate, some ovate, and some roundish, blunt or sharp-pointed; in opposite pairs, or in whorls of threes; some scattered, some two-rowed, some are four-rowed; some spreading, and some imbricated; some comparatively long from a quarter to half an inch, but generally short; some thick and leathery, some thin and soft; some glaucous, some smooth and shining; of various colours; light or dark green, glaucous, grey, or silvery-green; brownish-green or purplish-green. Its berries are comparatively small, globular, or roundish; of various shades of purple colours; some smooth, some warted or tuberculated; some shining, but generally with a glaucous powder when ripe. It produces good timber, which is compact, fine-grained, strong, fragrant, and durable; rich in colour; capable of receiving a good polish; and not subject to the ravages of wood insects, or fungoids. It is useful for many domestic purposes, as well as for carpenters, cabinet-makers, wood-turners, black-lead pencil makers, and other wood workers. It grows freely in almost any kind of soil, if in a healthy condition, and is an useful and ornamental small-sized tree, more particularly in maritime districts; but its slow and tardy growth, and small dimensions, detract much from its value as a profitable timber tree. It is to

that it is by accommodation of the term from frankincense to incense; not, of course, that they produce the Asiatic sandarac frankincense, but the incense used in lieu of it in modern Grecian, or Romish ceremonies of religion. Hence it is that so many of the Firs and Pines are so frequently mentioned as producing "frankincense," "incense," "odour" or "sandarac."

be found in many forms and varieties besides those already mentioned, amongst which I may here mention *Caroliniana*, (a more compact-growing and more thinly-foliaged variety,) *Dumosa*, (a more bushy and spreading form,) *Glauca*, (a very glaucous-leaved form,) *Nana*, (a dwarf variety,) *Variegata*, (a variety with part of its leaves or spray of a white or yellowish colour,) and *Viridis*, (a bright green-leaved variety;) there is moreover a *Pendula* or weeping-branched kind, and of this, again, a *mascula*, or male form; a *fœmina*, or female form; a *Variegata*, and a *Viridis;* all of which are hardy and highly ornamental.

S.D. III. PODOCARPEÆ: The Podocarpus Tribe.

From Greek πους; πεδος, *pedos*, "of a foot;" and καρπος, *karpos*, "a fruit;" fruit footstalked.

In foliage and general deportment this S.D. might be said to be the better-half of the allied S.D. *Taxineæ;* yet, in their general characteristics, particularly in flowers and fruit, and likewise in the ligneous tissues, and resinous juices, they are specifically and generically distinct from the Yews.

Flowers, male and female, on the same or separate plants; sometimes together, sometimes separate: terminal and solitary, or in spikes or clusters.

Leaves, linear, lanceolate, oblong, needle-shaped, spoon-shaped, awl-shaped, or three-sided; opposite, or alternate; scattered, or in whorls; two-rowed, three-rowed, four-rowed, or five-rowed; nerved, ribbed, or channelled; shining and leathery, sharp or blunt-pointed, various in colour; generally light or dark green, sometimes yellowish, or bluish-green; rarely rusty or brownish-green.

Fruit, plum-like, generally about the size of a pea, in some species as large as cherries, or moderate-sized plums; of various colours;—purple, red, violet, yellow, or green: generally shining, some with a powdery bloom when ripe; some singly and some in clusters; and not poisonous nor irritant as in the Yews.

§ 1. CALOPHYLLUS: The Beautiful-Leaved.

From Greek καλος, *kalos*, "beautiful;" and φυλλος, *phyllos*, "leafy:" their leaves being so large, massive, many-nerved, shining green, and conspicuously beautiful,—more Laurel-like than Pine-like in their foliage.

Flowers, male and female, together or separate, on the same or on separate plants, in some solitary, in others in clusters.

Leaves, these are comparatively large for firs or pines, being from

two to six inches long, and from half an inch to two inches broad; more laurel-like than pine-like. In form, linear, lanceolate, oblong, three-sided, or awl-shaped; generally opposite, but frequently alternate; two-rowed or five-rowed; all more or less leathery, stiff, and shining; of various shades of brown, yellow, light or dark green; all more or less numerously nerved and furrowed; and some have numerous *Stomata*,—or breathing-pores on their surface.

Fruit, plum-like, globular, generally singly, but frequently in twos or threes; various in size; some the size of a pea, some as large as cherries, changing from green to dark purple when ripe; but the beautiful fascicle inflorescence assumes many forms in their cup-like scales or bracts, which at first seems like the germ or embryo of a single fruit; but many of them being temporary, or deciduous in their nature, they frequently become disposed in bunches, changing as they increase in maturity through many shades of green, yellow, or brown; and when thoroughly matured forming a fleshy, thin, glaucous, soft, powdery, sloe-like berry, the seed of which is enclosed in the inner thin, hard, brittle, and bony shell.

In this section *(Calophyllus,)* we have two species, which are to be found in many forms or varieties.

PODOCARPUS JAPONICA: The Japan Podocarpus.

This is the "*Nagi*," or "Catkin-bearing Laurel" of the Orientals, attaining heights of from twenty-five to fifty feet; having a smooth, fleshy, soft bark, which is of a brown colour; and its resinous juice is strongly balsamic, and highly odoriferous. Its leaves are from one-and-a-half to three inches long, and about half as broad as long; generally deep green above, and yellowish or light green below. Its branches are generally spreading, opposite, or in whorls; mostly pendent when old, though more or less aspiring when young. Of its many forms I recognize:—*Cuspidata*, (long-pointed-leaved,) *Grandifolia*, (having leaves five to seven inches long, and one to two inches broad,) *Ovata*, (ovate-leaved,) *Ovata Variegata*, (variegated ovate-leaved variety,) and *Aurea*, (golden,) and *Argentea*, (silvery,) variegated varieties of it. All of which are most beautiful ornamental plants, but unfortunately more or less tender, and much too delicate and fastidious in such a climate as ours.

PODOCARPUS LATIFOLIA: The Broad-Leaved Podocarpus.

This is the "*Soplough*" Pine of India, a most beautiful little evergreen tree, attaining heights of from twenty to eighty feet in its native habitats, the mountains of Pundna and Salak, and in the Island

of Java; it is also more or less plentiful in Eastern Bengal. It is much influenced in its stature and dimensions, as well as in the size, colour, or texture, of its leaves, fruit, and bark, by the soils and altitudes in or upon which it may produce them. Its leaves are from three to seven inches long, and from one to two inches broad. Its fruit is globular, generally singly, yet frequently in bunches, particularly on the branchlets or tips of the branches. It is also found in a slightly altered form, named *Agathifolia*, or *Blumii*, in catalogues or collections; but in whatever form it may be found it is much too tender for an ordinary English winter.

§ 2. STACHYCARPUS: The Spike-Fruited Podocarpus.

From the Greek σαχυς, *saxus*, "an ear of corn," and καρπος, *karpos*, "fruit:" their floral organs being borne upon more or less elongated footstalks. But this, be it remembered, like many other botanical enactments, expresses only comparative, not absolute difference.

Flowers, male and female, generally on separate plants, exceptionally on the same plant; generally in spikes, exceptionally solitary; on more or less elongated footstalks.

Leaves, linear, lanceolate, oblong, foliate, ovate, awl-shaped, or needle-shaped; alternate, opposite, scattered, or in whorls; and one-nerved. Of various sizes, ranging from one-eighth of an inch to eight inches in length, and from one-sixteenth of an inch to one inch in breadth. Generally light or dark green, in some species yellowish or brownish-green.

Fruit, drupaceous or plum-like, of various sizes, some as small as peas, some as large as plums; inverted, scaled, adnate and adhering; in form globular, cylindrical, obtuse, ovate, or oblong; solitary, in twos, threes, or more in a cluster; dark purple, light red, yellow, or green in colour; some powdery, some shining, some glaucous, others non-glaucous.

In this section of the *Podocarpus* I include what botanists have been pleased to define as twelve genera, and of these genera about forty species, and of these species about as many varieties; and the synonyms by which this group is enumerated in botanical literature, and found in herbariums and collections, I do not here attempt to reckon up; suffice it to state, that the following enumeration includes each and all of the specific or distinct species of this section of the S.D. *Podocarpeæ*, all the others being, in my opinion, but quasi-species or varieties; the effects produced by, and inseparable from, the natural

agencies—soil, climate, and altitude; and, with three or four exceptions, all of them are too tender and delicate in constitution for our climate, hence my knowledge of them is, as a matter of course, more or less theoretical; for in the majority of cases it is founded upon, or derived from, dried or preserved specimens of their leaves, fruits, and ligneous tissue; at best but very imperfect materials whereby for a practical man to decide whether they may have been produced by a species, a quasi-species, or a variety; or are merely the varying products of soil, altitude, or climate; important considerations to the practical cultivator, but generally forgotten or ignored by hair-brained species-mongers.

PODOCARPUS AMARA: The Bitter-Juiced Podocarpus.

This is the Indian "Kimerack," attaining heights of from one hundred to two hundred feet; having leaves from two to five inches long, and from half an inch to one inch broad, and rich green in colour; with slender, spreading branches, which are disposed on the stem in whorls. It is found in Java, and is much too tender for the climate of Britain.

PODOCARPUS ANDINA: The Andes Podocarpus.

Excepting the Corean form of the Chinese Podocarpus, this is one of the most hardy and best constituted of the S.D., and in a sweet, healthy soil, and warm locality, it will succeed tolerably well in this country. Its leaves are linear, tapering to base and apex, scattered or two-rowed; from a half to one-and-a-half inches long, and from one to one-and-a-half lines broad; rich glossy green in colour, somewhat rusty on the margin, and nicely freckled above, and glaucous below; the fruit is about the size of a cherry, globular in form, and purple in colour.

It attains heights of from five to twenty-five feet, and the bark is smooth, and reddish-brown in colour. It is one of the few species in this S.D. which can be grown without protection in the winter, in the British Isles.

PODOCARPUS CHINENSIS: The Chinese Podocarpus.

This is of a sportive character, and found in three quasi-species, many varieties, and still more sub-varieties. Its quasis are *Koraiana* and *Macrophylla;* and of these there are *Argenteas* and *Aureas*, *Elegantissimas* and *Canaliculatas*, *Corrugatas* and *Microphyllas*. Its Corean form is one, if not the most hardy and best constitutioned kinds of the *Podocarpus* tribe, and in good soils, in this country it forms a most handsome evergreen shrub, while several of its varieties, particularly the large-leaved and variegated, deserve a place in every

collection of Pinaceæ, where a good healthy soil, a warm locality, and a well-sheltered situation can be afforded to them. Their leaves are of various sizes, ranging from half an inch to half a foot in length, thick and leathery, linear or lanceolate in form; conspicuously ribbed, light or dark green, silvery or golden; smooth and shining, or powdery and glaucous; erect-branched, small trees and shrubs; natives of China, Corea, and Japan; ranging in heights from four to forty feet; and most of them would survive our ordinary winters if planted in our warmest localities, in a sweet, healthy soil, and sheltered situation.

PODOCARPUS CUPRESSINA: The Cypress-like Podocarpus.

This, although a native of Java, and by the natives called "Kimerack," is distinct from *Amara;* and the more observant call it "Chomoro." It leaves rarely exceed an inch in length, but generally they are much shorter, and scale-formed, or cypress-like; hence its name: while the leaves of *Amara*, are from two to four inches long, and generally half an inch broad, and lanceolate; they differ also in the disposition of their branches, and in the size and form of their fruits; but like *Amara*, it is much too tender for the climate of Britain.

PODOCARPUS DACRYOIDES: The Dacrydium-like.

This, again, is somewhat related to *Cupressina*, but in foliage more like an Arbor-Vitæ than a Cypress; while in fruit and deportment more like a Dacrydium. It attains heights of from one hundred and fifty to two hundred feet; the New Zealanders call it "Kaki-Katea," (water-pine,) and the Colonist "White-wood." Its fruit is small, very numerous, sweet and edible; but, like most of the Podocarpus tribe, it is much too tender for Britain.

PODOCARPUS ELATA: The Tall or Lofty Podocarpus.

This is the "Hako-terro," or big-tree of New Holland; attaining heights of from one hundred to two hundred feet. The same tree, more or less altered by soil, climate, and altitude, has been found in Abyssinia, Cape of Good Hope, Brazil, Nepal, and New Guinea; and has been again and again re-introduced and re-christened; for it is to be found with such names as *elongata*, *Lambertiana*, *læta*, *nobilis*, *spicata*, *spinulosa*, *thevetiæfolia*, and *Thunbergii;* their only differences being in the size, form or colour of their leaves; each and all of which quasi-species, forms or varieties are much too tender in the British Isles.

PODOCARPUS FERRUGINEA: The Rusty-coloured Podocarpus.

This is the "Mairo," of the New Zealanders, attaining a height of about fifty feet; with leaves from half an inch to two inches long,

variously formed, some being linear, some needle or awl-shaped, while not a few are scale-formed; some are bright glossy green above and glaucous below; but the adult leaves generally assume a rusty-brown colour; the bark also is reddish or rusty-brown in colour: and, moreover, its nut-like fruit is reddish, and more or less covered with a glaucous rusty powder. The same tree is to be found on the more elevated parts of the volcanic mountains of Java; only slightly altered in the size and colour of its leaves; and is to be found in catalogues and collections named *Discolor*. In either of its forms it is thoroughly tender in this country.

PODOCARPUS JAMAICAENSIS: The Jamaica Podocarpus.

This is the "Yacca," of the native tribes of the West Indian Islands; and a very sportive or changeable kind; for it is to be found in the most northern parts of New Zealand, and on the highest mountains nearly to the limits of the perpetual snow line, reduced to a perfect pygmy or gnarled bush, with small, thick, yew-like leaves; and in this form it has been introduced to us and named *Nivalis*, (Snowy Podocarpus.) On the Antilles,, and blue mountains of Jamaica, it attains heights of fifty feet, with leaves from one to two inches long, and half an inch broad; thick, shining and leathery: and in this form it has been introduced to us and named *Coriacea*, (leathery-leaved Podocarpus.) While on the eastern declivities of the Island of Jamaica it attains heights of one hundred feet, with leaves from two to six inches long, and from half an inch to an inch broad. In whatever form, however, enlarged or reduced, it is much too tender for this climate.

PODOCARPUS NEREIFOLIA: The Nerium-Leaved Podocarpus.

This is the "Goonsi," of India; attaining heights of from thirty to fifty feet; with leaves from three to six inches long, and about half an inch broad; lanceolate, and acute-pointed, thick, flat, and leathery; bright green above, and yellowish-green below; having a prominent mid-rib; and not unlike the Oleander in foliage; hence its name. Its fruit, or rather the peduncles thereof, is sweet and edible; and is used as an article of food by the native tribes. It is a distinct kind, and tolerably constant in its distinguishing characteristics; but, like most of the tribe, much too tender for our climate.

PODOCARPUS RIGIDA: The Stiff-Leaved Podocarpus.

This is found in Peru, attaining heights of from twenty-five to fifty feet, with leaves from one to two inches long, and from one to two inches broad; variously formed, linear, lanceolate, sickle-shaped, and yew-like, flat, smooth, and leathery; some obtuse or rounded at the point, others

very sharp-pointed; one-nerved, shining, glossy green above and yellowish-green below. It is found in a slightly altered form on the mountains of Saragura, (in the same country,) from whence it was introduced to us as *Taxifolia*, and still more recently it has again been re-introduced and re-named *Taxifolia densifolia*. It is half-hardy.

PODOCARPUS SALICIFOLIA: The Willow-Leaved Podocarpus.

This kind is found more or less plentiful on the Colombian mountains, and other high altitudes of the north-western parts of South America; and at best it is only a very slightly altered form of the preceding; for the oleander-leaved, and the willow-leaved Podocarpus are one and the same tree; though found in two distinct native habitats. Both of these forms are quite tender in Britain.

PODOCARPUS TOTARA: The New Zealand Totara Pine.

This kind is at best only a quasi-species of *Elata*, "Kaka-terro," or big-tree of New Zealand; the natives call it "Totarra," and the colonists esteem it more than they do "Kaka-terro," inasmuch as it produces more durable, compact, close-grained, and ruby-coloured wood, than the big-tree; but when this is the case, the quantity is less, and the tree only attains one hundred feet in height; which clearly indicates to us that these mighty influences—soil, climate, and altitude, are the agents which produce such results: for when found in warm alluvial valleys, or soils rich in natural humis, then we have *Elata* instead of *Totara*, a two hundred instead of a one hundred feet tree; a creamy-white or brownish-yellow instead of a rich ruby-coloured wood. Such remarkable changes or transformations are, however, only the phenomena of nature's laws.

PODOCARPUS VALDIVIANA: The Valdivian Podocarpus.

This kind, though nearly allied to *Andina*, is distinct from it both in foliage and fruit. It is also somewhat sportive in character; and has been frequently re-introduced into this country as a new species, and two or three years ago as a new genus of **Pinaceæ**; and named *Prumnopitys Elegans:* the Elegant Plum-Fruited Pine. It was formerly introduced and named *Saxe-Gothæa Gracilis:* and is to be found in catalogues and collections named *Podocarpus Nubigæna*. It has been found in several habitats in Chili, more particularly in the provinces of Valdivia and Colchagua; and also, though less plentifully on the Andes of Chili and Patagonia. It attains heights of from twenty-five to fifty feet, with linear, thick, flat, foliage, dark glossy green above, and lighter and more or less glaucous green below; from half an inch to one-and-a-half inches in length; one-nerved; and generally disposed

in two rows. Its fruit is oblong or globular; the receptacle ovate or unequal-sided; generally singly; at first green changing to yellowish-green as it arrives at maturity, and when thoroughly ripe assuming a brownish-yellow colour; the drupes are from half-an-inch to three-quarters of an inch long, and about two-thirds as broad; pleasant to the taste and edible; and used by the native tribes as an article of food. It is tolerably hardy; but unless in the best soils, warmest localities, or best sheltered situations it will not stand the severity of a very hard winter in Britain.

S.D. IV. SYMMORPHAPITEÆ: The Allied Pine Tribe.

From Greek συμμορφος, *symmorphos* "allied," (or like in juice and wood) and πιτυς, *pitys*; "a pine tree." This re-arranged S.D. of my Bacciferæ or Fruit-bearing Pines, formed of old and well known materials, I have been forced, as it were, to adopt in this way, so as to enable me to include in my arrangement of **Pinaceæ** some genera which by most authors are admitted into, and treated as, Coniferæ. Although not one of them is such, yet, I consider myself warranted in including them in this reunion of the Firs and Pines; inasmuch as they are, though, to a certain extent, generically and specifically distinct from, yet, to a certain extent, so closely related or allied to, some of the other species of my Baccifers, in their juices, structure, and general deportment, as to entitle them to be admitted; not upon sufferance, however, but, under the auspices of their generic name; as legitimate claimants for presentation at this court of **Pinaceæ.**

§ 1. CHÆTOCLADUS: The Bristle-Branched Allied Pine.

From Greek χαιτα, *chaeta*, "a bristle;" and κλαδος, *klados*, "a branch;" the resemblance of their branches; forming as it were a bristly-branched bush.

Flowers, male and female, generally together, yet, exceptionally separate; males generally sitting close to the stem joints; females generally produced close to the joints, and on solitary footstalks; comparatively,—some are long, and some short.

Leaves, very small, few and distant; generally two at the joints of the very numerous, slender, many-jointed, articulate or divaricate branches; which are generally furnished with sheath-like appendages; some of the bristly or hair-like twigs are erect, some drooping.

Fruit, generally small; some produce succulent or fleshy, some dry or leathery carpels, or nut-like formations; some have one, others two seeds in a fruit.

CHÆTOCLADUS ALTISSIMA: Lofty Bristle-Branched Allied Pine.

This is found in Sicily, Spain, the Canary Islands ; also indigenous to the western regions of the Mediterranean : a climbing shrub, attaining heights of from fifteen to twenty feet.

CHÆTOCLADUS DISTACHYS: Twin-Spiked Bristle-Branched Allied Pine.

Found on the shores of the Mediterranean, Barbary, Egypt, Greece, Italy, Portugal, and Spain ; a curious, dwarf, erect-branched shrub ; never exceeding a yard in height.

CHÆTOCLADUS MONOSTACHYS: Spiked Bristle-branched Allied Pine.

This also is indigenous to the Mediterranean coasts, and to be found in Asia and Siberia. It forms a dwarf, tubercled, erect-branched shrub, never exceeding a yard in height.

These three kinds are all the members of this little family or group f the Allied Pines, which require notice here ; and are only useful for adding variety to, or for increasing our lists or collections of curious and ornamental plants.

§ 2. PHYLLOCLADUS: The Leaf-Branched Allied Pine.

From Greek φυλλον, *phyllon*, "a leaf;" and κλαδος, *klados*, "a branch;" resemblance of their branches to leaves.

Flowers, male and female, on the same plant, but separate ; terminal and in clusters, fertile ones generally in twos or threes in close heads.

Leaves, minute scale-formations, branchlets, leaf-like formations, fan-shaped, wedge-shaped, rhomboid, toothed, lobed, or cut-like, and-feather-nerved, some pinnate with wing-like appendages, and of various shades of green and rusty-brown colour.

Fruit, in connected heads two or three in a cluster, generally small, with fleshy disks, each containing a small nut-like seed, with a thin shell, having their apex bare, and their base enclosed in the fleshy disk.

PHYLLOCLADUS RHOMBOIDALIS: The Rhomboidal Allied Pine.

This forms a most picturesque, branching tree, attaining heights of from thirty to fifty feet ; but being from Tasmania's humid clime, and warm volcanic soil, it is too tender and delicate for the British Isles. There are the following two quasi-species or varieties of it, viz. ;— *Glauca*, (a more glaucous form,) and *Hypophylla*, (a kind with more numerous and distinct under-leaves, and more regularly oval-rhomboid

leaf-formed branchlets,) both of which, like the species, are too tender for our climate.

PHYLLOCLADUS TRICHOMANOIDES: Maiden-hair-like Allied Pine.

This is the 'Tanekaha,' or 'Toa-Toa,' of the New Zealanders, the timber of which is much esteemed by them, and they use the bark in the dyeing of their red and black mats. It attains heights of from fifty to seventy feet, with trunks of from ten to fifteen feet in circumference, and forms a very graceful, spreading-branched tree. There is also an *Alpina*, or dwarf mountain form of it, found on the Tongariro and Ruahine, and other high lands around Nelson in New Zealand. It is much too tender for our climate.

§ 3. PTEROPHYLLUS: The Feather-Leaved Allied Pine.

From Greek πτερον, *pteron*, "a feather;" and φυλλον, *phyllon*, "a leaf;" from the feathery appearance of their leaves.

Flowers, male and female, on separate plants, males in spikes, axillary, minus footstalks; females in clusters, with footstalks, and terminal.

Leaves, deciduous, of various sizes, from three to nine inches in circumference, more or less divided, some two, some three, some five, and some seven-lobed; the principal lobes, again generally subdivided, and more or less cut, or serrated on the edges; fan or feather-like, flat, leathery, thick, and more or less numerously nerved, or ribbed on each side, and tapering to their base where they unite with the long, pliant, glossy, yellowish-green footstalk; the leaves of the species are also yellowish-green, but in some of the varieties there are golden and creamy-white colours in the variegation.

Fruit, plum-like, smooth, and fleshy, in small cups, globular, with long footstalks, each fruit containing one seed of a globular form and whitish colour, and nut-like, with a hard, smooth, bony shell; the fruit when ripe is of a light glossy-green or yellowish colour.

PTEROPHYLLUS SALISBURIENSIS: Salisbury's Allied Pine.

This is a native of China, where it attains heights of from seventy to ninety feet. The Chinese call it 'Gink-go,' (full of leafless buds in winter,) and 'Gin-ki-go,' (a tree without leaves in winter,) and the Japanese names for it are 'Ginaua,' (deciduous tree,) and 'Fusi-kin-go,' (buds crowned with leaves in summer.) It is a somewhat remarkable tree on account of its feathery, fan-like foliage, and also for its straight stem, conical-shaped head, rough greyish bark, alternate, ascending,

horizontal, and drooping branches; short, spur-like branchlets, its prominent buds, and its close, vertical clusters of leaves.

Its timber is yellowish-white and beautifully veined, compact, close-grained, fine in texture, moderately hard, and tolerably durable, easily wrought, and capable of receiving a good polish; but its slow rate of growth, and its being somewhat delicate, and very fastidious as to soil and situation, disqualify it from taking rank as a profitable timber tree in these realms.

As an ornamental tree it is very useful, and in every collection of fine foliaged trees, where there may be a deep loamy soil, on a dry bottom, or a gravelly soil with porous substrata, a warm locality, or a well sheltered situation, it should have a place.

There are also the following varieties of it, viz.:—*Aurea*, (the golden-variegated,) *Argentea*, (the silvery,) *laciniata*, (the much-cut or many lobe-leaved,) *Macrophylla*, (the very-large-leaved,) and *Microphylla*, (a smaller-leaved variety,) all of which are beautiful ornamental trees.

S.D. V. TAXINEÆ: The Yew Tribe.

The Greek τοξον, "a bow"; being akin to ταζα, "to stretch"; and ταζο, "*to draw or pull*," man having become an expert in the arts of war and hunting before he took to literature; the bow and arrow being the ancient weapons for these arts, and the "bow" being made of yew-wood. In far remote periods of the world's history, the bow and arrow were held in as high estimation, and in some countries and amongst some tribes, were as much practiced, as is our present more perfect and efficient weapon the rifle amongst ourselves; and our own national and noble pastime, or art of archery, is only the same idea in a more humane and refined form. The inhabitants of the Balearic and other Mediterranean Isles, have always been noted for their archery. They learned it when young, and rather ingeniously, inasmuch, as when the children were hungry, their victuals were set upon a beam, and before partaking of them, they must needs hit them with a dart or arrow. Every mother who might pride herself upon the possession of a favourite son, made it a rule of daily observance to place his dinner before him, and that he must hit it with the arrow from his *Toxon*, (bow,) before he was allowed to partake of the viands.

Toxon, again, is the origin of the term *Toxica*, "poison," inasmuch, as in former times, nay, even through all epochs of the world's extant history, the Yew was, is, and most probably shall be considered poisonous; there is, however, much popular error prevalent anent this

subject; for it is not the berry, as a berry, that is so, but the husk of the kernel or seed that acts as an irritant upon the stomach and intestines of man; the fleshy pulp, and the seed, or rather the embryo or farina thereof, being innocuous. Moreover, the leaves, or young twigs, or branchlets in late spring or early summer, when the sap is in full flow, or ascending, and before being perfectly elaborated, and compounded or confected in nature's laboratory, and the component ingredients thereof not yet assigned their proper place in the tree's system, but being, as it were, in a crude state as received from the spongilets or feeding rootlets, then they are innocuous: while, in the late autumn, winter, and early spring months, when the sap is thoroughly matured, and when the tree is in a state of rest, as contra-distinguished from its feeding season, then these leaves or twigs will produce the same injurious effects as irritants upon the stomach and intestines of many of our four-footed domestic, or wild, ruminating animals. It is even yet more remarkable, that, when the leaves or twigs are full of the flowing or crude sap, while the tree is in full growth, or vigorously taking in its annual diet, then also will these leaves and twigs, if cut from the tree for a few days, and *partially* dried or withered, produce these noxious or irritant effects: yet if *thoroughly* dried or *completely* withered they are harmless. In this fact there is a most beautiful illustration to man as a chemist, and an indication to him of how much he has yet to learn in nature's chemical laboratory.

Again, *Taxis*, "arrangement," from the Greek ταασσω, "to arrange", has some affinity, and the name *Taxus*, may or may not owe its origin to this root, inasmuch as the arrangement of the leaves is somewhat regular, being disposed on the branches not unlike the tooth of a comb. Our own familiar English name Yew, is derived from the ancient Celtic *iw*, "green."

One is struck with the wide difference between the range of names of this tree among northern nations, and the Asiatic, and South European. It is plain there are two origins for them, the Celtic *iw*, Saxon *if*, which is retained to the letter by the French *if*, German *eibe*, English *Yew:* whereas the Italians in their *tasso*, and the Spaniards in their *tejo*, *texo*, follow the Grecian or Latin origin.

It were a curious question in philology what might be the origin and sense of the Saxon word *if*, and Celtic *iw*. Some derive even this also from the Greek,—from the Greek word ιπτω, *ipto* to hurt, because of the deleterious character of the yew, or of its destructiveness in the *bow*, or the poisoned arrows, of which Pliny writes so much: lib. xvi, c. 10.

Flowers, male and female, generally on different plants, yet, in some species, upon the same plant, but separate.

Leaves, oblong, oval, roundish, linear or lanceolate, sharp or blunt-pointed, concave falcate, flat, keeled, or ribbed; two-rowed, alternate, or spiral; generally green above, and more or less glaucous below; with the seed-leaves generally in twos.

Berries, various in form, oval, oblong, or roundish, solitary or in clusters, some nut-like in fleshy cups, some composed of several consolidated scale-like parts; of various colours; scarlet, purple, brown, or yellowish-green. Seeds of various sizes and forms, generally nut-like, with a bony shell.

§ 1. CEPHALOTAXUS: The Cluster-Flowered Yew.

From the Greek κεφαλη, *kephale*, "a head;" and ταξις, *taxis*, "arrangement;" the flowers being produced in close globular heads.

Flowers, male and female, on different plants.

Leaves, alternate, two-rowed, or opposite, acute-pointed, flat, straight, falcate, or curved; one-nerved, having two glaucous bands on their under face; the mid-rib and margins glossy green. Seed-leaves in twos.

Fruit, comparatively large, one to one-and-a-half inches long, and about half as broad, plum-like, fleshy, more or less elliptical or oval; generally two or three in a cluster. Seeds, nut-like, with a bony-shell, having one seed in each fleshy disk.

CEPHALOTAXUS DRUPACEA: The Plum-Fruited.

This forms a very compact little evergreen tree, attaining heights of from fifteen to thirty feet; with the branches regularly disposed in horizontal whorls, and well clothed with foliage; of a bright glossy green above, having a broad glaucous or silvery band on each side of the mid-rib on the under side. It is a native of China, and sufficiently hardy for our climate, but requires a good soil, a sheltered situation, and more or less humidity and shade to develope itself in this country when it would be found useful as an ornamental plant. There is also a *Glauca*, a more glaucous or silvery-leaved variety; which, however, is only caused by the soil and situation wherein it may be grown.

CEPHALOTAXUS FORTUNII: Fortune's Chinese Yew.

This kind is likewise tolerably hardy, but requires a warm locality or well sheltered situation. It attains heights of from thirty to sixty feet. Its branches, like to all its congeners, are disposed in whorls along the stem; its leaves are variable in size, generally linear-lanceolate; on

young plants, and on the principal branches, they are longer and more scattered, while on the branchlets they are regularly arranged in two rows; glossy green above and more or less glaucous or silvery below. It is a very distinct and beautiful Pine, and deserves a place in every large collection of ornamental trees. There are various forms of it, such as *fœmina*, (female form,) *mascula*, (male form,) and *pendula*, (pendent-branched.)

CEPHALOTAXUS PEDUNCULATA: The Long-Stalked.

This, too, is a native of China. A small, numerous, spreading-branched tree, from fifteen to twenty-five feet in height; having linear-falcate leaves, one-and-a-half to three inches long; which are glossy bright green above, and whitish or glaucous on each side the linear nerve below. It is somewhat more hardy, and less capricious as to soil and situation in our climate, than either of the preceding kinds; and is generally found in catalogues and collections named *Taxus Harringtonii*, (The Earl of Harrington's Yew.) It is a useful small tree or large ornamental shrub. The same plant, somewhat altered, has been re-introduced under the name *Cephalotaxus Umbraculifera*; and, again, as a new species and named *Torreya Grandis*.

§ 2. FŒTATAXUS: The Strong-Odoured Yew.

From *fœtidus*, "stinking," and *Taxus*, "Yew," resemblance of all their parts when pressed or heated; emitting a strong unpleasant odour, hence in their native habitats they are called "stinking nutmegs," and "stinking cedars."

Flowers, male and female on different plants; males solitary, females in twos or threes.

Leaves, alternate, opposite, two-rowed or scattered; linear or lanceolate, flat, falcate, straight or curved; from half-an-inch to three inches long, with short footstalks, and of a light or dark green colour; with two yellowish or brownish bands on their under surface.

Berries, plum-like, oval, and green, or yellowish purple in colour; having nut-like seeds with a hard bony shell.

FŒTATAXUS MONTANA: The Mountain Yew.

This is the American "Stinking Cedar." It attains heights of from twenty-five to fifty feet, forming a handsome, pyramidal, spreading-branched tree; with yew-like leaves, which are from one to two inches long; light shining green above, and glaucous grey below; having a reddish band on each side of the mid-rib.

It is tolerably hardy, but of very slow growth in this country; and

only useful for adding to the numbers of a large collection of **Pinaceæ.**

FŒTATAXUS MYRISTICA: The Californian Yew.

This forms a small round-headed, spreading-branched tree; from twenty to forty feet in height. Its leaves are from two to three inches long, and of a very pale or yellowish-green colour. It is tolerably hardy, but of no economic value as a timber tree; and only useful for increasing our list of ornamental Yews.

FŒTATAXUS NUCIFERA: The Nut-Bearing Yew.

This is the Chinese "Stinking Yew;" attaining heights of from fifteen to twenty feet, It is tolerably hardy, but it has nothing to recommend it to our especial notice; it is, however, a distinct and interesting form of the Yew.

§ 3. SQUAMATAXUS: The Scale-Fruited Yew.

From the Greek word *εσκαμμαι*, the perfect tense of *σκαπτω*, "dig or scratch;" hence Latin *squama*, "a scale or peel;" and *taxus*, "Yew;" the fruit being composed of consolidated, yet free scales; forming a fleshy cone-like fruit.

Flowers, male and female separate but on the same plant, males in spikes, females in globular heads.

Leaves, alternate or scattered; linear, lanceolate, or oblong; sickle-shaped or re-curved, and somewhat two-rowed; green above, with a glaucous band on each side of the mid-rib below: generally acute-pointed, and with very short footstalks.

Fruit, composed of several consolidated, yet, free scales, forming a fleshy cone-formed berry, somewhat depressed in form, angular-surfaced; thickly covered with spiny humps, or tubercles. Seeds, ovate nut-like, and of a pale brown colour.

SQUAMATAXUS ALBERTIANA: Prince Albert's Squamous Yew.

This is the only species we have in this *Section* of *Taxineæ*; and a very distinct and interesting little tree or large shrub it is. In its native habitat, on the Patagonian Mountains, it attains heights of from fifteen to thirty feet. It is somewhat too tender and delicate for general planting in our climate; but in a warm locality, a healthy dry soil, and a sheltered situation it would stand our English winters; but at best it can only be classed as a distinct species of **Pinaceæ:** a curious and interesting tree in any collection of the Firs and Pines.

§ 4. VERATAXUS: The True Yew.

Flowers, male and female on different plants.

Leaves, linear, lanceolate, oblong, or rounded; alternate, decurrent, leathery, stiff, or pliant; and of various colours.

Berries, round, oval, or spherical; scarlet, brown, or yellowish; having nut-like seeds with a bony shell or husk; free and exposed at the top, and covered or enclosed at the base in a fleshy cup or disk, which is glutinous.

In this section we have the Common Yew, and its many *quasi-species*, *varieties*, and *sub-varieties*: an assemblage of trees and shrubs, which are natives of Europe, America, China, and Asia, but to be found either in an indigenous or exotic state in most temperate regions of the globe. Many of them produce first-class timber, which is more or less close-grained, hard, tough as leather, flexible, elastic, and imperishable in its degree of durability; capable of a high polish, rich in colour, very frequently beautifully marbled and veined, and much prized by turners and other wood artists.

The Yew is thoroughly hardy, good in constitution, living to a fabulous age; and will grow in almost any description of soil if in a sweet and healthy condition; but prefers moist to very dry ones, and luxuriates in loams and clays, and in stony debris, and shady situations. They are comparatively small-sized trees, and many of them only large shrubs, while not a few of them are but pigmies or sprawling bushes: yet, a cognate group of plants of the most suitable description for forming hedges, shelter belts, screens, or mixed shrubberies: in short for any decorative or ornamental planting whatever. For resisting wet, or alternate wet and dryness, and the inclemency or variableness of our weather; for their being proof against fungoids, or other plant-enemies; for their so well enduring to be clipt or shorn into grotesque forms; and for forming plant-statuary, few if any species or varieties of plants are better adapted; while, even, in their natural forms they are most varied and dissimilar; some of them, *e. g. Communis*, are quite expansive or spreading in their habit of growth; some perfectly erect and cylindrical, *e. g.* the Irish form; some, again, are pendent-branched, while some are conical little pillars and others round or spherical little pigmies. Again, in their foliage they are equally diversified, some of which are superlatively variegated, others lively sea or pea-green; while the most of them are dull and sombre-green in colour; and a few of them rusty or brownish-green, others yellowish-green: some have large ample foliage, others have small scale-like leaves.

When Arboriculture is enthroned in her own legitimate

throne; which at times is being usurped by Horticulture, or still more frequently by that art at present popularly known as "Landscape Gardening," which correctly rendered, and as at present too frequently practiced, might be defined as, *helter-skelter-planting-of-trees-and-shrubs-upon-the-face-of-the-earth:* and which popular *art* does very much resemble another phase of an equally popular *art*—the *colour mania* in "Flower Gardening;" in which the colour-culturists have now run to the extreme acme of *over-done* contrivance: inasmuch, as they have satiated us with their "Gorgeous Ribbons," "Manchester Prints," "Brussels Carpets," "Kidderminster Rugs," "Geometrical Floor-cloths," and "Damask Covers;" at least, in so far as these, (in their proper places, most useful, and highly appreciated domestic articles,) are at present mimicked, in what is ycleped "Flower Gardening," and as practiced by too many of the colour-culturists of our own country, and our own day.

Better by far, methinks, were we to follow ancient customs, and make art imitate nature, than when, as I have just deprecated, nature is fettered to imitate art. Better by far, however, for the carpet to copy the verdant and floral earth, than the earth the carpet. Be this as it may, our *new ideas* of "Flower Gardening," have many an *old counterpoise,—e.g.* the Arabs, during the battle of Cadesia, occupied Madayn, and obtained amongst their other enormous spoils, from the Persians, a most extraordinary carpet, so superb in silk and cloth of gold, so elaborately wrought with curious and most costly jewels—the beryl and the emerald, the ruby and the sapphire, the topaz and the pearl were in it arranged with such consummate skill,—as to represent, in beautiful mosaic, trees and fruits, shrubs and flowers, rivulets and fountains; yes, and firs and pines of many kinds were in this *ideal winter paradise* or garden; which decorated an apartment of the palace, and which carpet was nearly thirty yards in length, and as much in breadth: and which must have been, indeed, very valuable, inasmuch as history informs us that, when the ruthless Omar, the Arab Chief, eventually ordered it to be cut to pieces, for division, the share of Ali alone, not bigger than a man's hand, was estimated as worth nearly *ten thousand pounds!!*

This artistic, yet *old idea*, seems of less questionable taste than our *new* "bedding-out" one in summer, and from which *old one* we might extract a sun-beam, or *new one* in our "bedding-in," particularly in winter-gardening. This "blaze of colour" mania is now, however, like most others, acted upon by fashion's contagious influence, and has at

last taken possession of the villa parterre, the city window, and the rural cottage: when, however, I say, we have elevated Arboriculture to her proper place as an art, and when the "landscape" shall become part of her domain, the "shrubbery," "flower-bed," "garden-plot," and "window," take leaves from her book for the ornamentation of our homes: in that 'good time coming,' which seems not so far distant as many suppose;—for even now, we have indications of that brighter morning, of that more enduring day, when a more natural, a more noble, and a more truly refined taste or fashion shall prevail, in the artistic embellishment of England's happy 'homes:'—the Yew, in its now numerous forms, varieties, and sub-varieties, will then stand high in public estimation.

TAXUS ADPRESSA: The Flattened-Branched Yew.

This although a hybrid, or seminal sport from the prototype *Communis*, is nevertheless a very distinct and interesting form of the Yew: forming a numerous and flattened-branched, thickly-foliaged, and ornamental small tree, or large spreading bush, having small, flat, oblong, dark glossy-green leaves, which, however, are lighter and slightly glaucous on their under face. It is thoroughly hardy, and well adapted for most descriptions of decorative planting, particularly for large rock-work and embankments. There is an *Erecta*,—a more erect-branched form of it; likewise a *Variegata*,—a more slender-branched sub-variety, having some of its young shoots covered with yellowish-green, or straw-coloured spray; some of the leaves, with their tips and margins, of a creamy-white, and the centre green on the upper face, while all of them have more green on the under side, rendering it a curious bizarre-looking little bush: shade and humidity being its likes, and sun and exposure its dislikes.

TAXUS CANADENSIS: The Canadian Yew.

This forms a numerous-branched, spreading bush, attaining heights of from one to four yards, distinguished from the common Yew by its shorter leaves, and browner-coloured bark and spray; a hardy, useful, and interesting form of the Yew.

TAXUS COMMUNIS: The Common Yew.

This is the prototype and representative of this *Verataxus* section of our S.D. *Taxineæ*. It is to be found in most European countries in an indigenous, and, in most temperate regions of the globe in an exotic state; and being, like all the other *species* of **Pinaceæ**, much influenced in its stature or dimensions by the soils, climates, or altitudes in or upon which it may be grown; it is, as a matter of course, to be

found ranging from five to fifty feet in height. When fully grown it will, whatever its height, be generally found with a short stem or trunk, and an ample, bushy head, densely branched, and literally covered with dark sombre-green leaves, which when matured all assume a drooping habit. It is valuable for its timber, and most useful for its adaptation to almost all descriptions of soils, climates, and altitudes, and for every description of planting, whether useful or ornamental; thoroughly hardy, though of slow growth, and an indispensable tree.

Of its numerous forms or varieties, all of which, however, are only to be considered as useful, and more or less beautiful small sized trees or shrubs, I select the following :—

Argentea, (the silvery-variegated variety,) having some of its branches clothed with leaves which are of a creamy-white on their margins, and at their points; which mixed with the green ones, renders the spray very pretty.

Aurea, this is the golden-variegated variety, in nothing but the colour different from the preceding variety.

Brevifolia, (the short-leaved variety,) this has much shorter, and more rounded leaves than the prototype; and is a distinct variety of the Yew.

Epacriodes, (the epacris-like variety,) an elegant, distinct, numerous-branched, dark-green-leaved, prickly-habited, ornamental plant.

Erecta, (the erect-growing variety,) differing from the pyramidal variety in its more rounded base, cylindrical form, and the more stem-clasping habit of its branches.

Erecioides, (the heath-like variety,) a small-leaved, slender-branched, numerous-sprigged little pigmy; and a pretty shrub.

Fructus-Luteus, (the yellow-fruited.)

Glaucus, (the glaucous-leaved.)

Gracilis, (the slender-branched.)

Nana, (the dwarf.)

Nigra, (the very-dark-green-leaved.)

These five kinds are all thoroughly hardy, and useful shrubs; and their names explain their character and variety.

Pendula, (the pendent or drooping-branched variety;) when left to Nature its branches scarcely ever are inclined to grow erect or ascend upwards; but when this kind is grafted or inarched upon a stem of the common, or some of its straight and tall growing varieties, then we have what we term a "Weeping Yew:" and there is again of this *pendula* several forms, found in catalogues and collections under such

names as *Dovastonii*, *Jacksonii*, *Recurvata*, and *Prostrata*; and, moreover, a *variegata* or variegated variety of this pendent-branched Yew is also extant.

Pyramidalis, (the pyramidal variety:) this kind is more conical in form, with a broader base, and more tapering to its point than either *erecta*, or *fastigiata*; somewhat intermediate; and of this, again, there are more forms than one; amongst which may be mentioned *Cheshuntensis*. There is, moreover, a *Pyramidalis-Variegata*, a nice-habited, ample and fastigiate-foliaged; green, yellowish, and creamy-white-sprayed variety of the pyramidal form of the English Yew.

Sparsifolia, (the thin, sparse, or poorly-foliaged variety,) more curious than beautiful, nevertheless, a distinct form of the common Yew.

Variegata, (the variegated variety;) this must not be confounded with any of the *Aureas* and *Argenteas* already mentioned; inasmuch, as it is a very different and very sportive variety of the yew: at times and seasons part of its foliage being of a yellowish-green or straw colour, particularly when young, and other branchlets may be clothed with light green leaves; while all of them as they increase in age, increase in darkness, when old assuming a dull sombre green; and when aged or before falling off changing to a rusty greenish-brown. A bizarre tree, and doubtless the ancient Naturalist's:—"variable-leaved-Yew-tree."

TAXUS COMMUNIS HIBERNICA: The Common Hibernian Yew.

This is the Irish Yew; a most useful well known, highly appreciated and distinct little tree; in habit and deportment it has no resemblance to the prototype; yet it is only a variety of it, inasmuch as it reverts to the common Yew when propagated from seed more than to the parent. It forms a fine contrast in a mixed group, shrubbery, or plantation; where, from its formal, compact, and erect habit of growth, it adds much to the scenic effect of any landscape, however picturesque; morever, it is a most useful plant for lawn or garden embellishment as an individual specimen tree or shrub. There is of this form of the Yew the three following sub-varieties:—*Argentea*, (the silvery-variegated,) having some of its branches clothed with creamy-white and green leaves, which when well variegated, and kept so, is very pretty: *Aurea*, this is the golden-variegated, differing from the preceding in nothing but the colour of its variegated leaves, which are more creamy or yellow: and *Aureo-virens*, (the gold-and-green-sprayed Irish Yew;) this is, indeed, a beautiful, distinct, and variegated variety; rich in its massive

leaves, which, when young, are golden-edged and tipped; having a green centre-band, increasing in breadth as it reaches the base; when old and thoroughly matured the leaves change their colour to a sombre green; while in middle age, they are freckled or mottled with bright-green and golden shades; rendering its spray a pretty conglomerate mass of yellow and green tints. In a shady situation, and a pure but humid atmosphere, it will form a cylindrical, bizarre-like pillar; and add much to the variety of form and colour, and enhance the pleasures we derive from a select collection of ornamental trees and shrubs.

TAXUS CUSPIDATA: The Abrupt-Pointed-Leafed Yew.

This is merely an altered form of the prototype: its name explains its difference; it has been sent us from China, or Japan; where the Orientals cultivated it under the name of "Araragi," and, like its congeners is quite hardy enough for the climate of Britain.

TAXUS LINDLEYANA: Dr. Lindley's Yew.

This form of the Yew is from California; where it attains, as a matter of course, larger dimensions than the prototope does in Europe; but when both are grown together in the same soil, situation, and altitude, they would be found to be as like as two peas.

TAXUS MEXICANA: The Mexican Yew.

Another somewhat altered form of our own familiar Yew: and all that I have stated regarding the Californian Yew is equally applicable to the Mexican Yew; with this difference, that, as a matter of course, the Mexican is a more tender and delicate plant.

TAXUS WALLICHIANA: Dr. Wallich's Yew.

This is the Indian form of *Taxus Vera;* the 'Sung-cha,' or Yew-tree, and 'Pung-cha,' or Tea-tree of the Himalayas and Bhootan. In the high lying valleys of Napal, Sikkim, and Thibet, it grows to a larger size than the prototype does in Europe: although tolerably hardy, it is somewhat delicate in constitution for the climate of Great Britain and Ireland.

And now, having completed my task;—having, I trust, submitted to my patrons, friends, and fellow arboriculturists, and all planters and admirers of trees and shrubs, some not unimportant information,—the results of years of practical experience, observation, and note-taking, in this particular department of Natural History;—I should not be a true and right-minded son of philosophy if I did not, in conclusion, at the least, just remind myself, if not my reader, that the highest, the

most sublime adaptation of all knowledge, and, specially, of all Natural Philosophy, is to discern and to remember, in all such beauteous productions as these whereof the foregoing pages have been written; and wherewith this our planet and mundane fabric is so magnificently adorned; the hand of the GREAT BUILDER of the boundless universe; and with filial and loving adoration to "look through Nature up to Nature's God."

Let the survey which has been taken lead, if it may presume to do so, not only the mind from which it hath emanated, but likewise that which hath courteously condescended to grant to it its kind consideration, to give utterance to what may well be the sentiment we may hence entertain, when engaged in the study of the Firs and Pines, by uniting in that tribute and ascription wherewith our incomparable poet, whose pen did not fear to pourtray even Paradise itself, hath in right welcome measures invited us to the footstool of the Celestial Sovereignty :—

"These are Thy glorious works, Parent of good:
Almighty, Thine this universal frame;
Thus wondrous fair: Thyself how wondrous then!
Unspeakable! * * * or dimly seen
In these Thy lowliest works! yet, these declare
Thy goodness beyond thought; and power divine.
* * * * * * * * * *
His praise, ye winds, that from four quarters blow,
Breathe soft or loud: and WAVE YOUR TOPS, YE PINES,
AND EVERY PLANT, IN SIGN OF WORSHIP, WAVE."

NORWICH: PRINTED BY FLETCHER AND SON.

APPENDIX OF TECHNICAL NAMES.

THE END.

FLETCHER AND SON, PRINTERS, NORWICH.