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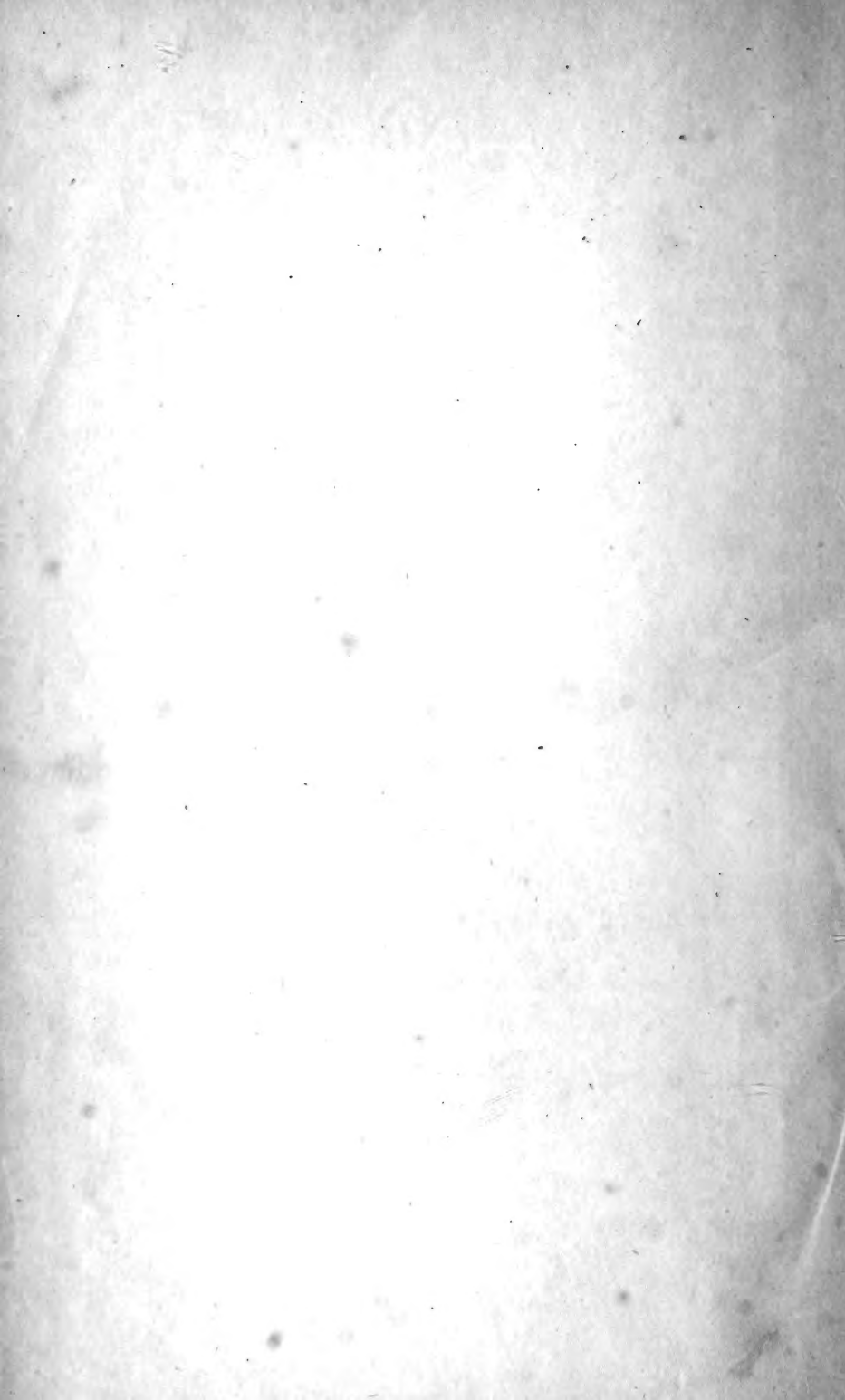
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THE PINETUM:

BEING

A SYNOPSIS OF ALL THE CONIFEROUS PLANTS AT
PRESENT KNOWN, WITH DESCRIPTIONS, HISTORY,
AND SYNONYMES,

AND COMPRISING NEARLY

ONE HUNDRED NEW KINDS.

BY

GEORGE GORDON, A. L. S.,

FORMERLY SUPERINTENDENT OF THE HORTICULTURAL GARDENS, CHISWICK.

ASSISTED BY

ROBERT GLENDINNING, F. H. S.,

OF THE CHISWICK NURSERY, NEAR LONDON.

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LONDON:

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1858.

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TO THE MOST NOBLE
ALGERNON, DUKE OF NORTHUMBERLAND, K.G.,
&c., &c., &c.

A GREAT ADMIRER OF HARDY TREES,
THE CULTIVATION OF WHICH IN ENGLAND HAS BEEN MUCH
INFLUENCED BY THE MANY FINE SPECIMENS IN HIS GRACE'S PARK
AND PLEASURE GROUNDS AT SYON,

This Work

IS VERY RESPECTFULLY DEDICATED,
BY
HIS OBEDIENT AND HUMBLE SERVANT,
GEORGE GORDON.

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The first part of the book
 deals with the general
 principles of the
 subject. It is
 divided into two
 parts. The first
 part is devoted to
 the study of the
 general principles
 of the subject. The
 second part is
 devoted to the study
 of the special
 principles of the
 subject. The book
 is written in a
 clear and concise
 style. It is
 suitable for use
 as a text book
 for students of
 the subject. It
 is also suitable
 for use as a
 reference work
 for those who
 are interested
 in the subject.

PREFACE.

WITH the view of rendering the present work useful to those unacquainted with the science of botany, the author has throughout aimed at the utmost simplicity in language and arrangement.

The alphabetical mode has therefore been adopted in reference both to the Genera and Species. By means of this, any Conifer, of which the name is known, may be immediately found.

For the use of those who possess some botanical knowledge, a diagnostic table is prefixed to the volume.

The descriptions of the Genera are comprehensive though concise; and each species is accompanied by all its synonyms, with the authorities for them. Care has also been taken to furnish such information respecting habits, value, products, &c., as is likely to be required by the planter or cultivator.

5157 Col. R. H. Montgomery

NOV 16 1947

The Volume is completed by an Index containing nearly 1700 names.

In conclusion, the author begs to acknowledge with thanks the valuable assistance afforded by his foreign correspondents, particularly those in Germany, France, and Mexico. He desires also to express his obligations to Mr. R. Pince, of the Great Exeter Nursery, and Mr. H. Low, of the Clapton Nursery.

G. G.

London, May 31st, 1858.

INTRODUCTION.

THE term Coniferæ, or cone-bearing trees, is very expressive of the Tribe to which the present Volume relates.

Regarded from almost every point of view, this Tribe possesses great importance. In the northern regions its members outnumber the common, broad-leaved trees, by about *ten to one*; they are most of them distinguished for majesty or symmetrical gracefulness; and their timber, from its length, straightness, and strength, is most valuable in the Arts.

It is in North America that the most extensive Pine Forests are located; some of the Pine barrens, as they are there called, being from 300 to 500 miles in extent. Captain Hall states, that while travelling in Georgia, sometimes when he came to a high knoll which overlooked the surrounding country, nothing could be seen but a vast ocean of Pines, stretching without a break in every direction as far as the eye could reach.

Perhaps, however, the most gigantic specimens exist in California, and on the North West Coast, where the dimensions of some appear almost fabulous. Among these we may mention more particularly *Wellingtonia*, *Sequoia*, and *Picea nobilis*, all of which grow, in favourable situations, from 200 to 300 feet high.

Immense Fir and Pine forests abound also in Sweden, Norway, Russia, Poland, and Prussia; "imagine," says Dr. Clarke, "the Gulf of Bothnia to be surrounded by one continuous unbroken forest, as ancient as the world, and consisting of Pine trees—then you will have a general and correct notion of a real Pine Forest."

In the temperate and northern zones of Europe and Asia, the Conifers enjoy a wide range, extending even to the regions of perpetual snow. In South America, some kinds, such as the Araucarias, differ considerably in general aspect from the true Pines: and still more so in Australia and Polynesia, with respect to the *Phyllocladus*, the *Dammara*, and the *Dacrydium*; but all produce similar timber and secretions. These secretions, which are always in the form of resinous juices, differ much in properties, and may be divided into two classes; those obtained from the living tree by incisions in the bark; and those obtained from the wood and roots after felling, by the application of heat. Among the former are liquid balsam, the common black and yellow resin of the shops, with oil and spirits of turpentine; among the latter are tar, pitch, and lamp black. The Strasburg and Venice turpentine come from the Silver Fir and Common Larch, and the best yellow resin (so much used in the manufacture of yellow soap) from the Norway Spruce. Olibanum and Sandarac are from the Junipers, and some of the finer resins and gums from the *Dammara*, *Araucaria*, and *Callitris*.

The soil preferred by Pines in a natural state (and therefore the most congenial to them), is that composed of the debris of granitic rock, with a dry subsoil. They

will, however, grow anywhere, excepting on chalky formations, and land surcharged with moisture (although some of the American kinds flourish under this latter condition). The Firs (of which class the roots run immediately under the surface), do not require a deep soil, but they will not produce large and fine timber without a sandy loam and cool subsoil.

It would be beyond the purpose on the present occasion to detail all the uses of this important tribe. I may, however, observe, that the yellow deal of Europe is the produce of *Pinus sylvestris*; the Norway white deal that of *Abies excelsa*; and the white American Pine that of *Pinus Strobus*. All of these are, besides their other uses, of the greatest value to man in the construction both of his habitation on the earth, and of the arks which bear him and his treasures in safety through the fathomless deep.

A NATURAL ARRANGEMENT
OF
ALL THE GENERA ENUMERATED IN THE PINETUM.

Order I. PINACEÆ, the PINE RACE.

TRIBE I. ABIETINEÆ, the FIR TRIBE, having numerous scales, arranged on a more or less elongated axis on the Cones.

Sec. I. ABIETINEÆ VERÆ, *Cones*, with numerous scales, arranged on a more or less elongated axis.

Gen. PINUS *Linnaeus* (the True Pines). *Leaves*, in sheaths, of two, three, or five, somewhat cylindrical and persistent.

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

Cones, more or less conical, woody, and composed of scales.

Seeds, oval, with a hard, bony shell, and either furnished with an ample wing, or wingless.

1st division, BINÆ, or those kinds having two leaves in a sheath.

2nd division, TERNATÆ, or those kinds having three leaves in each sheath.

3rd division, QUINÆ, or those kinds having five leaves in each sheath.

Gen. ABIES, *Don* (the Spruces). *Leaves*, solitary, four-sided.

TABLE OF GENERA

and scattered all round the shoots, or flat, and more or less in two rows laterally.

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

Cones, pendant, solitary, and terminal, with thin persistent scales.

1st division, *VERA*, or the true Spruces, with four-sided leaves, scattered all round the shoots.

2nd division, *TSUGA*, or those kinds with flat leaves, more or less in two rows, like the Hemlock Spruce, and glaucous below.

Gen. PICEA, *Don* (the Silver Firs). *Leaves*, solitary, flat, silvery beneath, and pectinated in two rows.

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

Cones, erect, cylindrical, or nearly so, axillary on the upper side of the branches, and with thin, deciduous scales when ripe.

1st division, *BRACTEATA*, or those kinds with the bracteas longer than the scales of the cone.

2nd division, *BREVIBRACTEATA*, or those kinds with the bracteas shorter than the scales of the cone, and hidden.

Gen. LARIX, *Link* (the Larches). *Leaves*, deciduous, linear, soft, and produced in bundles on the adult branches.

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

Cones, erect, small, oval, or somewhat cylindrical, with persistent thin scales of a leathery texture, with a dorsal bractea.

Seeds, small, with a leathery covering and membranaceous wing.

Gen. PSEUDOLARIX, *Gordon* (the False Larch). *Leaves*, deciduous, flat, linear, soft, and collected in bundles on the adult branches.

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

Cones, pendant, oblong, rather large, brittle, and covered with divergent scales, which are very de-

ciduous, extended at the apex, and heart-shaped at the base.

Seeds, irregularly shaped, with a soft thin covering, and ample wing.

Gen. CEDRUS, Link (the Cedars). *Leaves*, persistent, needle-shaped, somewhat four-sided, stiff, and disposed in bundles on the adult branches.

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

Cones, erect, ovate, bluntly depressed at the ends, axillary, and growing on the upper side of the branches, with thin, closely placed scales, more or less deciduous.

Seeds, somewhat angular, with a soft tegumental covering, full of turpentine, and an ample, persistent wing.

Sec. II. ARAUCARIÆ. Scales, one-seeded and attached.

Gen. ARAUCARIA, Jussieu (the Araucarias). *Leaves*, scale-formed, persistent, and widest at the base.

Flowers, male and female on separate plants.

Cones, mostly large, globular, and terminal; with the scales, deciduous, or partially so.

Seeds, more or less attached to the scales.

1st division, *COLYMBEA*, or the true Araucarias, with broad-lanceolate leaves, and seed-leaves germinating under ground.

2nd division, *EUTACTA*, or false Araucarias, with awl-shaped leaves, and seed-leaves produced above ground.

Sec. III. CUNNINGHAMIÆ. Seeds free, and from three to five under each scale.

Gen. CUNNINGHAMIA, R. Brown. Leaves, lanceolate, rigid, and flat.

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

Cones, small, ovate, or globular, and ligneous, with persistent, acute-pointed scales, having no dorsal bractea.

Seeds, three under each scale.

Sec. IV. DOUBTFUL.

Gen. DAMMARA, Rumphius (the Wax Pines). *Leaves*, broad, flat, petiolated, opposite or alternate, and leathery.

Flowers, male and female on separate plants.

Cones, ovate or globular, axillary, and with persistent scales, wanting the dorsal bractea.

Seeds, unattached and solitary, or in twos.

Gen. SCIADOPITYS, Siebold. *Leaves*, linear, flat, persistent and in whorls.

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

Cones, elliptic or cylindrical, obtuse at the ends, large and solitary, with wedge-shaped, persistent, thin, leathery scales, regularly imbricated, and furnished with a short dorsal bractea.

Seeds, elliptic, compressed, and seven under each scale, with a leathery covering, tapering into a membranaceous wing, attenuating to the base.

TRIBE II. CUPRESSINÆ, the CYPRESS TRIBE. *Cones*, with few valvate or peltate scales on a depressed axis.

Gen. CUPRESSUS, Tournefort. *Leaves*, scale-formed, regularly and closely imbricated in four rows.

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

Cones, globular, and composed of angular, thick woody scales, shield-shaped externally.

Seeds, numerous, angularly compressed, free and winged on the margins.

Gen. FRENELA, Mirbel. *Leaves*, mostly ternate, scale-formed and decurrent.

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

Cones, globular, or conical, and formed of six valvated scales, the alternate ones being much the smallest.

Seeds, numerous under each scale, more or less angular, and laterally winged.

Gen. CRYPTOMERIA, Don. Leaves, irregularly foursided, sickle-shaped, acute-pointed, scattered, decurrent, spreading, and persistent.

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

Cones, globular and woody, with loose, wedge-shaped scales, fringed on the edges.

Seeds, from three to five, angularly flattened, and winged on the sides.

Gen. WELLINGTONIA, Lindley. Leaves, needle-shaped, spiral, and spreading, or scale-formed and imbricated on the adult trees.

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

Cones, large, obtusely oval, woody, and solitary, with wedge-shaped scales, placed at right angles upon the axis.

Seeds, angular, and mostly in fives.

Gen. SEQUOIA, Endlicher. Leaves, linear, flat, persistent, and spread out in two rows horizontally.

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

Cones, small, globular, woody, and with wedge-shaped scales.

Seeds, mostly in threes under each scale, variously shaped and winged.

Gen. FITZ-ROYA, Hooker. Leaves, in whorls of three, but sometimes in twos and fours, ovate-oblong, flat, without footstalks, and more or less spreading.

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

Cones, star-like bodies, consisting of nine scales, in whorls of threes, with their edges bent outwards.

Seeds, from three to five under each fertile scale, surrounded by a broad wing, the central one attached to the scale, the other two to the axile.

Gen. ARTHROTAXIS, Don. Leaves, scale-formed, without footstalks, and closely inlaying along the shoots.

Flowers, male and female on separate plants.

Cones, small, oval, or globular and ligneous, with oval, entire, imbricated scales, destitute of the dorsal bractea.

Seeds, from three to five under each scale, with a thin crusty shell, and hardly any wing.

Gen. THUIOPSIS, Siebold. *Leaves*, scale-formed, opposite, regularly and closely imbricated in four rows.

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

Cones, somewhat globular, woody, and composed of eight or ten valvated, smooth scales.

Seeds, in fives, at the base of each scale, orbicularly compressed, and furnished with a membranaceous wing on each side.

Gen. WIDDRINGTONIA, Endlicher. *Leaves*, alternate, or in whorls, linear or needle-shaped, and spreading on the branches, but very small, scale-formed, and somewhat imbricated, with a gland on the back, in the adult branches.

Flowers, male and female on the same plant.

Cones, globular, and composed of four valves or scales, somewhat in a whorl, round a depressed axis, and converging at the edges.

Seeds, few, from abortion, and mostly in twos; but with from five to ten ovules at the base of each scale, in one or two series, with a crustaceous covering, spreading on each side into a membranaceous wing.

Gen. RETINISPORA, Siebold. *Leaves*, linear, or scale-formed, in threes or opposite pairs, mostly spreading and persistent.

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

Cones, very small, globular, woody, and with from five to six opposite pairs of scales, shield-shaped on the top.

Seeds, two at the base of each scale, in grooves, coated with resin, and furnished with membranaceous wings.

Gen. CHAMÆCYPARIS, Spach. Leaves, scale-formed, in opposite pairs, four-rowed, with a gland or sunken groove on the back, glaucous and persistent.

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

Cones, globular or oblong, small and woody, with mostly seven scales, in opposite alternate pairs.

Seeds, convex, hard-shelled, and in twos at the base of the scales, in sunken grooves, and either wingless or very slightly furnished with rudimentary ones.

Gen. GLYPTOSTROBUS, Endlicher. Leaves, scattered, spreading, variously shaped, and trigonal or subulate.

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

Cones, egg-shaped or oblong, and composed of several unequal-sized scales, all rising from the base, and of a leathery texture.

Seeds, in twos, and winged.

Gen. TAXODIUM, Richard. Leaves, linear, two-rowed, and deciduous.

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

Cones, globular, woody, and with the scales shield-shaped.

Seeds, irregularly shaped, wingless, woody, and in twos.

Gen. CALLITRIS, Ventenat. Leaves, very small, scale-formed, in alternate opposite pairs, close at the base of the joints, and with a gland on the back.

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

Cones, globular, or somewhat four-sided, and composed of four valved woody scales, truncated at the top, and with the alternate pair smallest.

Seeds, one or two at the base of each scale, slightly compressed, or three-edged, and winged on each side.

Gen. LIBOCEDRUS, Endlicher. Leaves, scale-formed, in opposite pairs, and imbricated, in four rows, the upper and under ones being much the smallest.

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

Cones, oval, more or less obtuse, leathery, and composed of from four to six scales, which are but slightly concave on the inner face, and with the lower ones much the smallest.

Seeds, singly or in twos under each scale, and unequally two-winged.

Gen. THUJA, Linnaeus. Leaves, in opposite pairs, compressed, very small, scale-formed, imbricated, and mostly unequal in size.

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

Cones, ovate-oblong, terminal, leathery, with from four to six scales, in opposite pairs, and unequally sized.

Seeds, in twos at the base of each scale, and furnished with a transparent wing.

Gen. BIOTA, Don. Leaves, scale-like, very small, in opposite pairs, flattened, and imbricated in four rows.

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

Cones, roundish, squarrose, leathery, and composed of from six to eight valves or scales, in opposite pairs, peltated on the top.

Seeds, in twos under each scale, crustaceous, and wingless.

Gen. ACTINOSTROBUS, Miquel. Leaves, in whorls of three, very small, scale-formed, persistent, and very acute-pointed.

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

Cones, globular, woody, and composed of six scales, disposed in two vertical sets at the base.

Seeds, in twos under each of the upper scales, three-edged, and winged on each side.

Gen. MICROCACHRYS, Jos. Hooker. Leaves, in opposite cross pairs, regularly imbricated in four rows.

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

Cones, cylindrical, very minute, terminal, and nodding, with spreading, loosely-imbricated scales.

Seeds, solitary and naked at the base of each scale, but much larger, and covered with a dry, transparent, membranaceous skin.

Gen. PHEROSPHERA, Archer.

(Generic distinction unknown.)

TRIBE III. JUNIPERINEÆ, the JUNIPER TRIBE.

Fruit, a globular kind of berry, composed of a fleshy or fibrous juicy substance, covered with a glossy skin, more or less angular, and furnished externally with minute scales.

Seeds, hard, bony shelled, either connected together or unconnected, and from one to five in number.

Leaves, simple, opposite, or ternate, lanceolate, or scale-formed, and either in extended whorls, or closely imbricated in four rows.

Gen. JUNIPERUS, Linnaeus. Leaves, opposite, or ternate, lanceolate, or scale-formed, and either in extended whorls, or closely imbricated in four rows.

Flowers, male and female on different plants.

Fruit, a globular berry, furnished with minute scales.

Seeds, from one to five, either connected or unconnected internally, and covered with a hard bony shell.

Sec. I. OXYCEDRUS, the True Junipers.

Leaves, in whorls of three, spreading, jointed at the base, and glandless on the adult plants, with the buds perulated.

Sec. II. SABINA, the Savin Junipers.

Leaves, in opposite pairs, mostly awl-shaped, and loosely imbricated on the adult plants, with the buds naked.

Sec. III. CUPRESSOIDES, the Cypress-like Junipers.

Leaves, in opposite pairs, four-rowed, small, scale-formed, and very closely imbricated on the adult plants. *Fruit*, more or less angular externally.

Order. II.—TAXACEÆ, the YEW RACE.

TRIBE I. TAXINEÆ VERÆ, the YEW TRIBE.

Fruit, more or less drupaceous, and naked on the upper part.

Gen. TAXUS, Smith. *Leaves*, on short footstalks, linear, decurrent, two-rowed, and alternate.

Flowers, male and female on separate plants.

Fruit, solitary, and composed of a fleshy open cup, of a scarlet colour, and viscid.

Seeds, solitary, nut-like, with a crustaceous shell, free, and exposed at the top.

Gen. TORREYA, Arnott. *Leaves*, linear-lanceolate, decurrent at the base, and either opposite or alternate.

Flowers, male and female on separate plants.

Fruit, drupaceous, or fleshy outside, and naked at the point.

Seeds, singly in each fruit, with the kernel ruminated like the inside of the common nutmeg, and covered with a hard bony shell.

Gen. CEPHALOTAXUS, Siebold. *Leaves*, linear, alternate, or opposite, and in two rows.

Flowers, male and female on separate plants.

Fruit, drupaceous, and two or three in a head.

Seeds, solitary, nut-like, with a bony shell, enclosed in a fleshy covering, but naked at the point.

Gen. SALISBURIA, Smith. *Leaves*, fan-shaped, on long footstalks, lobed, or jagged on the margins, and covered on both sides with fan-shaped straight nerves.

Flowers, male and female on separate plants.

Fruit, drupaceous, mostly single from abortion, and enclosed at the base in a small fleshy cup.

Seeds, solitary, and covered with a hard bony shell.

Gen. PHYLLOCLADUS, *Richard.* *Leaves*, minute scale-like bodies on the margins of the branchlets; branchlets, leaf-like, opposite, pinnated, or fan-shaped, and feather-nerved.

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

Fruit, in small connected heads, with a fleshy disk.

Seeds, solitary, very small, half enclosed at the base, and nut-like, with a thin shell.

TRIBE II. PODOCARPEÆ, the PODOCARPUS TRIBE.

Flowers, monœcious, or diœcious.

Fruit, drupaceous, seeds inverted.

Leaves, linear, or lanceolate, and one or many nerved.

Gen. PODOCARPUS, *L'Heritier.* *Leaves*, either opposite, alternate, or scattered, linear or oblong, and one-nerved.

Flowers, male and female mostly on separate plants, but sometimes monœcious.

Fruit, drupaceous, inverted, and adhering.

Seeds, bony shelled.

Sec. I. EUPODOCARPUS, the True Podocarpus.

Leaves, alternate, or scattered, and linear.

Fruit, solitary, with a fleshy receptacle connected with the bracts by the axis of the short spike.

Sec. II. STACHYCARPUS, the Spike-fruited Podocarpus.

Leaves, alternate, or in two rows, and linear.

Flowers, in spikes, provided with bracts, and frequently all abortive, except the upper ones.

Fleshy receptacle, wanting.

Sec. III. DACRYCARPUS, the Dacrydium-fruited Podocarpus.

Leaves, many-formed, and either three-sided or needle-shaped, and in five rows, or spreading, linear, and flat.

Flowers, solitary and terminal.

Fruit, pendant, almost drupaceous; receptacle, fleshy, with the axis of the short spike without bracts.

Gen. NAGEIA, Gærtner. Leaves, opposite or alternate, and many nerved.

Flowers, monœcious, or diœcious.

Fruit, axillary, drupaceous, and quite round, with a fleshy receptacle, connected with the bracts by the axis of the short spike.

Seeds, covered with a hard thin bony shell.

TRIBE III. DACRYDIÆ, the DACRYDIUM TRIBE.

Fruit, drupaceous and erect.

Gen. DACRYDIUM, Solander. Leaves, needle-shaped or scale-formed, opposite, and imbricated or spreading.

Flowers, male and female on separate plants.

Fruit, drupaceous and erect, with a short fleshy disk-like exterior, and bony shell on the seed.

TRIBE IV. SAXE-GOTHEÆ, the SAXE-GOTHLÆA TRIBE.

Fruit, composed of several consolidated free scales formed into a fleshy cone.

Gen. SAXE-GOTHLÆA, Lindley. Leaves, alternate, somewhat two-rowed, flat, and leathery.

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

Fruit, composed of several consolidated free scales formed into a fleshy cone.

Seeds, a pale brown glossy oval nut, with a short, thin jagged membrane enveloping the base of the seed.

THE PINETUM.

Gen. ABIES. *Don.* The Spruce Firs.

Flowers, monœcious, or male and female on the same plant, but separate; the male catkins axillary or terminal, the female ones terminal and solitary.

Cones, pendant, solitary, terminal, and persistent for a long time.

Scales, persistent, leathery, thin, broadly rounded, and sometimes undulated on the edges.

Seeds, oblong, pointed with a short stiff deciduous wing, and bony shell.

Bracteas, small and hidden by the scales, or long and trident, like the Douglas Fir.

Seed-leaves, from 7 to 9 in number.

Leaves, solitary, four-sided, acute-pointed, and scattered all round the shoots, or flat and more or less two-rowed, like the Hemlock Spruce.

Name derived from *απιος* (*apios*), a Pear tree; cones like its fruit.

All evergreen trees, found in the colder parts of Europe, Asia, and America.

Section I. VERA, OR THE TRUE SPRUCES, WITH FOUR-SIDED, NEEDLE-SHAPED LEAVES, SCATTERED ALL ROUND THE SHOOTS.

No. 1. ABIES ALBA, *Michaux*, the White Spruce Fir.

syn. *Abies curvifolia*, *Booth*.

„ „ *glauca*, *Hort*.

„ *Picea alba*, *Link*.

„ *Pinus laxa*, *Ehrhart*.

„ „ *glauca*, *Mæench*.

„ „ *tetragona*, *Mæench*.

„ „ *alba*, *Aiton*.

Leaves, solitary, incurved, sharp-pointed, glaucous, four-sided, and scattered round the branches; three-quarters of an inch long, and not very thickly set on the branches; branches, compact and rather dense. Cones, oblong-cylindrical; 2 or 2½ inches long and rather more than half an inch broad; slightly tapering to the point, pendulous, and not very firm; scales, thin, smooth, and broadly rounded on the upper part; half an inch wide, but much smaller towards the apex or top, regularly overlapping each other, and with entire margins.

A tree with horizontal branches, growing to a height of 50 feet, and seldom more than 1½ foot in diameter, forming a regular pyramid, with very light coloured bark, and quite a silvery appearance on account of the whiteness of its foliage. Wood, inferior to that of any other spruce in quality.

It is a native of Canada, New Brunswick, Maine, and Carolina; and even extends to near the Arctic Sea; for, according to Dr. Richardson, it is the most northerly tree that came under his observation on the Coppermine River, within 20 miles of the Arctic Sea, growing there 20 feet high. There are the following varieties :

ABIES ALBA NANA, *Loudon*.

Syn. *Abies alba prostrata*, *Hort*.

This only differs in being much smaller in all its parts, and in not growing more than 3 or 4 feet high, but forming a very dense spreading bush.

ABIES ALBA GLAUCA, *Plumbly*, Mr. Dimsdale's Silver Spruce.

Syn. *Abies alba argentea*, *Hort.*

This most distinct and striking variety has very white silvery leaves, and attains to about the same size as the common White Spruce. It was first brought into notice by Mr. Plumbly, in the excellent collection of Conifers, belonging to Charles Dimsdale, Esq., at Essenden, near Hatfield, in Hertfordshire.

ABIES ALBA MINIMA, *Knight*.

This very minute little White Spruce is the dwarfest of all Spruces, and a singular object of what a timber-tree may become. It is in the rich collection of Mr. Gambier Parry, near Gloucester.

No. 2. **ABIES EXCELSA**, *D. C.*, the Common Norway Spruce.

Syn. *Abies Picea*, *Miller*.

„ *Abies communis*, *Hort.*

„ *Picea excelsa*, *Link.*

„ „ *Latinorum*, *Bauhin.*

„ „ *major prima*, *Bauhin.*

„ „ *vulgaris*, *Link.*

„ *Pinus cinerea*, *Ræling.*

„ „ *excelsa*, *Lamarck.*

„ „ *Picea*, *Du Roi.*

„ „ *Abies*, *Linn.*

„ *Abies Carpatica*, *Hort.*

„ „ *rugosa*, *Hort.*

Leaves, scattered, solitary, four-sided, deep sombre green, curved, stiff, sharp-pointed, and more crowded together laterally than on the upper and under sides, and nearly one inch in length; branches on young trees nearly horizontal and disposed in regular whorls from the base to the summit; but in old trees the bottom branches drop off, and the others become rather pendulous. Cones, produced on the points of the upper branches, and when full grown become pendant; from 5 to 7 inches long, and 1½ to 2 inches in breadth; scales, irregularly, four-sided, or

rounded, slightly incurved and rugged, or toothed at the top. Seeds, very small, with a wing three-quarters of an inch long. Seed-leaves from 7 to 9 in number.

A fine lofty tree, attaining to the height of 150 feet, or even more in a favourable situation, with a straight trunk, from 2 to 5 feet in diameter, and widely extended branches, spreading regularly on all sides, so as to form a pyramid; timber light, elastic, and not very resinous. It is known under the name of White Deal.

The Spruce Fir is very common, and forms forests on the Alps, from east to west, and is principally found at a height varying from 4000 to 6500 feet of elevation, but it sometimes occurs as high as 7000 feet, where it becomes very dwarf; while on the other hand, it has been found as low as 1000 feet at Tolmezzo in Venice, but nowhere on the whole chain of the Apennines; it is also wanting in a natural state in the countries surrounding the Mediterranean, even on the mountains; but is common in Scandinavia, especially to the east of the mountains; and in the German plains, also from the Vosges in France, to the Carpathians, and on the Pyrenees. It is very common, planted and otherwise, in Norway, Sweden, Lapland, Denmark, the north of Germany, and Russia, and, as invariably happens, with a species subject to such a variety of climates and soils, it has many varieties or forms, of which the following are the most striking.

1. ABIES EXCELSA PYGMEÆ, *Loudon*, the Dwarf Spruce.

Syn. *Abies nana*, *Hort.*

„ „ *pumila*, *Hort.*

„ „ *minuta*, *Hort.*

„ „ *minima*, *Hort.*

A very diminutive variety, only growing a foot high, but spreading on the ground, and certainly one of the dwarfdest of all firs.

2. *ABIES EXCELSA TENUIFOLIA*, *Loudon*, the Slender Spruce.

- Syn. *Abies excelsa attenuata*, *Hort.*
 „ „ *gracilis microphylla*, *Hort.*
 „ „ *microphylla*, *Hort.*

This variety differs in having very thin slender leaves, and attenuated branches, with few branchlets.

3. *ABIES EXCELSA MUCRONATA*, *Loudon*.

- Syn. *Abies mucronata*, *Rauch.*

A dwarf-growing variety, with short, thick, dark green sharp-pointed leaves and distorted, irregular branches, rather crowded. It is of French origin, and very distinct.

4. *ABIES EXCELSA MONSTROSA*, *Loudon*.

- Syn. *Abies monstrosa*, *Hort.*
 „ „ *excelsa Cranstonii*, *Hort.*

A very striking variety, but straggling, with the branches much thickened, and mostly without any branchlets, or laterals, somewhat resembling *Araucaria imbricata* in general appearance.

5. *ABIES EXCELSA NIGRA*, *Loudon*.

- Syn. *Abies Lemoniana*, *Booth.*
 „ „ *gigantea*, *Smith.*
 „ „ *excelsa gigantea*, *Hort.*

This only differs from the common spruce, in having the leaves of an intense dark green, and stouter, and in the cones being very much longer and broader.

6. *ABIES EXCELSA PENDULA*, *Loudon*.

- Syn. *Abies communis pendula*, *Booth.*
 „ „ *viminalis*, *Alstræmer.*

This only differs from the species, in having all its branches and branchlets drooping, and the leaves rather longer.

7. *ABIES EXCELSA VARIEGATA*, *Loudon.*Syn. „ *foliis variegata*, *Loudon.*

This differs in having some of its leaves, and occasionally some of the lesser branchlets, pale yellow, or whitish in colour, intermixed with the ordinary green foliage of the plant.

8. *ABIES EXCELSA CLANBRASILIANA*, *Loudon.* Lord Clanbrasil's Dwarf Spruce.Syn. *Abies Clanbrasiliانا*, *Loudon.*

A low, compact, round bush, from 3 to 4 feet high, with the leaves less than half an inch in length, found in Ireland.

9. *ABIES EXCELSA STRICTA*, *Loudon.*Syn. *Abies communis fruticosa*, *Endlicher.*„ „ *Clanbrasiliانا stricta*, *Lawson.*

A dwarf variety, with stiff upright leaves and lateral branches, and small bright green foliage.

10. *ABIES EXCELSA ELEGANS*, *Loudon.*Syn. *Abies elegans*, *Smith.*„ *Abies excelsa dumosa*, *Hort.*

A dwarf variety, with very slender grey foliage, only growing 4 or 5 feet high, with a very compact pretty appearance.

No. 3. *ABIES MENZIESII*, *Loudon.* Menzies Spruce Fir.Syn. *Pinus Menziesii*, *Douglas.*„ „ *Sitchensis*, *Bongard.*„ *Picea Menziesii*, *Carriere.*„ „ *Sitchensis*, *Carriere.*„ *Abies Sitchensis*, *Lindley.*

Leaves, solitary, thickly scattered in every direction round the branches, twisted at the base, narrow, rigid, linear, sharp-pointed, incurved, silvery below, and vivid green above, three-quarters of an inch long, and soon falling off after the first season, leaving the branches very naked, warted, and with a jointed appearance. Buds, ovate-pointed and covered with resin.

Cones, 3 inches long and 1 to 1¼ inch broad, pendulous, cylindrical, blunt-pointed, and with the scales loose and not compact; scales elliptical, three-quarters of an inch long, and having a shrivelled brown appearance, with the margin thin, very irregularly toothed or bitten. Bracteas, small, and hidden by the scales; seeds very small and winged.

A tall tree growing 60 or 70 feet high, with a pyramidal, thickly-branched head, and silvery appearance. Timber of excellent quality.

It is found abundantly in Northern California, and on the Island of Sitcha, also growing in the Shasta Country, in rather moist situations along the banks of rivers, in deep alluvial soil 100 feet high.

ABIES MENZIESII CRISPA, Antoine.

This variety only differs from the species, in having the margins of the scales, on the cones, more undulated or somewhat jagged, and more extended.

No. 4. *ABIES NIGRA, Michaux, the Black Spruce Fir.*

Syn. *Abies Mariana, Miller.*

„ „ *denticulata, Poiret.*

„ *Picea nigra, Link.*

„ *Pinus nigra, Aiton.*

„ „ *Mariana, Du Roi.*

„ „ *Marylandica, Booth.*

Leaves, solitary, regularly spreading all round the branches, and somewhat four-sided, very short and stiff, of a sombre dark green, half an inch long, thickly set and erect. Branches, horizontal, or very slightly drooping at the ends. Cones, pendulous, egg-shaped from 1½ to 1¾ inch long, and nearly three-quarters of an inch broad, deep purple when young, but when ripe of a dusky reddish brown; scales very thin, rounded, blunt, and when ripe undulated or wavy and jagged on the margin; seeds, small, with a little stiff wing.

A tall tree, with a smooth blackish bark, attaining a height of 70 or 80 feet, and 1½ foot in diameter, with horizontal

branches, and a remarkable straight stem, diminishing regularly from the base to the top. Timber, light, elastic, and strong.

It is found in the coldest regions of North America, but is most abundant in Lower Canada, Newfoundland, New Brunswick, Nova Scotia, in the district of Maine, Vermont, and the upper parts of New Hampshire, in Pennsylvania, on the Black Mountains in South Carolina, and in California. It is the Double Spruce of the Canadians, and the tree from which they make spruce beer. It has the following variety—

ABIES NIGRA PUMILA, *Knight*.

Syn. *Abies nigra fastigiata*, *Hort*.

„ *Picea nigra fastigiata*, *Carriere*.

A dwarf variety, growing 3 or 4 feet high, and rather slender, with smaller foliage and a more compact habit.

No. 5. ABIES OBOVATA, *Loudon*, the Obovate-coned Siberian Spruce.

Syn. *Pinus Abies*, *Pallas*.

„ „ *obovata*, *Antoine*.

„ „ *Schrenkiana*, *Antoine*.

„ *Picea obovata*, *Ledebour*.

„ „ *Schrenkiana*, *Fischer*.

„ „ *Ajanensis*, *Fischer*.

„ „ *Wittmanniana*, *Carriere*.

„ *Abies Schrenkiana*, *Lindley*.

„ „ *Ajanensis*, *Lindley*.

„ „ *Wittmanniana*, *Hartwess*.

Leaves, solitary, partially four-sided, straight, thickly scattered all round the shoots, very slender, narrow, and sharp-pointed, $\frac{3}{10}$ to $\frac{1}{2}$ an inch long, bright green on the upper side, and paler below. Branches, numerous, horizontal, in regular whorls; branchlets very slender, pale yellow, stiff, mostly opposite, straight, spreading nearly horizontal, but frequently growing on the upper side; buds very small, numerous, mostly near the points of the shoots, bluntly egg-shaped, and dark brown. Cones, egg-shaped, obtuse at the apex, and pendulous at the

ends of the shoots ; $2\frac{1}{2}$ inches long, and $1\frac{1}{4}$ inch wide ; scales wedge-shaped, rounded on the upper margin, quite entire, nearly three-quarters of an inch wide, concave, loosely placed, and smallest at both ends.

A tall tree, resembling the Common Spruce, and in favourable situations growing 100 feet high, but diminishing in stature and foliage according to situation, soil, and elevation, and, like all other coniferous trees from Northern regions, subject to great variation in appearance.

It is found on the Altai mountains, and in Siberia, at elevations of from 4000 to 5000 feet.

It is quite hardy.

No. 6. *ABIES ORIENTALIS*, *Poiret*, the Eastern Spruce.

Syn. *Pinus Orientalis*, *Linnaeus*.

„ *Picea Orientalis*, *Link*.

Leaves, solitary, very dense, partially four-sided, covering the branches on all sides, deep green on both sides, narrow, but not sharp-pointed, half an inch long, and rather stout. Branches, straight, slender, and with the leaves all one length along the branchlets. Cones, pendulous when full grown, cylindrical, tapering regularly from near the base to the point, which is quite small, $2\frac{1}{2}$ to 3 inches long, and three-quarters of an inch broad at the widest part, which is towards the base ; scales, rounded, thin, loosely imbricated, broad near the base, but with the upper ones more wedge-shaped, somewhat pointed, narrower, and slightly uneven on the margins. Bracteas, shorter than the scales, and inclosed ; seeds very small, and nearly black, with a short but rather broad wing.

A lofty tree, with a straight stem, closely covered with rather stiff branches, growing 70 or 80 feet high, and $1\frac{1}{2}$ foot in diameter, forming a conical-shaped head. Timber, excellent and tough.

A native of the coast of the Black Sea, on the loftiest mountains of Imeretia, in Upper Mingrelia and the neighbourhood of Teflis, forming whole forests between Guriel and the Adshar mountains.

It is quite hardy.

No. 7. ABIES PATTONII, *Jeffrey*, Patton's Giant Californian Fir.

Syn. *Abies gracilis*, *Hort.*

„ „ *trigona*, *Rafinesque.*

„ „ *Hookeriana*, *Murray.*

„ *Picea Californica*, *Carriere.*

Leaves, solitary, alternate, thickly scattered on all sides of the branches, petiolate, trigone, stiff, curved, acuminate, and rather blunt-pointed, three-quarters of an inch long, and nearly one-tenth of an inch broad, triangular, a little declining, and springing from a small triangular pedestal of soft, spongy, elastic bark at the junction with the shoots; bright green above and glaucous beneath; buds irregularly scattered along the twigs, terminal ones very scaly, pointed, and destitute of resin, the bud scales continuing to encircle the twigs for years afterwards. Branches and young shoots densely covered with a brown woolly substance, and rough, scaly bark, slender, and rather drooping. Cones, cylindrical, oblong, tapering slightly to both ends, from 2 to 2½ inches long, and 1 inch broad, pendulous, crowded, and produced at the points of the top branches, smooth externally, and of a light brown colour; scales, rounded, thickest in the centre, and thin on the edges, entire, or somewhat wavy on the margins, very numerous, nearly all of a size, five-tenths of an inch broad, and rather loosely placed; seeds, very small, with rather a broad wing, a quarter of an inch long, stem straight, with numerous slender drooping branches, not very prolific at the extremities. Bark, rough, scaling off in irregular flakes, and of a reddish brown colour, particularly on the young shoots. It yields but little resin; but the timber is hard, fine grained, and of a reddish colour.

This splendid tree was first discovered by Lewis and Clarke, while exploring the sources of the Missouri River, and across the American continent to the Pacific Ocean, in the years 1804-6, and is described as being found by them attaining 300 feet in height, without any branches on the stem for more than 200 feet, and 42 feet in circumference at a point beyond the reach of an ordinary man. Mr. Jeffery, who again discovered it on the Mount Baker range, in Northern California, describes

it as a noble tree, rising to a height of 150 feet, and 13½ feet in circumference, and towering above the rest of the forest, but as it ascended the mountain, it got gradually smaller, till at last it dwindled down into a shrub not more than 4 feet high. It is found at elevations of from 5000 to 6000 feet, on Cascade Mountain, and on Mount Baker range, in Upper California.

It is quite hardy, and has been named by Jeffrey, in compliment to Mr. Patton, of the Cairnies, in Scotland, a gentleman much interested in conifers.

No. 8. *ABIES RUBRA*, *Poiret*. The Red or Arctic Spruce Fir.

Syn. *Picea rubra*, *Link*.

- „ *Abies rubra Californica*, *Hort*.
- „ „ *Arctica*, *Cunningham*.
- „ „ *rubra Arctica*, *Hort*.
- „ *Pinus Americana* *Gärtner*.
- „ „ *Americana rubra*, *Waugh*.
- „ „ *rubra*, *Lambert*.
- „ *Abies nigra*, *var. rubra*, *Michaux*.

Leaves, solitary, very slender, awl-shaped, rigid, sharp-pointed, and thickly and regularly scattered all round the branches, somewhat four-sided, half an inch long, and of a glaucous pale green colour. Branches, horizontal, and slender. Cones, oblong, egg-shaped, tapering regularly to both ends, pendulous, about 1 inch long, and half an inch broad, and of a reddish-brown colour. Scales, round, somewhat lobed or divided in the centre of the upper margin, and entire, the middle scales the largest, those near the apex the smallest, and more wedge-shaped. Seeds, very small, with a short stiff wing.

A tall tree, varying in stature according to soil and situation. In deep loamy soil, and in a favourable situation, it grows 70 or 80 feet high, while in the cold Arctic regions, it becomes a small bush.

It is found in Nova Scotia, Newfoundland, and the more northern parts of North America, as far as the Arctic regions, where it forms the last vestige of arborescent vegetation. Timber, excellent. There is the following variety.

ABIES RUBRA CÆRULEA, *Loudon.*

Syn. *Abies cœrulea, Loddiges.*

„ „ *rubra violacea, Loudon.*

„ *Pinus rubra violacea, Endlicher.*

„ *Picea cœrulea, Link.*

This is a slenderer and dwarfer variety, growing only 6 or 8 feet high, with bluish grey foliage, and violet-coloured cones.

No. 9. ABIES SMITHIANA, *Loudon*, the Indian Spruce Fir.

Syn. *Abies Khutrow, Loudon.*

„ „ *Morinda, Hort.*

„ „ *spinulosa, Griffith.*

„ „ *Torano, Siebold.*

„ „ *polita, Zuccarini.*

„ *Picea polita, Carriere.*

„ „ *Morinda, Link.*

„ „ *Khutrow, Carriere.*

„ *Pinus Khutrow, Royle.*

„ „ *Morinda, Hort.*

„ „ *Smithiana, Lambert.*

„ „ *Abies, Thunberg.*

„ „ *polita, Antoine.*

Leaves, singly at nearly equal distances around the shoots, mostly four-sided, somewhat curved, from $1\frac{1}{2}$ to 2 inches long, scattered and with excessive sharp points. Branches, spread out horizontal, those nearest the bottom somewhat bent downwards, lateral ones very numerous, slender and drooping. Cones, pendulous, when fully matured, from 4 to 6 inches long, and $2\frac{1}{2}$ inches broad, ovate-oblong, or nearly cylindrical, with very even, brown, obovate, rounded scales, coloured with a glaucous bloom when young, the young cones are at first upright, but from their own weight and the slenderness of the branches, and being terminal, soon become pendulous ; seeds, very small, and nearly black, wings rather small.

A magnificent tree, found on the lofty mountains of the interior, from Bootan up to Kafistan, at elevations of from 7000 to 12,000 feet, and is not only a very superb, but very

graceful tree, the boughs ascend a little in the young trees, but are horizontal in the older ones, and from these the branchlets and smaller twigs droop in the most graceful manner. It prefers a north aspect, and attains a great height in favourable situations, frequently from 100 to 150 feet high. Capt. Hodgson measured a fallen tree in 1830, and found the length 169 feet. The following dimensions in girth at 5 feet from the ground are given by Major Madden, in his observations on the conifers of India, viz.—*Abies Smithiana*, near Simla, 15 feet in girth; near Nagkunda, $17\frac{3}{4}$ feet; and on the north-east face of Choor mountain, 20 feet in girth. This species is also found in China and Japan. It is called ‘Rai’ by the people of India, a term used for Fir tree, and also Khutrow (prickly Fir). In China ‘Io-bi-sjo,’ and in Japan ‘Toranowo-Momi’ (the tiger’s tail).

The Timber is extremely soft, of a white colour, and generally free from knots, but very perishable.

It is quite hardy.

Section II. TSUGA, OR THOSE KINDS WITH FLAT LEAVES, MOSTLY GLAUCOUS BELOW, AND MORE OR LESS TWO-ROWED, LIKE THE HEMLOCK SPRUCE.

No. 10. *ABIES BRUNONIANA, Lindley*, the Indian Hemlock Spruce.

- Syn. *Abies dumosa, Loudon.*
- „ „ *decidua, Wallich.*
- „ „ *cedroides, Griffith.*
- „ *Pinus dumosa, Lambert.*
- „ „ *decidua, Wallich.*
- „ „ *Brunoniana, Endlicher.*
- „ *Tsuga Brunoniana, Carriere.*

Leaves, solitary, somewhat in two rows, or scattered along the branches, flat, linear, spreading, obtuse or slightly pointed, minutely toothed towards the apex, reflexed on the margins, and about 1 inch long, covered below with a milk-white mealiness,

and of a bright glossy green above, very easily detached by wind or pressure, and almost deciduous in winter. Branches, numerous, slender, and pendant. Cones, terminal, an inch long, solitary, without footstalks, bluntly oval, pale brown, and furnished at the base with several small oval, opposite, blunt scales; scales, persistent, loosely imbricated, rounded, and smooth on the margins. Seeds, small, a little compressed, and angular; wings, obtuse, and shorter than the scales.

A fine tree, growing from 70 to 80 feet high, with spreading branches and pendulous brittle branchlets, found in Bhotan proper, occurring from 6500 to 9500 feet of elevation, a large, solitary tree. Dr. Griffith measured one specimen 27 feet in girth, at a height of 5 feet from the ground; Dr. Hooker found it in Sikkim, forming a narrow belt at an elevation of from 9000 to 10,000 feet, on the south flank of Kunchinjinga, probably the loftiest peak in the world; but in the innermost valleys, the limits are from 8500 to 10,500 feet of elevation. In Nipal it is called 'Changathasi-Dhoop,' a name implying that it is employed for incense. The Gorkhalee name is 'Thingia,' or 'Tingoori-sulla.' The Bhotiya one, 'Semadoong.'

It is quite hardy, and by far the handsomest of all the Indian Pines, in a native state.

No. 11. ABIES CANADENSIS, *Michaux*, the Hemlock Spruce.

Syn. *Pinus Canadensis*, *Willd.*

„ „ *Americana*, *Du Roi.*

„ „ *Abies Americana*, *Marsh.*

„ *Picea Canadensis*, *Link.*

„ *Tsuga Canadensis*, *Carriere.*

Leaves, solitary, flat, and irregularly disposed in two rows, from half to three-quarters of an inch long, downy when young, rough at the margins, blunt-pointed, bright, vivid, light green on the upper surface, and with two silvery stripes underneath on each side of the mid rib. Branches, numerous, slender and downy when young, spreading, and rather flat. Cones, pendulous on the extremities of the branches, from five-eighths to seven-eighths of an inch long, and three-eighths of an inch broad, of an

oval shape, green when young, but brown when ripe ; scales roundish, smooth, entire on the margins, and few in number ; seeds small, light brown, with wings a quarter of an inch long, and nearly white ; bark smooth and light-coloured.

A bushy-headed tree, growing in its native country from 60 to 80 feet high, with a straight stem, of a uniform size, for two-thirds of its height.

The wood is less valuable than any of the other resinous trees in North America, but the bark is inestimable for the purposes of the tanner, and spruce beer is made from the branches.

It is found in the most northern regions of Canada, and on the highest mountains, as far as South Carolina. Michaux says it begins to appear about Hudson's Bay, the Lake of St. Johns, and in the neighbourhood of Quebec, and that it fills the forests in Nova Scotia, New Brunswick, Maine, Vermont, and the upper part of New Hampshire, in company with the Black Spruce, where it constitutes three-fourths of the ever-green woods. There is the following variety, viz :

Abies Canadensis nana, *Lawson*.

Syn. *Tsuga Canadensis nana*, *Carriere*.

A dwarf variety, not growing more than 2 or 3 feet high, and spreading on the ground with a more tufty foliage.

No. 12. *ABIES DOUGLASII*, *Lindley*, the Douglas Fir.

Syn. *Abies Californica*, *Don*.

„ *Picea Douglasii*, *Link*.

„ *Pinus Douglasii*, *Sabine*.

„ „ *taxifolia*, *Lambert*.

„ *Tsuga Douglasii*, *Carriere*.

„ *Abies mucronata*, *Rafinesque*.

Leaves, solitary, flat, entire, narrow, linear, spreading and irregularly two-rowed ; from 1 to 1½ inch long, bluntly pointed, bright green above, and slightly glaucous, and much paler below. Branches, numerous, irregularly placed along the trunk, spreading horizontal, sometimes a little ascending, very twiggy, and nearly flat, branchlets long, slender, mostly in two rows,

and more or less declining. Cones, ovate or oblong, terminal at the points of the upper branchlets, solitary, pendulous, yellowish brown, with many linear, extended, sharp-pointed bracteas, loosely imbricated; from 2 to 3 inches long, and rather more than one inch in diameter; scales, rounded, smooth, leathery, concave, quite entire, thin, and persistent, or not falling off after the seeds are ripe. Bracteas, linear, three-pointed, the middle one much the longest, the two outer ones being very short, membranaceous, but twice as long as the scales, and not reflexed; seeds, very small, with the wing little more than a quarter of an inch long.

A large conical tree, with smooth bark; when young, full of turpentine; but when old, with a rugged, greyish brown bark, from 12 to 14 inches thick, and attaining in its native country, under favourable circumstances, to a height of from 150 to 200 feet, and from 2 to 10 feet in diameter.

It is found in immense forests, in the north-west part of America, and at different elevations on the Rocky Mountains, forming a small dense little bush not a yard high, at the top of those mountains, but becoming larger and more stately as it descends the sides, and finally it becomes those mighty giants, 8 or 10 feet in diameter, and from 150 to 200 feet high, in the lower valleys, at the base of the same range, and along the banks of the Columbia River. It is also found abundantly in California, and the following variety in Mexico.

ABIES DOUGLASII TAXIFOLIA, *Loudon.*

Syn. *Abies Drummondii*, *Hort.*

„ „ *taxifolia*, *Drummond.*

„ „ *Douglasii Mexicana*, *Hartweg.*

„ „ „ *brevibracteata*, *Antoine.*

„ *Tsuga Lindleyana*, *Roehl.*

This very distinct variety has much longer leaves, and of a deeper green than the species, with the cones much shorter, but broader and less pointed; the extended bracteas are also much shorter, and not much longer than the scales.

A handsome small tree, growing from 30 to 40 feet high,

with horizontal branches and straight branchlets, little forked, found on the Real del Monte mountains, in Mexico, at an elevation of from 8000 to 9000 feet, and in the Oregon country.

ABIES DOUGLASII FASTIGIATA, *Knight*.

A variety with its branches ascending, and much more conical and compact in its outline than the species.

No. 13. *ABIES JEZOENSIS*, *Siebold*, the Jezo Fir.

Syn. *Picea Jezoensis*, *Carriere*.

„ *Pinus Jezoensis*, *Endlicher*.

Leaves, solitary, somewhat in two rows, or spirally scattered all round the shoots, persistent, spreading, and remaining on the branches for several years; from 1 to 2 inches long, and from 1 to $1\frac{1}{2}$ line broad, linear-lanceolate, tapering to a sharp point, straight, or very slightly falcate, smooth, flat, and glossy, of a light yellowish green colour on the upper surface, and a little more pallid on the under, but not glaucous, with a projecting rib along the middle on both faces, but especially along the upper surface, where it is very sharp and elevated, terminating in a long slender point, frequently of a dark brown colour on the adult leaves, which are sessile and very entire; buds, small, and surrounded by long slender scales; branches, in whorls, slender and horizontal, lower ones frequently bent downwards at the ends, lateral ones quite straight, slender, and stiff; young shoots, smooth, of a rusty brown, and somewhat downy, by the numerous short hairs on their surface when quite young. Cones, erect, or more or less so, somewhat terminal on long footstalks, oblong or cylindrical, slightly tapering to the point, quite straight, rather narrow, and smooth, from 6 to 7 inches long, and $1\frac{3}{4}$ of an inch in diameter; scales, numerous, very broad, concave, rounded at the edges, irregularly crenulated on the margins, smooth, thin, rather loosely placed, but persistent, nearly equal all over in size and $1\frac{1}{4}$ inch broad; seeds, angular, soft, and full of turpentine, like those of the *Piceas*; wing, short, but very broad, and rounded at the ends.

A fine large tree, 60 feet high, with a straight stem, covered

with rather a smooth, ash-grey coloured bark, a little cracked outside. It is found in the northern parts of China, and plentiful on the Island of Jezo and Karafto, but much cultivated in the gardens of Japan, particularly within some of the large towns of Jeddo, where it is called 'Jezo-Matsu.' Timber, soft and light.

Much confusion seems to exist in books respecting this species, as to whether it is a Spruce or Silver Fir, and which, no doubt, arises from its having loosely-placed persistent scales, cylindrical cones, somewhat erect, and nearly terminal, with flat leaves, more or less scattered spirally along the shoots when young, and more or less two-rowed on the adult ones, from all of which it would seem to be intermediate between the two ; particularly in having soft angular seeds full of turpentine. Still, having persistent scales, it must be considered as belonging to the Spruces rather than the Silver Firs.

No. 14. ABIES MERTENSIANA, *Lindley*, the Californian Hemlock Spruce.

Syn. *Abies heterophylla*, *Rafinesque*.

„ „ *taxifolia*, *Jeffrey*.

„ „ *Canadensis taxifolia*, *Gordon*.

„ *Pinus heterophylla*, *Endlicher*.

„ „ *Mertensiana*, *Bongard*.

„ *Picea Mertensiana*, *French Gardens*.

Leaves, solitary, linear, somewhat in two rows, flat, and channelled on the upper side, tapering to the base, with a very short footstalk, and somewhat obtuse at the point, from one half to three quarters of an inch long, and rather more than half a line broad in the larger ones, but very unequal in size, some being very long, while others are very short, and intermixed on the same shoot, of a very pale green colour, slightly glaucous below, and thickly placed on the branchlets. Branches, very numerous, slender, and more or less bent downwards at the ends ; branchlets, very slender, flexible, long, drooping and rather downy when young, but much tuberculated when old from the falling leaves ; cones, solitary ovate, blunt at the ends,

three-quarters of an inch long, without any footstalks, and pendulous at the ends of the shoots; scales, entire, kidney-shaped, smooth, few in number, and very persistent; seeds, very small, light brown, and furnished with an ovate wing, half an inch long.

A handsome bushy round-headed tree, growing from 100 to 150 feet high, and from 4 to 6 feet in diameter, with a straight, round stem, tapering upwards, with rather a thin and smoothish bark.

It is found in the Oregon and Northern California, where it constitutes one half of the timber in the neighbourhood. Timber, white, very soft, and yields but little turpentine.

It is quite hardy, and very much resembles, in general appearance, the Hemlock Spruce.

No. 15. *ABIES TSUGA*, *Siebold*, the Japan Hemlock Spruce.

Syn. *Pinus Tsuga*, *Antoine*.

„ „ *Araragi*, *Siebold*.

„ *Tsuga Sieboldii*, *Carriere*.

Leaves, solitary, somewhat two-rowed, thickly set on the branches, frequently alternate, lower ones reflected, and on short round footstalks, slightly linear, tapering to an obtuse (rarely acute) point, entire, smooth, and dark shining green above, ribbed on the under part, and marked with two white lines. Branches, numerous, irregularly spreading and drooping at the ends; branchlets, slender, recurved, and irregularly furnished with buds. Cones, very small, solitary, terminal on the ends of the branches, 1 inch long, and three quarters of an inch broad, elliptic, blunt-pointed, and remaining on the tree after the seeds have fallen out. Scales, permanent, imbricated, 20 or 30 in number, leathery, shut close, largest in the middle, slender at the base, partially rounded or obtuse on the summit, thin, and of a shining pale-brown colour; bracteas, very short, hardly longer than the footstalks of the scale, narrow, truncate, and irregularly bifid. Seeds, very small, with a slender membranaceous small wing.

A dwarf tree, growing from 20 to 30 feet high, with the

appearance and habit of the Hemlock Spruce (*Abies Canadensis*), but with the timber of a yellowish colour.

It is found in the northern provinces of Japan, on the mountains of 'Matsmai' and 'Dewa,' but is planted in gardens, and used for thickets in the neighbourhood of Temples, particularly the dwarf variety, called 'Hime,' or 'Fime-Tsuga,' (dwarf-Tsuga.)

This sort is not yet introduced into England.

Gen. ACTINOSTROBUS. *Miquel.*

Flowers, monœcious, or male and female on the same plant, but separate and terminal; the male catkins egg-shaped, or somewhat globular, the female ones solitary and globular.

Cones, somewhat globular, solitary, and composed of 6 scales, disposed in two vertical sets at the base, and woody.

Valves or Scales, convex on the back, those at the base much the shortest, with the interior ones much the largest.

Seeds, in twos, under each of the upper scales, three-edged, and winged on each side.

Seed-leaves, in twos.

Leaves, persistent, scale-formed, very small, in whorls of three stiff, and very acute pointed.

Name derived from *ακτις* (*aktis*), a ray, and *στροβος* (*strobos*), a cone; the scales radiated.

A pyramidal bush, found on the south-west coast of New Holland.

ACTINOSTROBUS PYRAMIDALIS, *Miquel*, the Swan River Cypress.

Leaves, in threes, vertical, very small, scale-formed, three-cornered, ovate, acute-pointed, rigid, decurrent at the base, and slightly spreading at the points. Branches, alternate, ascending, slightly spreading out at the extremities, very numerous, long, and slightly angular; branchlets, dense dark-green, and having

no particular direction; younger ones, covered with spinescent leaves, partially imbricated; the adult ones stand out stiff, while those on the cone bearing lateral ones, are scale-formed, very short, and entirely cover the stem. Cones, solitary, somewhat globular, composed of six scales, in opposite pairs; those at the base much the shortest, and the interior ones much the largest. Scales, convex on the back, sharply ribbed, woody, and without any terminal sharp-point. Seeds, in twos, under each of the upper scales.

A dense, narrow, pyramidal bush, growing 6 feet high, with ascending branches, and dark green branchlets, found growing in the Swan River colony, along the shores, where it is brackish from being inundated, and along the south-western coast of New Holland.

It is not hardy.

Gen. ARAUCARIA. *Jessieu.*

Flowers, dioecious, or male and female flowers on different plants.

Cones, globular, and terminal.

Scales, deciduous, or partially so.

Seeds, attached to the scales.

Leaves, scale-like, persistent, and widest at the base.

Name, derived from Araucanos, a people of Chili, in which country Araucaria imbricata abounds, and where its seeds furnish a great portion of the food.

Section I. COLYMBEA, *Salisbury*, OR THE TRUE ARAUCARIAS.

Cones, very large.

Scales, slightly winged, and deciduous.

Seeds, indistinctly attached at the base.

Seed-leaves, from 2 to 4, and germinating under ground.

Leaves, on young plants, equally formed.

They are all large trees, natives of America and Australia.

NO. 1. ARAUCARIA BIDWILLI, *Hooker*, Mr. Bidwill's Araucaria.

Leaves, ovate, lanceolate, rigid, flat, deep-green, shining, and spiny pointed, generally forming two rows along the branchlets, and without any footstalks, narrower, and nearly two inches long on the young plants, but much shorter and broader on the more mature plants, and not more than three-quarters of an inch long; those on the stem alternate, those on the branchlets somewhat two rowed. Branches, in regular whorls, from 5 to 7 in number, but frequently more on the adult trees; horizontal, those near the base sometimes deflected, and not more than 12 feet in length on old trees. Branchlets, in opposite pairs, about 18 inches long, slender, and rather thinly covered with flat, distant sharp-pointed leaves. Cones, ovate-globular, or oblong, about 9 inches long, and sometimes nearly as broad, a little depressed at the ends. Scales, large, projecting, with an acute transverse ridge across the centre, highest in the middle, and furnished with a sharp-pointed, reclining hook at the extremity, from 1 to 2 inches broad, and from half to three-quarters of an inch thick, loosely adhering, and very deciduous when the seeds are ripe. Seeds, very large, from 2 to $2\frac{1}{2}$ inches long, by three-quarters of an inch broad, terminating at the apex in a short callous marginal wing, furnished with a long, flat, tapering, curved point, more than an inch long. Nuts eaten by the Aborigines.

A majestic tree, with a very straight cylindrical trunk, growing from 100 to 150 feet.

It is found on the Brisbane Mountains, and in the neighbourhood of Moreton Bay, in Australia. Mr. Bidwill, after whom it was named, describes it as overtopping the forests, with a clear, smooth, blackish trunk, and depressed, loose, conical head, and that the timber is very fine, close-grained, and very durable.

It is the 'Banza-tunza' or 'Banya-tunya' of the natives.

It is not hardy.

No. 2. ARAUCARIA BRASILIENSIS, *Richard*, the Brazil Araucaria.

Syn. *Pinus dioica*, *Arrabida*.

„ *Colymbea angustifolia*, *Bertoloni*.

Leaves, linear, lanceolate, quite straight, and entire, loosely imbricated, and tapering to a very sharp point; from 1 to 2 inches long, and a quarter of an inch broad, scattered all round the leading shoots, and spreading, the older stem ones imbricated the reverse way, and remaining on after they become brown, broadest at the base, decurrent, and frequently a little twisted at the base, young ones keeled and glaucous below, light green, and shining above. Branches, numerous, mostly in horizontal whorls, lower ones declining, and partly covered with the adult leaves, upper ones ascending and only divided towards the extremities; branchlets, slender, leafy, spreading, undivided, and bending gracefully downwards, the lower ones soon turning brown and falling off. Cones, very large, globular, sometimes slightly depressed at the extremities, solitary on the tops of the branches, erect, and without any footstalks, 6 inches long, nearly the same in diameter, and of a yellowish brown colour. Scales, thick, compressed, wedge-shaped, oblong, four-sided, and closely placed together, of a firm corky texture, each terminating in a lanceolate, acute, recurved spine, hollow within at the base on the upper side, and covering a monospermous nut, 2 inches long, covered with a smooth reddish-brown leathery skin. Seeds, very large, oblong, eatable, and without any winged appendage.

A very handsome pyramidal tree, growing from 70 to 100 feet high, with a straight stem, covered with tolerable smooth bark, except near the upper part, where the leaves still adhere in a reclining, imbricated position.

It forms immense forests between the province of Minas Geraes and Soam-Paulo, to the north of Rio de Janeiro; the nuts, which have very little resin in them, are sold as an article of food in the markets of Rio, and the fragrant resin which exudes from the trunk of the tree is mixed with wax to make candles.

It is tender, and has the following varieties.

ARAUCARIA BRASILIENSIS RIDOLFIANA, *Savi.*Syn. *Araucaria Ridolfi*, *Hort.*,, ,, *Lindleyana*, *Van Houtte.*,, ,, *Bibbiani*, *Italian Gardens.*

This variety is more robust, larger and longer in the foliage, and, according to Count Ridolf, is very distinct when old, and more hardy than the species. It is found on the higher mountains about Rio.

ARAUCARIA BRASILIENSIS GRACILIS, *Carrière.*Syn. *Araucaria elegans*, *Knight.*,, ,, *gracilis*, *Van Houtte.*

Leaves, of a bright green, almost glaucous when young, very straight, dense, less rigid, much narrower, and slenderer than the species, with very slender spreading branches, bent downwards towards the extremities, and undivided. It very much resembles the *Cunninghamia Sinensis*, and is only an accidental variety of the common Brazilian kind.

No. 3. ARAUCARIA IMBRICATA, *Pavon*, the Chili Pine, or
Monkey Puzzle.Syn. *Araucaria Chilensis*, *Mirbel.*,, *Abies Columbaria*, *Desfont.*,, ,, *araucana*, *Poiret.*,, *Colymbea quadrifaria*, *Salisbury.*,, *Dombeya Chilensis*, *Lamack.*,, ,, *araucana*, *Ræuschel.*,, *Pinus araucana*, *Molina.*,, *Araucaria Dombeyi*, *Rich.*

Leaves, in whorls of from 7 to 8 in number, ovate-lanceolate, spirally placed, rigid, concave, straight, smooth, shining, deep green, very pungent, closely imbricated, and cartilaginous on the margin, entirely covering the stems, and remaining on for several years; from $\frac{5}{4}$ to $1\frac{3}{4}$ of an inch long, very sharp-pointed, somewhat thickened at the base, but without any footstalk, and remaining on the shoots for years quite green, but getting more

separated, closely pressing along the stem, and turning backwards as the tree increases in circumference. Branches, horizontal, somewhat ascending at the extremities, regularly divided laterally, in opposite pairs, and quite straight, from 5 to 7 in a whorl, diminishing in length as they ascend higher up the tree, until at the top they terminate in the leading shoot, and form a kind of pyramidal head, lateral branches long, straight, in opposite pairs, and regularly divided; branchlets, cylindrical, thickly covered all over with leaves, rather slender, undivided, and mostly bent downwards; male and female on separate trees, male catkins ovate-cylindrical, in clusters of from 6 to 7 at the ends of the branches; females, solitary and erect. Cones very large, globular, solitary, and erect on the ends of the top branches; from 6 to 8 inches broad, and from 6 to 7 inches long, of a dark brown colour, with the scales regularly and closely imbricated, but when ripe, quite deciduous, and soon dropping to pieces. Scales, numerous, wedge-shaped, curved near the ends, and deciduous, 1 inch broad at the widest part, terminating in a long, flat, thin tail, $1\frac{1}{2}$ inch long, and tapering to a fine point. Seeds, very large, from 1 to $1\frac{1}{2}$ inch long, bluntly four-sided, afterwards gibbose, compressed on the opposite sides, and ending in a long, flat, inflexed, tapering tail, like those of the scales; of a deep brown colour, $1\frac{1}{4}$ inch long, and seven-eighths of an inch at the widest part, and of a leathery texture, each cone producing from 200 to 300 seeds, two to each scale, and ripening towards the end of March.

A noble tree, growing 150 feet high, and indigenous to Southern Chili, where it is found on the western declivities of the Andes, often reaching the snow line, but never more than 2000 feet below it. It forms vast forests in a part of the Andes inhabited by the Araucanians, a people who are said to pride themselves on their name, its signification being frank or free. It is found also in great abundance on the mountains of Caramavida and Naguelbuta in Chili, and in the neighbourhood of Concepcion. The Corcovado, a mountain that rises opposite Chiloe, is said to be studded from its foot to the snow line with large groups of these beautiful trees.

The Timber is hard and durable, yellowish white, fibrous, and beautifully veined, capable of receiving a high polish, and easily worked, but heavy.

The tree is full of a milky-white resin, and the Araucano Indians eat the nuts either fresh, boiled, or roasted, and distil from them a kind of spirituous liquor, or dry and prepare a kind of flour and pastry from them, or dry them for trading at Concepcion or Valdivia; from whence they find their way to Valparaiso and Lima. It is the 'Pehuen' or Monkey-puzzle of the Chilians, no animal of that kind attempting to climb the trees.

There are several seedling varieties distinguished in the nurseries, but such differences are only retained while young, with the exception of the variegated variety.

ARAUCARIA IMBRICATA VARIEGATA.

A very striking variety, with pale, straw-coloured leaves, and occasionally the young shoots intermixed with the ordinary deep-shining green ones.

It originated in Mr. Glendinning's Nursery, at Turnham Green, and is quite unique.

Section. II. EUTACTA, *Link.* THE NEEDLE-LEAVED OR FALSE ARAUCARIAS.

Cones, small, terminal, and globular.

Scales, broadly winged, and more or less persistent.

Seeds, visibly fastened at the base.

Seed-leaves, in 4, and developed above ground.

Leaves, on the young plants unequal shaped, and small.

Large trees, natives of Australasia.

No. 4. ARAUCARIA COOKII, *R. Brown*, Capt. Cook's Araucaria.

Syn. Araucaria columnaris, *Hort.*

„ Cupressus columnaris, *Forster.*

Leaves, alternate, scattered all round the shoots, those on the larger ones compressed, spreading, or curved, from half an inch to 1 inch long; those on the branchlets of young plants much more slender, shorter, and more numerous, incurved and somewhat four-sided; those on the adult trees closely imbricated, rounded and almost inlaying upon the branchlets. Branches, in regular distant, horizontal whorls, slightly bending downwards, and again ascending towards the extremities; branchlets, in two rows, along the sides of the branches, frequently declining, and closely covered with foliage. Male catkins, terminal, ovate, and about $1\frac{1}{2}$ or 2 inches long. Cones, ovate, rounded at the ends, from 4 to 6 inches long, and from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches broad, lateral, and sometimes in pairs. Scales, large, gibbose, coriaceous, very thin on the edges, closely imbricated, and terminating on the summit, in a long hooked spiny appendage.

A very tall tree, with a straight stem, covered with a thin glossy bark, resembling the Norfolk Island Pine, but differing in several respects, growing from 150 to 200 feet high, with a very narrow head, very much resembling a well-proportioned factory chimney. It is found abundantly on the islands of Aniteura, New Hebrides, and New Caledonia.

It is quite tender.

No. 5. ARAUCARIA CUNNINGHAMII, *Aiton*. Cunningham's Araucaria.

Syn. Altingia Cunninghamii, *Don.*

„ Eutaeta Cunninghamii, *Link.*

„ Eutassa Cunninghamii, *Spach.*

Leaves, very rigid, those on young trees vertically compressed, sharp-pointed, straight, alternate, decurrent at the base, smooth, dark green, shining, and disposed all round the branches; half an inch long, swelling towards the base, and awl-shaped, those

on the full-grown trees lanceolate, acute, imbricated, curved, awl-shaped, shorter, wider at the base, and reclining on the principal branches and stem. Branches, in horizontal whorls of from 6 to 8 in number, spreading out straight, or slightly ascending when young, but bending downwards when old; branchlets, distant and alternate. Male catkins, solitary, cylindrical, terminal, 3 inches long, and about the thickness of the middle finger. Cones, ovate, 3 inches long, and nearly the same in thickness, terminal on the upper branchlets, and without footstalks. Scales, wedge-shaped, numerous, thick, leathery, membranaceous, winged on the margins, and wavy; half an inch broad, and terminated by a linear, awl-shaped, recurved, stiff, spiny point, one third the length of the scale, seeds flattened, and appearing as if concealed within the scales, which they resemble.

A large tree, growing from 100 to 130 feet high, and 14 or 15 feet in girth, with a clear stem, 80 feet high, and rather thin, loose head, found forming vast forests along the shores of Moreton Bay, and on the alluvial banks of the Brisbane river in Australia.

There are the following varieties.

ARAUCARIA CUNNINGHAMII GLAUCA, *Antoine.*

Syn. *Araucaria glauca, Loddiges.*

This differs from the species in nothing except in the glaucous colour of its leaves and young shoots. It is a very striking variety, and was imported by Loddiges, some years ago, from Moreton Bay.

ARAUCARIA CUNNINGHAMII LONGIFOLIA, *Antoine.*

This variety has much longer and straighter leaves than the species, and is altogether a more robust tree.

No. 6. ARAUCARIA EXCELSA, *R. Brown*, the Norfolk Island Pine.

- Syn. *Dombeya excelsa*, *Lambert*.
 „ *Eutassa heterophylla*, *Salisbury*.
 „ *Eutacta excelsa*, *Link*.
 „ *Colymbea excelsa*, *Sprengel*.
 „ *Altingia excelsa*, *Loudon*.

Leaves, unequally awl-shaped, compressed, somewhat four-sided, curved, and of a light green, the adult ones imbricated, bent inwards, and pointless; from half to three-quarters of an inch long, thick, three-edged, and recurved towards the branches. Branches, regularly verticillate, spread out straight, or curved upwards at the extremities; lateral ones opposite or alternate, horizontal or drooping, very closely placed along the sides, in two rows, slender, and undivided. Cones, globular, from 5 to 6 inches in diameter, erect on long footstalks, and of a brownish colour. Scales, large, broadly-winged, thick on the upper part, and thin on the edges, woody, and terminating in an incurved pointed projection, one third of an inch long. Seeds, large, broadly winged, thick on the upper part, and thin on the edges, having the appearance as if concealed within the scale.

A majestic handsome tree, with a perfectly straight stem, attaining the height of from 150 to 230 feet, and from 8 to 11 feet in diameter, free from branches, to the height of 80 feet. It is found in Australia, but principally on Norfolk Island.

It is not hardy.

Gen. ARTHROTAXIS. *Don.* The Jointed Yew.

Flowers, diœcious, or male and female on separate plants, solitary and terminal.

Cones, small, ovate, globular, and woody.

Scales, oval, entire, destitute of bracteas, and imbricated.

Seeds, from 3 to 5 under each scale.

Leaves, without footstalks, scale-formed, and closely inlaying along the shoots.

Name, derived from 'Arthron,' a joint, and 'Taxis,' arrangement ; shoots, regularly jointed.

All small shrubs, natives of Van Diemen's Land (Tasmania).

No. 1. ARTHROTAXIS CUPRESSOIDES, *Don*, the Cypress-like Jointed Yew.

Syn. *Cunninghamia cupressoides*, *Zuccarini*.

Leaves, very small, closely inlaid along the branches, imbricate, ovate, blunt-pointed, thick, smooth, and of a bright shining green colour ; from 1 to 3 lines long, obscurely keeled on the back, and concave on the other, entirely adhering at the base and scariosc. Male catkins, without footstalks, solitary, or in loose heads, at the ends of the branchlets, with numerous close, scale-formed leaves at their base. Cones, small, roundish, and numerous. Scales, wedge or lance-shaped, woody, much thickened at the part which covers the seeds, almost shield-shaped, trigone and uneven on the surface. Footstalks, compressed and four-sided.

A small erect-stemmed Tree, growing 30 feet high, and much branched, with very numerous branchlets, which are slender, spreading, or pendant, and cylindrical. It is found at Lake St. Claire, and along Pine River in Tasmania (Van Diemen's Land).

It is not hardy.

No. 2. ARTHROTAXIS LAXIFOLIA, *Hooker*, the Lax-leaved Jointed Yew.

Leaves, loosely imbricated, incurved, oval-lanceolate, acute-pointed, keeled or convex on the back, and concave on the face. Branchlets, slender.

Of this species little appears to be known, but from Sir Wm. Hooker's figure and description in the London Journal of Botany,

vol. iv. p. 149; and judging from which it appears very near *Arthrotaxis cupressoides*, the principal difference appearing to be, in its loose, more distantly imbricated, and especially in the more pointed leaves.

A small tree, found near the Cataracts on the Meander, in Van Diemen's Land.

It is not hardy.

No. 3. *ARTHROTAXIS SELAGINOIDES*, *Don*, the Selago-like
Jointed Yew.

Syn. *Arthrotaxis Alpina*, *Van Houtte*.

„ *Cunninghamia selaginoides*, *Zuccarini*.

Leaves, ranged in 5 spiral rows, closely placed along the shoots, slightly imbricated, ovate or ovate-lanceolate, incurved, leathery, rigid, blunt-pointed, keeled on the back, and seldom more than 4 or 5 lines long, but frequently very much shorter; level on the inside, convex or obsoletely keeled on the back, and very smooth; at first light green, but afterwards of a much deeper colour, and quite glossy; rigid, dilated and firmly adhering at the base. Male and female flowers sometimes on the same plant, sessile, solitary, and placed at the ends of the branchlets. Cones, globular, the size of a walnut, with thick woody, non-peltate scales, on thick footstalks, almost tetragone, and thickest at the part covering the seeds, oval on the top, acute, and laying close together. Seeds, in threes, but more frequently in twos; (one being abortive), under each scale, with hardly any wing, the wing being constituted in a great part by the epidermis of the seed; shell thin and crusty.

A bush with spreading ever-green branches and branchlets, tridently divided, or sometimes only forked at irregular distances; the adult stems and branches are covered with leaves united along the whole surface of the stem, and persistent, lateral ones short and completely covered with leaves drawn close together, and appearing as if jointed. It is found growing at the cataracts on the Meander in Tasmania (Van Diemen's Land).

It is not hardy.

Gen. BIOTA. *Don.* The Chinese Arbor-Vitæ.

Flowers, monœcious, or male and female on the same plant, but separate ; male catkins oval or conical, female ones solitary and globular.

Cones, roundish, squarrose, and composed of from 6 to 8 leathery valves, or scales.

Scales, in opposite cross pairs, peltated, and furnished with a spiny point, just below the apex, and containing each two seeds at the base.

Seeds, in twos under each scale, bellying crustaceous, and wingless, or only furnished with rudimentary ones.

Seed-leaves, in twos.

Leaves, scale-like, very small, in opposite cross pairs adpressed and tiled, or imbricated in 4 rows.

Name derived from ' Biota,' the old sectional name given to distinguish the Chinese from the American Arbor-Vitæ, or the Eastern from the Western kinds.

All large bushes or small trees, found in China, Tartary, north of India, and Japan.

No. 1. BIOTA ORIENTALIS, *Don*, the Chinese Arbor-Vitæ.

Syn. Thuja Orientalis, *Linnaeus*.

„ „ acuta, *Mærch*.

„ Cupressus Thuja, *Targ-Tozz*.

„ Platycladus strictus, *Spach*.

Leaves, on the adult plants very small, in 4 rows, ovate, rhomboid, acute-pointed, scale-like imbricated, adpressed, decurrent and furrowed along the back, the outer or marginal ones lapping over on both sides, the upper and lower ones flat with the points thickened, glaucous green and shining when young ; afterwards dull green when old, and glandless. Branches, somewhat vertical, and horizontal at first, but soon afterwards turn up at the ends, and finally become fastigiata, with the stem ; branchlets, disposed in two rows, densely crowded along the

extremities of the branches, and placed sideways. Cones, ovate-elliptic, six-valved, solitary at the ends of the small branchlets, half an inch long, green when young, but light brown when ripe, and composed of six scales, two being central and four around the sides. Scales, blunt, central ones truncate, with a short stout projecting point below the apex, each scale covering two naked, egg-shaped, somewhat angular, wingless seeds.

A low evergreen tree, or pyramidal bush, densely clothed with deep green branchlets, found abundantly in China and Japan, growing in rocky situations and on the mountains, where it attains a height of 18 or 20 feet. It has the following varieties.

BIOTA ORIENTALIS GLAUCA, *Pince*.

Syn. *Thuja glauca*, *Hort*.

This beautiful and very distinct variety differs from the species in having all its leaves and branchlets covered with a fine glaucous powder, giving the plant quite a silvery appearance when in good health. It was raised by Messrs. Pince, of Exeter.

BIOTA ORIENTALIS SIEBOLDII, *Endlicher*.

Syn. *Biota Japonica*, *Siebold*.

„ „ *Orientalis nana*, *Carriere*.

„ „ „ *compacta*, *Hort*.

„ *Thuja compacta*, *Hort*.

„ „ *nana*, *Hort*.

„ „ *Orientalis compacta*, *Hort*.

This kind is distinguished by its dwarf, compact, conical head, and numerous short branchlets of a bright green colour. It is from Japan, where it is much cultivated in pots, on account of its dwarf, compact habit. It is the 'Tsabo-hiba' of the Japanese.

BIOTA ORIENTALIS AUREA, *Hort.*

Syn. *Biota pyramidalis pumila*, *Carriere.*

„ *Thuja aurea*, *Waterer.*

„ „ *Orientalis aurea nana*, *Hort.*

This neat little plant is composed of numerous compact and very small slender branchlets ; of a golden colour, those at the extremities, and during winter are of the finest colour. It seldom grows more than 2 or 3 feet high.

BIOTA ORIENTALIS PYRAMIDALIS, *Endlicher.*

Syn. *Biota Orientalis stricta*, *Loudon.*

„ „ *pyramidalis*, *Carriere.*

„ *Thuja Orientalis cupressoides*, *Cels.*

This handsome variety has a very tall, narrow, fastigiata head, much resembling the upright Cypress in shape, and quite as compact, with the foliage and branchlets more robust than those of the Chinese Arbor-Vitæ, and growing from 15 to 20 feet high. This variety must not be confounded with the Tartarian Arbor-Vitæ (*Biota Tatarica*).

BIOTA ORIENTALIS VARIEGATA, *Hort.*

Syn. *Biota variegata aurea*, *Carriere.*

„ *Thuja variegata*, *Hort.*

„ „ *Orientalis variegata*, *Hort.*

This is the golden variegated variety of the Chinese Arbor-Vitæ.

BIOTA ORIENTALIS ARGENTEA, *Hort.*

Syn. *Biota variegata*, *Hort.*

„ *Thuja argentea*, *Hort.*

This is the silvery, variegated Chinese Arbor-Vitæ.

BIOTÀ ORIENTALIS GRACILIS, *Carriere*.

Syn. *Biota Nepalensis*, *Endlicher*.

„ „ *freneloides*, *Belgian Gardens*.

„ „ *gracilifolia*, *Knight*.

„ *Thuja freneloides*, *Hort*.

„ „ *Nepalensis*, *Hort*.

This variety differs in being much more slender, compact, and erect in all its parts, and in having much smaller and more acute foliage than the species. It is found on the mountains of Nepal and other parts of Northern India, and is called by the natives 'Majoo,' which, according to Major Madden, is derived from the external resemblance of its fruit to the nutgall.

No. 2. BIOTA PENDULA, *Endlicher*, the Weeping Arbor-Vitæ.

Syn. *Biota intermedia*, *French Gardens*.

„ *Thuja pendula*, *Lambert*.

„ „ *pendulata*, *Hort*.

„ „ *filiformis*, *Loddiges*.

„ „ *Orientalis flagelliformis*, *Jacques*.

„ *Cupressus filiformis*, *Hort*.

„ „ *pendula*, *Thunberg*, not *Staunton*.

„ „ *patula*, *Persoon*.

„ „ *pendulata*, *Hort*.

Leaves, in opposite pairs, very small, somewhat distant, scale-formed or ovate-lanceolate, spreading at the points, and loosely imbricated, decurrent and keeled on the back, much smaller, shorter, less pointed, and more closely imbricated at the base and towards the ends of the branchlets than along the intermediate parts, where they are more distant, pointed, longer, and spreading out at the points. Branches, spreading, slender, very long, and recurved; branchlets, long, numerous, collected in clusters at irregular distances along the branches, slender, thread-like, sometimes forked, loosely drooping, and distantly covered with small scale-like sharp-pointed leaves. Cones, globose or ovate-oblong; half an inch long, erect, and produced in clusters of from three to five in number, near the ends of the

branches, and composed of from four to six scales. Scales, externally convex, smooth, terminating near the apex in a stout recurved blunt point. Seeds, ovate, slightly angular, and wingless.

A bush or small tree, with a straight stem and very long slender drooping branches; growing 10 or 15 feet high, and perfectly hardy, but subject to vary in the appearance and size of its branchlets according to soil and situation. It is found growing spontaneous on the Hakone mountains in Japan, but is cultivated universally all over Japan and the northern parts of China, on account of its graceful appearance. It is also said to be found in Tartary and Nepal, but on very doubtful authority. It was also stated, some years ago, to be a hybrid raised by the Loddiges, between a Red Cedar and a Chinese Arbor-Vitæ, in their nursery at Hackney; and, singular as it may appear, the same was said by some person in France, only that in this case the hybrid was raised between the common Cypress and Chinese Arbor-Vitæ. Dr. Siebold, however, having discovered the plant in a wild state in Japan, soon dispelled such absurd statements.

No. 3. BIOTA TATARICA, *Loudon*, the Tartarian Arbor-Vitæ.

Syn. Thuja Tatarica, *Loddiges*.

„ „ Orientalis Tatarica, *Lawson*.

„ Biota pyramidalis, *Carriere*.

„ Thuja Australis, *Hort*.

Leaves, in opposite pairs, scale-formed, and in four rows, those on the branches rather distant, decurrent, and sharp-pointed, while those on the branchlets are more closely and regularly imbricated, ovate, and blunt-pointed; the marginal pair folding over on each side, with the upper and under ones flattened, channelled along the back, and deep, glossy green. Branches, erect, stiff, and compact, lesser ones spread out sideways, and flat; branchlets, crowded towards the extremity of the branches, stout, short, numerous, pressed flat, and spread out straight. Cones, solitary at the ends of the smaller branchlets, mostly composed of eight scales, in alternate pairs, the two lower ones

frequently abortive, and sometimes bent backwards towards the base of the cones.

A dense conical bush, growing 8 or 10 feet high, on the mountains of Tartary and Northern Asia, very distinct from the Chinese Arbor-Vitæ, and reproduced from seed.

SECTION—DOUBTFUL KINDS.

No. 4. BIOTA MELDENSIS, *Lawson*, the French Hybrid Arbor-Vitæ.

Syn. Thuja hybrida, *Hort.*

„ „ Meldensis, *French Gardens.*

Leaves, needle-shaped, decurrent, sharp-pointed, and in opposite distant pairs, somewhat spirally placed along the branches, glaucous on both sides when young, but of a light shining green when old, quite stiff, and extended outwards. Stem and branches ascending, lateral ones loose, spreading, and irregularly placed along the main branches; branchlets, very slender, rather drooping, and distantly clothed with sharp-pointed leaves. Cones said to be like those of the common Arbor-Vitæ.

This plant is said to be a hybrid between the Chinese Arbor-Vitæ and the common Red Cedar, and to have been raised at Meaux in France. It, however, has very much the appearance, when young, of an attenuated variety of the Virginian or Red Cedar, and is a very doubtful hybrid, having not the least appearance of the Arbor-Vitæ in it.

It is quite hardy.

Gen. CALLITRIS. *Ventenat.*

Flowers, monœcious, or male and female on the same plant, but separate and terminal, the male catkins globular, female ones solitary.

Cones, globular or somewhat four-sided, and composed of four valved woody scales, the alternate pair much the smallest.

Valves or Scales, in opposite pairs, regularly truncated on the top, and four in number.

Seeds, one or two at the base of each scale or valve, the larger pair of scales having two seeds each, the smaller pair but one under each; seeds winged on each side, slightly compressed, and somewhat three-edged.

Seed-leaves, from three to six in number, but mostly in fours.

Leaves, very small, scale-formed, in alternate opposite pairs, close together at the base of the joints.

Name derived from 'Kallos,' beauty, from the elegant and regular appearance of the jointed branchlets.

Tree, native of Barbary and the North of Africa.

CALLITRIS QUADRIVALVIS, *Ventenat*, the Jointed Arbor-Vitæ.

Syn. *Thuja articulata*, *Wahlenberg*.

„ *Frenela Fontanesii*, *Mirbel*.

„ *Thuja inæqualis*, *Desfontain*.

Leaves, very small, scale-formed, in alternate opposite pairs, close together at the base of the distant joints, and facing four successive ways, those on the margins clasping both sides, those on the upper and lower sides flat, with a terminal point, and small transparent gland near their extremity; those on the adult branches are very much smaller and decurrent. Branches, spread out horizontal, with numerous lateral ones, regularly dividing again into flattened, slender, jointed, shining, smooth, pale green branchlets; branchlets, numerous, regularly branching, quite flat, glabrous, sometimes glaucescent, distantly jointed, and straight. Cones, globular, somewhat quadrangular, and consisting of four scales or valves, in opposite pairs, regularly truncate on the summit, slightly concave and obtuse; the two opposite ones much longer, seldom convex, but terminating in a point at the extremity, and containing one or two double-winged seeds in each.

A large tree, diminishing into a small bush, according to

elevation and soil ; found on the mountains of Barbary in rocky situations, and on Mount Atlas, in Africa.

It is not hardy, except in the milder parts of England.

Gen. CEDRUS. *Link.* The Cedars.

Flowers, monœcious, or male and female on the same plant, but separate ; the male catkins solitary, cylindrical, erect, and terminal, female ones somewhat oval and obtuse, solitary, very rarely in twins, and erect.

Cones, oval, obtuse at the ends, quite smooth, erect, and on the upper side of the branches.

Scales, very closely placed, rounded on the outer margins, quite thin at the edges, leathery, smooth, and more or less deciduous.

Seeds, in twos under each scale, with a soft tegumental covering, full of turpentine, more or less angular, and furnished with a large persistent membranaceous wing.

Seed-leaves, mostly nine in number.

Leaves, needle-shaped, somewhat four-sided, stiff, persistent, and disposed either in bundles or solitary.

Name derived from 'Cedron,' a brook in Judea, the Cedar of Lebanon being found plentiful on its banks.

All splendid evergreen trees, found either on Mount Lebanon, the north of India, or on the Barbary and Atlas Mountains in Northern Africa.

No. 1. CEDRUS ATLANTICA, *Manetti*, the Mount Atlas Cedar.

Syn. Cedrus Africana, *Gordon*.

„ „ argentea, *Loudon*.

„ „ elegans, *Knight*.

„ Abies Atlantica, *Lindley*.

„ Pinus Atlantica, *Endlicher*.

Leaves, in tufts, or singly on the young shoots, stiff, needle-shaped, cylindrical, or flattened on the upper side, sharp-

pointed, and straight; evergreen, with a silvery appearance, and shorter and denser than those of the Common Cedar of Lebanon, very irregular in length in the fascicles, varying from half an inch to three-fourths of an inch in length, longer on the leading shoots, and with a furrow running along the whole length of the leaf. Branches, rather slender, less rigid, and covered with scattered bundles of leaves, mostly opposite, but sometimes very irregularly placed. Cones, ovate, flattened, or rather depressed at the ends, from two and a half to three inches long, erect on the upper side of the external branches, of a shining light brown colour, and full of resinous matter. Scales, flat, closely pressing against each other, smooth, broad, truncate and blunt on the upper part, of a leathery texture, and thin on the edges. Seeds, of an irregular or angular shape, soft, and with a thin, transparent wing, one inch or more long.

A noble tree, like the Cedar of Lebanon, growing from 80 to 100 feet high, with horizontal branches, and a tabular-shaped head, but rather open in appearance.

It is found on the highest mountains in Barbary, particularly on the famous Atlas range in Northern Africa, at an elevation of from 7000 to 9000 feet, in great abundance, and is quite hardy, and more rapid in growth than the Common Cedar.

No. 2. CEDRUS DEODARA, *Loudon*, the Deodar or Indian Cedar.

Syn. *Abies Deodara*, *Lindley*.

„ *Cedrus Indica*, *De Chambr*.

„ *Pinus Deodara*, *Roxburgh*.

Leaves, evergreen, somewhat four-sided, needle-shaped, acute-pointed, pungent, very glaucous, and from one to two inches long, those on the principal and lateral branches being collected in tufts or close bundles of from 30 to 60 in number, on very short and numerous branchlets, while those on the young shoots are solitary, alternate, and scattered along the twigs; when young, very glaucous, but getting much greener as they get older. Branches, very stout, irregularly placed along the stem,

much divided, horizontal, and quite flat, the lower ones being more or less deflected and close to the ground, but the general aspect of the tree when young is drooping and exceedingly graceful, but as it grows older and larger the branches assume a stiff, flat, and solemn appearance, like that of the Cedar of Lebanon. It flowers in September, and the seeds are ripe in October or November of the following year, or in about thirteen months. The male catkins, though solitary, are very numerous, erect, 2 or 3 inches long, at first oval, but gradually become cylindrical; the majority of these and the female flowers are produced on separate trees, but a considerable number of trees also produce both male and female flowers on the same individual. In about a month after the Deodar has flowered, the young cones, covered with a bluish bloom, appear of a cylindrical form, without any footstalks, and solitary on the top of the little tufts of leaves. Cones, erect, solitary on the upper side of the stout top branches, ovate, obtuse, or nearly cylindrical, from 3 to 5 inches long, and $2\frac{1}{2}$ inches wide, flat, and slightly depressed at both ends, and very much resembling those of the Common Cedar of Lebanon, of a rusty brown colour, and when the seeds are ripe, break up and fall to pieces, shedding both scales and seeds on the ground. Scales, firmly and closely imbricated when young, but deciduous when matured; broad, thin, smooth, quite entire on the margins, of a rusty-brown colour, and full of resinous matter on the outside, in the shape of numerous transparent tears. Seeds, wedge-shaped, soft, and full of turpentine; wings, obovate and membranaceous.

In the Himalayas the Deodar occupies a great vertical belt or range, flourishing from about 5500 to 12,000 feet of elevation, mixed up for the first 1500 feet with *Pinus longifolia*, while for the last 3000 or 4000 feet of elevation it accompanies *Abies Smithiana* and *Picea Pindrow*. It is found on all the higher mountains from Nepal up to Cashmere; and Dr. Griffith describes it as occurring in vast forests and of great size towards Kaf-fristan, where it is called 'Nokhtur,' and flourishes at an elevation of from 6000 to 10,000 feet above the sea; but to see

the Deodar in its greatest perfection, one must visit the snowy ranges and lofty mountains of the interior, far from the influence of the plains, and where for nearly half the year it is enveloped in snow ; there its dimensions become gigantic. In Lower Kamaoon there is an extensive forest of very fine trees from 20 to 27 feet in girth ; and Major Madden measured one tree in 1830 which measured $36\frac{1}{2}$ feet in circumference fully five feet from the ground ; and on a subsequent journey he saw several on the northern declivity of the Boorum and Roopin Passes, not under 30 feet in girth, and from 150 to 200 feet high. The timber has a peculiar and strong odour, so that no insects will touch it ; the grain is open, straight, not liable to warp, even if in thin boards and exposed to the weather, and may be considered the best wood of its class in the world ; but, like all other woods of that class, if cut young it will soon decay, when in contact with damp ; but after its timber, the most valuable product is its turpentine, which, when rubbed on any other kind of timber, renders it less liable to decay and the ravages of vermin.

The Hindostanee name, 'Devadara,' or Tree of God, or Spirit Bearer, is one of the innumerable names of this celebrated tree in India. It is also called 'Keloo,' or 'Kelou,' about Simla, and 'Deodar,' or 'Dewar,' by the people of Gurhwal, Kamaoon, Nepal, Cashmere, and Persia.

There are the following varieties :—

1. CEDRUS DEODARA VIRIDIS, *Hort*, the Green Deodar.

This singular and very distinct-looking variety has a slenderer habit and a very bright green foliage, entirely free from any glaucous appearance, even when young, but in other respects similar to the ordinary form.

2. CEDRUS DEODARA ROBUSTA, *Hort*, the Robust Deodar.

This variety has the glaucous foliage of the species, and is very much larger in all its parts.

3. CEDRUS DEODARA CRASSIFOLIA, *Hort.*

This variety differs from the preceding one in having much thicker and shorter leaves, and much shorter and more compact branches, which are less pendulous.

No. 3. CEDRUS LIBANI, *Barrelier*, the Cedar of Lebanon.

Syn. *Pinus Cedrus*, *Linnaeus*.

„ *Abies Cedrus*, *Poiret*.

„ *Larix Cedrus*, *Miller*.

„ „ *patula*, *Salisbury*.

„ „ *Orientalis*, *Tournefort*.

„ *Cedrus Phœnicea*, *Renealm*.

Leaves, simple, very dense, in alternate tufts, of about 30 in number, evergreen, rigid, partially four-sided, or cylindrical, tapering to the point, straight, one inch long, sharp-pointed, and of a dark grass-green colour. Branches, horizontal, with the branchlets disposed in a flat, fan-like manner on the branches, very numerous, and thickly set with leaves. Cones, erect, ovate, flattened at the ends, and depressed, 4 or 5 inches long, and $2\frac{1}{2}$ inches wide, with rather a long footstalk, of a greyish brown colour, and remaining firmly attached for years to the branches. The cones require two years to ripen, and exude a large quantity of resinous matter while growing. Scales, flat and firmly pressed against each other, one and a half inch broad, obtuse, and truncated at the summit, very thin, leathery, slightly denticulated at the edge, and of a reddish colour, shining on the flat part. Seeds, somewhat triangular, soft, and surmounted by a broad and very thin membranaceous wing more than an inch long.

A noble tree, with wide-spreading horizontal branches, growing from 60 to 80 feet high, and 30 feet in circumference, with a flat, tabular top when old.

It is found on Mount Lebanon, and probably over the whole of that group of mountains which is situate between Damascus and Tripoli, in Syria, and which includes the Libanus and

Mounts Amanus and Taurus of antiquity. There are the following varieties:—

CEDRUS LIBANI ARGENTEA, *Loudon.*

Syn. Cedrus Libani glauca, *Hort.*

This beautiful variety has the leaves of a silvery hue on both sides, and contrasts well in old trees with the more common form with green foliage.

CEDRUS LIBANI NANA, *Loudon.*

A very dwarf variety, growing only from 2 to 3 feet high, with very short shoots and smaller leaves.

CEDRUS LIBANA PENDULA, *Knight.*

This variety has slenderer and more pendulous branches than the Common Cedar of Lebanon.

Gen. CEPHALOTAXUS. *Siebold.* The Cluster-flowered Yews.

Flowers, diœcious, or male and female on different plants, pedunculate and in globular heads.

Fruit, drupaceous, or like the common plum, fleshy outside, and two or three in a head.

Seeds, solitary, nutlike, with a bony or woody shell, and enclosed in the fleshy disk.

Leaves, one-nerved, linear, alternate, and in two rows.

Seed-leaves, in twos.

Name derived from κεφαλη (kephale), a head, and ταξις (taxis), arrangement, flowers and fruit growing in close globular heads.

All evergreen trees, found in China and Japan.

1. CEPHALOTAXUS DRUPACEA, *Siebold*, the Drupaceous or Plum-fruited Cephalotaxus.

Syn. Cephalotaxus Fortunei fœmina, *Carriere*.

„ Podocarpus drupacea, *Hort*.

„ Taxus baccata, *Thunberg*.

„ „ coriacea, *Hort*.

Leaves, strictly arranged in two rows laterally along the branches, regularly opposite, rather close, leathery, stiff, linear, slightly curved or falcate, bluntly tapering to a short, acute, spiny point at the apex, and on very short footstalks, more or less twisted at the base, from three-quarters to $1\frac{1}{4}$ inch long, and $1\frac{1}{2}$ to two lines broad near the base, of a deep glossy green colour above, with a narrow, elevated nerve along the middle, and with two broad glaucous white bands along the under side, but with the mid rib and margins of a bright glossy green below. Branches, in horizontal whorls along the stem, upper ones sometimes a little ascending, quite straight, very spreading, flat, stiff, and rather short, lateral ones in two rows, quite flat, short, rather numerous, and either opposite or alternately placed at irregular distances along the principal branches; branchlets, very short, rather stiff, very flat, and spread out laterally on each side. Buds, small, and covered with persistent, imbricated, acute-pointed, more or less extended scales. Male flowers in globular heads provided with bracts, each catkin being oval and rather pointed. Fruit, drupaceous or plum-like, regularly elliptic, and from three-quarters to one inch long, and three-quarters of an inch broad. Seeds, solitary, with a thin, hard, bony shell, covered with a thin fleshy substance, and purplish skin when ripe. Seed-leaves in twos, and rather short.

A fine, compact, evergreen tree, growing from 20 to 30 feet high, found in China and Japan, both cultivated and in the wild state, particularly on the mountains of Nagasaki, at an elevation of 2000 feet, and in the north of China, in the province of Yang-Sin.

It is quite hardy.

2. CEPHALOTAXUS FORTUNII, *Hooker*, Fortune's Cephalotaxus.Syn. *Cephalotaxus filiformis*, *Knight*." " *Fortunii pendula*, *Carriere*." " " *mas*, *Hort*.

Leaves, on the lateral branches and branchlets strictly arranged in two rows, linear-lanceolate, and regularly tapering to an acute point, quite straight, smooth, flat, mostly opposite, but sometimes slightly alternate, somewhat distant apart, and nearly sessile, or on very short, more or less twisted footstalks; those on the principal branches and on the young plants are mostly scattered alternately and much the longest, of a deep glossy green, with a narrow, acute rib along the middle on the upper surface, and of a glaucous white below, except on the mid rib and margins, which are of a bright, glossy, green colour. Branches, in horizontal whorls round the stem, long, slender, spreading, and rather pendant towards the ends; lateral ones and branchlets arranged laterally in two rows, frequently in opposite pairs, but sometimes irregularly and distantly scattered, very slender, long, and more or less filiform. Buds, very small and covered with persistent, long, acute, glossy, imbricated scales, extended at the points, and which remain at the base of each successive growth for some years afterwards in a withered state. Male flowers in globular heads, axillary, on short footstalks. Fruit, drupaceous, regularly elliptic, tapering to both ends, and frequently furnished with a small point on the apex; from 1 to $1\frac{1}{4}$ inch long, and nearly three-quarters of an inch broad. Seeds, solitary, in each fruit covered with a hard, bony shell, rather thin, and brittle, and enveloped in a thin, fleshy substance, and purplish skin when ripe. A fine evergreen tree, growing from 40 to 60 feet high, with long, slender, drooping branches, found by Fortune in the north of China, particularly in the province of Yang-Sin. It is also found in Japan.

It is hardy.

3. CEPHALOTAXUS PEDUNCULATA, *Siebold*, the Long-stalked
Cephalotaxus.

Syn. *Taxus Harringtonia*, *Loudon*.

„ „ *Inukaja*, *Knight*.

Leaves, in two rows, mostly opposite and flat on the branchlets, but somewhat spiral and alternate on the leading shoots and principal branches, linear, a little curved, very closely set on the shoots, thick, leathery, revolute, and without or on very short footstalks, from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, and $1\frac{1}{2}$ to 2 lines broad; of a bright, glossy green above, and furnished with an elevated straight nerve, and two broad glaucous white bands on the under one, terminating in an acute or obtuse spiny point. Branches, numerous, spreading, and mostly in whorls; branchlets in two rows, horizontal, and mostly opposite. Buds furnished with persistent imbricated scales. Male flowers collected in globular heads, on peduncles furnished with bracts, each catkin being oval and much shorter than the bracteas, female ones axillary and disposed in heads on long, somewhat four-cornered fruitstalks. Fruit, two or three in a close head, drupaceous, or each enclosed in a fleshy covering, like the fruit of the common plum. Seeds, solitary in each fruit, erect, and with a smooth bony shell, which is hard and thin. Seed-leaves in twos, short and rounded.

A handsome small evergreen tree, growing from 20 to 25 feet high, with numerous spreading branches, mostly in whorls round the stem; found abundantly in Japan, cultivated in gardens under the name of 'Inukaja.'

It is quite hardy.

4. CEPHALOTAXUS UMBRACULIFERA, *Siebold*, the Shade-
affording Cephalotaxus.

Leaves, in two rows, quite flat, closely placed along the shoots, very rigid, linear-lanceolate, rather short, and somewhat falcate; from three-quarters to an inch long, and $1\frac{1}{2}$ line broad near the base, of a dark glossy green above, but much paler below, with two narrow greyish lines, almost sessile, or on very short

spirally-twisted footstalks, more or less opposite, and furnished with a long acute spiny point at the apex. Branches, on the stem in whorls, spread out horizontally, and extended ; branchlets arranged in two rows laterally, flat, and spreading. Male flowers in globular heads. Fruit, drupaceous, oval-pointed, fleshy, and about the size of a small walnut. Seeds, solitary, egg-shaped, tapering much to the apex, one inch long, and three-quarters of an inch in diameter, with a hard, thick, woody shell, more or less fluted on the outside. Seed-leaves in twos, short, and rather rounded.

A fine evergreen tree, with horizontal, much-extended branches, found in the northern parts of China, and on the mountains of Japan.

It is quite hardy.

Gen. CHAMÆCYPARIS. *Spach.* The White Cedar.

Flowers, monœcious, or male and female on the same plant, but separate and terminal. Male catkins cylindrical, female ones globular.

Cones, ligneous, small, globular or oblong, numerous, and covered with a glaucous bloom.

Scales, mostly seven in number, oblong or rounded, shield-shaped and in alternate opposite pairs.

Seeds, convex, a little flattened on one side, hard shelled, in sunken grooves, two at the base of each scale, and either wingless or very slightly furnished with rudimentary ones.

Leaves, scale-formed, in opposite pairs, four-rowed, with a sunken groove or gland on the back, glaucous and persistent.

Seed-leaves, in twos.

Name derived from 'Chamæ,' ground ; 'Cyparis,' the Cypress, the ground or swamp Cypress.

All evergreen trees, found in North America, and Mexico.

No. 1. *CHAMÆCYPARIS SPHÆROIDEA*, *Spach*, the White Cedar.

Syn. *Cupressus thyoides*, *Linnæus*.

„ „ *nana-mariana*, *Pluknet*.

„ *Thuja sphæroidea*, *Hort*.

„ „ *sphæroidalis*, *Richard*.

Leaves, in four rows, regularly imbricated, ovate-pointed, and in opposite pairs, seldom spreading at the points, but always in straight lines, of a bright glaucous green, and with a large transparent gland on the back rib. Stem, bushy, branching to the ground, particularly on young plants. Branches, horizontal, somewhat pendulous, and densely covered at the points, with numerous small branchlets; branchlets, crowded, compressed, long, regularly forked, frequently bent downwards, and covered with small scale-formed leaves. Cones, very small, globular, numerous, clustered together, and about the size of a small pea, green when young, but of a glaucous blue or brown colour when ripe. Scales, mostly seven in number, shield-shaped, four or five sided, in opposite alternate pairs, with the odd terminal one the largest, each having a slightly elevated, broad, flat point in the centre, and covering two small round slightly winged seeds at their base in sunken grooves.

A tall evergreen tree, growing 70 or 80 feet high, and 3 feet in diameter.

It is only found growing in a wild state, in the wet grounds of the maritime districts of New Jersey, Maryland, and Virginia, where it nearly fills all the extensive marshes along the coast. It also occurs in great abundance in the Dismal Swamps near Norfolk, in the state of Virginia, and is found to extend as far as Carolina, but always in swampy places. It is perfectly hardy, and has the following varieties.

CHAMÆCYPARIS SPHÆROIDEA GLAUCA, *Endlicher.*

Syn. *Chamæcyparis Kewensis, Hort.*

„ *Cupressus sphæroidea pendula, Hort.*

„ „ *thyoides Kewensis, Hort.*

„ „ *sphæroidea Kewensis, Knight.*

This variety differs from the species in being more compact, denser, and in having the branchlets and leaves of a silvery glaucous colour. It is a very beautiful variety.

CHAMÆCYPARIS SPHÆROIDEA ATROVIRENS, *Knight.*

Syn. *Chamæcyparis atrovirens, Hort.*

„ *Cupressus thyoides atrovirens, Lawson.*

This differs in having its branchlets and foliage of a bright shining green, with little or no traces of the glaucous hue of the species.

CHAMÆCYPARIS SPHÆROIDEA VARIEGATA, *Endlicher.*

Syn. *Cupressus thyoides variegata, Loudon.*

„ „ *variegata, Hort.*

„ *Thuja sphæroidea variegata, Hort.*

This variety differs in having some of its leaves and small branchlets of a golden yellow colour, intermixed with the green ones ; a desirable kind.

CHAMÆCYPARIS SPHÆROIDEA NANA, *Endlicher.*

Syn. *Cupressus thyoides nana, Loudon.*

„ „ *nana, Hort.*

„ *Thuja sphæroidea nana, Hort.*

A very distinct, small, compact little bush, of diminutive size, smaller in all its parts, and quite glaucous.

No. 2. CHAMÆCYPARIS THURIFERA, *Endlicher,* the Mexican
White Cedar.

Syn. *Cupressus thurifera, Humboldt.*

„ *Juniperus thurifera, Bonpland.*

Leaves, in four rows, ovate-lanceolate, imbricated, smooth, without any footstalks, and pointed; those on the adult plants much broader, more ovate, thicker, and blunt pointed, with a deep sunken groove along the back, and more closely imbricated, while those on the young plants are much more pointed, longer, narrower, and spreading at the points; one line long, and of a glaucous green colour. Branches, spreading out horizontal, much divided, reflexed at the ends, scattered, and rather distant along the stem; lateral branches, flat, subdivided, two-rowed, and spreading widely. Branchlets, four-sided, straight, regularly placed in two rows, along the sides of the lateral branches, of a bright glaucous green, and thickly covered with small imbricated foliage. Cones, solitary, rather oblong, the size of a very large pea; and of a brownish colour, covered with a glaucous bloom, half an inch broad, and rather more in length, on very short footstalks, and mostly composed of from six to eight scales, with a terminal scar or rudimentary scale on each, near the apex. Scales, oblong, rounded on the margins, rarely angular except on the upper ones, in two sets, the four lower or outer ones are connected at their base, much the largest, and flattened on the sides, while the inner or central ones are long, narrow, and shield-shaped on the top, and springing from the centre of the others, and generally abortive or one-seeded, while the alternate pairs of the others contain two seeds at the base of each. Seeds, convex, sometimes a little flattened on one or two of its sides, hard-shelled, and without any wings.

A tall tree, with horizontal spreading branches reflected at their extremities, and frequently pendant, found on the mountains of Mexico in forests, at Tasco and Tehuilotepc at an elevation of 5500 feet. It is also found on the mountains of Orizaba, and may prove hardy in England.

Gen. CRYPTOMERIA. *Don.*

Flowers, monœcious, or male and female on the same plant, but separate ; the male catkins numerous, somewhat oblong, and collected in clusters at the extremities of the branchlets ; the female ones mostly solitary, or two or three together, without footstalks, spherical, and terminal.

Cones, globular, woody, and either singly or in clusters.

Scales, wedge-shaped, numerous, loose, and with rough-fringed edges.

Seeds, from three to five under each scale, obovate or angularly depressed and covered with a crustaceous tegument, prolonged on each side into a regular membrane, cut sloping at both extremities.

Seed-leaves, from two to four in number, but mostly in threes.

Leaves, alternate, in five rows, sickle-shaped, irregularly four-sided, without any footstalks, but running downwards at the base, acute-pointed, spreading, and persistent.

Name derived from 'Kruptos,' hidden, and 'Meris,' a part.

A large evergreen tree, found in the north of China and Japan.

CRYPTOMERIA JAPONICA, *Don*, the Japan Cedar.

Syn. *Cupressus Japonica*, *Thunberg*.

„ *Taxodium Japonicum*, *Brongniart*.

„ *Cupressus Cheusanensis*, *Plukn*.

The Chinese name for this tree is 'San' or 'Sin ;' and the Japanese call it 'Sugi,' which in their language signifies an evergreen tree, with stiff bristle-shaped leaves.

Leaves, five-rowed, without any footstalks, short pointed, very

close together, incurved or sickle-shaped, compressed on the sides: of a four-sided, rhomboidal shape, running downwards on the under side, and with a sharp, projecting mid rib, from a quarter to three quarters of an inch in length, bright green, and quite smooth. Branches, erect or horizontal, spreading, lateral ones dividing alternately into numerous branchlets, thickly clothed with leaves. Cones, about the size of a large cherry, mostly standing singly, but sometimes in clusters on the extremities of the branchlets, and without any footstalks, mostly erect, and of a globular shape, but not very compact or solid. Scales, numerous, rather loose, of a dull brownish red colour, and with rough fringed edges. Male flowers on the same tree, intermixed with the young cones, at the extremities of the branchlets, and of a small oval or oblong shape, in large loose clusters. Seeds, ripen in September and October.

A tall pyramidal tree, with a straight stem, from 60 to 100 feet high, and four or five feet in diameter, with a brownish red bark. Wood, compact, very white, soft, and easily worked, and much used for various purposes, particularly for cabinet work in Japan.

It is found plentifully about Shanghae and other northern parts of China, in the form of avenues and groves, and where no doubt it has been introduced from Japan. Professor Thunberg, who in the year 1784 first published an account of this tree under the name of Japan Cedar, states that it is found both spontaneous and planted on the mountains of Nagasaki, and elsewhere on the southern mountainous districts of Japan, between an elevation of from 500 to 1200 feet, generally growing in damp soils on a basaltic substratum.

Dr. Siebold, in his 'Flora Japonica,' calls it a majestic tree, well deserving the name of Cedar; that it grows from 60 to 100 feet high, and four or five feet in diameter, with a pyramidal-shaped head, and rather erect or horizontal branches; that it occurs in great abundance on the three great isles of Japan, and most probably on the smaller ones, and that a tenth part of the forests which cover the skirts of the mountains between 500 and

1200 feet of elevation is composed of this tree. It was first introduced into England by Fortune, in 1844.

There is a very curious dwarf variety of this plant, and also a much greener variety, viz.

CRYPTOMERIA JAPONICA NANA, *Fortune*.

This variety seldom attains a greater height than two or three feet, and in habit very much resembles a small Juniper bush, in its stunted habit, forming quite a dense bush, with twisted or erect leaves recurved at the points.

CRYPTOMERIA JAPONICA LOBBII, *Hort*.

Syn. *Cryptomeria viridis*, *Hort*.

„ „ *Japonica viridis*, *Hort*.

This variety differs in nothing from the original, except in its being of a much brighter green in colour, and more compact growth. It is said to have been introduced from the Dutch Botanic gardens at Batavia, by one of the Lobbs.

Gen. CUNNINGHAMIA. *R. Brown*.

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

Cones, small, ovate or globular, and ligneous.

Scales, acute-pointed, and without bractæas.

Seeds, three under each scale.

Leaves, lanceolate, rigid and flat.

Seed-leaves, in twos.

Named by Dr. Brown in compliment to Mr. James Cunningham, who first discovered the plant in China.

A small tree, native of China and Japan.

CUNNINGHAMIA SINENSIS, *R. Brown*. The Chinese Cunninghamia.

Syn. *Cunninghamia lanceolata*, *Van Houtte*.

„ *Belis jaculifolia*, *Salisbury*.

„ „ *lanceolata*, *Sweet*.

„ *Abies lanceolata*, *Desfontaines*.

„ *Pinus lanceolata*, *Lambert*.

„ *Araucaria lanceolata*, *Hort*.

Leaves, lanceolate, quite entire, flat, sessile, spreading, rigid, pungent, bent downwards, one inch and a half long, and disposed all round the branches and stems, except on the old lateral ones, where they are arranged in two rows. Branches, generally in whorls; lower ones horizontal, but those near the top ascending. Branchlets, opposite, in two rows, and spreading. Male catkins terminal in clusters, cylindrical, and near an inch long. Cones, globular, three or four together, but sometimes solitary, sessile, drooping, smooth, and about the size of a walnut. Scales, ovate, tapering to a sharp point, leathery, sharply denticulated on the margins, thin, and free at the points.

A middle-sized evergreen tree, growing from 30 to 40 feet high, and very much resembling the Brazilian *Araucaria* in appearance. It is found plentiful in the southern parts of China, and cultivated in Japan. Its Chinese name is 'San-Shu.' There is the following variety.

CUNNINGHAMIA SINENSIS GLAUCA, *Hort*.

This variety differs from the species in having its leaves on the branchlets of a glaucous colour.

Gen. CUPRESSUS. *Tournefort.* The True Cypresses.

Flowers, monœcious, or male and female on the same plant, but separate; male catkins cylindrical and numerous, female ones roundish, and either in clusters or solitary.

Cones, somewhat globular, and composed of angular, irregularly-shaped, woody scales, externally shield-shaped.

Scales, from six to ten in number, irregularly four or five-sided, raised in the centre, and terminating in a more or less curved point.

Seeds, numerous, inserted on the upper, interior surface of the scales, angularly compressed or ovate, with a bony covering, extending into a membranaceous wing at the margins.

Seed-leaves in twos or threes, rarely in fours, but mostly in twos.

Leaves, scale-formed, regularly and closely imbricated in four rows.

Name derived from 'Cyparissus,' a beautiful youth of the Island of Ceos, who, according to tradition, was changed into a cypress; or from the Isle of Cyprus, where one of the first species was found in abundance.

All large bushes or trees, found in the south of Europe, China, California, Mexico, Guatemala, North America, and the East Indies.

No. 1. CUPRESSUS AROMATICA, *Van Houtte*, the strong-scented Cypress.

Syn. Cupressus Kewensis, *Hort.*

„ „ Californica, *Carriere.*

„ Juniperus aromatica, *Hort.*

Leaves, on the young plants, glaucous green, but much darker when old, and glossy, loosely imbricated, regularly in four rows, in opposite pairs, and very sharp-pointed; those on the adult plants scale-formed, regularly imbricated, and glaucous when young, but dark green when old, slightly spreading at

the ends, and sharp-pointed, with a sunken gland on the back. Branches, scattered distantly apart on the stem, and spread out horizontal, with the lateral ones alternate, rather short, distant, and frequently bent downwards at the points; branchlets, straight, distant, somewhat in two rows, regularly four-sided, and closely covered with imbricated leaves. Cones, unknown. This is a robust growing kind, very much resembling the Cedar of Goa (probably not different), but said by Carriere to be from California. It emits a strong, disagreeable odour when the young, soft parts of the branches are crushed between the finger and thumb.

It appears to be about as hardy as the *Cupressus Lusitanica*.

No. 2. *CUPRESSUS ATTENUATA*, *Gordon*, the slender-branch-
letted Cypress.

Syn. *Cupressus nivea*, *Hort.*

Leaves, on the young plants, distant, spreading, slender, very small, straight, and of a light, glaucous green colour, broadest at the base, and tapering to rather a blunt point; those on the laterals much shorter, thicker, and closer together, while those on the adult plants are scale-formed, very short, closely imbricated, and bluntly oval, with a sunken oblong gland on the back, and very glaucous. Branches, horizontal, very distant, long, slender, and little forked, lateral ones alternate, slender, distant, and spread out somewhat in two rows; branchlets, very short, thin, mostly opposite, and very slender, somewhat four-sided, and loosely imbricated. Cones, small, terminal, on short scaly footstalks, and in large clusters, on the upper branches. Scales, irregularly four or five-sided, mostly six in number, shield-shaped, slightly elevated in the centre, and terminating in a short, blunt point, sometimes curved outwards. Seeds, rather small, numerous, and surrounded with a dull, brown wing or margin, cut sloping at top and bottom.

A slender bush, growing from six to ten feet high, with a graceful habit, found along the banks of streams in the

Shasta Country and other mountain valleys in Northern California.

It is quite hardy, and was introduced by the French collectors.

No. 3. CUPRESSUS BENTHAMII, *Endlicher*, Mr. Bentham's
Cypress.

Syn. *Cupressus thurifera*, *Bentham*.

Leaves, imbricated, opposite, ovate-pointed, and mostly free towards the points, keel-shaped at the back, with a hollow gland in the centre, and, like the branchlets, dark green, or very slightly glaucous, when young. Branches, long, round, spreading, dense, and flat; branchlets, four-sided, slender, and mostly curved and forked. Cones, globular, five lines in diameter, produced in great abundance on the outer parts of the branches, and consisting of from eight to ten scales. Scales, wrinkled, and shaped like that of an ancient shield, with the outer face convex, terminated with a long prickle in the centre. Seeds, numerous below each scale, and more or less winged.

A tall tree, with an ample, dense head, growing from 50 to 60 feet high, on the mountains of Mexico, at an elevation of from 5000 to 7000 feet, particularly on the mountains of Angangueo and Tlalpuxahua.

It was first discovered by Mr. Hartweg, and described by Mr. Bentham as the *Cupressus thurifera* of Humboldt (now *Chamæcyparis thurifera*); an error which Professor Endlicher afterwards detected, and changed to that of *Cupressus Benthamii*.

Timber, fine-grained and excellent.

It is tolerably hardy.

No. 4. CUPRESSUS EXCELSA, *Scott*, the Tall Guatemala Cypress.
Syn. *Cupressus Skinneri*, *Hort*.

Leaves, on the young plants, needle or awl-shaped, and glaucous; opposite, in four rows, all decurrent, at the base straight, and tapering to a sharp point at the summit, of various

lengths, those on the ends of the branchlets much shorter, closer, and loosely imbricated, while those on the adult branches are ovate, blunt-pointed, in opposite pairs, loosely imbricated, decurrent, and curved inwards at the points; those on the branchlets very much shorter, thicker, ovate, and closely imbricated in four rows. Branches, horizontal, slender, short, and spreading; branchlets, very slender, long, little forked, and drooping on the adult plants. Cones, globular, in large clusters on the upper branches, nearly three-quarters of an inch in diameter, terminal, and on short, but not very slender footstalks. Scales, from six to eight in number, irregularly four-sided, larger ones in the middle, half an inch across, nearly flat on the face, with a short, stout, blunt point in the centre, sometimes a little curved downwards. Seeds, rather large, encircled with a transparent brown wing, and numerous under each scale.

A large tree, growing 100 feet high, on the mountains of Santa Cruz de Kachequil, in Guatemala, producing excellent timber, which is very durable.

The plants are too tender for the climate of England, and require protection in winter.

No. 5. CUPRESSUS FUNEBRIS, *Endlicher*, the Weeping or
Funeral Cypress.

Syn. Cupressus pendula, *Staunton*.

Leaves, imbricated, partially open or spreading at the points, four-rowed, clasping the stem at the base, acute-pointed, rather three-sided, of a greenish grey colour, keeled at the back, and thickly set on the branchlets. Branches, spreading, forked, loose, scattered, horizontal, curved upwards, and pendulous at the ends, smaller ones long, slender, pendulous, lateral ones alternate, forked, and spreading; branchlets, two-edged, leafy, and rather flat. Cones, globose, solitary, on short imbricated footstalks, and, when full grown, about half an inch in diameter, and of a brown colour. Scales, seven or eight in number, shield-shaped, four or five-sided, and uneven round the margins,

terminated with a round, blunt point, half sunk in the centre. Seeds, angular, surrounded by a pale yellow membranaceous wing.

It is, when old, a most graceful tree, with a straight stem, and long, drooping branches, attaining a height of 60 feet, but when young it has quite an opposite character, being rigid, pyramidal, and quite a compact bush, full of simple, long, lance-shaped leaves, distant and spreading, very glaucous, and not in the least imbricated ; but afterwards it assumes, as it gets older, very much the appearance of the Indian Cypress (*Cupressus torulosa*), which also becomes quite weeping, when old, on the hills of India.

It was first introduced into England by Fortune, from the celebrated tea country 'Wheychou,' in the north of China, and who describes it as having the branches growing at first horizontal from the main stem, then describing a graceful curve upwards, and drooping again at the points.

No. 6. *CUPRESSUS GOVENIANA*, *Gordon*, Mr. Gowen's Californian Cypress.

Leaves, imbricated, blunt, thickly set in four rows, and bright grass green on the old plants, expanded, awl-shaped, very distant, more or less reflexed, sharp-pointed, and rather slender on the young plants. Branches, very irregular on the main stem, some being opposite, others alternate, very numerous, slender, and rather pendant ; lateral branches, spiral, frequently opposite, very dense, and of a beautiful bright green colour. Cones, in large clusters, globular, half an inch in diameter, each having from six to eight scales, which are nearly all four-sided, and elevated in the centre to a blunt point. Seeds, numerous to each scale, rather small, dark brown, irregularly angular, and membraneous at the edges. Seed-leaves, mostly in threes, seldom in fours.

This beautiful Cypress was first discovered by Mr. Hartweg, on the western declivity of the mountains of Monterey, in Upper California, within two miles of the sea shore, in company with

Pinus muricata, forming a dense bush, from six to ten feet in height. It is at once distinguished from the great Californian species (*C. macrocarpa*) by its very much smaller cones, and more spreading, slender, somewhat pendulous branches.

It was named in compliment to J. R. Gowen, Esq., late secretary to the Horticultural Society of London.

It is quite hardy.

No. 7. *CUPRESSUS KNIGHTIANA*, *Perry*, Mr. Knight's Cypress.

Syn. *Cupressus Lindleyi*, *Klotsch*.

„ „ *Coulteri*, *Forbes*.

„ „ *thurifera elegans*, *Hort*.

„ „ „ *Knightiana*, *Gordon*.

Leaves, opposite, scale-like, not compressed at the points, four-rowed, sharp-pointed, loosely imbricated, decurrent, acutely-keeled, with a hollow gland in the centre at the back; very distant, lance-shaped, large and running down the stem at the base, on the leading shoots, glaucous green, and standing free. Branches, dark brown, stiff, scattered, rarely opposite, along the stem; the upper ones slightly spreading, the lesser ones horizontal, and frequently bending downwards. Branchlets, mostly two-rowed, alternate, closely placed, mostly pointing obliquely outwards, and flattened. Cones, globular, eight or ten lines in diameter, very glaucous, smooth, and with eight or ten scales in each. Scales, elevated, shield-shaped, and convex in the centre, terminated by a short prickle, and containing under each several flattish winged seeds of a light brown colour.

A handsome, vigorous tree, with a conical head, and all the principal young shoots of a beautiful glaucous violet, or reddish plum colour, growing 120 feet high, and $2\frac{1}{2}$ to 3 feet in diameter, on the mountains of Mexico. It is much hardier in England than *Cupressus Benthami*, a kind with which it has been confounded by some writers, on account of their never having seen the living tree; but Mr. Perry, a very accurate observer of

Conifers, many years ago, detected the mistake, and named this plant in compliment to Mr. Knight of Chelsea. It has since received other names, as indicated above. Timber, excellent.

No. 8. CUPRESSUS LAWSONIANA, *Murray*. Messrs. Lawson's
Cypress.

Syn. *Chamæcyparis Boursieri*, *Carriere*.

Leaves, on the adult plants ovate, in alternate opposite pairs, closely pressed, in four imbricated rows, and of a glaucous green colour, with a pure white margin, while those on the young plants are lanceolate, sharp-pointed, spreading at the ends, whitish at the margins, and frequently furnished with a small gland on the back. Branches, crowded, flexuose, and more or less ascending; branchlets, very slender, flattened on the upper and lower surfaces, much divided, bending alternately inwards and outwards, and thickly covered with decurrent leaves in alternate opposite pairs, closely pressed together on the adult plants, but spreading on the younger ones. Cones, solitary, terminal, many-sided, of a light brown colour, covered with a glaucous bloom when young, and about the size of a large pea, on rather a short footstalk. Scales, mostly six in number, but sometimes more, flat, with a rough external surface, of a corky texture, light brown, and irregularly four or five-sided, with an elevated straight point in the centre. Seeds, somewhat ear-shaped, rather large, and mostly three under each scale.

A large graceful tree, growing 100 feet high, and two feet in diameter, found in the Shasta and Scots valleys, and, according to Mr. Murray, along the banks of streams in a valley in the mountains of Northern California, in lat. 40° to 42° where it formed the handsomest tree seen by him in his whole expedition; the habit of the tree being the most graceful, with the branches at first curved upwards, like those of the common Spruce, and towards the ends hanging down like an ostrich feather, with the leading shoots, when young, drooping like those of the Deodar.

This beautiful tree is nearly related, and in some respects somewhat resembles the *Cupressus Nutkaensis* (syn. *Thuiopsis*

Borealis), but differs in being much slenderer and smaller in all its parts, and of a more graceful habit.

Timber, good, clear, and easily worked, with a strong odour. It is quite hardy.

No. 9. CUPRESSUS LUSITANICA, *Miller*. The Cedar of Goa.

Syn. Cupressus glauca, *Lamarck*.

„ „ pendula, *Heritier*.

„ „ glauca pendula, *Hort*.

„ „ „ tristis, *Carriere*.

„ „ Lusitanica pendula, *Hort*.

„ „ „ patula, *Tournefort*.

„ „ Sinensis, *Lee*.

„ „ „ pendula, *Hort*.

„ „ „ glauca, *Van Houtte*.

„ „ Libani glauca, *Knight*.

Leaves, imbricated, opposite, four-rowed, acute, glaucous, keeled and marked with a hollow gland on the back, stem clasping, and adhering except at the points, broad at the base, and tapering to an awl-shaped point. Branches, spreading, divided, flexuose, horizontal, turned down at the points, scattered on the stem, and rather distant, smaller ones branching out and nearly pendant; branchlets, four-sided when young, but rounded when old, crowded, forked, spreading, incurved, pendulous, and very numerous. Cones, globose, three quarters of an inch in diameter, covered with glaucous grey powder, solitary, and on the points of the short lateral branches. Scales, shield-shaped, six or eight angled, and elongated into a reflexed broad point, terminated by a small prickle. Seeds, yellowish, and numerous, under each scale.

A rather pendulous growing tree, attaining a height of 50 feet, growing plentiful in Spain and Portugal, particularly at Bussaco, near Coimbra in Portugal, but introduced into those countries from Goa, in the East Indies, where it grows to an equal size with those of Spain and Portugal.

It is rather tender in the climate of London.

CUPRESSUS LUSITANICA VARIEGATA, *Lawson*.

This differs only in having white leaves intermixed on the branchlets with the ordinary ones.

No. 10. CUPRESSUS MAC-NABIANA, *Murray*, Mr. Mac-Nab's
Cypress.

Syn. *Cupressus glandulosa*, *Hooker*.

„ *Juniperus Mac-Nabiana*, *Lawson's Catalogue*.

Leaves, in opposite pairs, distant, and spreading, broadest at the base, glaucous, and tapering to a sharp point, decurrent, and keeled, with a hollow gland upon the under-side on young plants, while on the adult plants they are much shorter, blunter-pointed, thicker towards the ends, loosely imbricated, and with a large hollow gland in the centre on the outside. Branches, short, mostly opposite, thickly set on the stem, and curved upwards at the points; branchlets, short, dense, slender, stiff, and closely covered with small, oval, blunt-pointed leaves in four rows. Cones, globular, three quarters of an inch in diameter, frequently clustered on the upper branches, or singly, on short, thick, woody footstalks. Scales, in opposite pairs, mostly six in number, rather more than half an inch across, irregularly four-sided, each elevated in the centre, and terminated with a stout blunt point, sometimes slightly curved, particularly on the half-grown cones. Seeds, mostly angular, but sometimes rounded, and with scarcely any trace of the wings.

A compact, rather pyramidal, glaucous bush, growing from 6 to 10 feet high.

It was first discovered by Mr. Jeffrey, on the Shasta mountains, in Northern California, in lat. 41°, at an elevation of 5000 feet, and afterwards by Mr. Murray in the same country, who transmitted seeds to Messrs. Lawson. This beautiful Cypress is perfectly hardy, and must not be confounded with a more slender and less ornamental kind, substituted for it by an importer of Californian Conifers.

No. 11. CUPRESSUS MACROCARPA, *Hartweg*, Lambert's
Cypress.

Syn. C. Lambertiana, *Gordon*.

„ „ macrocarpa fastigiata, *Knight*.

Leaves, ovate, imbricated, in four rows, bright grass green, and closely set upon the old plants; they are expanded, awl-shaped, sharp-pointed, and thickly set upon the young plants. Branches, irregularly spiral, but sometimes alternate or opposite, younger ones and laterals opposite, dense and quite green, older branches dark brown, and nearly horizontal from the main stem. Cones, in clusters, of three or four together, oblong, one and a half inch long, and one broad, with ten scales, the larger dark brown, and more or less angular. Seed-leaves, in fours, but sometimes only in threes. Seeds, angular.

In the year 1838 the late Mr. Lambert distributed among his friends a few seeds of this Cypress, without any name or indication from whence he had obtained the seeds, and from these seeds plants were raised, which, when large enough, were at once seen to be very distinct from any previously known; and I gave to it the name of C. Lambertiana, in compliment to the late Mr. A. Lambert, and to mark from whence they were first obtained. Nothing, however, was ascertained further concerning the country from whence it came until some two years afterwards, when I observed at Mr. Low's nursery, at Clapton, a plant of the same kind, which had been received from Dr. Fischer, of St. Petersburg, as a new species from California. At a later period Mr. Hartweg, when in Upper California, discovered it, and finding it had very large fruit, gave it the name of Cupressus macrocarpa, and which, having been published in his Journal, takes precedence of my unpublished though general name of C. Lambertiana. It is identically the same plant, although some persons endeavour to make them distinct varieties; that there is some difference in the shape of the plants may be, but then that arises from nearly all those plants known under the name of C. Lambertiana being raised from cuttings, while all those called C. macrocarpa are seedling,

and have a more pyramidal-shaped head, while the cutting plants (*C. Lambertiana*) have a horizontal and rather flat-headed appearance.

It is one of the finest Cupresses yet introduced, on account of its beautiful bright green aspect, its great size and hardiness. Mr. Hartweg found it forming a tree 60 feet high, with a stem 9 feet in circumference, on the wooded heights near Monterey, in Upper California, and with a far-spreading, branching flat top, like a full-grown Cedar of Lebanon, which it very much resembles when old. It is hardy, and will grow in almost any kind of soil which is not very poor.

No. 12. CUPRESSUS NUTKAENSIS, *Lambert*, the Nootka Sound
Cypress.

- Syn. Cupressus Nootkatensis, *Loudon*.
 „ „ Americana, *Trautvetter*.
 „ Chamæcyparis Nutkaensis, *Spach*.
 „ Thuia excelsa, *Bongard*.
 „ Thuiopsis Borealis, *Fischer*.
 „ Abies aromatica, *Rafinesque*.

Leaves, in four rows, in opposite pairs, broadly ovate at the base, sharp-pointed, and one-eighth of an inch long, very thick, smooth, of a glossy green, sometimes a little glaucous when young, on the upper side, and pale, dull green below, convex on the back, decurrent, and closely adhering at the base; adult ones much shorter, awl-shaped at the points, keeled on the back, without any gland, but furrowed, and closely imbricated; those on the young plants glaucous, somewhat lanceolate, quite straight, extended at the points, loosely imbricated, and bristle-pointed. Branches, round, spreading, or curved upwards towards the ends, but sometimes those near the bottom of the trees are more or less deflected; scaly from the withered leaves, and of a brownish colour; lateral ones in two rows, regularly placed alternately on each side, flat and flexible; branchlets, in two rows, four-sided, rather distant, extended, and thickly

covered with short, straight, regularly imbricated leaves. Cones, solitary, globular, almost sessile, or on the ends of very short, scaly branchlets, about the size of a large pea, and covered with a glaucous bloom. Scales, small, rough, and from six to eight in number, embossed, shield-shaped, with four or five angular or orbicular sides, elevated in the centre, in alternate opposite pairs, furnished in the middle with a straight, thick, conical, obtuse point, the lower pair much the thinnest, and very closely inserted at the base. Seeds, mostly three under each scale, freely inserted on the interior of the upper surface of the scales, flat, and ear-shaped, with a bony shell along each side, and a membranaceous wing, frequently much broader than the seeds, and cut more or less sloping, top and bottom.

A tall evergreen tree, attaining 100 feet in height, with spreading or curved flexible branches, which, when old, are covered with small blisters, filled with a fine, aromatic balsam; but every part of the plant, when bruised or cut, emits a strong odour, very much resembling the smell of the common Savin.

It is found along the north-west coast of North America, particularly at Nootka Sound, in Observatory Inlet, and on the Island of Sitcha.

It is quite hardy.

No. 13. *CUPRESSUS SEMPERVIRENS*, *L.*, the Upright Cypress.

Syn. *C. fastigiata*, *D. C.*

„ *C. stricta*, *Miller.*

„ *C. pyramidalis*, *Tozzett.*

„ *C. Tournefortii*, *Audibert.*

„ *C. fœmina*, *Cæsalpin.*

Leaves, imbricated in four rows, small, deep, shining green, closely pressed to the stem, convex, blunt, or pointed on young plants, and persistent. *Cones*, large, globular, one inch or more in diameter, with numerous large angular scales, slightly convex and mucronate in the centre, becoming woody, and

separating when ripe. Seeds, numerous under each scale, yellowish brown, and irregularly angular, and covered with a thin membranaceous skin.

An evergreen tree, growing in its native country 50 or 60 feet high, with all its branches growing in an upward direction, closely pressed to the stem, like those of the Lombardy Poplar.

The Upright or Common Cypress is a native of Greece, Asia Minor, the south of Europe, and Persia, and cultivated in all the countries along the Mediterranean, and throughout the whole of Italy, from the foot of the Alps to Calabria, as well as in Sicily and Turkey. There are the following varieties:—

CUPRESSUS SEMPERVIRENS HORIZONTALIS, *Miller*, the Horizontal Cypress.

Syn. *C. expansa*, *Audibert*.

„ *C. Orientalis*, *Hort*.

„ *C. mas*, *Cæsalpin*.

„ *C. horizontalis*, *Du Hamel*.

„ *C. fastigiata horizontalis*, *D.C.*

This differs in no way from the upright kind, except in its manner of growth,—it having its branches disposed in a horizontal direction, and very spreading, and only grows to about half the height of the upright kind.

It is found indigenous in Candia, Bithynia, and Persia, but mixed with the upright kind; and some writers still consider it a distinct species, but the question as to whether the upright and spreading Cypresses are the same, or two distinct species, is now well ascertained that both are the same species; for seeds sown from the horizontal variety will produce plants varying in shape and appearance from the spreading to the most upright form of this plant, while seedlings raised from the upright, only produce plants with a tapering or conical-shaped head; and this may have led *Cæsalpin*, and other ancient writers, to consider one the male, and the other the female Cypress.

CUPRESSUS SEMPERVIRENS VARIEGATA, *Knight*.Syn. *C. fastigiata variegata*, *Hort*.

This only differs in having some of its shoots and leaves of a pale yellow or white colour intermixed.

CUPRESSUS SEMPERVIRENS MONSTROSA, *Hort*.Syn. *C. thujæfolia*, *Knight*.,, *C. fastigiata thujæfolia*, *Hort*.

A deformed and more robust variety, with shorter and more flattened branchlets, resembling a Thuja, and of French origin.

No. 14. CUPRESSUS TORULOSA, *Don*, the Twisted or Bhotan Cypress.Syn. *Cupressus Cashmeriana*, *Hort*.,, *Nepalensis*, *Loudon*.,, *pendula*, *Griffith*.

Leaves, very small, ovate, scale-formed, smooth, regularly and closely imbricated in four rows, or slightly spreading, acute, more distant, much longer, and very glaucous, with a yellow tint on the young plants, but of a more greenish hue, with a tinge of grey on the adult ones. Branches, spreading, alternate, or irregularly placed along the stem; lateral ones short, numerous, mostly in two rows, and slightly bent downwards; branchlets, drooping on each side, and considerably subdivided; from two to six inches long, closely covered by numerous oval-pointed, imbricated, scale-like leaves, arranged in four rows resembling small green cord. Cones, globular, or somewhat oblong, from three-quarters to one inch long, and produced in great abundance in dense clusters, each cone consisting generally of ten scales, of the shape of a shield, with from four to six convex facets, rising into a kind of boss in the centre, which is stiff and woody when ripe, and furnished in the centre with a short, reflected, spiny point. Seeds, small, nearly flat, of a light brown colour, with a narrow wing round the border, and from six to seven under each scale. Seed-leaves only two in number.

A fine pyramidal tree, with numerous short, slender, horizontal, or sometimes deflected branches to near the ground, and drooping branchlets. It is found in great abundance in Northern India, at elevations of from 4000 to 8000 feet.

It grows to a great size; trees from ten to fifteen feet or more in girth are common, and one at a place called 'Urcho,' in the Kothee State, north of Simla, is said to be six or seven feet in diameter. Major Madden says the Lime Stone Mountains of 'Nynee Tal' are covered from 4500 to 6200 feet with clumps of the most stately trees, the height of many of them at least 150 feet, and all as straight as an arrow, with the branches drooping slightly towards the ground, and so arranged as to make the tree appear a perfect cone,—the largest specimen measured by him being $16\frac{3}{4}$ feet in girth at five feet from the ground, the spread of its branches 24 feet on each side; but about 12 feet is the average girth of the finer specimens at 'Nynee Tal,' where the tree is commonly called 'Raisulla,' or King Pine. It seems to be unknown as an indigenous tree in North-West Kamaoon, but in South-East Gurhwal it is in abundance at from 7000 to 8000 feet of elevation. It is the 'Soorui,' or 'Name Divine,' of the Himalayas, and the Weeping Cypress of travellers.

Timber, white, with a tint of red and yellow; is exceedingly fragrant, and considered equal to that of the Deodar for durability. Bark, reddish brown, peeling off in numerous long stripes, and frequently appears twisted, which is supposed to have suggested its specific name (*torulosa*). The wood and branches are burnt in sacred rites, as incense, among the Hindoos, both to please the gods, and scare away evil demons.

It is more or less tender in England, and has the following varieties:—

CUPRESSUS TORULOSA VIRIDIS, Hort.

This variety differs in having all its parts of a bright glossy green, and rather slenderer than the species.

CUPRESSUS TORULOSA MAJESTICA, *Hort.*

Syn. „ majestica, *Knight.*

This kind differs in nothing from the ordinary form of the species except in its more robust appearance, being much larger in all its parts, and much hardier, and no doubt is the larger kind from the mountains of Cashmere and Nepal.

CUPRESSUS TORULOSA NANA, *Hort.*

Syn. Cupressus torulosa elegans, *Hort.*

„ „ „ religiosa, *Knight.*

„ „ religiosa nana, *Hort.*

This variety differs from the species in being very much smaller in all its parts, more compact, and very dwarf.

No. 15. CUPRESSUS UHDEANA, *Gordon*, Mr. Uhde's Cypress.

Syn. Cupressus tetragona, *Hort.*

Leaves, small, opposite, regularly four-rowed, very glaucous, closely imbricated, blunt, angular on the under side, frequently with a small hollow in the middle, thickly set, and pressed one upon another, decurrent at the base, but slightly removed at the points. Branches, rather slender, numerous, long, round, dark brown, and well furnished with branchlets; irregularly scattered round the stem, nearly horizontal, but with the points slightly elevated and rather dense; smaller ones mostly one-sided, distant, alternate, very slender, and not very flat, but regularly four-sided, and slightly curved. Cones, globular, very glaucous, small, five or six lines in diameter, with eight scales to each. Scales, convex, shield-shaped, terminating in the centre with a small prickle, and containing many seeds, of a light brown colour, and nearly flat.

A handsome small tree, with a dense, bushy head, growing 40 or 50 feet high, and first discovered by M. Uhde on the Real del Monte, and other mountains, in Mexico, in high, exposed situations, at an elevation of from 6000 to 7000 feet.

It is tolerably hardy.

No. 16. CUPRESSUS WHITLEYANA, *Hort*, the Straight Indian
Cypress.

Syn. Cupressus sempervirens Indica, *E. I. Comp.*

” ” Roylei, *Carriere.*

” ” Australis, *Low.*

Leaves, on the younger plants, in opposite pairs, distant, spreading, and of a slight glaucous green colour, awl-shaped, widest at the base, decurrent, and tapering to a sharp point, from two to four lines long, quite straight, and thinly set on the branches, while those on the adult plants are very small, oval, blunt-pointed, closely imbricated, regularly in four rows, thickened towards the point, and glossy green. Branches, numerous, erect, rather distant, and thin on the young plants, but dense and closely compressed on the older ones, and forming a pyramid; branchlets, erect, numerous, mostly pointing upwards, thickly covered with foliage, and four-sided. Cones, large, globular, one inch in diameter, and very much resembling those of the Common Cypress. Scales, rather small, mostly eight or ten in number, nearly flat, or slightly elevated in the centre, with a very uneven surface, and short, blunt point. Seeds, large, with rather a broad wing surrounding the seed.

A tall, pyramidal tree, and, according to Mr. Elphinstone, growing 100 feet high in the gardens of Kohaut and Peshawur. The Straight Cypress is also found plentiful in Nepal and the Kooloo country. It very much resembles the Common Cypress when old, but has not so close or dense a head when young.

It is rather tender, but about as hardy as Cupressus torulosa, with which Indian travellers frequently confound it, although one is upright, and the other pendulous when old.

Gen. DACRYDIUM. *Solander.*

Flowers, diœcious, or male and female on separate plants.

Fruit, drupaceous and erect.

Seeds, with a hard, bony shell, resting in a short, disk-formed, fleshy integument.

Leaves, needle-shape or scale-formed, and opposite.

Name derived from *δακρυ* (*dakru*), a tear, the gummy exudation of the trees.

Trees and shrubs, natives of Tasmania, New Zealand, and the East Indies.

No. 1. DACRYDIUM COLENSOI, *Hooker*, Colenso's Dacrydium.

Syn. *Podocarpus biformis*, *Endlicher*.

„ *Alania* sp., *Colenso*.

„ *Lycopodium arboreum*, *Banks*.

Leaves, many-shaped on the same branch, while on others they are all uniform, some densely four-rowed, regularly imbricated, ovate, rhomboid, bluntly pointed, and one line long, while others are long-linear, loosely spreading, and from three to six lines long, all leathery, of a bright glossy green, and strongly ribbed; again, others are scale-formed, somewhat triangular, obtuse, very closely arranged, regularly imbricated, and densely four-rowed. Branches, long, and variably disposed, some ascending, others pendant, while the greater part are spreading, and more or less horizontal; male catkins, terminal, solitary, and without footstalks; fruit, small, lateral, leathery, and placed on a horizontal, resinous disk, in the form of a cup.

A very rare tree, even in New Zealand, growing 50 feet high, and two feet and a half in diameter, found growing in the western parts of the Northern Island of New Zealand.

The timber is hard, and of an incorruptible nature.

It is not hardy.

No. 2. DACRYDIUM CUPRESSIFORME, *Carriere*, the Cypress-formed Dacrydium.

Leaves, scale-formed, dense, thick, short, and closely pressed at the base, slightly convex, and keeled on the outer side, and marked with a glaucous band on each side of the rib. Branches, thin and spreading, lateral ones and branchlets slender, somewhat cylindrical, or slightly angular, from the leaves being arranged in four rows. Fruit unknown.

A compact bush, thickly covered with numerous small branches, and resembling Dacrydium Franklinii, in a small state, but said to be found on the mountains of New Zealand.

It is quite tender.

No. 3. DACRYDIUM CUPRESSINUM, *Solander*, the Cypress-like Dacrydium.

Syn. *Thalamia cupressina*, *Sprengel*.

Leaves, awl-shaped, more or less four-sided, very dense, rigid, alternate, irregularly decussate, sometimes loosely imbricated, or spreading, fully adhering at the base, and decurrent; a quarter of an inch long, thickest at the base, tapering to an obtuse, rounded point, and of a pale, yellowish-green colour. Branches, scattered along the stem, lower ones spreading or deflected, upper ones more or less ascending, regularly forked, and much divided; lateral ones, at irregular distances, forked, slender, long, and pendant; branchlets, filiform, very slender, quite straight, seldom divided, gracefully drooping, thickly covered with foliage, and of a pale, yellowish green, sometimes a little copper-coloured. Male catkins without footstalks, oblong, or ovate, and terminal; female flowers, terminal, and enclosed in an involucre, which forms a sort of cup. Fruit, solitary and terminal, in the form of a small red berry, containing a black seed, and eaten by the natives.

A noble tree, growing 200 feet high, and 15 feet in circumference, with pendant branches, and long, slender, drooping shoots, thickly clothed with small, spiny leaves, and very much resembling some of the Lycopodiums. It is found in vast

forests on the southern and middle islands of New Zealand, particularly on the great mountains behind Dusky-Bay, where the settlers call it the Native Spruce Fir, and the New Zealanders 'Dium,' or 'Rium.'

It is not hardy.

No. 4. DACRYDIUM ELATUM, *Wallich*, the Lofty Dacrydium.

Syn. *Juniperus elata*, *Roxburgh*.

„ „ *rigida*, *Sieber*.

„ „ *Philippiana*, *Wallich*.

Leaves, either needle-shaped, four-cornered, acute-pointed, somewhat erect, and spreading, or scale-formed, ovate-obtuse, rarely acute, and closely depressed, alternate, very dense, and from four to seven lines long; those on the stem and lower part of the principal branches much shorter, more distant, wider, decurrent, and slightly spreading at the points, while those on the lesser branches and branchlets are needle-shaped, almost cylindrical, spreading, slightly angular, compressed, and very much smaller on the adult trees. Branches, numerous, scattered along the stem, with the lower ones spreading, or bent downwards, and the upper ones mostly ascending; branchlets, slender, pendant, numerous, and thickly clothed with foliage; those of the adult trees being very much shorter, and covered with small, scale-formed leaves, regularly imbricated. Fruit, ovate, bluntly four-cornered, and solitary on the ends of the branchlets.

A lofty tree, with a cylindrical stem, covered with an ash-grey bark, slightly furrowed, and very full of branches, found on the mountains of Sumatra and Pulo-Penang, in the East Indies, where its native name is 'Gambinur.'

It is very tender.

No. 5. DACRYDIUM FRANKLINII, *Hooker*, Capt. Franklin's Dacrydium, or Huon Pine.

Syn. *Dacrydium Huonense*, *Cunningham*.

Leaves, small, scale-formed, very closely pressed, and somewhat spirally decussate, ovate, rhomboid, and closely imbricated,

convex, and somewhat acutely keeled on the back, with the inner face concave, and acute or obtuse-pointed, decurrent at the base, and deep, glossy green, dotted on the outer sides with a glaucous powder. Branches ascending or spreading, sometimes more or less deflected towards the bottom; on the adult trees, lateral ones very much loaded with branchlets. Branchlets, very numerous, dense, long, slender, and flexible. Malecatkins, solitary, terminal on the ends of the branchlets, oval, or rounded, and from one to two lines long. Fruit, small, and in terminal spikes.

A large, pyramidal tree, with spreading or pendant branches, thickly clothed with spray, growing 100 feet high, and 20 feet in circumference, found in Van Diemen's Land (Tasmania), on the banks of the Huon River, and at Port Macquarrie. Timber excellent for naval purposes.

It is tolerably hardy in some situations in England.

No. 6. *DACRYDIUM LAXIFOLIUM*, *Hooker*, the loose-leaved
Dacrydium.

Leaves, linear-obtuse, leathery, convex, and channelled on the upper surface, tapering to the base, but not decurrent, the lower ones loosely spreading, flaccid, and seldom exceeding two lines in length, while those on the upper branches and branchlets are oval, imbricated much shorter, and keeled on the back. Branches loosely pendant or prostrate, branchlets very slender and graceful. Fruit terminal on the end of the branchlets, solitary and erect.

A dwarf little shrub, not growing more than three feet high, but creeping along the ground, and very much resembling the common crowberry (*Empetrum nigrum*). It is found on the mountains of Nelson, at an elevation of from 6,000 to 7,000 feet, and on Mount Tongoriro in New Zealand.

It will be tolerably hardy.

Gen. DAMMARA. *Rumphius.*

Flowers, diœcious, or male and female on separate plants.

Cones, ovate or globular, and axillary.

Scales, persistent, and without bractœas.

Seeds, unattached, and solitary.

Seed-leaves, in twos.

Leaves, petiolated, or almost sessile, opposite or alternate, and leathery.

Name derived from its native one in Amboyna, where the Malays call it Dammar 'puti,' or 'batu,' on account of the large quantity of resin it produces, which at first is soft, viscid, and transparent, but eventually becomes hard, and like amber.

All large trees, natives of the East Indian Islands, New Zealand, and New Guinea.

No. 1. DAMMARA AUSTRALIS, *Lambert*, the Kauri Pine.

Syn. *Agathis Australis*, *Salisbury.*

„ *Podocarpus zamiaefolius*, *Richard.*

Leaves, linear-oblong, rarely elliptic, flat on both sides, alternate and distant on the stem and larger branches, but much closer, opposite and somewhat two-rowed on the branchlets; from one and a half to two and a half inches long, and from one half to three-quarters of an inch broad at the widest part, thick, leathery, sometimes falcate, of a shining greenish-brown colour, sometimes spotted on the upper part, and of a reddish-copper colour, much less glossy on the under side, frequently twisted and tapering to the base, obtuse at the ends, and without footstalks. Branches, of a large size, spreading, numerous, distant, smooth, and divided into numerous smaller ones; ascending and leafy towards the top of the tree, but naked at the bottom from the falling leaves. Male catkins, solitary, cylindrical, erect, more than an inch long, and two lines in diameter. Cones, almost spherical, from two to three inches in

diameter, solitary, erect, and produced near the top of the branches on stout footstalks. Scales, broad, spreading, wedge-shaped, thick, leathery, closely imbricated, acute on the apex, and very smooth, becoming smaller towards the base of the cone, thicker externally towards the apex, woody, hard, and membranaceous on the margin. Seeds, in twos, wedge-shaped and brown; having at the top on one side, a thin, transparent, quite entire, oblique, pale-coloured wing.

A large tree, attaining a height of from 120 to 150 feet, and about twenty-four feet in circumference, naked two-thirds of its entire height, and covered with a level, thick, lead-coloured bark, full of resinous matter. It produces an excellent hard brittle resin, like copal.

It is found in the northern parts of New Zealand, in forests close by the River Thames, towards the district of Mercury-Inlet; also upon the north side of the Island of Wangarow, and towards the western side of the Hokianga. The natives call it 'Kauri,' or 'Kouri,' and the settlers, 'Cowrie.'

It is not hardy.

No. 2. DAMMARA MACROPHYLLA, *Lindley*, the long-leaved
Dammara.

Leaves, very large, ovate, lanceolated, and pointed; seven inches long, and two broad in the widest part. Cones, ovate-obtuse, very like those of the Cedar of Lebanon in size and form. Scales, smooth, regularly inlaying, and much wider than long.

A large tree, growing 100 feet high, very much resembling the Amboyna Pine (*Dammara Orientalis*), but with larger cones and leaves. It was discovered by Mr. Moor, on the island of Vanicolla, one of the Queen Charlotte group in the South Seas.

It is very tender.

No. 3. DAMMARA MOORI, *Lindley*, Mr. Moor's Dammara.

Leaves, very narrow-lanceolate, acuminate, slightly falcate, and slender, from five to six inches long, and less than half-an-inch wide. Cones, unknown.

A very distinct species, of which little is known at present ; found by Mr. Moor ; seldom growing more than forty feet high, and with an erect compact head, in New Caledonia.

It is very tender.

No. 4. DAMMARA OBTUSA, *Lindley*, the obtuse-leaved
Dammara.

Syn. *Dammara Brownii*, *Hort.*

Leaves, very variable in shape, but mostly oblong, rounded at the ends, nearly four inches long, and one inch and a quarter broad ; thick, leathery, of a dark glossy green, and without the least trace of a point. Cones, oblong-cylindrical, with the ends rounded, three inches long, and one inch and three-quarters wide. Scales, convex at the ends, about four times as broad as long, and quite different in that respect from the spreading points of the New Zealand kind.

A large tree, very similar in appearance to the New Zealand Cowrie, from which it is distinguished by the size and form of both its leaves and cones. It was found by Mr. Moor on the Island of Aniteura, one of the New Hebrides. Timber, valuable for ship-building.

It is very tender.

No. 5. DAMMARA ORIENTALIS, *Lambert*, the Amboyna Pine.

- Syn. *Dammara alba*, *Rumph.*
 „ „ *loranthifolia*, *Spach.*
 „ *Agathis loranthifolia*, *Salisbury.*
 „ „ *Dammara*, *Richard.*
 „ *Abies Sumatrana*, *Desfont.*
 „ „ *Dammara*, *Poiret.*
 „ *Pinus Dammara*, *Lambert.*
 „ „ *Sumatrana*, *Mirbel.*

Leaves, opposite, but sometimes alternate, ovate-oblong, attenuated at the base, obtuse or rounded on the point, quite entire, glabrous, of a thick leathery texture, and glaucous green, from two to four inches long, and nearly one inch and a-half

broad at the widest part, straight, rarely falcate, smooth and dull green on both faces, somewhat two-rowed on the young branchlets, and distant, those on the young plants almost lanceolate, and sharp-pointed. Branches, vertical, a little reflected, and ascending at the extremities, forming a small head on the adult trees; branchlets and lateral branches in opposite pairs, and spreading; male catkins about two inches long. Cones, globular or turbinate, singly, on footstalks, rising from the axil of the leaves, near the extremities of the branches, from three to four inches long, and more than two inches broad. Scales, adpressed, smooth, rounded at the top, thick, and very closely inlaying. Seeds, unattached, with an obtuse, one-sided wing, covering the rib of the scale.

A huge tree, growing upwards of 100 feet high, with a straight, smooth bark and trunk, from eight to ten feet in diameter, found on the very summit of the mountains of Amboyna and Ternate, and in many of the Molucca Islands, Java, and Borneo. Timber of little value, but it produces a fine transparent resin, sometimes hanging like icicles, and much esteemed by the natives for incense. Its Malay name is 'Dammara.'

It is very tender.

There is the following variety:—

DAMMARA ORIENTALIS ALBA, *Knight*.

Syn. *Dammara alba*, *Makoy*.

„ „ *Orientalis pallens*, *Carriere*.

This variety differs from the species in having much longer and more lanceolate-shaped leaves, with the edges more regularly rolled up on the under side, slightly undulated, whitish and tapering much to the point, but abruptly and irregularly so to the base, and with the bark on the branches of a much whiter colour than the species.

Gen. FITZ-ROYA. *Hooker.*

Flowers, (monœcious?) male ones unknown, females solitary, globular, and terminal.

Cones, star-like bodies, having their axis terminating in three soft club-like glands or abortive scales, and consisting of nine scales, three in each whorl.

Scales, nine in number, in whorls of three, the lower three alternate with the upper leaves, the intermediate three only are fertile, the upper three are alternating with the fertile ones flattened, and standing with their edges bent outwards.

Seeds, three under each fertile scale, surrounded by a broad wing, ending in a narrow neck, the centre seed attached to the scale, the other two to the axil, but sometimes two seeds are on the scale, and three on the axil. (Hooker.)

Leaves, in whorls of three, but sometimes in twos or fours, ovate-oblong, flat, without any footstalks, and more or less spreading.

Named, by Dr. Hooker, in compliment to Capt. Fitz-Roy, who first discovered the tree.

A large evergreen tree, found on the Patagonian mountains.

FITZ-ROYA PATAGONICA, *Hooker*, the Patagonian Fitz-Roya.

Leaves, in whorls of three, but sometimes in twos or fours, linear, or ovate-oblong, and mostly blunt-pointed, decussate, flat, without any footstalks, and spreading, of a deep green above, and with two glaucous lines on the under-side, from four to six lines long on the young plants, but much smaller and closer on the adult ones, from one to one line and a-half long, closely imbricated, almost oval, and with hardly any traces of the glaucous bands on the under side. Branches, irregularly placed along the stem, spreading, rather slender, and bent downwards towards the extremities; branchlets, short, numerous, rather clustered, and thickly clothed with foliage. Cones,

small, solitary and terminal, star-like bodies, having their axis terminating in three soft club-like glands or abortive scales. Sir William Hooker describes the fruit as consisting of nine scales, three in each whorl, the lower three which alternate with the uppermost leaves are barren, the intermediate three only are fertile, the three uppermost alternate with the fertile ones and are flattened, but stand with their edges bent outwards, each fertile scale has three erect seeds, surrounded by a broad wing, and ending in a narrow neck ; the central seed is attached to the scale, the other two to the axil, but sometimes two seeds are on the scale, and three on the axil.

A large evergreen tree, growing 100 feet high, with slender spreading branches, bending downwards at the ends in a curved manner.

It is found on the Patagonian mountains, growing in rocky places on the Pacific side, to a large tree, with a stem eight feet in diameter, but diminishing with elevation until it dwindles down to a small bush, only a few inches high, on the borders of perpetual congelation.

It will stand our ordinary winters in favourable situations, but is very much injured, and frequently killed in severe ones.

Gen. FRENELA. *Mirbel.*

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

Cones, globular, or conical, and consisting of six valvated scales, the alternate ones being much the smallest and shortest.

Seeds, numerous, more or less angular, and laterally winged on both sides.

Leaves, mostly ternate, scale-formed, and decurrent.

Seed-leaves, in threes.

All trees or shrubs, and natives of New Holland.

Named after M. Frenel, by Professor Mirbel of Paris.

No. 1. FRENELA ARENOSA, *Endlicher*, the Sand Frenela.

Syn. *Callitris arenosa*, *Sweet*.

An evergreen bush, of which little is known, found growing in sandy places in New Holland.

No. 2. FRENELA AUSTRALIS, *Mirbel*, the Australian Frenela.

Syn. *Callitris Australis*, *R. Brown*.

„ *Thuja Australis*, *Desfont*.

„ *Chamæcyparis glauca*, *Hort*.

An evergreen tree, with scale-formed leaves, decurrent at the base, and placed in threes at the bottom of each joint, but sometimes scattered, extended, spreading, and of a very glaucous white colour. Branches, and branchlets, slightly angular and slender. Cones, globular, mostly in clusters, but sometimes solitary, on short footstalks, and about the size of a common nut. Valves, thick, rounded at the ends, oval, woody, smooth, or longitudinally wrinkled, and with the central column short, and three-edged. Seeds, oval, osseous, and furnished with a narrow membranaceous wing on the sides.

A tree, growing from 60 to 70 feet high, found on the east coast of New Holland, and Van Diemen's Land, where it is called by the settlers, the Oyster Bay Pine.

It is not hardy.

No. 3. FRENELA CALCARATA, *Cunningham*, the Spurred Frenela.

Syn. *Callitris calcarata*, *R. Brown*.

An evergreen tree, of which little is known, found in the interior of the eastern part of New Holland.

It is tender.

No. 4. FRENELA ERICOIDES, *Endlicher*, the Heath-like Frenela.

Syn. *Juniperus ericoides*, *Noisette*.

A small evergreen bush, of which little is known, from New Holland.

No. 5. FRENELA FOTHERGILLI, *Endlicher*, Fothergill's
Frenela.

Syn. *Callitris Fothergilli*, *Loudon*.

„ *Cupressus Fothergilli*, *Pinet Wobourn*.

A large pyramidal bush, or small tree, with erect branches, and numerous dense branchlets. Cones, solitary, conical, and quite woody. Valves, unequal, and rounded at the ends.

It is nearly hardy, and comes from the mountains of Tasmania.

No. 6. FRENELA FRUTICOSA, *Endlicher*, the Shrubby
Frenela.

Syn. *Callitris fruticosa*, *R. Brown*.

„ „ *oblonga*, *Richard*.

An evergreen bush, or small tree, found in the interior of the eastern part of New Holland, and Port Jackson, with ovate, sharp-pointed, dry, woody, six-valved cones, smooth internally, and with a very short, depressed, three-sided, central column. Seeds, furnished with narrow, lateral wings, rounded on the edges.

It is not hardy.

No. 7. FRENELA GLAUCA, *Mirbel*, the glaucous Frenela:

Syn. *Callitris glauca*, *R. Brown*.

An evergreen bush, of which little is known, from the interior of New Holland.

No. 8. FRENELA GUNII, *Endlicher*, Gunn's Frenela.

Syn. *Callitris Gunii*, *Hooker*.

Leaves, small, scale-formed, sharp-pointed, closely adpressed at the base of each joint. Branches, ascending; branchlets, angular, smooth, glaucous, and slightly jointed. Cones, somewhat conical, very rarely elliptic, solitary, or in pairs, but sometimes in clusters, sessile, or placed on very short footstalks, and both growing on the branches and principal stems. Valves, six in number, thick, rounded on the ends, and unequal sized,

the alternate ones being much shorter and smaller than the others, convex, much rounded in the middle, and shining brown externally. Seeds, broadly winged, and rather angular.

An evergreen tree, with a pyramidal head, found in Van Diemen's Land, where the colonists call it 'The Native Cypress.'

It is tender.

No. 9. FRENELA HUGELII, *Carriere*, Hugel's Frenela.

Syn. *Callitris Hugelii*, *Knight*.

Leaves, scale-formed, very short, closely adpressed, much longer, and more pointed on the branches than on the smaller branchlets. Branches, somewhat ascending, lateral ones rising up at the sides, and forming a slightly spreading head; branchlets, spreading, obtusely angular, and very short jointed. Cones, solitary, or in clusters, somewhat globular, depressed, and frequently much broader than long. Valves, unequal, the three alternate ones being much shorter and smaller than the others; wrinkled externally, and shining. A pyramidal tree, with ascending branches, found on the south-west coast of New Holland and Swan River.

It is tender.

No. 10. FRENELA MACROSTACHYA, *Knight*, the Long-spiked Frenela.

Syn. *Callitris macrostachya*, *Hort*.

„ *Cupressus macrostachya*, *Hort*.

A small, rather straggling bush, which is rather hardy, found in Van Diemen's Land.

No. 11. FRENELA PROPINQUA, *Cunningham*, the Related Frenela.

Syn. *Callitris propinqua*, *R. Brown*.

An evergreen pyramidal bush, of which little is known, found in the southern part of New Holland.

No. 12. FRENELA PYRAMIDALIS, *Carriere*, the Pyramidal
Frenela.

Syn. *Callitris pyramidalis*, *Sweet*.

Leaves, very small, scale-formed, very close, and obtuse, very rarely pointed. Branches, ascending and dense; branchlets, very numerous, small, and pressed towards the ends of the branches, of a greyish colour, angular, and loose. Fruit unknown.

A pyramidal bush or small tree, found in New Holland.
It is tender.

No. 13. FRENELA RHOMBOIDEA, *Endlicher*, the Rhomboid
Frenela.

Syn. *Callitris rhomboidea*, *R. Brown*.

An evergreen bush, with very small scale-formed leaves, in threes at the base of each joint, acute, persistent, and closely adpressed together. Branches, rounded, or a little angular, and very full of branchlets; branchlets, scattered and jointed. Cones, globular, or conical, solitary, and composed of six acute-pointed valves, the alternate ones being much the smallest and shortest. Seeds, with broad wings. It is found on the eastern part of New Holland, and very much resembles the Common Cypress in appearance.

It is quite tender.

No. 14. FRENELA RIGIDA, *Endlicher*, the Rigid Frenela.

Syn. *Juniperus rigida*, *Noisette*.

A small bush, of which little is known, found in New Holland.

No. 15. FRENELA ROBUSTA, *Cunningham*, the Robust Frenela.

Syn. *Callitris robusta*, *R. Brown*.

„ „ *Preissii*, *Miquel*.

A large pyramidal tree, with very small, scale-formed leaves, slightly spreading at the points, and mucronate. Branches,

ascending; branchlets, slightly angular, or three-edged. Cones, spheroidal, much depressed, and frequently broader than long. Valves, warted on the interior, with the central column short, and three-edged. Seeds furnished with narrow lateral wings.

It is found on the south-west coast of New Holland, and at the Swan River, where the natives call it 'Marro.'

It is quite tender.

No. 16. FRENELA ROEI, *Endlicher*, Roe's Frenela.

An evergreen bush, with globular cones composed of six valves, smooth on the interior, with a short, depressed, three-sided, central column, and acute-pointed valves, found on the south-west coast of New Holland.

It is not hardy.

No. 17. FRENELA TRIQUETRA, *Spach*, the three-edged Frenela.

- Syn. Frenela Ventenatii, *Mirbel*.
 „ Callitris cupressiformis, *Ventenant*.
 „ Cupressus Australis, *Desfont*.
 „ „ triquetra, *Loddiges*.
 „ „ articulata, *Pinet-Wobourn*.
 „ Juniperus Cunninghamsi, *Hort*.

A small tree, or bush, with a straight stem, and spreading or ascending branches, furnished with irregularly tufted, flexuose, striped branchlets, somewhat three-forked, or much divided, and furnished with very small, remote, bright, bluish green leaves. Cones, in clusters, about the size of a cherry, oval, or globular, and composed of six acute-pointed valves, tuberculated on the interior, with a short, depressed, three-sided central column, and unequal-sized scales, the alternate ones being much the smallest. Seeds, furnished with narrow wings, and angular.

It is found on the east coast of New Holland, growing 20 feet high.

No. 18. *FRENELA TUBERCOLATA*, *Mirbel*, the Tuberculated Frenela.

Syn. *Callitris tuberculata*, *R. Brown*.

An evergreen bush, from the southern part of New Holland of which little is known.

No. 19. *FRENELA VARIABILIS*, *Carriere*, the variable Frenela.

Leaves, scale-formed, very small, and closely approaching. Branches, short; branchlets, angular, glaucous, and somewhat distantly jointed. Cones, oval, or conical. Valves, six, but sometimes from seven to eight in number, thick, rounded, convex on the outside, and of a shining brown colour, dotted or smooth, thickened at the summit, which is slightly reflected.

A pyramidal bush, with short branches, and very glaucous branchlets, found in New Holland.

It is not hardy.

No. 20. *FRENELA VERRUCOSA*, *Cunningham*, the Warted Frenela.

Syn. *Callitris verrucosa*, *R. Brown*.

An evergreen pyramidal tree, with small, scale-formed leaves frequently spreading at the points. Branches, spreading, or ascending, very compact, and cylindrical. Cones, globular, depressed, and sometimes broader than long. Valves, externally covered by large, irregular tubercles, and internally warted, central column oblong, and three-sided. Seeds, broadly winged.

It is found in the interior, on the eastern part of New Holland.

It is tender.

Gen. GLYPTOSTROBUS. *Endlicher.* The Embossed Cypress.

Flowers, monœcious, or male and female on the same plant, but on separate parts, and terminal.

Cones, egg-shaped, or oblong, and composed of several unequal-sized scales, all rising from the same point at the base, and leathery.

Seeds, two under each scale.

Leaves, scattered and trigonal.

Name, derived from ‘Glypho,’ embossed, and ‘strobis,’ a cone; scales of the cone embossed on the face.

A small tree, native of China, where it is called Water Pine.

GLYPTOSTROBUS HETEROPHYLLUS, *Endlicher*, the Chinese Water Pine.

Syn. *Taxodium nuciferum*, *Brongniart*.

„ „ *Japonicum*, *Denhardt*.

„ „ „ *heterophyllum*, *Brongniart*.

„ *Scubertia Japonica*, *Spach*.

„ „ *nucifera*, *Denhardt*.

„ *Thuia lineata*, *Poiret*.

„ „ „ *lavandulæfolia*, *Poiret*.

„ „ *pensilis*, *Staunton*.

„ *Cupressus nucifera*, *Hort*.

„ „ *Sinensis*, *Hort*.

„ *Juniperus aquatica*, *Roxburgh*.

Leaves, of various shapes, alternate, some scale-formed, small, ovate, acute or obtuse pointed, sometimes much longer, closely pressed and decurrent along the shorts, sometimes two-rowed, regularly tortuose and almost awl-shaped; from three to eight lines long, slightly curved, blunt or somewhat acute at the ends, and of a glaucous grey colour, the lower ones near the base of the shoots frequently very short, scale-formed, somewhat triangular, imbricated, and compressed, but increasing in size and

length towards the points of the shoots, and spreading out into rather long awl-shaped recurved leaves. Branches, rising upwards and spreading out at the summits; branchlets, alternate, stout, and rendered angular by the decurrent base of the leaves; the cone-bearing ones of various lengths, and covered with very small scale-formed leaves, particularly at the base of the cones. Cones, terminal, egg-shaped or oblong-cylindrical, tapering to both ends, blunt at the apex, and composed of several unequal-sized scales, the smaller ones being towards the base, and all rising from the same point at the base upwards, imbricated and furnished with a stout, short-curved, blunt point on the back near the end of the scale, projecting outwards.

A small tree or large bush, growing from eight to ten feet high, with a straight stem, and fastigate head, a little extended at the top, and nearly evergreen.

It is found in many parts of China, particularly in the provinces of Shan-Tung and Kiang-nan, and is planted along the margins of rice fields about Canton. It is the Chinese Water Pine.

It is tolerably hardy in England.

Gen. JUNIPERUS. *Linnæus.* The Juniper.

Flowers, diœcious, or male and female on different plants. The males, axillary or terminal catkins; the female ones, small axillary bud-like bodies, bracteated at the base.

Fruit, a globular kind of berry, composed of a fleshy or fibrous juicy substance, covered with a glossy skin, more or less furnished externally with minute scales, and sometimes angular and naked at the apex.

Seeds, from one to five, but mostly three, in each fruit, obscurely three-cornered, and covered with a hard bony covering, having gland-bearing pits towards the base.

Leaves, simple, opposite or ternate, lanceolate or scale-formed, and either in extended whorls, or closely imbricated in four rows.

Seed-leaves, in twos.

Name, derived either from 'Juneprus,' a Celtic word, meaning 'rough' or 'rude,' from the plants being stiff, or from 'Juniores pariens,' from the young and old leaves and berries being on the plant at the same time.

All evergreen shrubs or small trees; found in the temperate and frigid regions of Europe, Asia, Africa, or America.

Section 1. OXYCEDRUS, THE TRUE JUNIPERS.

Leaves, in whorls of three, spreading in the adult plants, jointed at the base, and glandless on the back.

Fruit, globular and smooth.

No. 1. JUNIPERUS CANADENSIS, *Loddiges*, the Canadian
Juniper.

Syn. *J. communis depressa*, *Pursh*.

„ „ *nana montana*, *Endlicher*.

„ „ *depressa*, *Booth*.

Leaves, lanceolate, narrow, three in a whorl, incurved, spreading, tapering regularly from the base to the point, very sharp-pointed and stiff; pale green below, and channelled with a white band on the upper surface. Branches, rather slender, spreading and elevated; lateral ones rather short, and not very thickly clothed with its very pungent leaves. Berries, ovate-globular, smooth, shining, and nearly black when ripe.

This species grows from three to five feet high, with an elevated spreading head, rather open in appearance. It is found growing in the Northern parts of North America, in Labrador, Newfoundland, Hudson's Bay, the rocky districts of Newbury and Main, in Greenland, and on the Island of Sitcha.

It is frequently confounded with the dwarf Juniper of Europe (*J. nana*), but it is easily distinguished from it, by its much narrower, sharper-pointed, and paler foliage, and in its more elevated branches, growing from three to five feet high, while those of the dwarf juniper lay flat, or creep along the ground.

No. 2. JUNIPERUS CEDRO, *Webb*, the Canary Island Juniper.

Syn. *Juniperus Cedrus*, *Carriere*.

Leaves, in whorls of three, straight, rigid, spreading and blunt-pointed, ending in a short prickle, very numerous and close, especially upon the branchlets; the lower ones ovate-lanceolate, the upper ones linear and sharp-pointed, slightly keeled, mostly straight, seldom concave, and frequently very glaucous on the upper side. Branches, horizontal, bent downwards at the points; branchlets, numerous, short, angular, thickly clothed with leaves, and of a glaucous green colour. Berries, large, globular, nearly smooth, of a reddish-brown colour, covered all over with glaucous bloom, and with a few tubercles slightly jutting out all round.

This kind is very nearly related to the *Juniperus macrocarpa*, but differs from it in having much shorter and more numerous branches, in the leaves being more dense, shorter, and more glaucous, and in the berries being of a reddish brown colour and scaly on the top, probably only a variety of *Juniperus Oxycedrus*.

It is found on the Island of Teneriffe, and Canary Islands, a bush or small tree, growing about ten feet high.

No. 3. JUNIPERUS COMMUNIS, *Linnæus*, the Common Juniper.

Syn. *Juniperus minor*, *Fuchs*.

„ „ *vulgaris*, *Bauhin*.

„ „ „ *fruticosa*, *Duhamel*.

„ „ *communis vulgaris*, *Loudon*.

„ „ *Cracovia*, *Loddiges*.

Leaves, spreading, in whorls of three, narrow, sharp-pointed awl-shaped and stiff; green on the under and grey on the upper surface, and half an inch or more long. Berries, small, roundish, marked on the top with a three-forked groove; when young, bright green, but when ripe of a dark purple or blackish blue, covered with a bloom, and continuing two years on the bush; they are stalkless, and grow from the axil of the leaves; branches spreading and inclining equally on all sides; bark, reddish brown.

This Juniper grows in favourable situations from twelve to eighteen feet high, and is common in all the northern parts of Europe, both on hills and valleys, in open sandy plains, or in moist and close woods; on the sides of hills it grows tall, but on the tops of rocky mountains it is only a dwarf-trailing shrub. In England it is chiefly found on open downs, in a chalky or sandy soil. It occurs very generally on the Alps, from east to west, and from the foot to a height of 5,000 feet; also on the Apennines at the same elevation as the Alps, and occurs in the whole of the north of Europe, as far as Lapland, and is found, according to Mr. Bentham, on the Pyrenees. Those plants referred to this species by writers as being found in North

America and Northern India, belong to very different species; the following are its varieties, viz. :

JUNIPERUS COMMUNIS SUECICA, *Loudon*, Swedish Juniper.

Syn. *Juniperus vulgaris arborea*, *Bauhin*.

„ „ *Suecica*, *Miller*.

Leaves, spreading, shorter than those of the species, more distant and sharper-pointed. Branches, ascending, compressed, and forming a sharp-pointed cone, with a very distinct upright appearance. Berries, larger and longer than those of the common Juniper, of a dark purple colour, and smooth.

It is a native of Sweden, Denmark, Norway, and Russia, and attains to a greater size than the common Juniper in those countries, frequently attaining a height of from twelve to twenty feet.

JUNIPERUS COMMUNIS HIBERNICA, *Loddiges*.

Syn. *Juniperus stricta*, *Hort*.

„ „ *pyramidalis*, *Hort*.

„ „ *Hibernica*, *Loddiges*.

„ „ *communis stricta*, *Carriere*.

A pyramidal variety, with erect branches and rather spreading, short, angular branchlets, having its leaves shorter and less pointed than those of the species, and with the branches less compressed than those of the Swedish Juniper (*J. c. Suecica*).

It is a handsome variety, found on the mountains in Ireland.

JUNIPERUS COMMUNIS COMPRESSA, *Carriere*.

Syn. *Juniperus Hibernica compressa*, *Hort*.

„ „ *Hispanica*, *Presl*.

„ „ *compressa*, *Rinz*.

„ „ *communis Hispanica*, *Lawson*.

This variety is easily distinguished from the Irish Juniper by its branches being very much shorter, slenderer; all erect, and

forming in consequence a very straight and compact pyramid, with the leaves closer together along the branchlets, much shorter, and less spreading, and with the bark of the branches much darker in colour.

A very compact variety, with a pyramidal-shaped head, found indigenous on the Pyrenees and Apennines, at an elevation of 5,000 feet.

No. 4. JUNIPERUS DRUPACEA, *Labill*, the Plum-fruited Juniper.

Syn. *Arceuthos drupacea*, *Antoine*.

„ *Juniperus latifolia arborea*, *Tournefort*.

„ „ *major*, *Bellonius*.

Leaves, in whorls of three, thickly set all round the branches, rigid, linear-lanceolate, sharp-pointed, spreading, and without any footstalks, but slightly decurrent; three quarters of an inch long, and more than one-tenth of an inch wide near the base; but the lower leaves on the branches are shorter, broader, more oval or elliptic, and get regularly narrower, and more linear towards the summit or ends of the shoots, and terminating in a very sharp hard point, slightly concave on the upper side, with a small mid-rib, on each side of which is a white glaucous line, convex on the under side, with a projecting nerve along the back, and of a light green colour. Stem, erect, much branching, branches short, spreading, slightly angular, inclining to cylindrical; smaller ones numerous, three-sided, with the ends rather straight; fruit-bearing ones very short, and thickly covered with short, oval, sharp-pointed leaves pointing upwards. Berries, solitary, standing in the axil of the leaves, globular or bluntly-ovate; one inch long, and nearly the same broad, with from six to nine fleshy scales, disposed vertically in threes, alternately one above another, and blended or run together on the surface, but projecting and very distinct, being divided into distinct spaces of an angular form, deeply divided at the apex, and of a dark purple colour, covered all over with a glaucous violet bloom, or powder, each fruit containing a single, large, egg-shaped, hard bony nut, parted in the interior into

three divisions, each containing a single seed, but frequently one of them is abortive; the seeds require two or three years to vegetate.

A large bush, growing eight or ten feet high, in the northern parts of Syria, on Mount Cassio and Asia Minor.

It is quite hardy, and the finest of all the Junipers.

No. 5. JUNIPERUS HEMISPHERICA, *Presl*, the Globular Juniper.

Syn. *J. echinoformis*, *Rinz*.

„ „ *vulgaris fruticosa*, *Cupan*.

„ „ *Oxycedrus echinoformis*, *Van Houtte*.

Leaves, spreading, very dense, sharp-pointed, three in a whorl, whitish above, pale green below, and like those of the common Juniper (*J. communis*), but much smaller; branches very short, numerous, dense, and compact, forming a small globular-headed bush, not more than one or two feet high. Berries, globular, bright red, and shining.

It is found on the upper barren regions of Mount Etna, a low spreading but dense bush, at an elevation of from 5,000 to 7,000 feet. Professor Tenore says it is also found on the mountains of Calabria.

This very dwarf and singular little Juniper is now frequently to be found in English collections of Conifers, under the name of *J. echinoformis*, or the Hedgehog Juniper, a very appropriate name; for young healthy plants, at a short distance, look very like a green Hedgehog.

No. 6. JUNIPERUS MACROCARPA, *Sibthorp*, the large Purple-fruited Juniper.

Syn. *J. maximus*, *Lobel*.

„ „ *Lobelii*, *Gussone*.

„ „ *oblongata*, *Gussone*.

„ „ *Biassolettii*, *Link*.

„ „ *major, bacca-cærulea*, *Tournefort*.

„ „ *neaboriensis*, *Lawson*.

„ „ *elliptica*, *Van Houtte*.

Leaves, spreading, lanceolate, and in whorls of three, broader

than those of *J. Oxycedrus*, and sharp-pointed, keeled on the under side, two furrowed and glaucous grey above; branchlets, angular and slender, with the ends rather pendant. Berries, very large, obovate, or elliptic, smooth, shining, and of a deep purplish black colour, when ripe, covered with a glaucous violet bloom, like a small Plum.

A large bush, growing from six to ten feet, on all the rocks and sandy coasts of the Mediterranean, in Austria, Sicily, Greece, and near Cadiz, in Spain, and probably on the Barbary Coasts.

It is quite hardy.

No. 7. *JUNIPERUS NANA*, *Willd.*, the Dwarf Juniper.

Syn. *Juniperus Alpina*, *Clusius*.

„	„	minor Montana, <i>Bauhin</i> .
„	„	<i>Alpina Suecica</i> , <i>Pluknet</i> .
„	„	communis Montana, <i>Aiton</i> .
„	„	„ nana, <i>Loudon</i> .
„	„	„ <i>Alpina</i> , <i>Wahlenb</i> .
„	„	<i>Sibirica</i> , <i>Burgsdorff</i> .
„	„	nana <i>Alpina</i> , <i>Endlicher</i> .
„	„	<i>Davurica</i> , <i>Fischer</i> .
„	„	saxatilis, <i>Pallas</i> .
„	„	dealbata, <i>Douglas</i> .
„	„	<i>Alpina minor</i> , <i>Booth</i> .

Leaves, broad, thick, somewhat adpressed, and incurved, in whorls of three, deep shining green below, glaucous grey on the upper surface, with a green margin, linear and blunt-pointed, dense and one fourth of an inch long. Branches, numerous, flat, prostrate, the smaller ones angular, rigid, and thickly clothed with foliage, which all face one way, and remain on the branches for years. Berries, like those of the common Juniper, but much longer.

A creeping shrub, seldom growing more than one foot high, but spreading to a great distance on all sides, and quite dense.

It is found in England and Scotland, on mountains, on the Alps, seldom below 5,000 feet, but up to 9,000 feet of elevation, on the higher summits of the Apennines, and occurs on the Carpathian Mountains, in Lapland as far as the Northern regions, on the Altai Mountains, in Greenland, and the higher mountains of Portugal, and on the Alpine regions and snow line of the Pyrenees. This is a very distinct kind from *Juniperus Canadensis*, with which many writers confound it.

No. 8. *JUNIPERUS OBLONGA*, *Bieberstein*, the Caucasian Juniper.

Syn. *Juniperus Caucasica*, *Fischer*.

„ „ *interrupta*, *Wendland*.

„ „ *reflexa*, *Hort*.

„ „ *communis oblonga*, *Loudon*.

„ „ „ *Caucasica*, *Endlicher*.

„ „ *Thuiæcarpus juniperinus*, *Trautv*.

Leaves, in whorls of three, long, narrow, rigid, lance-shaped, acute-pointed, spreading and pointing outwards, bright green on one side, and glaucous grey on the other, distant and without footstalks. Branches, straggling, very numerous, and curved upwards at the points, with the branchlets slender, branching, and drooping. Berries, very small, oblong, in threes round the stem, without any footstalks, of a purplish colour, covered with a glaucous bloom, and divided on the top with two or three grooves, radiating from the centre, each fruit containing either two or three hard bony seeds, in a dry spongy flesh.

A large straggling, many-stemmed bush, growing from four to five feet high, but covering a large space along the ground.

It is found on the sub-Alpine Mountains in the Western Caucasus, on the Talusch Mountains, in South Western Russia, and on the mountains of Taurica.

It is a very handsome and distinct kind, and certainly not a variety of the common Juniper, as supposed by some writers, but nearly related to *Siebold's Juniperus rigida*.

No. 9. JUNIPERUS OXYCEDRUS, *Linn.*, the Prickly Cedar, or large brown-fruited Juniper.

Syn. *Juniperus Monspeliensium*, *Lobel.*

„ „ *Oxycedrus Phœnicea*, *Dodon.*

Leaves, dull green, distant, three in a whorl, spreading, very sharp pointed, lanceolate, with two furrows on the upper side, angular below, and nearly the same colour on both sides. Branches, furrowed; branchlets angular, slender, and rather pendant at the points. Berries, round, very large, smooth, numerous, and chestnut brown, marked with two white lines on the apex.

A shrub or small tree, mostly with a centre stem, about ten or twelve feet high, with rather an open pendulous appearance, the berries of which are used for flavouring gin.

It is found growing on the Apennines at an elevation of 3,000 feet, in the South of France, and is common in Spain and Portugal, and the countries bordering the Mediterranean, growing on the sea coast.

It is quite hardy.

No. 10. JUNIPERUS RIGIDA, *Siebold*, the Stiff-leaved Japan Juniper.

Syn. *Juniperus oblonga pendula*, *Loudon.*

„ „ *pendula vera*, *Hort.*

Leaves, in whorls of three, lanceolate, very rigid; half an inch long, widest at the base, and tapering to a long rounded sharp point; concave and glaucous above; slightly keeled, or ribbed along the middle; convex, or channelled and bright green on the under side, and without any footstalks. Branches, few, scattered and rather fastigate on the stem, but with the ends recurved and pendant; smaller branches, quite pendant, straight, very slender, flexible, angular, and of a dull yellow colour. Berries, solitary, globular, or oblong; smooth, and of a violet glaucous colour; nearly sessile, or on very short branchlets, covered with oval-pointed short leaves.

A small tree, growing from fifteen to twenty-five feet high, with quite a drooping habit, found on the Hakone ridge of Mountains, in the Island of Nippon, in Japan, and in the Northern parts of China.

It is quite hardy, and a very handsome plant.

No. 11. JUNIPERUS RUFESCENS, *Link*, the small, shining, red-berried Juniper.

Syn. Juniperus	Oxycedrus	Taurica,	<i>Hort.</i>
„	„	Taurica,	<i>Strangways.</i>
„	„	Wittmanniana,	<i>Fischer.</i>
„	„	communis Wittmanniana,	<i>Carrière.</i>
„	„	Oxycedrus Wittmanniana,	<i>Hort.</i>

Leaves, in whorls of three, rigid, distant, spreading, very sharp-pointed, dull green, and without footstalks, nearly three-quarters of an inch long, lanceolate, tapering from the base to the point, with two furrows, slightly glaucous on the young foliage on the upper side, and angular below, but nearly the same colour on both sides, on the adult leaves. Branches, spreading, angular, and straight; branchlets, slender, long, rather stiff, and dull brown. Berries, small, globular, four-tenths of an inch in diameter, and of a smooth, shining, dull red colour, with very short footstalks, and marked on the apex with three white lines, radiating from the centre.

A shrub, or large bush, growing eight or ten feet high.

It is found in the South of Europe, inhabiting the shores of the Mediterranean, along the rocky districts of Spain and France, the sands of Spain, Portugal, Italy, and Greece, and the Western Islands, at elevations varying from 1,000 to 6,000 feet. It is also found in the Caucasus, and Taurian Mountains, but greatly influenced in size and foliage by elevation and climate. There is the following variety:—

JUNIPERUS RUFESCENS BREVIFOLIA, *Endlicher.*

Syn. Juniperus Oxycedrus brevifolia, *Hochst.*

This variety differs from the species in having much shorter

and smaller leaves, partially imbricated, and more compact, and in growing much taller.

It is found in the Azores and adjoining islands.

No. 12. JUNIPERUS TAXIFOLIA, *Hooker*, the Yew-leaved
Juniper.

Leaves, in whorls of three, linear, slightly rounded at the point, rigid, spreading, upper side hollow, two furrowed, and glaucous, the under-one smooth, dark green, with a strong elevated rib along its centre, terminating in a blunt point, and without any footstalk. Branches, few, scattered on the stem, rather spreading, and pendulous at the ends, smaller ones angular, pendulous, and but little forked, flexible, and of a dull yellow colour. Berries, very small, solitary, globular, smooth on the surface, and of a glaucous violet colour when ripe, nearly sessile, or on very short branchlets, imbricated with oval-pointed short leaves.

A small bush, on the Mountains of Japan, not yet introduced, and probably only a variety of Dr. Siebold's *Juniperus rigida*.

Section II. SABINA. THE SAVIN JUNIPERS.

Leaves, in opposite pairs, mostly awl-shaped, slightly divergent, and loosely imbricated in the adult plants.

Berries, mostly very small, and numerous.

No. 13. JUNIPERUS BERMUDIANA, *Linnæus*, the Bermuda, or
Pencil Cedar.

Syn. *Juniperus oppositifolia*, *Mönch*.

„ „ *Barbadensis*, *Linnæus*.

„ „ *Cedrus Bermudæ*, *Ray*.

Leaves, of two sorts, either in pairs, opposite, and very much drawn together along the shoots; or in whorls of three, spread open and needle-shaped, very dense, nearly half-an-inch long, tapering from the base to the point, rigid, smooth, narrow, and

quite straight, channelled above, and glaucous ; slightly keeled, and without any gland on the under side ; light green when young, but much darker when old, and seldom growing on the under part of the branches. The other form, which is that of the berry-bearing kind (female), has the leaves on the mature plant, in opposite pairs, short, closely drawn together along the branches, imbricated, and not so dense ; ovate, lanceolate, and in four rows. Stem, erect, branches spreading, and furnished with a great number of smaller ones, completely covered with leaves. Berries, small, globular, solitary on the ends of the branchlets, and of a dark brown colour, inclining to purple when ripe.

A pyramidal dense-headed tree, with the lower branches rather spreading, and attaining a height of forty or fifty feet, in the Islands of Bermuda, the Canary Islands, and Barbadoes.

This is the tree which furnishes the wood from which cedar pencils are made.

It is not hardy in England.

No. 14. JUNIPERUS EXCELSA, *Bieberstein*, the Tall Juniper.

Syn. *Juniperus* *fœtidissima*, *Willdenow*.

„ „ *fœtida squarrulosa*, *Spach*.

„ „ „ *excelsa*, *Spach*.

„ „ „ *Taurica*, *Pallas*.

„ „ *excelsa vera*, *Hort*.

„ *Cedrus Orientalis fœtidissima*, *Tournefort*.

Leaves, in twos, very small, glaucous grey, sharp-pointed, loosely imbricated, and spreading at the points on the young plants ; but short, thick, ovate, imbricated, and four-rowed, with a sunken gland at the back of those on the old plants. Stem, erect, thickly covered with numerous short compact branches, curved upwards towards the ends, and densely clothed with foliage ; branchlets, rounding, four-sided, straight, and rather rigid. Berries, globular, slightly angular, half an inch in diameter ; when full grown, of a deep glaucous purple, solitary, and on the ends of very short branchlets.

A handsome pyramidal small tree, growing thirty or forty feet high, with the lower branches rather drooping when old.

It grows on the Islands in the Grecian Archipelago, Taurica, Syria, Armenia, and between Tefis and Erivan; also in Persian Armenia, and Georgia.

It is quite hardy, and very distinct from *Juniperus excelsa* of Indian botanists, which is *Juniperus religiosa*.

JUNIPERUS EXCELSA VARIEGATA, *Carriere*.

A very striking variety, with variegated leaves and branchlets, of French origin.

No. 15. JUNIPERUS FLACCIDA, *Schlecht*, the Loose-growing Mexican Juniper.

Syn. *Juniperus fœtida flavida*, *Spach*.

„ „ *gracilis*, *Endlicher*.

Leaves, in various forms, some opposite, and in pairs, others in whorls of three, spreading at the points, needle or lance-shaped, very small, and pointing upwards; three-quarters of a line long, with frequently an elongated gland, on the back of those small rounded, and closely imbricated leaves on the smaller branchlets of the adult plants; those on the young plants, spreading, straight, much longer, lance-shaped, and bright green on both sides. Branches, naked towards the base, slender, horizontal, drooping at the points, and covered with a smooth greyish-brown bark; branchlets numerous, on the ends of the branches, four-sided, pliable, spread out, mostly growing on one side, and pendant. Berries, large, globular, solitary, half-an-inch in diameter, with projecting thin-pointed scales, short scaly footstalks, and of a deep purple colour, covered with a glaucous bloom.

A graceful, loose-spreading, pyramidal bush, or small tree, growing from fifteen to twenty feet high, with a drooping appearance.

It is found on the mountains of Atotonilco el Chico, Regla, and Real del Monte, in Mexico, at elevations of from 6,000 to

8,000 feet, where it produces Sandarac, but in much smaller quantity than the Mexican Juniper (*J. Mexicana*).

It is very distinct, and tolerably hardy.

No. 16. *JUNIPERUS JAPONICA*, *Carriere*, the Japan Juniper.

Syn. *Juniperus procumbens*, *Siebold*.

„ „ *Chinensis procumbens*, *Endlicher*.

Leaves, in whorls of three, thickly set on the shoots, spreading, rigid, and tapering to a sharp prickly point; straight, smooth, bright green, and convex, with hardly any trace of the mid-rib on the under side; channelled, with two glaucous lines on the upper one, while those on the outer branches in the adult plants are very small, ovate, blunt at the points, closely imbricated, and three-sided. Branches, spread out, numerous, twisted, and frequently bent downward at the ends; smaller ones, very dense, short, rigid, and covered at the ends with small closely-imbricated leaves. Berries, solitary, at the points of the small lateral branchlets, small, irregularly egg-shaped, gibbous, and sometimes two-lobed, containing from one to three seeds in each, of a very deep purple, covered with a glaucous powder, before and when ripe.

A small dense-spreading bush, not growing more than one or two feet high, found plentiful on the mountains of Japan.

It is quite hardy, and very distinct.

No. 17. *JUNIPERUS MEXICANA*, *Schlecht*, the Sandarac, or Mexican Juniper.

Syn. *Juniperus Deppiana*, *Steudel*.

„ „ *fœtida thurifera*, *Spach*.

„ *Cupressus Sabinoides*, *Humboldt*.

Leaves (on the adult plants), in opposite pairs, very short, three quarters of a line long, ovate-pointed, and loosely imbricated; but ovate, blunt-pointed, and closely imbricated on the small branchlets, four-rowed, and marked on the back with an elliptic gland, and of a dull greyish colour.

Leaves (on the young plants), mostly in threes, round

the branches, sharp-pointed, needle-shaped, rigid, spreading, loosely imbricated, and dull glaucous green. Branches, angular, horizontal, slightly elevated at the ends; smaller ones covered with sharp-pointed, scaly leaves, extended at the points, and with an elevated gland at the back; branchlets, four-sided, rather cylindrical, short, stiff, and straight. Berries, solitary, on short scaly footstalks, half an inch in diameter, irregularly globular, with a few gouty humps, or tubercles, terminated with a very thin scale on the outside, and of a dark purple colour, dusted over with a glaucous powder.

A small tree or bush, growing from ten to fifteen feet high, with a pyramidal-shaped head, producing a pale yellow resinous matter, frequently found in drops or lumps on the branches, and resembling sandarac.

It is found plentiful on the Real del Monte Mountains, and on the Llanos of Perote and Mineral Monte, at an elevation of from 8,000 to 10,000 feet, and is called by the Mexicans, 'Cedro.'

It is quite hardy.

No. 18. *JUNIPERUS PROCERA*, *Höchst*, the Abyssinian Juniper.
Syn. *Juniperus Lasdeliana*, *Lawson*.

Leaves, in pairs, opposite, thick, fleshy, and very small, ovate-pointed, scale-like, and imbricated, with an oblong gland on the back, in the adult trees, but needle-shaped, loosely spreading, and sharp-pointed on those of the young plants. Branches, roundish, and spreading; branchlets, numerous, and dense on the outer parts. Berries, oval, the size of a common pea, and glaucous.

Timber, hard, firm, and durable.

This is said to be a huge tree, found in Abyssinia, of which little is known, except that it very much resembles the tall Crimean Juniper (*J. excelsa*), and probably not different except in size, which may be caused by the favourable effects of climate, soil, &c.

No. 19. JUNIPERUS PROSTRATA, *Persoon*, the Prostrate-branched
Juniper.

- Syn. *Juniperus repens*, *Nuttall*.
 „ „ *Hudsonica*, *Loddiges*.
 „ „ *Sabina prostrata*, *Loudon*.
 „ „ „ *humilis*, *Hooker*.
 „ „ *Alpina*, *Loddiges*.

Leaves, in twos, alternately opposite, very short, loosely running over each other, and irregularly four-rowed, very dense, concave above and convex below, terminating with a very sharp point, stem-clasping, dull shining green, and with the ends pointing outwards and quite free. Stems, prostrate, long, slender, laying flat on the ground, flexible and spreading; smaller ones, short, dense, alternate, straight and thickly placed on the upper side of the branches. Berries, small, globular, or oblong, tuberculated, and when ripe, of a glaucous black or blackish violet colour, on short branchlets, and solitary.

A prostrate shrub, trailing along the ground, and not rising more than six or eight inches high, but spreading over a large space.

It is found in the United States of America, on the sandy beaches of Lake Huron, and the hills along the Missouri River, near Fort Mandan.

No. 20. JUNIPERUS RECURVA, *Don*, the Weeping Indian
Juniper.

- Syn. *Juniperus incurva*, *Hamilton*.
 „ „ *repanda*, *Hort*.
 „ „ *canescens*, *E. I. Company*.
 „ „ *recurva densa*, *Hort*. { this is the male form
 „ „ *Nepalensis*, *Rinz*. { of the plant.

This is called ‘Aroo,’ and ‘Uguroo,’ in Nepal, probably from its growing among the rocks where eagles resort.

Leaves, in threes, linear-lanceolate, bristly-pointed, loosely imbricated and convex beneath. Branches and branchlets re-

curved, pendulous, and not very numerous; easily distinguished from all the other Indian species, not only by its chaffy leaves of the past year, but by the mixture of its brown half-decayed chaffy leaves of the past year with the greenish-grey ones of the present. Branches and branchlets recurved and pendulous; bark, rough brown, curling up and scaling off; a bush or low tree; very graceful in habit, growing from four to ten feet in height. It is found in Gosainthan in Nepal, and in Bhotan, at an elevation of from 8,000 to 10,000 feet; a small, but elegant tree; and in higher elevations, only a scrubby bush. Berries, roundish-oval, deep purple, or nearly black when ripe, with a shining smooth surface; each berry contains only one seed; the berries and branches are burnt as incense in temples, and in other magical incantations, by the natives.

The sexes of this species are on different plants, and both very dissimilar in appearance; the male has longer and looser foliage, and a denser appearance; while the female form has much shorter and more closely imbricated, three-rowed leaves, and a slenderer appearance; the female form is that which is most common in collections.

No. 21. JUNIPERUS RELIGIOSA, *Royle*, the Pencil, or Incense Juniper.

Syn. *Juniperus excelsa*, *Madden*, and all other writers on Indian Conifers under this name.

Leaves, closely imbricated in opposite pairs, somewhat blunted, with a central gland or raised line on the back, four-rowed, and imbricated, or slender, acute, disposed in threes; glaucous, and spreading on the young plants, but both forms are frequent. Branches and branchlets, very similar but more compact than *Cupressus torulosa*. Berries of a purplish colour, the size of a small pea, rounded or two-lobed, smooth, and with only one or two small seeds in each; dry, resinous, and with a strong aroma when bruised, and very disagreeable-taste. Male and female flowers on separate plants.

This species is rarely found below 10,000 feet of elevation,

and gradually dwarfing into an Alpine creeping shrub, at 12,000 or 13,000 feet, but ascending in this form to 13,500 feet on the south flank of Kunchinjinga, and to 15,200 feet on the rearward ranges. Young plants have spreading, subulate leaves, as have often the terminal branchlets. It forms a large densely-branched stiff tree, growing from sixty to eighty feet high, in eastern Nepal. Major Madden saw a tree at the Songnum Temple, thirteen feet in circumference, at five feet from the ground, and about 100 feet high. Captain Strachey found it at 'Hunu' 12,000 feet above the sea; but it is found in many parts, particularly in Kunawur; on Gosainthan in Nepal; in Kamaoon, near Nantee; and appears to flourish best at elevations of from 9,000 to 13,000 feet, but never below 7,000 feet in a native state.

Dr. Griffith found it in Bootan about Temples, and in woods from 9,000 to 11,000 feet of elevation. In 'Kooloo,' at an elevation of 11,000 feet, it is preferred for its timber, and its sprigs are burnt for incense. It is commonly planted by Buddhist temples, where it is used in all sacred ceremonies, hence its specific name, 'religiosa;' the name commonly applied to this tree (*excelsa*) by writers on Indian Conifers, having been previously applied to a Crimean plant, now common in English collections. The natives of Durii, in Gilgit, on a particular day, burn goats' fat and juniper branches upon the altar, and dance, sing, and drink wine; they also fry juniper branches and berries in goats' grease, in small dishes for incense. Mr. Winterbottom found it on all the elevated tracts of Astor and Gilgit, even in the North East quarter of Cashmere, used for the same purpose under the name of 'Lewi,' or 'Newr' (Juniper), and 'Dhoop' (incense). It is also found in the North West of Sikkim and Nepal Proper, where it is called 'Googgal Dhoop,' and always burned in temples as incense, on festive days. It has scaly bark, of a deep brown colour, and timber exactly similar to that used in Cedar pencils, with a scent equally aromatic.

No Indian Conifer seems to have been more confused or mixed up in the cloudy regions of conjecture, than this species, both by European and Indian writers. The Indian travellers

confounding it with *Cupressus torulosa*, a tree which in general appearance it very much resembles when old, and may easily be confounded with, by common observers; but by its fruit it is easily and at once distinguished, as well as by the ramifications of its branches, which are much shorter and less pendulous in the Juniper than in the Cypress, and of a brighter green. Again, the *Juniperus religiosa* seldom ever descends to a less elevation than 9,000 feet in a natural state; while *Cupressus torulosa* is not to be found at a greater elevation than 7,000 or 8,000 feet, and which accounts for its tenderness in many parts of England.

Timber, red, close-grained, and exempt from the ravages of insects. It is to be found in some collections as the Pencil or Kooloo Juniper, is perfectly hardy, and resembles somewhat the Chinese Juniper (*J. Chinensis*).

No. 22. JUNIPERUS SABINA, *L.* the Common Savin.

Syn. *Juniperus Lusitanica*, *Miller* (not of others).

„ „ *fœtida Sabina*, *Spach.*

„ „ „ *multicaulis*, *Spach.*

„ „ *horizontalis*, *Mönch.*

„ „ *Sabina vulgaris*, *Endlicher.*

„ „ „ *cupressifolia*, *Aiton.*

„ „ „ *stricta*, *Hort.*

Leaves, in pairs, opposite, imbricated, oval, somewhat pointed, convex on the back, awl-shaped, and remote. Branches, nearly straight, very much ramified, younger ones entirely covered with imbricated leaves, which have a very disagreeable odour, and very bitter taste. Berries, of a blackish-purple colour, generally one-seeded, small, oval, smooth, and about the size of a small currant.

A low, much-branched shrub, but sometimes growing six or seven feet high on the Lower Alps in Southern Europe. It occurs in the mountains of Lombardy, in the Apennines, on the Pyrenees, in Greece, on the Spanish Peninsula, but always as a mountain plant. It is also very abundant on the northern and western slopes of the Alps, on the Altai and Taurian mountains.

JUNIPERUS SABINA VARIEGATA, *Loudon*.

This variety differs from the ordinary Savin in having some of its branchlets and foliage pale-yellowish white, intermixed with the green ones, and forms a very pretty variety.

No. 23. JUNIPERUS SABINOIDES, *Griseb*, the Berry-bearing Juniper.

Syn.	Juniperus	Sabina	tamariscifolia,	<i>Aiton</i> .
”	”	”	Alpina,	<i>Hort.</i>
”	”	”	elegans,	<i>Booth.</i>
”	”		fœtida tamariscifolia,	<i>Spach.</i>
”	”		bacciformis,	<i>Willd.</i>
”	”		turbinata,	<i>Gussone.</i>

Leaves, in pairs, opposite, the lower ones spreading, almost needle-shaped, very short, glaucous, blue on the upper side, broadest at the base, tapering to a very sharp point, half opened, and spread outwards, but on older plants much more approaching together, smaller, scale-formed, loosely imbricated, and sharp-pointed. Branches, spreading out horizontal, very dense and stiff; branchlets, very numerous, straight, short, and tufted. Berries, quite round, of a blackish violet colour, one-seeded, and smaller than those of the Common Savin, a little flatter, and more glaucous.

A dense little bush, spreading out horizontally, not more than two or three feet high, found in Spain and the mountains of Southern Europe.

No. 24. JUNIPERUS SQUAMATA, *Don*, the Scaly-leaved Nepal Juniper.

Syn.	Juniperus	squamosa,	<i>Hamilton</i> .
”	”	dumosa,	<i>Wallich</i> .
”	”	Lambertiana,	<i>Wallich</i> .
”	”	rigida,	<i>Wallich</i> (not of Thunberg).
”	”	? Wallichiana,	<i>Hooker</i> .

Leaves, in threes, closely imbricated, ovate-oblong, more or

less acute, inflexed at the point as if obtuse ; the withered ones persistent, with very long points, and adhering to the branches like scales. Branches, numerous, creeping, and a little set up at the points ; branchlets, stiff, very numerous, and thickly covered all over with foliage. Berries, ovate-obtuse, or ovate-oblong, very glossy, varying from light-blue to nearly black, one-seeded, with three or four opposite scales about the centre, and two small ones near the top, which is umbilicate and furrowed ; on old plants the upper branches have closely-imbri-cated, cypress-like leaves, while on the lower branches of young plants they are in whorls of three, linear and lanceolate, acute, stiff, more or less spreading, green on the upper side, white below, but varying in some so as to leave both sides of the foliage bright green.

A large decumbent, much-branched shrub, growing four or five feet high, in Nepal, and on the Bhotan Alps. In Cashmere and the adjacent regions it is common at all great elevations, particularly on the Indian face of the Himalayas from 11,000 to 13,000 feet. It is also common on the snowy ranges of Kamaoon and Gurhwal, and penetrates into the heart of the Himalayas, to 'Rimkin,' at an elevation of 14,500 feet, its upper limits is 15,000 feet, and its lowest 9,000 feet, but is in greatest abundance between 12,000 and 13,000 feet. It also grows on the Choor mountains, where it forms extensive beds, overlaying the high, tabular masses of granite, which occur on or near the top, at an elevation of 12,000 feet, where it has the form of a large creeping bush, covered with its large, glossy, purplish-black fruit, which is well tasted, having but little bitter in them, and a single seed. It is the 'Pama,' or 'Pudma,' of Upper Kamaoon and the Himalayas, and the 'Googgul' of Cashmere, a word meaning incense, also the bastard or creeping Cedar of travellers.

. It is quite hardy.

- No. 25. JUNIPERUS THURIFERA, *Linnaeus*, the Spanish Juniper.
 Syn. Juniperus Hispanica, *Miller*.
 „ „ *Koophora, unze*.

Leaves, in twos, opposite, very small, narrow, glaucous-grey, loosely imbricated, in four rows, spreading at the points, rigid, straight, and sharp-pointed, concave at the base on the upper side, convex at the back, stem-clasping, and without any gland on the under side; stem erect, covered thickly with branches all round, and curved upwards at the points; branchlets, very dense, short, all growing on the outer side, curving upwards, and forming a dense pyramidal head, tapering to quite a point at the top. Berries, very large, solitary, obovate or egg-shaped, glaucous-black when ripe, reddish brown when immature, and bright green when young, and growing at the points of the smaller branchlets, which are entirely covered with small imbricated leaves.

A very handsome, dense, pyramidal, small tree, branching to the ground, and tapering to quite a sharp point, and attaining a height of 30 or 40 feet.

It is found on the mountains in the province of Seville, in Spain, and in Portugal, at an elevation of 3000 to 4500 feet above the sea.

It is quite hardy.

- No. 26. JUNIPERUS VIRGINIANA, *L*, the Virginian or Red Cedar.

Syn. Juniperus arborescens, *Mench*.
 „ „ Caroliniana, *Loddiges*.
 „ „ Virginiana humilis, *Loddiges*.
 „ „ „ vulgaris, *Carriere*.
 „ „ major Americana, *Parkinson*.

Leaves, in twos, opposite, and four-rowed; but frequently in whorls of three on the young shoots, those on the adult plants closely imbricated, very small, and sharp-pointed; but afterwards, as they get older, become spread out at the

points, glossy and light green, in the common form of the tree, but frequently becoming of a tawny brown colour in winter. Branches, horizontal, numerous, close together, and feathered to the ground; branchlets, four-sided, slender, straight, spreading, and very numerous on the outer parts of the branches. Berries, dark purple, very small, ovate, smooth, or slightly warted on the surface, and covered with a white glaucous powder. Male and female flowers on the same plant, but sometimes on separate ones.

A handsome tree, growing forty or fifty feet high, and one foot and a half in diameter.

It is found abundantly in the United States of America, on the Cedar Island in Lake Champlain, and in the district of Maine, from whence it spreads without intermission to Cape Florida, and thence round the Gulf of Mexico, a distance of more than 3,000 miles; in Virginia and the more Southern States, it is common, but is only seen in the form of a shrub in the open, dry, sandy soils of the Western States.

There are the following varieties:—

JUNIPERUS VIRGINIANA GLAUCA, *Hort.*

Syn. *Juniperus Virginia cinerascens*, *Hort.*

” ” ” *argentea*, *Van Houtte.*

” ” *argentea*, *Hort.*

This beautiful variety only differs from the species in having its foliage of a fine glaucous white colour.

JUNIPERUS VIRGINIANA PENDULA, *Hort.*

Syn. *Juniperus Virginia Chamberlaini*, *Hort.*

Leaves, mostly needle-shaped, spread out at the points, but frequently resting upon the shoots; very sharp-pointed, glaucous, straight, and scale-like. Young shoots, very long and slender. Branches, drooping, and slender; smaller ones, numerous and quite pendant.

A very singular weeping kind.

JUNIPERUS VIRGINIANA VARIEGATA, *Hort.*

This variety has whitish leaves, intermixed with the ordinary green ones, and makes an interesting variety, of which there is two forms, one with white silvery leaves, the other with golden yellow ones.

JUNIPERUS VIRGINIANA BARBADENSIS, *Loudon.*

Syn. *Juniperus Virginiana Australis*, *Carriere.*

” ” ” *gracilis*, *Hort.*

” ” *Bedfordiana*, *Knight.*

” ” *Gossainthanea*, *Loddiges.*

” ” *Barbadensis*, *Michaux.*

This variety has much slenderer branches, which are reflected at the extremities, and frequently drooping ; branchlets, very numerous, long, straight, slim, and frequently pendant. Leaves, in opposite pairs, or in whorls of three, needle-shaped, straight, narrow, and sharp-pointed on young plants ; but very short and blunt-pointed on those of the adult plants, and closely imbricated.

A tree growing fifty or sixty feet high, with a trunk one foot and a half in diameter.

It is found in the Island of Barbadoes, and other Windward Islands, but has been widely distributed by the Loddiges under the name of *Juniperus Gossainthanea*, a name evidently originating in carelessness, for no such plant is to be found in that part of India, as is evident from the writings of such excellent and acute observers as Major Madden, Mr. Winterbottom, and Drs. Wallich, Hooker, and Griffith ; for if such a tree existed in Gossainthan, it certainly would have been detected by one or other of those excellent travellers.

It is rather tender.

No. 27. JUNIPERUS WEBBII, *Carriere*, Webb's Juniper.

Syn. *Juniperus Canariensis*, *Knight.*

Leaves, in threes, very much spread out, and distant, frequently smaller towards the summit, and narrower, bluntly-

pointed or somewhat obtuse, thin, slender, and quite straight, slightly keeled on the under side, and slightly glaucous above. Branches, horizontal, bent downwards at the ends; branchlets, very long, slender, seldom forked, and frequently pendant; fruit-bearing ones covered with small scales one line in length. Berries, somewhat globular, of a reddish yellow colour, or dull greenish yellow, with small prickly scales on the top when young, but almost smooth when matured, or slightly tuberculed, and of a reddish brown, slightly glaucous in colour, and from three-tenths to four-tenths of an inch in diameter.

A large tree, according to Webb, four or five feet in circumference, found in the Canary Islands, and said to be distinguished from all others by its branches and branchlets, being very slender, very long, and seldom forked, and by its berries being warted on the summit, and terminating when young in small prickles, and scattered along all the little branchlets on the upper parts of the trees.

It is tender, and probably only a variety of *Juniperus Bermudiana*, growing to a large size in a favourable climate.

Section III. CUPRESSOIDES. THE CYPRESS-LIKE JUNIPERS.

Leaves, in opposite pairs, four-rowed, small, scale-formed, and closely-imbricated in the adult plants.

Fruit, more or less angular, and furnished with external bracts, or humps.

No. 28. *JUNIPERUS CHINENSIS*, *Linnæus*, the Chinese Juniper.

Syn. *Juniperus dimorpha*, *Roxburgh*.

„ „ *dicæcia*, *Makoy*.

This species has the male and female on separate plants, which are very dissimilar in appearance.

A—Male form.

- Juniperus Chinensis mas, *Linnæus*.
 Syn. Juniperus Thunbergii, *Hooker*.
 „ „ struthiacea, *Knight*.
 „ „ diœcia, *Makoy*.
 „ „ dimorpha, *Roxburgh*.

Leaves, in whorls of three, lance-shaped, sharp pointed, channelled on the upper side, and convex below, sometimes very glaucous or bright green, spreading, distant, stiff, and without any footstalks, densely clustered on the smaller stem-shoots and bottom branches. Branches, irregularly alternate, and thickly placed on the stem, mostly pointing outwards, and spreading, smaller ones straight, very thickly placed on the lateral branches, and thickly covered with male flowers, of a bright yellow colour.

B—Female form.

- Juniperus Chinensis fœmina, *Linnæus*.
 Syn. Juniperus Reevesiana, *Hort*.
 „ „ flagelliformis, *Reeves*.

Leaves, in twos, opposite, closely imbricated, very short, scale-formed, ovate, slightly pointed, closely pressed over each other in four rows, stem clasping at the base, with an oblong sunken gland on the back, and pointing in the same direction as the shoot. Branches, scattered, but thickly placed on the stem, pointing outwards and spreading; smaller ones slender, four-sided, partially rounded, seldom forked, and frequently pointing downwards. Berries, very small, of a glaucous violet brown when ripe, and variously shaped, in some rounded, two-lobed, or angular; others globular, or oblong, depressed on the surface, and mostly containing only one or two seeds in each.

The open leaves are frequently alike on both sexes when young, and frequently on the smaller stem-shoots, and bottom branches of the female plant; while the mature leaves on the outer and upper branches of the male plant, become like

those of the female, small, closely pressed over each other, and stem clasping.

This very fine species attains a height of from fifteen to twenty feet, particularly the male form, which is much the handsomest plant, with a pyramidal head.

It is found abundantly in China, Japan, and adjoining islands and is perfectly hardy.

There is the following variety:—

JUNIPERUS CHINENSIS CORNEYANA, *Gordon*, Mr. Corney's
Juniper.

Syn. *Juniperus cernua*, *Roxburgh*.

„ *Cupressus Corneyana*, *Knight*.

„ „ *gracilis*, *Hort*.

This distinct variety belongs to the female form of the Chinese Juniper, but with much longer, slenderer, and straighter branches, and more attenuated, spreading, and longer branchlets, but in all other respects the same. How Mr. Knight could have mistaken it for a Cypress, is a mystery.

No. 29. JUNIPERUS OCCIDENTALIS, *Hooker*, the Western Tree
Juniper.

Syn. *Juniperus Hermanni*, *Persoon*.

„ „ *fœtida excelsa*, *Spach*.

„ „ *excelsa*, *Lewis and Pursh*. not *Willdenow*.

„ „ *alba*; *Knight*.

„ „ *dealbata*, *Loudon*, not *Douglas*.

„ „ *fragrans*, *Knight*.

Leaves, (on the adult trees,) in pairs opposite, almost round, or ovate, blunt-pointed, closely imbricated, in four rows, convex, and with a hollow gland upon the back; full of clear resin, very small, and of a silvery white colour.

Leaves, (on the young plants) ternate, needle-shaped, or lanceolate, spreading at the points, and distant; but as the plants get older, gradually change to those of the adult ones. Branches, very dense, spreading, and cylindrical, with a dark-coloured bark; branchlets, numerous, short, four-sided, alternate, and of

a glaucous silvery colour ; those of the open shoots on the young plants, almost white, and with a very strong, disagreeable smell when bruised. Berries, globular, smooth, deep purple, covered with a silvery white powder, and produced singly on the ends of the small branchlets on the upper part of the tree.

A tall tree, growing from sixty to eighty feet high, and two or three feet in diameter.

It was first found by Douglas, growing on the Stony Islands in the Columbia River, and in the valley of the Rocky Mountains ; a tree sixty or eighty feet high. Jeffrey more recently found it on the Klamet Mountains, in the Oregon country, at an elevation of 5,000 feet, growing on desert tracts of country, where there was scarcely any other vegetable production ; the soil being almost entirely composed of sand, and very dry. A tree forty feet high, with an umbrella-shaped top, and sometimes three feet in diameter, with a foliage covered with a silvery bloom, and very strong scented.

It is quite hardy.

No. 30. JUNIPERUS PHŒNICEA, *L.*, the Phœnicæan Juniper.

Syn. *Juniperus tetragona*, *Mærch.*

„ „ *Phœnicea sclerocarpa*, *Endlicher.*

Leaves, opposite, or in threes, bright green, imbricated, bluntly egg-shaped, somewhat channelled, and convex on the back, and perfectly smooth ; but on some of the branches a few open, sharp, lanceolate, glaucous leaves are found in whorls of three. Young branches, entirely covered with very small leaves, which are disposed in threes, opposite to each other, closely covering the surface of the branchlet, and laid one upon another, like scales. Male and female flowers mostly on separate plants, but sometimes they are both found on the same plant. Berries, terminal, about the size of a pea, pale yellow, shining, of an irregular, globular form, slightly compressed, and angular ; the pulp is dry, fibrous, and containing three or four seeds in each berry.

A small tree, or large bush, from fifteen to twenty feet in

height, loaded with numerous branches, so disposed as to form a regular pyramid.

This species is found on the rocks along the shores of the Mediterranean, particularly on the French Coast; from Nice to Calabria, and Sicily, and along the Ionian Sea, the Adriatic Gulf, in Greece, the Levant, and in Barbary. There is the following variety:—

JUNIPERUS PHŒNICEA LYCIA, <i>Loudon</i> , the Lycian Juniper	
Syn. Juniperus Lycia, <i>Linnaeus</i> .	
” ” Phœnicea malacocarpa, <i>Endlicher</i> .	
” ” Pseudo-Sabina, <i>Fischer</i> .	
” ” Phœnicea myosurus, <i>Hort</i> .	
” ” ” filicaulis, <i>Hort</i> .	
” ” Davurica, <i>Pallas</i> .	
” ” fœtida Davurica, <i>Spach</i> .	

This variety differs from the species in being rather smaller in all its parts, but more spreading and bushy, of a deeper green, and in the berries being much larger, rounder, less angular, and nearly black, (not pale yellow) when ripe, and in being soft and glaucous.

It grows from ten to fifteen feet high, and is found growing in the South of Europe, the Levant, in Italy, and Spain, and, according to Professor Pallas, even in Siberia, where, however, it becomes a creeping shrub, and is frequently introduced from the Russian Gardens as the *J. Davurica* of Professor Pallas, and *J. Pseudo-Sabina* of Dr. Fischer.

This shrub produces the resinous gum called *olibanum*, used for incense in religious ceremonies on the Continent.

No. 31. JUNIPERUS SPHÆRICA, *Lindley*, the Globular-fruited Juniper.

Syn. Juniperus Fortunii, *Van Houtte*.

” ” Chinensis Smithii, *Loudon*.

Leaves, in opposite pairs, imbricated, very rarely sharp pointed, except on young plants; scale-formed, blunt-pointed

slightly spreading at the points, of a shining lively green colour, and with a little circular sunken pit or gland on the back of the leaves. Branches, numerous, slender, and curved ; branchlets, roundish, four-sided, thickly covered with small scale-like foliage, and bright green. Berries, exactly round, tolerably large, twice the size of those of the common Chinese Juniper (*Juniperus Chinensis*), smooth, and of a violet glaucous colour.

This species, according to Fortune, grows to the height of thirty or forty feet in the northern parts of China, forming a stately tree. It has long been cultivated in England under the name of *Juniperus Chinensis Smithii*.

Juniperus sphaerica glauca, *Fortune*, is a very different kind from the above, and of which little is at present known.

No. 32. *JUNIPERUS TETRAGONA*, *Schlecht*, the Tetragonal Juniper.

Leaves, on the adult plants, in pairs, opposite, fleshy, obtuse, egg-shaped, thickest at the points, very closely imbricated, half to three-fourths of a line long, and regularly and closely in four rows, but rather distant when old and withered on the branches ; of a dull green colour, slightly glaucous when young. Branches, spreading, nearly flat, with the ends turned upwards ; smaller ones, short, and thickly covered with the truly four-sided branchlets ; branchlets, straight, regularly four-sided, very numerous, stiff, spread out, and the fruit-bearing ones slightly curved, and very dense at the ends of the branches. Berries, solitary, about the size of a small pea, globular, with a few scars, and thin scales on the surface ; of a dark purple colour, with a slight glaucous bloom on the surface, and three or four lines in diameter.

A beautiful low-spreading shrub, growing from four to five feet high, plentiful on the mountains of Mexico, particularly on the mountains from Real del Monte to Chico, at an elevation of from 10,000 to 11,000 feet. It does not produce Sanderac.

It is quite hardy.

DOUBTFUL KINDS, OR THOSE OF WHICH LITTLE IS KNOWN.

No. 33. JUNIPERUS CÆSIA, *Carriere*.

This kind is said to belong to the Savin tribe, and to have been found in the North of Europe, where it is said to be an erect bush, with numerous ascending branches and branchlets, covered with opposite leaves, smooth, glossy, and rounded on the under side, and glaucous blue above; more or less needle-shaped, or lanceolate and spreading.

No. 34. JUNIPERUS OLIVIERII, *Carriere*.

Leaves, scale-formed, in opposite pairs, closely imbricated, thickened at the points, and obtuse. Branchlets, numerous, small, and covered with scale-like leaves. Berries, solitary, placed upon the short curved branchlets, quite round, smooth, with hardly any signs of the little tubercles remaining when fully grown, and of a reddish violet colour, abundantly covered outside with a glaucous bloom.

It is said to be found on the Caramanian Mountains, and other parts of Asia Minor, probably *Juniperus excelsa*.

No. 35. JUNIPERUS CALIFORNICA, *Carriere*.

Syn. *Juniperus pyriformis*, *Hort*.

Leaves, on the adult plants, scale-formed, very short, closely placed along the branchlets, and regularly imbricated; but very open, spreading, and glaucous on the young ones. Berries, solitary, obtusely egg-shaped, or elongated, and tapering to both extremities, but most towards the apex; rather more than half an inch long, smooth, or slightly tuberculated externally, thickly covered with a glaucous powder, and on very short footstalks.

A tree, with an umbrella-shaped head, growing forty feet high, and three feet in diameter, found abundantly on the Californian and Oregon mountains, at elevations of from 1,000 to 5,000 feet, probably not different from *J. Occidentalis*.

- No. 36. *JUNIPERUS GIGANTEA*, *Roezl*, the Gigantic Juniper.
(Discovered by M. Roezl in 1856-7.)

This kind is described as a magnificent tree, growing from eighty to one hundred feet high, and nearly three feet in diameter at the base, with a very straight stem. The Indians who look after the cattle at Tlaxcal, describe it as growing near Tenancingo, at an elevation of from 7,000 to 8,000 feet on the mountains of Mexico.

- No. 37. *JUNIPERUS GLAUCA*, *Willdenow*.

Probably *Cupressus glauca*, or Cedar of Goa.

- No. 38. *JUNIPERUS RACEMOSA*, *Risso*.

A kind said to be found in the South of Europe, by M. Risso, probably in Naples.

- No. 39. *JUNIPERUS SPHÆRICA GLAUCA*, *Fortune*.

A kind of which little is known, except that the young plants are very different from *J. sphærica*, and quite a different species; found by Fortune, in China.

- No. 40. *JUNIPERUS SCHOTTI*, *Van Houtte*.

Nothing is known of this kind, except the name in Foreign catalogues.

Gen. LARIX. *Link.* The Larch.

Flowers, monœcious, or male and female on the same plant, but separate; the male catkins small, without footstalks, and egg-shaped; the female ones erect, solitary, ovate, and much larger than the males.

Cones, small, oval-obtuse, or somewhat cylindrical, and consisting of but few scales.

Scales, persistent, leathery, thin towards the margins, and a little reflected or undulated.

Bracteas, either longer or shorter than the scales, unevenly notched on the edges, ovate-pointed, or lanceolate.

Seeds, very small, with a leathery covering and membranaceous wing.

Seed-leaves, from five to seven in number.

Leaves, deciduous, linear, obtuse, soft, without footstalks, and either produced in bundles or singly.

Name derived from the Celtic word 'lar,' which signifies fat, the trees producing abundance of resin.

All deciduous trees, found in the colder parts of Europe, Asia, and America.

No. 1. LARIX DAHURICA, *Turczaninow*, the Dahurian Larch.

Syn. Larix Europæa Dahurica, *Loudon*.

„ „ Gmelini, *Ledebour*.

„ „ Archangelica, *Lawson*.

„ „ Sibirica, *Ledebour*.

„ „ Rossica, *Sabine*.

„ Abies Gmelini, *Rupprecht*.

„ „ Kamtchatica, *Rupprecht*.

„ Pinus Dahurica, *Fischer*.

„ „ Sibirica, *Loddiges*.

Leaves, single, or in bundles of many together round a central bud; they are single on the leading shoots and young plants, soft, narrow, linear, blunt-pointed, spreading, recurved, and

deciduous, without any footstalks, and of a bright green colour, a little glaucous when young. Branches distorted and pendulous. Cones, oblong, egg-shaped, tapering rather more towards the apex; from half to three-quarters of an inch long, erect, and not compact. Scales very small, reflexed at the margins, wavy, or slightly jagged, and not falling off when ripe; bracteas shorter than the scales, ovate, and pointed. Seeds very small, and winged.

A large tree, dwarfing down by climate to a stunted bush, or irregular-growing little tree, only a few feet high, with twisted, half-pendulous branches, thickly furnished with bundles of the leaves all round the branchlets.

It is found in Northern Siberia, on the bleak mountains of Dahuria, and in the arctic regions of Siberia, a mere little sprawling shrub, amongst the last vestiges of arborescent vegetation in those regions, also on cold mountainous places, from the Ural Mountains and Kamtchatka to the Pacific Ocean, but a large tree in Southern Siberia and Russia, and is there what is called the Archangel Larch.

No. 2. LARIX EUROPÆA, *De C.*, the Common Larch.

Syn. *Abies Larix*, *Lamarck*.

„ *Larix decidua*, *Miller*.

„ „ *pyramidalis*, *Salisbury*.

„ „ *excelsa*, *Link*.

„ „ *vulgaris*, *Fischer*.

„ *Pinus Larix*, *Linnæus*.

„ *Larix communis*, *Lawson*.

Leaves, in bundles, many together round a central bud, but singly on young plants and the leading shoots, deciduous, linear, soft, blunt, or rounded at the points, spreading, slightly recurved, and of a beautiful bright green. Cones, of a longish oval shape, erect, of a brown colour, one inch long, and remaining for a long time on the trees. Scales, persistent or not falling off, roundish, streaked, and slightly waved on the margins; bracteas generally longer than the scales, particularly towards the base of the cones. Seeds, small, of an irregular oval form, with a broad wing;

seed-leaves, from five to seven in number. Cones ripen late in the autumn.

A fine, deciduous, and quick-growing tree, in favourable situations attaining from 80 to 100 feet in height, and from three to four feet in diameter, with a conical head, and horizontal, spreading branches, with the branchlets pendulous, particularly in old trees.

The Common Larch is spread over Central Europe, and forms forests in the upper regions of the Alps of France and Switzerland, from east to west; its proper region is at a height of from 3,000 to 6,500 feet of elevation, but it sometimes occurs as high as 7,000 feet of elevation; but then it is a dwarf bush or scrubby plant, while it, on the other hand, descends as low as 1,500 feet, but is not found anywhere on the Apennines, according to Professor Schouw, and is less common on the northern than on the southern slope of the Alps. It is found on the Carpathian Mountains, in Tyrol and Hungary, but does not exist in the German plains, nor in the mountains of Scandinavia, nor in the Pyrenees, and is equally wanting in Greece, and in the Iberian peninsula. Those Larches found in Russia, &c., are different species.

The following are the most striking varieties of the Common Larch.

LARIX EUROPÆA PENDULA, *Loudon*, Godsall's Weeping Larch.
Syn. *Larix Europæa Godsallii*, *Loudon*.

A very distinct variety; on account of its very pendant branches, said to be a subvariety of the Tyrolese Larch, picked out of a seed-bed in Mr. Godsall's Nursery.

LARIX EUROPÆA REPENS, *Loudon*.

Another variety, differing from the Common Larch in having wide-spreading, robust branches, and a less aspiring stem, with all the lateral branches pendant.

LARIX EUROPÆA RUBRA, *Endlicher*.

The Red-flowered Common Larch.

LARIX EUROPÆA ALBA, *Endlicher*.

The White-flowered Common Larch.

There are other varieties to be found in nurserymen's lists, but which are of only trivial account, such as *Larix Europæa laxa*, the loose-headed Larch, the *Larix Europæa compacta*, the compact-headed Larch, and *Larix Europæa Killermannii*, a dwarf monstrosity, with remarkably thickened branches, densely clothed with leaves.

No. 3. LARIX GRIFFITHIANA, *Hooker*, the Sikkim Larch.

Syn. *Abies Griffithiana*, *Lindley*.

„ *Larix Griffithii*, *Hort*.

Leaves, deciduous, growing in scattered bundles of many together, round a central bud, or singly on the young shoots, linear, narrow, and longer than those of the Common Larch; slightly glaucous when young, spreading, and of a beautiful light green, but which, in autumn, before falling off, becomes of a red colour. Cones, large, oblong, cylindrical, without footstalks, blunt-pointed, erect, two inches and a half long, and one inch broad, and slightly incurved, reddish purple when young, and abounding in tears of white resin. Scales, rounded, half an inch broad, slightly uneven at the margin, and numerous. Bractæas, flat, wedge-shaped, broadest near the base, and nearly as long as the scales, to which they are attached; unevenly notched on the edges, and projecting beyond the lower scales. Seeds, angular, with a short, broad wing, a quarter of an inch long, and of a dull brown colour.

A tree rarely growing more than thirty or forty feet high, except on the shingly banks of Alpine streams, where it sometimes attains a height of sixty feet, and, according to Dr. Hooker, it forms an inelegant, sprawling, branched tree, with the branches standing out awkwardly, and often drooping suddenly.

It is found in Bhotan at an elevation of from 6,000 to 9,000 feet, but dwarfed at the latter place by elevation. In Sikkim, and in the valleys of Eastern Nepaul, close to the snow line, it is

abundant at an elevation of 11,000 or 12,000 feet; in Sikkim it is very common in the interior, and rearward valleys and mountain slopes, but is not found in the Sub Himalayas, and rarely occurs gregarious or in clumps.

The timber is small, but splits well, and is used for flooring.

It was first discovered by Dr. Hooker, and named in compliment to the late Dr. Griffith.

No. 4. *LARIX LEDEBOURII*, *Rupprecht*, the Altaian Larch.

Syn. *Larix Altaica*, *Fischer*.

„ „ *Pseudo-Larix*, *Loddiges*.

„ „ *intermedia*, *Lawson*.

„ *Pinus Ledebourii*, *Endlicher*.

„ „ *intermedia*, *Loddiges*.

„ *Abies Ledebourii*, *Rupprecht*.

„ *Pinus Pseudo-Larix*, *Steudel*.

Leaves, single, or in bundles of many together round a central bud, but mostly single on the leading shoots and young plants, soft, linear, broad, and rather flat on vigorous young plants, but on older ones rather four-sided, obtuse, and with much longer and broader foliage than the Common Larch, and darker green. Branches, robust, but not numerous, and pendant. Cones, very small, erect, slender, and rather loose. Scales, oval, with the margins entire, convex, and persistent. Seeds, very small.

A tall, luxuriant tree, similar to the Common Larch in appearance, but with very much smaller cones, and much longer and broader foliage, growing 80 feet high, at elevations of from 2,500 to 5,000 feet, on the Altai mountains in Siberia.

No. 5. LARIX LEPTOLEPIS, *Siebold*, the Slender-scaled Japan Larch.

Syn. *Larix Japonica*, *Carriere*.

„ *Abies nodosa* (‘ Fusi-matu ’), *Japanese*.

„ *Pinus nummularia* (‘ Kin t’sian song ’), *Japanese*.

„ „ *leptolepis*, *Endlicher*.

„ „ *Larix*, *Thunberg*.

Leaves, linear, blunt-pointed, in bundles of many together round a central bud, but sometimes singly on the leading shoots and young plants, deciduous, soft, spreading at the points, slightly recurved, and of a beautiful light green; from three-quarters to one inch and a quarter long. Branches nearly cylindrical, smooth, yellowish-grey when young, very spreading, horizontal, and in regular whorls; branchlets, slender, mostly drooping, and thickly covered with bundles of leaves. Cones, ovate, rounded, blunt at the ends; terminal and numerous on the ends of the small, short branchlets; remaining on the trees, after the seed is shed, for years, and about the size of those of the Common Larch. Scales, numerous, alternate, thin, flat, imbricated, upper part rounded, jagged, reflected, undulated, and almost reduced to a thin membrane, of a greyish brown colour, and drawn to a point at the base; bractees, lanceolate, acute, very entire, membranaceous, dry, and shorter than the scales. Seeds, almost three-sided, with a wing four or five lines long, and blunt at the end.

This kind closely resembles the Common Larch, but differs from it in having more rounded cones, with slenderer and more numerous scales, undulated and torn round the upper margin, and in being altogether a more slender tree.

A tall tree, found on the Fakone mountains, in the island of Nippon, and on the Jezu Island, in the north of Japan. It is cultivated by the Japanese in pots, which, in some instances, are priceless; hence its Japan name (*P-nummularia*), Money-Pine.

No. 6. LARIX MICROCARPA, *Lambert*, the Red American Larch.Syn. *Larix Americana rubra*, *Loudon*.„ „ *Americana*, *Michaux*.„ „ *tenuifolia*, *Salisbury*.„ „ *Fraseri*, *Curtis*.„ *Abies microcarpa*, *Lindley*.„ *Pinus microcarpa*, *Lambert*.„ „ *Larix rubra*, *Marsh*.

Leaves, deciduous, in bundles of many together, round a central bud, or singly on the young shoots, from half to three-quarters of an inch long, of a vivid, grassy green, shorter and narrower than those of the common Larch. Branches, horizontal, or slightly pendulous, upper ones rather ascending; branchlets, pendulous, and with the branches more numerous and dense. Cones, half an inch long, and three-eighths of an inch broad, oblong, erect, and of a red or violet colour. Scales, oval, slightly incurved, distinctly striated, and entire. Seeds, very small, wings short, and of a light brown colour.

A large tree, with a slender pyramidal head, and numerous horizontal branches, which are not very long, but forming rather a close head.

It is found in North America, from Canada to Virginia, but mostly abounds in Vermont, New Hampshire, and the district of Maine, attaining a height, sometimes, of 100 feet, and two or three feet in diameter.

Its timber is much esteemed in America, being heavy and resinous.

No. 7. LARIX PENDULA, *Salisbury*, the Black American Larch.Syn. *Abies pendula*, *Lindley*.„ *Larix Americana pendula*, *Loudon*.„ *Pinus pendula*, *Aiton*.„ „ *laricina*, *Duroi*.„ „ *Larix nigra*, *Marsh*.„ *Larix nigra*, *Hort*.

Leaves, deciduous, in bundles of many together, or single on

the young shoots, three-quarters of an inch long, and like those of the Common Larch in shape, but longer, darker in colour, and arising from shorter buds. Branches, few, remote, long, pendulous, and in whorls; branchlets also thinner, and more pendulous than the branches. Cones, ovate, roundish, erect, three-quarters of an inch long, and easily detached from the branches. Scales, rounded, loose, largest near the base, and with the margin entire, and curved inwards. Seeds, small and short-winged.

A medium-sized straggling-headed tree, with a stem seldom more than one foot and a half in diameter, and with few branches, which are long and pendulous, and thinly covered with branchlets:

It is found on the mountains of North America, particularly in Canada, New Jersey, Pennsylvania, and the coldest and gloomiest exposures in the mountainous tracks of Virginia, where it is called by the inhabitants 'Tamarack,' or Black Larch, and, according to Michaux, is considered among the most valuable of timber.

Gen. LIBOCEDRUS. *Endlicher.* The Incense Cedar.

Flowers, monœcious, or male and female on the same plant, but separate and terminal. Male catkins, almost cylindrical; female ones, solitary and globular.

Cones, oval, more or less obtuse, woody, and composed of from four to six scales, which are flat, or slightly concave on the inner face.

Scales, in opposite pairs, face to face, and not overlapping, the lower ones small, and mostly abortive, the whole of them furnished with a terminal, small, incurved spine below the apex, and leathery in texture.

Seeds, singly, or in twos under each scale; the upper, or larger scales having each two seeds at the base, while the two lower, or smaller ones, are either abortive, or have but one seed each: seeds, unequally two-winged.

Seed-leaves, in twos.

Leaves, scale-formed, compressed in opposite pairs, and in four imbricated rows, the under and upper ones much the smallest.

Name, derived from 'Libanos,' incense, 'Cedrus,' the cedar.

All large evergreen trees, found in Chili and New Zealand.

No. 1. LIBOCEDRUS CHILENSIS, *Endlicher*, the Chilian Arbor-Vitæ.

Syn. Thuja Chilensis, *Don*.

„ „ Andina, *Pæppeg*.

„ Cupressus Chilensis, *Gillies*.

Leaves, in pairs, opposite, compressed, blunt, glaucous at the sides, bright green at the back and edges, the lower pair being much larger than the upper ones, and keeled at the back. Branches, compressed, obovate between the joints, bright green, with glaucous furrows, and thickly covered with leaves, flattened, and two-edged. Cones, drooping on short footstalks, half an inch long, and consisting of four woody scales in opposite pairs. Scales, face to face, and not overlapping, with a sharp

tubercle on the outside below the apex; the two larger scales have each two seeds at their base; the two lower, or smaller ones, being abortive; each cone generally having four seeds, which stand erect, and with unequal sided wings.

A fine evergreen tree, attaining a height of from sixty to eighty feet in the Andes of Chili, where it is found in cold valleys on the Southern Andes, and on the Volcano of Antuco, a mountain about three degrees north of Valdivia. Pœppeg states that it resembles the American Arbor-Vitæ, when full grown, but is less robust, sometimes branching from the base, and gaining the habit of a Cypress, but in other cases forming a conical head, with a straight trunk, clothed with rough cracked bark, of a brownish ash colour, and scarcely more than a foot in diameter, with a yellowish, resinous, hard, strong-scented wood.

A beautiful species, nearly or quite hardy in favourable situations in England.

LIBOCDRUS CHILENSIS VIRIDIS, *Hort.*

Syn. *Libocedrus excelsa*, *Hort.*

This variety only differs from the species in having bright green leaves, entirely free from the glaucous bands on the leaves and branchlets.

No. 2. LIBOCDRUS DONIANA, *Endlicher*, Don's Arbor-Vitæ.

Syn. *Thuja Doniana*, *Hooker*.

„ *Dacrydium plumosum*, *Don*.

Leaves, in four rows; marginal ones more or less extended at the points, acute, and clasping on both sides; while those on the upper and under surfaces are pressed flat, very much smaller, nearly round, and acute pointed, with the outer surface of the leaves clothing the under part of the branchlets of a much lighter colour, and thickly covered with a glaucous bloom, while the outward surface of those on the upper part are smooth, and of a glossy green. Branches, rounded, with a smooth brownish bark; branchlets, arranged in two rows, flat, compressed, and clothed with four rows of small imbricated leaves. Cones,

half an inch long, solitary, ovate, obtuse, and borne erect on the points of the short branchlets. Scales, in two opposite pairs, woody, with a solitary two-winged seed under each scale.

A tree from thirty to seventy feet high, and two or three feet in diameter; found on the northern island of New Zealand, in forests along the river Hokianga, near the Bay of Islands, also on the wooded mountains more to the north, and on the higher mountains of Nelson, at an elevation of from 4,000 to 6,000 feet, where it is called 'Kawaka' by the natives. Timber, hard, resinous, and of a beautiful reddish colour.

It is tolerably hardy in favourable situations in England.

No. 3. *LIBOCEDRUS TETRAGONA*, *Endlicher*, the Tetragonal Arbor-Vitæ.

Syn. *Thuja tetragona*, *Hooker*.

„ *Juniperus uvifera*, *Don*.

„ *Pinus cupressoides*, *Molina*.

Leaves, in four rows, oval, blunt-pointed, concave, hardly two lines long, and closely adpressed, keeled on the back, much sharper towards the apex, and of a light green colour. Branches, horizontal, irregularly scattered along the stem; branchlets, placed in two rows, spreading, four-sided, and completely covered by the leaves. Cones, solitary, ovate, erect, small, and placed at the extremity of the short branchlets. Scales, woody, or somewhat leathery; alternate in three pairs; the lower ones small, and mostly abortive, the whole of them furnished with a terminal, small, incurved spine near the apex.

A magnificent evergreen tree, from just below the snow line of the Andes of Patagonia, inhabiting the swampy places between the mountains. It is also found in South Chili, as far as the district of Magellan, where it becomes little more than a bush, while on the mountains in the neighbourhood of Valdivia, and on the Cordilleras, it becomes a large tree from sixty to a hundred feet high, and eighteen or twenty feet in circumference, with a straight stem. Timber, excellent, and very durable.

It no doubt will prove quite hardy, but not yet introduced.

Gen. MICROCACHRYS. *Hooker.* The Small-coned
Tasmanian Cypress.

Flowers, monœcious, or male and female on the same plant, but separate; the male catkins in clusters, and cylindrical; the female ones solitary and drooping.

Cones, cylindrical, very small, terminal, nodding, and thicker than the branchlets.

Scales, spreading, loosely imbricated, ovate, boat-shaped, concave, and from eight to ten in number.

Seeds, solitary, and naked, at the base of each scale, but much larger, and covered with a dry, transparent, membranaceous tegument.

Leaves, in opposite cross pairs, four-rowed, regularly tiled on the branchlets; those on the adult ones scale-formed, and ovate.

Name, derived from *μικρος*, small, and *καχρυς*, a pine cone, the cones being very small.

A large evergreen bush, found in Van Diemen's Land.

MICROCACHRYS TETRAGONA, *Hooker*, the Small-Coned Cypress.
Syn. *Arthrotaxis tetragona*, *Hooker*.

Leaves, arranged in four rows on the young plants; those on the more adult ones, imbricated, rhomboid-ovate, and keeled on the back, sitting closely, but not adhering to each other; male flowers, clustered on the ends of the little branchlets, two lines long, cylindrical, and erect; the female ones, solitary, terminal, and curved or drooping, with from eight to ten scales to each cone. *Cones*, terminal, nearly cylindrical, much thicker than the top of the branchlet, and composed of spreading scales, resembling the leaves, but much smaller. *Scales*, spreading, recurved, loosely imbricated, ovate, boat-shaped, acute-pointed, and concave in the middle. *Seeds*, solitary at the base of each scale, erect, entirely naked, and somewhat greater than the scales, with a dry, transparent, membranaceous covering.

Branches, very numerous, slender, entirely covered with scale-formed leaves, loosely imbricated, very much like those of an *Arthrotaxis*, but very much smaller.

A large evergreen bush, from fifteen to twenty feet high, very much resembling a Cypress, with the leaves of a *Dacrydium*, found very common on the hills of Port Cypress, and along the borders of Lake St. Clair, in Tasmania (Van Diemen's Land).

It is not hardy.

Gen. NAGEIA. *Gærtner.*

Flowers, monœcious or diœcious.

Fruit, axillary, drupacious, about the size of a cherry, and quite round.

Receptacle, fleshy, and connected with the bractæas by the axis of the short one-fruited spike.

Seeds, with a hard thin shell.

Leaves, opposite or alternate, and many-nerved.

Seed-leaves, in twos.

Name, derived from 'Na' or 'Nagi,' its Japanese name, and signifying catkin-bearing.

All moderate-sized trees, natives of the East Indies, Java, and Japan.

No. 1. NAGEIA BLUMEI, *Gordon*, Dr. Blume's Java Nagi.

Syn. *Podocarpus Blumei*, *Endlicher*.

„ „ *agathifolia*, *Blume*.

„ „ *latifolia*, *Blume*.

Leaves, in nearly opposite pairs, elliptic, or broadly lanceolate, stiff, many-nerved, shining, leathery, and slightly twisted at the base; from three to five inches long, and from one to two inches broad on the adult ones; but longer, more pointed, and much thinner on the younger ones, and sometimes withered or sphaeculate at the points. Branches, spreading, cylindrical, and of a

brown colour; outer and upper ones opposite, thick, rounded, jointed, and sometimes compressed at the ends. Flower buds, axillary or lateral, from among the abortive leaves, and composed of a few imbricated, oval-pointed scales, keeled or boat-shaped on the back. Male catkins, in clusters of from three to seven in number on the short branchlets, sometimes, but very rarely on short footstalks; from a quarter to three quarters of an inch long, thick, and of a yellowish colour; footstalks of the fruit, axillary, solitary, and opposite. Fruit, globular, singly at first, but soon afterwards, on account of the deciduous nature of the floral leaves, become disposed in bunches at the extremities of the branchlets, with the outer covering thin and leathery, the inner one brittle and bony.

A tall tree, from seventy to eighty feet high, with an ample head, full of spreading branches, found in forests, on the mountains of Salak, in the Island of Java.

It is very tender.

No. 2. *NAGEIA CUSPIDATA*, *Gordon*, the Long Pointed-leaved Nagi.

Syn. *Podocarpus cuspidata*, *Endlicher*.

Leaves, opposite, or nearly so, those at the extremities of the branchlets frequently alternate, and somewhat in two rows; elliptic, very entire, undulated on the margins, tapering to a short stout footstalk at the base, and long tail at the apex, very seldom acute, and never mucronate; from one and three quarters to three inches long, and one and a quarter to one and a half inch broad in the middle, of a very deep green on the upper surface, and light green below, marked on the under side with numerous longitudinal nerves, slightly elevated, and of a bright green colour. Branches, spreading, alternate, or opposite, or in whorls, frequently naked, and much warted on the adult branches by the falling of the leaves; branchlets, opposite, very rarely alternate, and generally in two rows. Fruit, unknown.

A small tree, growing from fifteen to twenty feet high, found growing on the Island of Jezo, in Japan.

No. 3. NAGEIA GRANDIFOLIA, *Gordon*, the Great-leaved Nagi.
Syn. *Podocarpus grandifolia*, *Endlicher*.

Leaves, opposite, oblong, lanceolate, thick at the margins, many-nerved, and covered with stomates on both surfaces.

This species, according to Professor Endlicher, is easily distinguished from Dr. Wallich's *Podocarpus latifolia*, which it much resembles, by its leaves being more than six inches long, and one inch and three quarters broad, and stiff, with the branchlets of a reddish colour, and the buds being rounded and obtuse.

It is very doubtful of what country it is a native, but most probably China, or Japan, or the Mountains of India, certainly not western.

It is quite tender.

No. 4. NAGEIA JAPONICA, *Gartner*, the Japan Laurel.

Syn. *Podocarpus Nageia*, *R. Brown*.

„ *Cupressus bambusacea*, *Otolanzan*.

„ *Myrica Nagi*, *Thunberg*.

„ *Laurus julifera*, *Kæmpfer*.

Leaves, in opposite pairs, but frequently alternate, elliptic, or oblong-lanceolate, attenuated at the base, and acuminate at the point; three inches long, and rather more than one inch broad in the widest part. Branches, spreading, alternate, or opposite, slender, swelling at the place of insertion, frequently pendant, and furnished with leaves in double pairs, or in threes, an inch distant apart between each set; of the same colour on both sides, smooth, and of a dull, purplish green colour. Flowers, diœcious, but sometimes on the same plant. Male catkins, in threes or fours, rising from the axil of the leaves. Fruit, solitary, very rarely produced in pairs, axillary and slender; half an inch long, frequently with the peduncle curved, and when ripe of a blackish purple colour on the outside, covered with a glaucous powder resembling that on the common sloe; rind very thin, soft, succulent, insipid, loosely adhering, and orbicular; about the size of a cherry, quite round, smooth, and with

a small top-shaped point on the apex; shell, hard, thin, and brittle, enclosing a seed covered with a reddish cuticle, and slightly bitter.

A tree, growing from thirty to sixty feet high, with the stem covered with a smooth, soft, fleshy, brown bark; that on the branches being of a beautiful green, and when cut emitting a strong balsamic odour.

It is found abundantly in Japan, on the mountains in the provinces of Katsuga and Jamato, on the Island of Nippon, where the Japanese call it 'Na' or 'Nagi,' a term signifying the Catkin-bearing Laurel.

No. 5. NAGEIA LATIFOLIA, *Gordon*, the Broad-leaved Nagi.

Syn. *Podocarpus latifolia*, *Wallich*.

„ „ *zamiæfolia*, *Hort. Belg.*

„ „ *pinnata*, *Hort.*

Leaves, in opposite pairs, or nearly so, ovate, lanceolate, spreading, attenuated at the base, much pointed, smooth, very entire, leathery, stiff, and on short footstalks, not more than one or two lines long; from five to six inches long, and one and a quarter broad, in two rows, of a lively shining green on the upper surface, but much paler on the under, with numerous longitudinal nerves a little elevated, the larger ones being flat and furrowed. Branches, mostly short, slender, spreading, horizontal, or declining, and quickly denuded of the exhausted leaves; branchlets, cylindrical, and as green as the leaves, the more younger ones are covered with pale, lanceolate, loosely scattered, glaucescent leaves. Flowers, monœcious; male catkins, in bundles on a common peduncle, axillary, and one inch long. Female flowers, few in number, axillary, solitary, opposite, or under the male ones, and supported on cylindrical footstalks about one inch long. Fruit, somewhat globular, or obliquely oval, slightly pointed at the base, placed on an oblong cylindrical cup, green at first, but afterwards purple; one inch long, covered with loose, spreading, lanceolate, bracteas.

A middle-sized evergreen tree, growing from twenty to thirty feet high, found on the Mountains of Pundna, a lofty range,

bordering on the eastern parts of Bengal, and not far from the district of Silhet, where it is called by the natives 'Soploug.'

It is not hardy.

PHEROSPHÆRA HOOKERIANA. *Archer.*

(Genus, unknown.)

A low evergreen shrub, found in Van Diemen's Land by Dr. Archer, of which little is known, and of course not hardy in England.

Gen. PHYLLOCLADUS. *Richard.* The Celery-leaved Pines.

Flowers, monœcious, or male and female separate, but on the same plant, and in close terminal clusters.

Fruit, in small, connected heads, with a fleshy disk.

Seeds, solitary, very small, half enclosed at the base by the fleshy disk, and nut-like, with a thin shell.

Leaves, minute, scale-like bodies, on the margins of the branchlets; branchlets, leaf-like, opposite, pinnated, or fan-shaped, and feather-nerved.

Seed-leaves, in twos.

Name derived from 'phyllon,' a leaf, and 'klados,' a branch; leaf-like branchlets.

All trees, found in New Zealand, Borneo, and Tasmania.

No. 1. PHYLLOCLADUS ALPINA, *Hooker*, the Alpine Phyllocladus.

Leaf-formed branchlets, very small, on long footstalks, bluntly lobed, obovate, and with the lobes irregularly toothed into divisions; the upper ones very small, more bluntly lobed, and much thickened on the margins; female flowers disposed in twos or

threes, in little, close, fleshy heads at the base of the leaf-like branchlets.

A very small and compact little bush, somewhat resembling *Phyllocladus trichomanoides*, found on the Mountains of Tongariro, Ruahine, and those in the neighbourhood of Nelson, in New Zealand, at an elevation of 6,000 feet.

No. 2. PHYLLOCLADUS GLAUCA, *Carriere*, the Glaucous
Phyllocladus.

Leaf-formed branchlets, slender, and tapering to the base; of a reddish-green or rusty-brown colour on the upper surface; very finely and irregularly cut or jagged on the margins, and very like those of *Phyllocladus rhomboidalis*, with an angular footstalk; the more younger leaves being of a glossy green, slightly glaucous on the under side; while the adult ones are remarkable for their very white-glaucous or almost bluish-grey colour.

A kind of which little is known, beyond the above, and probably only a glaucous form of the *Phyllocladus rhomboidalis*.

No. 3. PHYLLOCLADUS HYPOPHYLLA, *Hooker*, the Under-leaf
Phyllocladus.

Leaf-formed branchlets, strictly oval-rhomboid, obliquely wedge-shaped at the base, on footstalks, and with the lobes oblong, obtuse, crenulated or toothed on the margins, and glaucous on the under side; the superior or flower-bearing ones being obovate, truncated, deeply emarginate or two-lobed, and irregularly toothed on the edges; female flowers without footstalks on the last or utmost division of the leaf-formed branchlets; very rarely in small heads of more than two or three flowers on the terminal branchlets.

A straight tree, found at Kini-Balu, in Borneo, growing at an elevation of 6,000 feet, and of which nothing further is known.

It no doubt is tender.

No. 4. PHYLLOCLADUS RHOMBOIDALIS, *Richard*, the Celery-topped or Adventure Bay Pine.

Syn. *Phyllocladus Billardierii*, *Mirbel*.

„ „ *asplenifolia*, *Hooker*.

„ *Salisburia Billardierii*, *L. C. Richard*.

„ *Podocarpus asplenifolia*, *Labillardier*.

„ *Thalamia asplenifolia*, *Sprengel*.

Leaves, at first minute, scale-like appendages on the apex and margins of the leaf-like branchlets, which at length become leaves, the leaves themselves appearing to be only compressed branchlets of various shapes, some rhomboid, or oblong fan-shaped, pinnatifid, more or less divided, lobed, and all wedge-shaped at the base, closely adhering, decurrent, and with numerous fan-like nerves, the same colour and texture on both sides, and furnished in the centre with a large round rib, most elevated towards the base of the leaf, where it is drawn into a short, stout footstalk, linear-incised, or serrated round the edges, sometimes entire or bluntly lobed, and pinnatifid, with opposite lobes, somewhat pinnate on the lower part, with wing-like appendages. Branches, scattered, or somewhat in whorls, ascending or spreading, regularly rounded, mostly naked on the lower part; lateral ones and branchlets vertical or alternate; branchlets greenish on both faces when young, but of a purplish brown when old and in winter; male flowers on the summit of the leaf-like branches surrounded by the scale-formed, imbricated leaves; female ones in separate clusters, small, obscure, and terminal. Fruit, in connected heads, two or three together, each half enclosing in a fleshy covering a solitary seed of an oval shape, with a thin shell, and very small.

A beautiful branching tree, growing forty or fifty feet high, and from two to six feet in diameter, found on the humid mountains of Tasmania.

It is not hardy.

No. 5. PHYLLOCLADUS TRICHOMANOIDES, *Don*, the Maiden-hair-like Phyllocladus.

Leaflets, numerous and pinnated in two rows, obliquely wedge-shaped, feathery-nerved, lobed, or pinnatifidly divided, with the lobes terminating very abruptly, and toothed on the edges, regularly flattened on the upper surface, furrowed, alternate, and channelled at the base, deeply divided, with the divisions somewhat two-rowed, without any footstalks, and indented or crenated, but frequently a little undulated, of a green or reddish-green colour when young, but of a brilliant red or brown colour when old, and in winter. Branches, frequently in whorls of five, spreading, and cylindrical; branchlets, leaf-like, slender, short, spreading, or deflected, and either in whorls or somewhat in two rows; male flowers terminal, in close heads, and cylindrical; female ones in small clusters, and terminal. Fruit, connected in small heads, two or three together. Seeds, very small, oval-pointed, nut-like, solitary, and half enclosed in a fleshy covering. Seed leaves in twos.

A graceful tree, with a straight, cylindrical stem, and spreading branches, growing 60 or 70 feet high, and three feet in diameter, found in the forests of Tamesin, on the northern island of New Zealand, where it is called by the natives—‘Tanekaha,’ or ‘Toa-Toa.’

Timber excellent, and so heavy, as almost to sink in water.

It is not hardy.

Gen. PICEA. *Don.* The Silver Firs.

Flowers, monœcious, or male and female on the same plant, but separate; the male catkins axillary or terminal; the female ones solitary, on very short branchlets, and cylindrical.

Cones, erect, cylindrical, or nearly so, axillary, and growing on the upper side of the branches.

Scales, deciduous, or falling off when ripe from the axile of the cone, which remains persistent on the branches.

Bracteas, dorsal, and either enclosed by or projecting beyond the scales.

Seeds, somewhat triangular, full of turpentine, two under each scale, covered with a soft tegument, and furnished with an ample persistent, membranaceous wing, more or less wedge-shaped.

Seed-leaves in fives.

Leaves, solitary, flat, pectinated more or less in two rows, persistent and silvery below.

Name derived from 'pix,' pitch,—the trees producing abundance of resin.

All trees, found in Europe, Asia, North America, and Mexico.

Section I. BRACTEATA, OR THOSE KINDS WITH THE BRACTEAS ON THE CONES NOT HIDDEN BY THE SCALES, AND EITHER PROJECTING OR REFLEXED.

No. 1. PICEA BALSAMEA, *Loudon*, the Balm of Gilead Fir.

Syn. *Abies balsamifera*, *Michaux*.

„ „ minor, *Duhamel*.

„ „ balsamea, *Miller*.

„ *Pinus balsamea*, *Linnaeus*.

Leaves, solitary, entire, or emarginated at the end, irregularly two-rowed, or scattered round the leading shoots, spreading,

flat, silvery beneath, and bright, deep green above, three-quarters of an inch long, and thickly set on the branches. Cones, cylindrical, slightly tapering to both ends, erect on the upper part of the branches, four inches long, and one inch and a half broad, of a violet colour, and without any footstalks. Scales, rounded above, six-eighths of an inch broad, and the same in length, entire on the exposed part, and smooth. Bracteas rather short, erect, and projecting half the length of the scale, rounded in the middle, and terminated with rather a long, sharp point. Seeds, very small, angular, soft, and only half the size of those of the Common Silver Fir, with a broad, ample wing.

A small, pyramidal tree, seldom growing more than thirty or forty feet high, even in America, and one foot in diameter.

It is found in Canada, Nova Scotia, New England, and other Northern States of America, also on the Grandfather Mountain, in North Carolina.

The stems of this Fir produce by incision the Balm of Gilead, or Canadian Balsam, used in medicine and the arts.

There are the following varieties:—

PICEA BALSAMEA LONGIFOLIA, *Loudon.*

Syn. *Abies balsamea longifolia, Endlicher.*

This variety has much longer leaves and more upright branches, and was first brought into notice by Messrs. Booth, of Hamburg.

PICEA BALSAMEA VARIEGATA, *Knight.*

Syn. *Abies balsamea variegata, Hort.*

This variety only differs in having a portion of its leaves of a whitish colour intermixed along with the usual green ones, which gives the tree a variegated appearance.

- No. 2. *PICEA BRACTEATA*, *Loudon*, the Leafy-bracted Silver Fir.
 Syn. *Abies bracteata*, *Hooker*.
 „ *Pinus bracteata*, *Don*.
 „ „ *venusta*, *Douglas*.

Leaves, solitary, two-rowed, linear, tapering to both ends, alternate, flat on the upper side, entire, and sharp-pointed, from two to two and a half inches long, and rather more than one-tenth of an inch wide, bright green above, ribbed with two silvery, white lines below, crowded and scattered at the insertion on the branches, but two-rowed and extended above. Branches, in whorls, spreading, slender, lower ones drooping, lesser ones bent downwards; buds composed of large, loose, elliptic, pale-yellow scales, destitute of resin, axillary, and scattered along the branches, but mostly towards the points. Cones, ovate, erect, on very short footstalks, four inches long, and two inches wide, in great clusters on the upper side of the top adult branches; scales, kidney-shaped, concave and rounded on the upper margin, and stipulate at the back; bracteas, wedge-shaped, three-lobed, the middle one two inches long, recurved, particularly those towards the base, which are the longest, while those towards the summit are nearly straight, much shorter, and but little changed in appearance or colour from the ordinary leaves; the lateral lobes are very short, and extend very little beyond the end of the scales. Seeds, wedge-shaped, soft, and angular, with rather a short, but broad, membranaceous wing.

Trunk very slender, but as straight as an arrow; with the upper third of the tree frequently only clothed with branches, and giving it the appearance of an elongated pyramid or cone.

A tall, slender tree, growing 120 feet high, but only two or three feet in diameter, first discovered by Douglas, on the mountains along the Columbia River, and afterwards by Dr. Coulter and Hartweg, on the sea range of Santa Lucia, in Upper California, at an elevation of from 2,500 to 3,000 feet above the sea.

It is quite hardy, but suffers very much in its young growth from late spring frosts.

No. 3. PICEA CEPHALONICA, *Loudon*, the Mount-Enos Fir.

Syn. Abies Luscombeana, *Loudon*.

„ „ Apollinis, *Link*.

„ „ pectinata Apollinis, *Endlicher*.

„ Pinus Apollinis, *Antoine*.

„ „ Cephalonica, *Endlicher*.

„ Abies Cephalonica, *Loudon*.

„ „ Cephalonica Apollinis, *Hort*.

„ Picea Apollinis, *Rauch*.

Leaves, solitary, flat, dagger-shaped, and standing at right angles on every side of the branches; dark, shining green above, and with two silvery lines beneath, tapering from the base to the point, which terminates in a sharp point; footstalks very short, dilated lengthwise at their juncture with the branches, equally and closely distributed all over the branches, and not two-rowed, as is commonly the case in the Silver Firs. Buds prominent, somewhat square-sided, pointed, and slightly covered with resin; branches very numerous, in regular tiers on the main stem, but branching in all directions in the lateral ones. Cones, erect, straight, cylindrical, tapering at both ends, five or six inches long, and an inch and a half in diameter. Scales, rounded on the upper part, broad and entire, wedge-shaped below; bractees projecting beyond the scales, linear-oblong, with the lower end much attenuated, and tapering gradually into a stiff, unequally-toothed, and reflexed sharp point at the top.

A fine tree, growing upwards of sixty feet high, with a trunk nine or ten feet in circumference, and a spreading head.

Timber very hard and durable. It is called the Wild Cedar by the Greeks.

It is found on the highest mountain in Cephalonia, called Mount Enos, or the Black Mountain, at an elevation of 4,000 or 5,000 feet, and was first introduced into England by General Napier, when governor of Cephalonia; but it has since been found on the different mountains in Greece, particularly on the Sacred Apollo, and Mount Parnassus, also on the lofty and rugged Mount Ceta, on Mount Olympus, and in Attica.

NO. 4. *PICEA FIRMA*, *Siebold*, the Japan Silver Fir.

Syn. *Abies homolepis*, *Siebold*.

„ „ *firma*, *Zuccarini*.

„ „ *Momi*, *Siebold*.

Leaves, solitary, somewhat two-rowed, one inch long, very thickly placed on the shoots, linear, flat, and blunt-pointed, or sometimes slightly bifid at the ends, partially sickle-shaped, on very short footstalks, and seldom inserted exactly in lines on the branches; smooth, leathery, of a rich green above, and marked on each side of the mid-rib on the under side with two white lines. Branches, in regular whorls, like the common Silver Fir, spreading, flat, and horizontal, with the smaller ones opposite, and thickly clothed with foliage; buds, oval, rounded on the points, smooth, in threes, the middle one the longest, imbricated, and surrounded with numerous narrow membranaceous scales, in several close tiers, and remaining at the base of the shoots, afterwards, for some years. Cones, cylindrical, blunt-pointed, straight, but sometimes slightly curved, and on short footstalks, three inches long, and one inch broad, thickly covered with imbricated, closely reflected scales. Scales, broad, wedge-shaped at the base, rounded on the upper margin, and slightly crenulated, numerous, deciduous, thin, flat, imbricated, membranaceous round the edges, and slightly toothed, thickest at the base, and of a dull brown colour, falling off the axile in the autumn after the seeds are ripe; bractees projecting, stiff, and acute. Seeds, triangular and soft, with a broad wing. Seed-leaves in fives.

A tall tree, with the appearance of the common Silver Fir, found, according to Dr. Siebold, on the Japan Islands of Nippon, and Jezo, and frequent in the provinces of Mutsu and Dewa, at an elevation of 2,000 or 3,000 feet. The Japanese distinguish different varieties under the names of 'To-Momi,' from the north of China, and the 'Jezo-Momi,' or the 'Nire-Momi' of Japan; this last is distinguished by its leaves sloping more towards the ends of the branches, and by the cones being much shorter. They also distinguish a kind with the ends of the leaves slightly

divided (bifid); but such variations appear to be produced by elevation, climate, and soil, and are, as well as Dr. Siebold's *Abies homolepis*, nothing but the species altered by such circumstances.

It is not yet introduced.

No. 5. PICEA FRASERI, *Loudon*, Fraser's Silver Fir.

Syn. *Abies balsamea* Fraseri, *Spach*.

„ *Pinus* Fraseri, *Pursh*.

„ *Abies* Fraseri, *Lindley*.

Leaves, solitary, irregularly two-rowed, linear, flat, emarginated, or bluntly two-lobed at the ends, deep-green above, silvery beneath, shorter, and more erect than those of the Balm of Gilead Fir, and denser on the branches. Cones, erect, oblong egg-shaped, two inches long, and rather more than one inch broad, and singly on the upper surface of the branches. Scales, orbicularly wedge-shaped, and half an inch broad; bracteas, inversely heart-shaped in the upper part, sharp-pointed, half-projecting beyond the scales, reflexed, or bent backwards, very broad and in regular rows.

A small tree, growing from fifteen to twenty feet high, thickly set with rather flat branches and branchlets, found on the mountains of Carolina and Pennsylvania. †

There is the following variety:—

PICEA FRASERI HUDSONICA, *Knight*, the Hudson's Bay Silver Fir.

Syn. *Picea* Fraseri Hudsonia, *Loudon*.

„ *Abies* Hudsonia, *Bosc*.

„ *Picea* Hudsonia, *Hort*.

„ „ *balsamea prostrata*, *Knight*.

„ *Abies* Fraseri nana, *Hort*.

„ „ *balsamea prostrata*, *Knight*.

This is a very dwarf variety, not growing more than three or four feet high, but forming a dense, close bush with a flat top.

It comes from the Hudson Bay Company's territory in North America.

PICEA GLAUDESCENS, —, the Silver-leaved Mexican Fir.

Syn. *Abies glaucescens*, *Roezl.*

„ „ *glauca*, *Roezl.*, in *Gard. Chron.*

Leaves, much longer and more silvery on both sides than those of the Oyamel Fir, but in other respects very similar. Cones also like those of *Picea religiosa*, but broader, and furnished with large, reflected bracts, which are very much longer than the scales, except near the apex of the cone, where they are mostly wanting. Bracteas much longer than the scales, bent backwards, very broad, spoon-shaped, fringed round the margins, and furnished with a long, tapering point or tail, quite entire on the edges.

A beautiful kind of Silver Fir, found growing on the ‘Mont de las Cruces,’ in Mexico, by M. Roezl, who says the leaves are so glaucous, or silvery on each side, that, at a great distance, one would declare the trees were covered with snow, and that they are much whiter than the *Cedrus Deodara*, on closer inspection.

It appears quite new, and probably may prove hardy.

No. 6. PICEA NOBILIS, *Loudon*, the Noble Silver Fir.

Syn. *Pinus nobilis*, *Douglas.*

„ *Abies nobilis*, *Lindley.*

Leaves, solitary, crowded, irregularly two-rowed, mostly on the upper side of the branches; one inch and three quarters long, linear, falcate, compressed, and turned upwards, flat, linear, dull green above, and silvery beneath. Cones, solitary on the upper part of the top branches, cylindrical, thick, and rather obtuse; six or seven inches long, and two inches and three quarters broad. Scales, triangular, with the edges incurved, entire on the margin, and without the bract, one inch and a quarter long, and the same broad. Bracteas, projecting, imbricated backwards, and longer than the scales; jagged round the edges on the exposed part, five-eighths of an inch long, and with a long and rather broad point or tail in the middle. Seeds, small, angular, soft, with the wing one inch

and a quarter in length, and five-eighths of an inch broad in the widest part.

A noble tree, growing 200 feet high, with regular, horizontal, spreading branches, and cinnamon-coloured bark, forming vast forests upon the mountains of Northern California.

It is found growing on the North-West Coast of North America, along the banks of the Columbia River, and on the mountains of Northern California. Mr. Jeffrey found it on the Shasta Mountains at an elevation of from 6,000 to 8,000 feet, a tree 200 feet high and four feet in diameter, growing in red loamy soil.

No. 7. *PICEA NORDMANNIANA*, *Loudon*, Nordmann's Silver Fir.
 Syn. *Abies Nordmanniana*, *Link.* ;
 ,, *Pinus Nordmanniana*, *Stevens*.

Leaves, solitary, in two rows, curved upwards, nearly equal in length, linear, one inch long, with the point emarginate ; pale yellowish green above, channelled below, with a silver glaucous line each side of the mid-rib, equal in breadth to the keel, and thickened margins, more or less twisted at the base, and flat. Branches, dense, and regularly disposed, the lower ones horizontal, the upper ones rising at a more acute angle. . Cones, on very short footstalks, erect on the upper side of the branches, five inches long, two inches and a half in diameter, and egg-shaped, a little blunted at the ends. Scales, closely adpressed, cup-shaped, very obtuse, nearly one inch and a half in breadth, and the same in the full length ; somewhat recurved, smooth, entire, and falling off when the seeds are ripe. Bractees, adhering to the narrow base of the scales, but afterwards free and extending beyond the scales, getting wider by degrees from the base outwards, rarely ovate, often cordate, reflexed at the apex, and incumbent on the lower scale, with the point a line and a half long. Seeds, triangular, soft, and two under each scale. Wing, obliquely expanded, membranous, with the inner margin straight, and ripe in September. Stem, exceedingly straight, and from eighty to a hundred feet high, and three feet in diameter, with a smooth bark when full grown.

This beautiful tree is common on the Crimean Mountains and those east of the Black Sea. Professor Nordmann, of Odessa, discovered it first on the summit of the Adshar Mountains, towards the sources of the Kur, at an elevation of 6,000 feet, and M. Wittmann observed it on the southern declivity of the mountains between Cartalin and Achalzich, as far up as the Alpine regions, growing amongst a forest of *Abies Orientalis*, and nearly 100 feet high. The timber is good, and harder than that of the celebrated Oriental Spruce.

This species is quite hardy, and begins to grow late in the spring.

No. 8. *PICEA PECTINATA*, *Loudon*, the Common Silver Fir.

Syn. *Abies taxifolia*, *Desfont.*

„ „ *vulgaris*, *Poiret.*

„ „ *Picea*, *Lindley.*

„ „ *argentea*, *De Chamb.*

„ „ *alba*, *Miller.*

„ „ *pectinata*, *De Candole.*

„ *Picea taxifolia*, *Hort.*

„ *Pinus Picea*, *Willd.*, not *Tournefort.*

„ „ *Abies*, *Duroi.*

„ „ *pectinata*, *Lamarck.*

Leaves, solitary, flat, obtuse, two-rowed, and with their points turned up; from three quarters to an inch long, stiff, and of a shining dark green above and with two lines of a silvery white on each side of the mid-rib beneath. Cones, from six to seven inches long, and from one and a half to two inches broad, cylindrical, erect, and axillary, green when young, afterwards reddish, and when ripe of a brown colour. Scales, one inch and a quarter long and the same in breadth, rounded, and thin at the margins, with a long bract fixed on the back of each, and extending beyond the scale, and terminating in a sharp flat point. Seeds, soft, and full of turpentine, angular, enveloped, and surmounted with a membranaceous wing, broader above than below. Seed-leaves, five in number.

A lofty tree, growing from eighty to one hundred and fifty feet high, with an erect stem, regularly furnished with whorls

of branches, which stand horizontal, and a trunk frequently six or eight feet in diameter.

The Common Silver Fir is found all over the Alps, from east to west, and on the Alps of Piedmont. It is principally found at an elevation of from 2,000 to 4,500 feet, and grows on the whole chain of the Apennines, from north to south, and on the mountains of Middle Europe, but is not found on the mountains of the North of Europe. It is also found on the Pyrenees, is common on the higher mountains of Greece, and has the following varieties, viz. :—

PICEA PECTINATA LEOCLADA, *Hort*, the Smooth-branched Silver Fir.

- Syn. *Abies cilicica*, *Kotsch*.
 „ „ *leioclada*, *Stevens*.
 „ *Pinus Picea*, *Tournefort*.
 „ *Picea cilicica*, *Hort*.
 „ *Abies candicans*, *Fischer*.
 „ „ *pectinata leioclada*, *Endlicher*.
 „ „ *Picea leioclada*, *Lindley*.

Leaves, solitary, flat, in a double series, two-rowed, pointed, dark green above, silvery beneath. Branches and branchlets quite smooth, (not hairy when young, as in the common Silver Fir). Cones, like those of the Silver Fir (*Picea pectinata*), and of which this, as Professor Endlicher observes, may be a variety, an opinion which, from all appearance, I think correct.

It is a tall tree, from Asia Minor, on Mount Taurus, and the summit of Adshar, above Guriel, where Tournefort long ago observed it, and considered it not different from the Silver Fir.

PICEA PECTINATA PYRAMIDALIS, *Hort*.

- Syn. *Picea pectinata fastigiata*, *Booth*.
 „ „ „ *Metensis*, *Hort*.
 „ „ *Metensis*, *French Gardens*.
 „ „ *Rinzi*, *Hort*.
 „ *Abies Rinzi*, *Hort. Paris*.
 „ „ *pectinata pyramidalis*, *Hort*.

This variety differs in the branches growing more erect and

compressed or fastigate, and in the tree having a pyramidal shape, and in the leaves being shorter and more slender.

It is of German origin, and distinct.

PICEA PECTINATA PENDULA, *Godefroy*.

This differs in having all its branches and twigs drooping.

It is of French origin, and curious.

PICEA PECTINATA VARIEGATA, *Hort*.

This variety has some of its leaves pale straw colour, or white, intermixed on the branches and young shoots, which gives the tree a variegated appearance.

PICEA PECTINATA TORTUOSA, *Booth*.

This variety has its branches and branchlets very much twisted and crooked, which gives it a very singular appearance. It is of German origin.

PICEA PECTINATA NANA, *Knight*.

Syn. *Picea cinerea*, *Baumann*.

„ *Abies pectinata prostrata*, *Hort*.

A very dwarf variety, growing one or two feet high, and smaller in all its parts; of French origin.

No. 9. *PICEA RELIGIOSA*, *Loudon*, the Sacred Silver Fir.

Syn. *Abies religiosa*, *Lindley*.

„ *Picea hirtella*, *Loudon*.

„ *Abies hirtella*, *Lindley*.

„ *Pinus hirtella*, *Humboldt*.

„ „ *religiosa*, *Humboldt*.

Leaves, solitary, from one to one inch and a half long, linear, and rather thinly set on the branches; quite entire, bluntly pointed, and rather irregularly two-rowed, flat, deep green above and silvery beneath, especially when young, but when old both sides are nearly the same colour. Branches, rather slender, and when young covered with hairs; but when full grown and old, quite

smooth. Cones, erect, with a short footstalk, roundish egg-shaped, five inches long and two and a half wide, and of a purple colour when young. Scales, broad, rounded, or kidney-shaped on the upper margin, one inch and a half broad, entire, and rather thick at the margin. Bractees, longer than the scales, projecting, and reflexed backwards over the scale, very broad, short-pointed, and with an even edge. Seeds, rather large, angular, and soft, with a transparent wing. Seed-leaves, five in number.

An elegant tree, attaining a height of 150 feet, with a smooth brown bark, and rather thin of branches.

It is found on the mountains of Mexico. Schiede found it upon the cold mountains of Orizaba, at the highest limit of arborescent vegetation. Hartweg found it in various places in Mexico between 15° and 22° of south latitude, but its chief range is about 19° of south latitude, and at an elevation of 9,000 feet. He also found it on the Campanario, the highest point of the mountains of Anganguero, five or six feet in diameter, and 150 feet high.

It is the Oyamel of the Mexicans, and is largely used for decorating their churches on particular religious observances.

The supposition of some writers, that *Picea hirtella* is a distinct species from *Picea religiosa*, is an error, which I have long since pointed out, as arising from M. Humboldt's description being made from the young shoots, when first he published the name *hirtella*, the shoots being only *hirtellus* when young, but quite smooth when old and full grown.

Section II. BREVIBRACTEATA, OR THOSE KINDS WITH THE BRACTEAS SHORTER THAN THE SCALES, AND ENCLOSED.

No. 10. PICEA AMABILIS, *Loudon*, the Lovely Silver Fir.

Syn. *Pinus amabilis*, *Douglas*.

„ *Abies amabilis*, *Lindley*.

„ *Pinus lasiocarpa*, *Hooker*.

„ *Abies lasiocarpa*, *Lindley*.

Leaves, solitary, linear, flat, entire, blunt-pointed, one inch

long, irregularly and densely two-rowed, incurved on the upper side of the branches, bright green above, and glaucous below. Branches, irregular on the main stem; lateral ones numerous, tolerably flat, and densely covered with leaves. Cones, erect, solitary, large, ovate-cylindrical, six inches long, and two inches and a half broad, slightly tapering to both ends, and woolly when young. Scales, smooth, round, and entire, an inch and a quarter broad, and about the same long, and falling off when the cones are ripe. Bractees very short, and concealed by the scales. Seeds, angular and soft, with a membranaceous wing.

A magnificent tree, seen towering above all others in its native forests, in Northern California, growing 200 feet high on the mountains east of Fraser's River, in latitude 50°. Mr. Jeffrey found it growing on the sloping sides of the mountains at an elevation of 4,000 feet, with the leaves very small, dark green above, and silvery beneath, with horizontal branches, short and bushy, growing 250 feet high in a gravelly soil, and five feet in diameter, with sixty feet of the stem without branches; the bark of the young trees is covered with large blisters filled with resinous matter.

It is quite hardy.

No. 11. *PICEA CONCOLOR*, ———, the Concolor-Silver Fir.

Syn. *Pinus concolor*, *Engelmann*.

„ *Abies concolor*, *Lindley*.

Leaves, long, linear, flat, and much resembling those of *Picea grandis*, but with both faces of the leaves of the same colour. Cones, cylindrical. Scales, deciduous.

A tall tree, found on the mountains of New Mexico by Engelmann, of which nothing further is known.

No. 12. *PICEA GRANDIS*, *Loudon*, the Great Silver Fir.

Syn. *Pinus grandis*, *Douglas*.

„ *Abies falcata*, *Rafinesque*.

„ „ *grandis*, *Lindley*.

Leaves, solitary, flat, linear, distinctly two-rowed, obtuse or

bifid at the ends, and quite entire, of a deep, shining green above, and silvery beneath, from one to one and a half inch long, and spreading. Branches, in whorls, horizontal, flat, and distant. Cones, solitary, erect, bluntly cylindrical, three inches and a half long, and an inch and a half broad. Scales, very broad transversely, and deciduous, or falling off when ripe, incurved on the margins, entire, and smooth, three-quarters of an inch broad, and nearly the same long; bracteas hidden below the scales, irregularly toothed on the margin, very short, wedge-shaped, and truncate. Seeds, small, angular, and soft, with a wing three-quarters of an inch long. Seed-leaves five in number.

A noble tree, very similar in appearance to the common Silver Fir, growing 180 or 200 feet high, with a brown, scaly bark.

It is a native of Northern California, in low, moist valleys, growing along the banks of rivers. Jeffrey found it on the banks of Fraser's River, from the Falls, all the way down to the ocean, but particularly on the alluvial banks of the river near Fort Langley, growing 280 feet high, five feet in diameter, and fifty feet without branches. It is also found on the banks of the river at South Umpqua.

It is quite hardy.

No. 13. *PICEA PICTA*, *Loudon*, the Pitch or Siberian Silver Fir.

Syn. *Abies Pichta*, *Fischer*.

„ *Abies Sibirica*, *Ledebour*.

„ *Pinus Sibirica*, *Steudel*.

„ *Pinus Pichta*, *Fischer*.

„ *Picea Sibirica*, *Hort*.

Leaves, solitary, irregularly two-rowed or scattered, and very thickly set round the branches, linear, blunt-pointed, flat, dark green, with a very slight trace of the glaucous appearance on the under side, and mostly curved upwards towards the point. Branches, at first horizontal, but afterwards, as they get older, become rather pendulous at the extremities. Cones, erect,

cylindrical, tapering towards an obtuse end, three inches and a quarter long, and an inch and three quarters broad at the widest part, a little below the middle. Scales, obovate wedge-shaped, largest and broadest near the base, rounded and entire at the margin, and quite smooth. Bractees hidden by the scales, quite short, round, irregularly toothed, and convex externally at the edge, with a large point or tail in the middle. Seeds, small, angular, soft, and with a membranaceous wing nearly as large as the scale.

A middle-sized tree, with rather a dense head, growing from thirty to fifty feet high, at an elevation of from 2,000 to 5,000 feet, on the mountains of Siberia and the Altai, forming entire forests. There is a variety, viz. :—

PICEA PICTA LONGIFOLIA, *Hort.*

Syn. *Picea Sibirica alba*, *Hort.*

„ *Abies Sibirica alba*, *Fischer.*

This is a variety with longer leaves, more silvery on the under side, and said to be found on the upper parts of the Altai mountains.

No. 14. PICEA PINDROW, *Loudon*, the Upright Indian Silver Fir.

Syn. *Picea Herbertiana*, *Madden.* .

„ „ *Naptha*, *Knight.*

„ *Abies Pindrow*, *Spach.*

„ *Pinus Pindrow*, *Royle.*

„ *Taxus Lambertiana*, *Wallich.*

„ *Abies Webbiana affinis*, *Hort.*

Leaves, solitary, flat and at first all round the shoots, but finally disposed into two rows on the branchlets horizontally, with the upper surface of the deepest green, almost black when fully matured, and the under one having two faint, white, silvery lines, from one and a half to two inches and a half long, and rather more than one line broad, with acutely two-toothed ends. Branches, in whorls, horizontal, and spreading; branchlets op-

posite in two rows. Cones, erect, solitary, four inches and a half long, and three inches and a half broad, cylindrical, or elongated, flat at the ends, deep purple, smooth on the surface, and growing on the upper surface of the top branches. Scales, deciduous, trapeziform, stiff, leathery, upper margin entire and wedge-shaped at the base. Seeds, soft, angular, full of turpentine, and ripe in October ; wing, long and ample.

A noble tree, growing from 80 to 100 feet high, with flat, horizontal branches, in regular, distant whorls, found abundantly in Bootan, from 11,000 to 12,000 feet of elevation. In Kamaoon it is found at from 7,500 to 9,000 feet of elevation, where it clothes the sources of the 'Kosilla' in a forest of unusual gloom and thickness. It also grows on the easternmost range of the Himalayas, where it is called 'Rayha,' also on the Choor and Kedarkanta Mountains, at elevations of from 8,500 to 12,000 feet, and on all other ranges of similar heights, where the trunks attain a great girth and height,—some of the trees on the Choor Mountains measuring twenty feet round at five feet from the ground, and upwards of 150 feet high, with the stem densely clothed with short, scrubby boughs, bearing little proportion in length to the height of the tree, and generally ending in a mass of flat, declining branches.

The word Pindrow, its Indian name, refers to its very peculiar mode of growth, being tall and cylindrical, or slightly tapering, like the Lombardy Poplar. Mr. Winterbottom, while travelling in India, observed the great preference given by this species to northern and western aspects on the Cashmere Mountains, where it is called the Black Pine, on account of its dark foliage. This tree is quite hardy, but suffers from the late spring frosts in England, and should be planted, when young, in a northern aspect, or screened from the mid-day sun.

Timber good, but soon warps and rots if exposed to rain and sun.

No. 15. PICEA PINSAPO, *Loudon*, the Pinsapo Fir.

Syn. *Abies Pinsapo*, *Boissier*.

„ *Pinus Pinsapo*, *Endlicher*.

„ *Abies Hispanica*, *De. Chamb.*

Leaves, solitary, regularly and thickly disposed around the branches, short, not more than half an inch long, and placed at right angles on the branches, very stiff, sharp-pointed, flat on the upper surface, and with a central rib slightly marked on each side by two furrows, which forms the only and very superficial indication of the two silvery lines so strikingly conspicuous on the under side of the leaves in the Silver Fir tribe. Branches, regularly in whorls on the main stem, very densely clothed with laterals even to their base, and scarcely extending any wider than those branches nearer the top, giving the tree a shape rather that of a cylinder than a pyramid; the young shoots also have a cylindrical shape, on account of the leaves being so thickly placed at right angles all round the stem. Bark, darker in colour, and more scaly than that of the common Silver Fir. Cones, erect, in great numbers on the upper part of the top branches towards their extremities, and without any footstalks; oval, cylindric, terminating abruptly at the top, often with a small elevated point, and from four to five inches long, and from two to two and a half inches broad. Scales, rounded, entire, and broad in the exposed part of the cone, but rather wedge-shaped towards the base. Bractees, small, concealed by the scales, and not extended beyond them. Seeds, angular, soft, and with a membranaceous wing. Seed-leaves, seven in number.

A fine tree, sixty or seventy feet high, with a dense branching head, and timber full of resin, resembling in colour and structure that of the common Silver Fir.

It is found in Spain, on the mountains between Ronda and Malaga, in Granada, and forming forests on the higher parts of the Sierra de la Nieve, at an elevation of from 4,000 to 6,000 feet. It abounds in all the higher mountains, particularly on the northern exposures, reaching even near the summits, where the snow lies at least four or five months in the year.

There is the following variety, viz:—

PICEA PINSAPO VARIEGATA, *Hort.*

Syn. *Abies Pinsapo variegata, Carriere.*

„ *Pinus Pinsapo variegata, Lawson.*

This variety differs in having a portion of its leaves, and smaller shoots, of a pale yellow or straw colour, intermixed with the ordinary bright green ones.

No. 16. PICEA WEBBIANA, *Loudon*, Capt. Webb's Indian Fir.

Syn. *Abies Webbiana, Lindley.*

„ „ *spectabilis, Spach.*

„ „ *densa, Griffith.*

„ „ *bifida, Siebold.*

„ „ *Chilrowensis, Hort.*

„ *Pinus striata, Hamilton.*

„ „ *spectabilis, Lambert.*

„ „ *tinctoria, Wallich.*

„ „ *Webbiana, Wallich.*

„ „ *bifida, Antoine.*

Leaves, solitary, at first scattered all round the shoots, but finally more or less arranged in two rows laterally, from one to two inches long, linear, flat, leathery, bidented on the end, of a dark glossy green above, and furnished with two broad white bands below. Branches, in regular whorls, horizontal, and spreading; branchlets, opposite, two-rowed, and stout; buds, oval, covered with brown scales, and resinous. Cones, solitary, erect, and of a rich purple colour, from six to seven inches long, and about two and a half broad, cylindrical, blunt-ended, full of resinous matter, and growing on the upper surface of the top branches. Scales, deciduous, regularly wedge-shaped, leathery, dilated on the upper part, and quite round on the margin, regularly imbricated, and provided at the base with very short bracts, much shorter than the scales. Seeds, soft, oblong, or angular-wing, thin, broad, and somewhat obovate.

A noble tree, growing from seventy to eighty feet high, with a tabular-formed head when old, found abundantly in the Himalayas, at different elevations. Its lowest limit on the

southern face of the Himalayas is 10,000 feet. Dr. Griffith informs us that this species is rare below 9,500 in Bhotan, but constitutes vast woods at from 12,000 to 13,000 feet of elevation. Dr. Hooker found it in Sikkim measuring thirty feet in girth. It also forms most dense and extensive forests on the north side of the Shatool-Pass, but on the south face it does not flourish. It is called 'Chilrow' in the Northern Himalayas, 'Oonum,' or Purple-coned Fir, and the 'Raisalla,' or King Pine, in Upper Kamaoon and Nepal.

Timber, white, very soft, and coarse-grained, but full of clear white resin ; and a beautiful dye, of a lovely violet colour, is extracted from the young cones.

It is hardy, but suffers from the late spring frosts.

Gen. PINUS. *Linnæus.* The True Pines.

Flowers, monœcious, or male and female on the same plant, but separate; the male catkins laterally placed in dense masses around the shoots, in a kind of spike; the female ones solitary, or in whorls, and terminal.

Cones, more or less conical, and woody.

Scales, numerous, persistent, more or less elevated, pyramidal, swollen, and imbricated.

Seeds, oval, with a hard bony shell, and either furnished with ample wings, or wingless.

Seed-leaves, numerous.

Leaves, in sheaths, of two, three, or five in number, somewhat cylindrical, or concave on one side, and convex on the other, persistent, and pointed.

Name, derived either from 'pinos,' a Greek word, signifying Pine tree, or 'pion,' fat, the trees producing abundance of turpentine; or from 'Pinus,' derived from the Celtic word 'pen,' a mountain, in allusion to the situation in which these trees grow.

All evergreen trees, found in Europe, Asia, and America, with one in Africa (*P. Canariensis*).

Section I. BINÆ, OR THOSE KINDS HAVING ONLY TWO LEAVES
IN EACH SHEATH.

No. 1. PINUS AUSTRIACA, *Hoss.* The Austrian Pine.

Syn. *Pinus nigricans*, *Hoss.*

„ „ *nigra*, *Link.*

„ „ *Laricio Austriaca*, *Endlicher.*

„ „ *nigrescens*, *Hort.*

Leaves, two in a sheath, slender, straight, and not wavy; dark glossy green, four or five inches long, erect when young, but spreading and curved inwards when old; outer surface half round, inner channelled, sharp-pointed, rough at the edges, and thickly set on the branches; sheaths, very short, scaly, torn

at the ends, and almost disappearing when old. Branches, horizontal, in regular whorls, spreading, and with the ends curved upwards; smaller ones, short, scaly, and with a greyish brown bark, regularly and deeply raised by the insertion of the leaves, furrowed, and shining; buds, ovate-pointed, covered with long brown scales, fringed at the edges, and slightly resinous. Cones, three inches long, one inch and a quarter broad, conical, rounded at the base, and tapering regularly to the apex, pointing horizontal, or slightly inclining downwards; of a light yellowish brown colour, with a shining surface. Scales, numerous, hard, and glossy; larger ones rather more than half an inch broad, but much smaller, and less elevated towards the base, angular on the upper edge, rounded below, slightly pyramidal, with an elevated horizontal line across the centre, terminated by a blunt dark brown scar.

A large tree, growing 120 feet high, with spreading branches, and when old, a flat top.

It is found on the calcareous mountains in Lower Austria, Styria, Moravia, Corinthia, Transylvania, and in the neighbourhood of Mehadia in Banat.

Timber, strong, tough, and resinous.

No. 2. PINUS BANKSIANA, *Lambert*. Sir Joseph Banks's Pine.

Syn. *Pinus Hudsonica*, *Lamarck*.

„ „ *rupestris*, *Michaux*.

„ „ *sylvestris divaricata*, *Aiton*.

„ „ *divaricata*, *Hort*.

Leaves, in twos, regularly distributed obliquely all over the branches, one inch long, spreading, rigid, robust, dull greyish green in colour, thickly set on the branches, and remaining for years; sheaths, very short, one tenth of an inch long, and rather jagged at the margin. Branches, divaricate, spreading, with few laterals, long, slender, twisted in all directions, and rather flexible; buds, full of resin. Cones, small, horn-shaped, very hard, curved at the point, twisted, one and a half to two inches long, widest at the base, and tapering to a point; mostly in twos, of a grey ash colour, smooth, always pointing in the same direc-

tion as the branches, and remaining on the tree for years. Scales, rounded, one third of an inch wide, irregularly four-sided, and terminating in a protuberance, with a blunt point in the centre. Seeds, extremely small, with little wings half an inch long.

A low, scrubby, straggling bush, or small tree, from five to ten feet high, but in good soil and a favourable situation, from fifteen to twenty feet high.

It is found in the most northern parts of America; in the district of Maine, Nova Scotia, and among the rocks at Labrador; at Halifax and Hudson's Bay it disappears, except in a few straggling bushes amongst the rocks. Dr. Richardson describes it as a handsome tree in favourable situations, and Douglas found it on the higher banks of the Columbia, and in the valley of the Rocky Mountains, of considerable size.

No. 3. PINUS BRUTIA, *Tenore*, the Calabrian Cluster Pine.

Syn. *Pinus conglomerata*, *Græffer*.

Leaves, in twos, rarely in threes, from six to eight inches long, very slender, and wavy, glabrous, spreading, channelled above and convex below, serrulated on the margins, with a sharp point, and of a bright green colour. Sheaths, half an inch long, of an ash colour, quite entire, and not falling off; buds, three quarters of an inch long, pointed, woolly, and free from resinous matter. Cones, stalkless, generally in large clusters, but sometimes singly on young trees, ovate, and smooth, two or three inches long, and flattened at the base, of a deep brown colour, and remaining on the tree for years. Scales, depressed, umbilicate, and slightly concave at the apex.

A tall tree, seventy feet high, with many large spreading branches, thickly set with bright green foliage.

It is found growing, according to Professor Tenore, in Calabria, on the mountain of Aspero, at an elevation of from 2,400 to 2,600 feet, and resembles *P. Halepensis*, but is easily distinguished from that species in its cones being stalkless, and in large clusters, and in the leaves being nearly double the length.

It yields excellent timber, according to Lambert.

It is quite hardy.

No. 4. PINUS CONTORTA, *Douglas*, the Twisted-branched Pine.

Syn. Pinus M'Intoshiana, *Carriere*.

„ „ M'Intoshiana, *Lawson*.

„ „ Boursieri, *Carriere*.

Leaves, in twos, but sometimes in threes on the young plants, two inches long, stout, sharp-pointed, and closely placed on the shoots, rounded on the outer part, and concave or channelled on the inner face; sheaths, very short, and composed of a few loose, shrivelled, dark-brown scales, full of resinous matter. Branches, horizontal, spreading, very much twisted, slender, and much resembling those of *Pinus inops*, or *Banksiana*, when old. Cones, small, ovate-pointed, tapering most to the apex, clustered round the branches, from two to two inches and a half long, and from three quarters to one inch in diameter in the widest part, nearly straight, or very slightly curved, compact, and smooth on the surface. Scales, thickened at the base, tetragonal, transversely keeled, blunt-pointed, a little depressed in the centre, and furnished with a small deciduous prickle in the middle; those nearest the base being much smaller, and nearly level.

A small tree, growing not more than fifteen or twenty feet high, with a twisted, scrubby appearance, found abundantly in swampy places near the sea coast at Cape Disappointment, and Cape Lookout, on the north-west coast of North America. It was also found by the French travellers, M. Boursier and M. Riviere, in Northern California, in similar situations.

It is quite hardy.

No. 5. PINUS HALEPENSIS, *Aiton*, the Aleppo, or Jerusalem Pine.

Syn. Pinus Hierosolymitana, *Du Hamel*.

„ „ *Genuensis*, *Cook*.

„ „ *Halepensis minor*, *Loudon*.

Leaves, in twos, but not very unfrequently in threes, of a deep green, two inches and a half to three inches long, thickly clothing the younger branches, and very slender, but never remaining longer on the branches than two years, in consequence of which the branches of old trees have a naked appearance, and the

head an open, thin, and straggling aspect ; buds, a quarter of an inch long, imbricated, roundish, and entirely destitute of resin. Cones, pyramidal, rounded at the base, smooth, solitary, or in pairs, two and a half or three inches long, and one inch and a half broad, inversely turned downwards, with a footstalk three quarters of an inch long. Scales, nearly flat, one and a quarter to one inch and a half long, and three quarters of an inch broad, of a deep shining brown colour. Seeds, middle size, with a wing nearly one inch long. Seed-leaves, seven in number.

A low, spreading tree, growing from twenty to thirty feet high, and ripening its cones in the autumn of the second year.

It is not found to the north of the Apennines, but is very common to the east and west of those mountains, as well as in Sicily, growing both on sands and on rocks, but better on the latter : its upper limits is 2,000 feet of elevation.

It is also found in the South of France near Toulon, on the island and mainland of Dalmatia, in Greece, Syria, Spain, and Asia Minor.

There is the following variety, viz. :—

PINUS	HALEPENSIS	PITYUSA,	<i>Stevens.</i>
Syn.	Pinus	Pithyusa,	<i>Strangways.</i>
„	„	maritima,	<i>Lambert.</i>
„	„	„	prima, <i>Matthiol.</i>
„	„	Halepensis	Syriaca, <i>Rauch.</i>
„	„	„	maritima, <i>Loudon.</i>
„	„	Abchasica,	<i>Fischer.</i>
„	„	Abasica,	<i>Carriere.</i>
„	„	Cairica,	<i>Don.</i>
„	„	Colchica,	<i>Booth.</i>

This variety differs from the species in having much longer and larger cones, stiffer and longer leaves, and in the tree being more compact, and growing to a much larger size.

It is found growing plentiful on the shores of Abshasia, (hence one of its names), around Pezundan, the ancient Pityus, and from which circumstance also, it received the name of Pityusa, a name given by M. Steevens, and according to whose account

the tree produces leaves sometimes scarcely more than one and a half or two inches long, and very slender, while others have foliage longer and stouter than those of *P. Halepensis*.

It is also found growing on the Colchis Mountains, in Syria, and on the coast of Greece.

No. 6. *PINUS INOPS*, *Solander*, the New Jersey Pine.

Syn. *Pinus Virginiana*, *Miller*.

„ „ *variabilis*, *Lamb*.

Leaves, in twos, short, rigid, and sharp-pointed, from two to two inches and a half long, bright green, and scattered equally all over the younger branches; sheaths, short, entire, and a quarter of an inch long. Branches, irregularly placed on the stem, twisted, with the more slender branchlets, pendulous, and the young shoots covered with a fine, violet, glaucous bloom; buds, blunt-pointed and resinous, the stem and larger branches emitting tufts of leaves or abortive shoots. Cones, oblong-conical, tapering slightly to a blunt point, and drooping, from two and three quarters to three inches long, and an inch and a quarter broad, very hard, and of a glossy, yellowish-brown colour, with short, thick footstalks, and usually solitary. Scales, elevated, pyramidal, four-sided, terminating in an awl-shaped, strong, projecting prickle, pointing outwards, or slightly reflexed, half an inch broad, and nearly all of a size. Seeds, very small, with a narrow wing, rather more than half an inch long. Seed-leaves from six to eight in number.

A low tree, with a spreading top, thirty to forty feet high, with a dark-coloured bark, full of resinous matter.

It inhabits the interior of North America, and is found from New Jersey to Carolina, where the soil is poor and sandy; it is also found in Maryland, Virginia, Kentucky, and Pennsylvania, but not found north of the Hudson River.

Timber of little use except for fuel.

No. 7. PINUS LARICIO, *Poiret*, the Corsican Pine.Syn. *altissima*, *Banks*.,, *pyramidalis*, *Hort*.,, *maritima*, *Aiton*, not *Lambert*.,, *Poiretiana*, *Hort*.,, *Corsicana*, *Hort*.,, *Cebenensis*, *Hort*.

Leaves, two in a sheath, from four to six inches long, dark green, often twisted, and rather slender for its class, and with shorter sheaths. Cones, solitary, or in pairs, seldom more than three or four inches long, and an inch and a half broad near the base, conical, straight, or sometimes slightly curved near the points. Scales, convex on the back, elliptic in their general form, scarcely angular, very slightly elevated, and of a light, yellowish-brown colour ; buds, ovate, with a long, narrow point, and resinous. Seed-leaves from six to eight in number.

A lofty tree, with its branches regularly in very distant whorls, from 80 to 130 feet high, very common on Mount Etna, where it forms woods at an elevation of from 4,000 to 6,000 feet. It also forms forests, according to Professor Tenore, on the mountains of Sila, in Calabria, but it was first discovered in Corsica, and has since been found spread over the countries of the south of Europe, in Greece, Crete, and Spain.

It forms a handsome, open, pyramidal-shaped tree, growing very rapid, and coming to maturity in seventy or eighty years after planting ; the wood is whitish, but brown near the centre, very resinous, coarse, long-grained, elastic, easily worked, and durable. There are the following varieties, viz. :—

PINUS LARICIO CALABRICA, *Delamarre*, the Calabrian Pine.Syn. *Pinus Calabrica*, *Hort*.,, *Pinus stricta*, *Hort*.

Leaves on this variety are from six to eight inches long, thickly set on the branches ; and the tree attains a large size on the mountains of Sila, in Calabria.

PINUS LARICIO CARAMANICA, *Loudon*, the Caramanian Pine.

Syn. *Pinus Caramaniensis*, *Vilmorin*.

„ „ *Romana*, *Hort*.

This variety seldom grows more than half the height of the Corsican Pine, but has a much rounder and denser head, with very dark-green foliage, and slenderer branches, covered with a reddish-coloured bark; buds pointed and nearly covered with a whitish resin; the cones also are larger than those of the *P. Laricio*.

PINUS LARICIO PYGMÆA, *Rauch*, the Dwarf Corsican Pine.

Syn. *Pinus Magellensis*, *Schouw*.

„ „ *Laricio Montana*, *Hort*.

„ „ *Laricio nana*, *Hort*.

A very dwarf variety, from the highest region of Mount Amaro. It has its branches lying flat on the ground, with stiff, slightly-curved leaves. Cones, of a spherical form, and smaller than those of *Pinus Pumilio*.

PINUS LARICIO CONTORTA, *Hort*, the Twisted-branched Corsican Pine.

This differs only in having its lateral branches contorted or twisted round in different directions.

PINUS LARICIO SUBVIRIDIS, *Du Hamel*, the Green-coned Corsican Pine.

This only differs in having very pale, yellowish-green cones.

No. 8. PINUS MERKUSII, *Vriese*, Merkus's Pine.

Syn. *Pinus Sumatrana*, *Junghu*.

„ „ *Finlaysoniana*, *Wallich*.

Leaves, in twos, needle-shaped, wavy, almost smooth on the outer part, and a little angled and rough at the edges on the inner face, from four to six inches long on the young shoots, but more than eight inches long on the adult ones; sheaths

nearly half an inch long, composed of dark-brown, jagged scales, the outer ones soon falling off, the inner ones being persistent; buds, long, narrow, somewhat incurved, and composed of awl-shaped scales, closely adhering at the tops, whitish at the edges, deep-brown in the middle, and jagged on the ends. Branches, slender, lower ones bent downwards, upper ones ascending at the ends, and spreading; male catkins, nearly an inch long, in clusters, and blunt-pointed. Cones, ovate, tapering to both ends, three inches long, and one inch and a half in diameter, slightly bending downwards, on short, slender footstalks. Scales, projecting, pyramidal, regularly recurved at the points, one and a quarter inch broad, and almost one inch long, slightly convex at the extremities, thickest on the summit, woody, and of a dark, glossy brown colour. Seeds, small, with a short, narrow wing, half an inch long, and a quarter of an inch broad in the middle.

A very large tree, growing 100 feet high, found in the Island of Sumatra, on the mountains of Tanna-Huring and Tobah, at an elevation of from 3,000 to 4,000 feet above the sea. It is also found in Cochin-China, in Borneo, and probably in the other islands in the Indian Archipelago.

It is quite tender.

No. 9. PINUS MITIS, *Michaux*, the Soft-leaved or Yellow Pine.

Syn. *Pinus variabilis*, *Pursh*.

- „ „ *Tæda variabilis*, *Michaux*.
- „ „ *echinata*, *Miller*, not *Lambert*.
- „ „ *lutea*, *Loddiges*.
- „ „ *Roylei*, *Lindley*.
- „ „ *intermedia*, *Fischer*.

Leaves, in twos, but not unfrequently in threes, pale, yellowish green, rather spreading, from two to two and a half inches in length, rather broad, stiff, blunt-pointed, partially twisted, channelled on the upper surface, and light, glaucous green; sheaths half an inch long on the young leaves, but very short on the adult ones, ragged or torn, and partially persistent. Branches, spreading on the lower part of the trunk, but less

divergent as they approach the head of the tree, so as to form the summit into a regular pyramid; the young shoots are of a violet glaucous colour, and the buds slightly resinous. Cones, small, two inches and a half in length, and one inch broad in the middle, of a greyish brown colour, oblong-conical, slightly tapering to the base, and rather blunt-pointed, solitary, and with a short, stout footstalk. Scales, small, half an inch wide on the larger ones, but much smaller and more numerous near the base, slightly elevated in the centre, and terminating in an irregular, four-sided, projecting, hooked point, slightly bent backwards in some, in others straight. Seeds, very small, with a broadish wing, rather more than half an inch in length. Seed-leaves mostly in sixes, and rather long.

A beautiful tree, growing fifty or sixty feet high, and from fifteen to eighteen inches in diameter, for nearly two-thirds of its length.

It is found in most Pine forests from New England to Georgia, but towards the north it does not extend beyond Connecticut and Massachusetts; is abundant in the lower parts of New Jersey, and still more so on the eastern shore of Maryland, in the lower parts of Virginia, and as far as Carolina, also in the Floridas, on the poorest lands, and on the Cumberland Mountains in East Tennessee.

Timber, close-grained, moderately resinous, excellent, and durable.

This Pine, a few years ago, was distributed in seeds, by the Honourable Court of Directors of the E. I. Company, as a new species, found by their collectors in Nepal; and at the request of Dr. Jamieson, who transmitted the seed to the Company, it received the name of *Pinus Roylei*, he stating at the time that it was a noble-growing tree, found at an altitude of from 8,000 to 10,000 feet in Nepal; but when the young plants attained a sufficient size, I soon detected an old acquaintance, and afterwards ascertained that the seeds had been obtained from the Residency Garden at Kathmandoo, where the late Mr. Winterbottom had previously observed it a scrubby-looking Pine about thirty feet high, and, as he described

it to me after his return to England, with leaves in pairs, the length of the Scotch Pine, and with very persistent ovate cones about one inch and three-quarters long. Mr. Winterbottom could not learn that it was found in a wild state in Nepal, but only that it had been planted, where he found it, in the Kathmandoo Garden several years.

It has also been distributed from the Russian Gardens under the name of *Pinus intermedia* (as connecting or being intermediate between the two and three-leaved kinds), having frequently two and three leaves in a sheath.

No. 10. PINUS MUGHO, *Bauhin*, the Mugho Pine.

Syn. *Pinus uncinata*, *Raymond*.

„ „ *sylvestris* Mugho, *Bauhin*.

„ „ *Mughus*, *Loudon*.

Leaves, two in a sheath, from one to two inches long, twisted, rather broad, stiff, not spreading, and of a dull green colour. Cones, one and a half to two inches long, ovate and stalkless, growing two or three together, rather erect, with hooked scales, more fully developed on the outer side, and full of resinous matter. Branches, ascending and numerous, thickly covered with foliage, and with a brownish grey bark. Wood, heavy, close-grained, red, and very durable, forming in favourable situations a small tree thirty feet high.

It is found in the mountains extending from the Pyrenees eastward, the Alps of South-Western and Central Europe, with the following varieties :—

PINUS MUGHO ROSTRATA, *Antoine*, the Beaked Mugho Pine.

Syn. *Pinus uncinata*, *Widdrington*.

„ „ *Montana*, *Baumann*.

„ „ *echinata*, *Hort*.

„ „ *rubræflora*, *Loudon*.

„ „ *sanguinea*, *Lapeyrouse*.

This variety differs in the scales of the cones being greatly elevated, and hooked or beaked at the points, much larger than

in the original, and is the tree described by Captain Widdrington (Cook) in his Travels in Spain, where he discovered it on the Pyrenees, a small tree, thirty feet high.

PINUS MUGHO ROTUNDATA, *Link*, the Round-coned Mugho Pine.

Syn. *Pinus sylvestris rotundata*, *Link*.

„ „ *Pumilio rotundata*, *Hort*.

„ „ *Montana*, *Wahlenberg*.

This variety is found below *P. Pumilio*, on the Tyrol, but readily to be distinguished from it, by its upright growth, and forming a small tree with a distinct stem.

PINUS MUGHO ULIGINOSA, *Wimmer*, the Marsh Mugho Pine.

Syn. *Pinus Fischeri*, *Booth*.

„ „ *pyramidalis*, *Reuss*.

„ „ *obliqua*, *Sauter*.

This is the Austrian form of *P. Mugho*, but very much more robust in stature, forming a handsome pyramidal small tree.

PINUS MUGHO NANA, *Loudon*, the Knee Pine.

This variety never grows more than three feet high on the Styrian Alps.

No. 11. PINUS MURICATA, *D. Don*, the Bishop's Pine.

Syn. *Pinus Edgariana*, *Hartweg*.

„ „ *Murrayana*, *Balfour*.

Leaves, in twos, not very thickly set on the branches, from three and a half to four inches in length, very stiff, rather broad, blunt pointed, hollow on the inner side, round on the outer, and of a deep green colour; sheaths rather short, smooth, and not more than half an inch in length on the young leaves, and only slightly persistent on the older ones. Seed-leaves on the young plants in fives, and rather short. Branches, not very numerous, but tolerably stout and rather irregular. Buds, below the middle size, imbricated, much pointed, and destitute

of resinous matter. Cones, in clusters, of from four to seven, in whorls round the stem, reddish brown when young, but changing to a grey or ash colour when old ; rather pendulous, and nearly straight or very slightly incurved on the side next the branch ; three inches in length, and one and a half broad near the base, which is the widest part, and tapering to rather a blunt point ; the base is slightly uneven, and the cone sessile or nearly so. Scales, largest on the outer side of the cone, particularly those towards the base ; where they are conical, nearly straight or slightly bent backwards near the base, much elongated, pointed, and half an inch in length ; the scales on the inner side of the cone and at the point are much the smallest, quadrangular, and nearly flat, except those near the point, which are rather more elevated than the others, with a slight ridge running across their middle, terminated by a short, straight, broad prickle in the centre ; each cone contains from nine to ten rows of scales, within each of which are two very small, dark-brown seeds, with wings half an inch long.

This very distinct pine was first discovered by Dr. Coulter at San Luis Obispo in Upper California, to the South of Monterey, at an elevation of 3,000 feet, and within ten miles of the sea-shore. It grows straight, but rather stunted, seldom exceeding forty feet in height. Mr. Hartweg found it growing on the western declivity of the mountains near Monterey, and within two miles of the sea-shore, attaining a height of from twenty to thirty feet, and with a trunk twelve inches in diameter. In this locality it was confined to a small wood half a mile square, and intermixed with and surrounded by *Pinus insignis*. Mr. Hartweg again met with it at a considerable distance to the south of Monterey, on the ascent to the Mission of La Purissima, where the monotony of the bare hills was only relieved by a small forest of it ; the trees, however, not attaining a larger size than those found growing near Monterey. Mr. Jeffrey found it a tree forty feet high, of a conical form, on the Siskyon Mountains, at an elevation of 7,500 feet, growing in moist soil, near the summit of the mountain. It was named *P. Murrayana* by the Oregon Committee, and *P. Edgariana* by

Hartweg in his Journal. It is the 'Obispo,' or Bishop's Pine of the Californians, and quite hardy.

No. 12. *PINUS PALLASIANA*, *Lambert*, the Taurian Pine.

Syn. *Pinus Taurica*, *Hort.*

„ „ *Laricio Pallasiana*, *Loudon.*

Leaves, in twos, very long, sharp-pointed, erect, rigid, five or six inches long, and channelled above; smooth, crowded, and of a shining dark green; sheaths, short, half an inch long, covered with scales and torn on the margin; white when young, but dark brown when old. Buds, ovate, one inch and a quarter long, and resinous, with the sides hollow. Branches, scattered irregularly along the stem, robust and incurved upwards, with some of the lower ones almost equal to the trunk in size. Cones, ovate-oblong, tapering to the point, without footstalks, often curved near the end, four or five inches long, and one inch and three quarters broad, at the widest part near the base; horizontal or incurved downwards, mostly single, or in threes round the branches, and of an ash-grey colour. Scales, rhomboid, half an inch broad, slightly elevated, and enlarged at the base; smooth, and terminated by a slight ridge, with a very small prickle in the centre. Seeds, middle size, with a broad wing.

A large pyramidal tree, seventy or eighty feet high, confined to the central regions of the Crimea, forming considerable forests on the western declivity of the lofty mountains which extend along the coast of the Black Sea.

Timber, very knotty, resinous, and very durable.

It is quite hardy.

No. 13. *PINUS PERSICA*, *Strangways*, the Persian Pine.

Leaves, in twos, twisted, rather stiff, sharp-pointed, and not spreading; dense, and tufted towards the end of the branches; of various lengths, from two to five inches long, deep green, channelled on the inner side, and convex on the outer one, with the edges rough and finely serrated; seldom remaining

longer on the tree than the second year. Branches, regular, short, and rather slender, but mostly pointing upwards; the larger and older ones rather naked on the lower parts, but tufted with leaves towards the points. Buds, imbricated, very thready, and free from resin. Sheaths, persistent, short, one-third of an inch long, rather smooth, but shrivelled, not jagged at the ends, and guarded at the base with rather a broad lanceolate, recurved scale, or metamorphosed leaf, of a bright brown colour, although green at first. Cones, ovate, tapering to a very blunt point, and rounded at the base, five inches long, and three inches across at the widest part; mostly in clusters round the stem, or principal top branches, but frequently solitary, and pointing downwards; of a dull greyish brown colour, with a hard, smooth surface, short footstalks, and destitute of resinous matter. Scales, slightly elevated, nearly one inch broad, with the apex depressed, and hollowed in the centre. Seeds, large, with a broad wing, one inch and a half long.

A large tree, belonging to the same section as the Aleppo Pine (*P. Halepensis*) introduced from the South of Persia by the Hon. W. F. Strangways.

It is perfectly hardy.

No. 14. *PINUS PINASTER*, *Aiton*, the Star, or Cluster Pine.

Syn. *Pinus Massoniana*, *Lambert*.

- „ „ *Nepalensis*, *Royle*.
- „ „ *Latteri*, *Madden*.
- „ „ *maritima*, *Lamarck*.
- „ „ *Japonica*, *Loudon*.
- „ „ *Chinensis*, *Knight*.
- „ „ *Nova-Hollandica*, *Loddiges*.
- „ „ *Nova-Zealandica*, „
- „ „ *St. Helenica*, *Loudon*.
- „ „ *Syrtica*, *Thore*.
- „ „ *neglecta*, *Low*.

Leaves, in twos, dark green, six to eight inches long, rigid, broad, and very stout, slightly serrated on the margins, and thickly set on the branches in dense whorls; sheaths, three

quarters of an inch long, imbricated, and pale yellow when young, but turning nearly black when old; buds, three quarters of an inch long, white, woolly, imbricated, and non-resinous, with the scales turned back at the points. Cones, from four to six inches long, and two inches and a half wide at the broadest part, which is below the middle, and of a light shining brown colour, and growing in clusters of from four to eight, but sometimes more in number, in a horizontal direction, and without any footstalks. Scales, from one to one inch and a quarter in length, and three quarters of an inch broad, terminating in an unequally four-sided pyramid; of an ash-grey colour, very hard, and with a small sharp point, more particularly on the upper part of the cone. Seeds, oblong, with wings one inch and a half long, and nearly half an inch broad. Seed-leaves, from seven to eight in number.

A large tree, attaining a height of from fifty to seventy feet, with the branches in regular whorls, turned up at the extremities, and thickly set with foliage at intervals of three or four inches, occasioned by the shedding of the male flowers. This species and its varieties mostly grow in the sandy plains on the lower mountains of the northern and central Apennines, the variety with shorter leaves and smaller cones, (minor), prefers the lower mountains, while the larger coned and longer leaved form prefers the sandy plains, but neither is found south of the Apennines. Its highest limit is 2,800 feet above the sea in Upper Italy. It is found in Spain, Portugal, Greece, and Turkey, also on the French coast of the Mediterranean, where it is employed for covering immense tracts of sand along the shore, and in the island of Brazza, on the Dalmatian coast in the Gulf of Venice. It is also found (but no doubt introduced from Europe) in China, Japan, New Holland, New Zealand, and St. Helena, and even in the north of India, where Major Madden and other travellers detected it in Nepal, and gave it the names of *P. Nepalensis* and *P. Latteri*, but there is not the slightest difference between the European and Asiatic plants.

It grows freely exposed to the sea breezes, and is one of our

commonest firs, but the wood is soft, and not very durable ; there are the following varieties, viz. :—

PINUS PINASTER HAMILTONII, *Tenore*, Lord Aberdeen's Pine.

Syn. Pinus Pinaster major, *Du Hamel*.

„ „ Hamiltonii, *Tenore*.

„ „ Escarena, *Hort. Soc.*

„ „ Pinaster Escarena, *Loudon*.

„ „ „ Aberdoniæ, „

„ „ „ altissima, *Lamarck*.

Leaves, of a paler green, much broader and shorter than those of the species. Cones, shorter, and more ovate. It was first pointed out to the Earl of Aberdeen in 1825, by M. Risso, at Nice, where it is found sparingly on the mountains in that neighbourhood, and from whence seeds were obtained by his Lordship. It is a very distinct and handsome variety.

PINUS PINASTER LEMONIANA, *Loudon*, Sir C. Lemon's Pine.

Syn. Pinus Lemoniana, *Bentham*.

A curious variety, differing from the species in its proliferous habit, producing its cones at the extremity of the shoots, and consequently has a stunted appearance, and becomes short-lived on poor soils.

PINUS PINASTER MINOR, *Loudon*, the Cortean Pine.

Syn. Pinus maritima minor, *Du Hamel*.

„ „ dietritis, *Hort.*

This differs in having shorter leaves and smaller cones, and abounds on the west coast of France, also in the neighbourhood of Corte, in Corsica, where it is called as well as in France, 'Pin de Corte.' It is a taller tree, but with a less denser head than the common Cluster Pine, and more resembling the *P. Laricio*.

PINUS PINASTER VARIEGATA, the Variegated Cluster Pine.

This only differs in having one third of its leaves of a pale

straw colour intermixed with the green ones, but sometimes the entire shoot is composed of all white, and sometimes of all green leaves.

No. 15. PINUS PINEA, L., the Italian Stone Pine.

Syn. *Pinus sativa*, *Bauhin*.

- „ „ *domestica*, *Matth*—.
- „ „ *densiflora*, *Siebold*.
- „ „ *Pinea Arctica*, *Hort*.
- „ „ *Aracanensis*, *Knight*.
- „ „ *Pinea Chinensis*, *Knight*.
- „ „ „ *Americana*, *Hort*.
- „ „ *Maderiensis*, *Tenore*.

Leaves, in twos, from five to eight inches long, straight, very robust, and of a deep shining green; those on the young plants consist of a glaucous single bract-like leaf, thickly set on the shoots, and without any sheaths, and from amongst which afterwards spring the true leaves. Sheaths, when young, half an inch long, but afterwards become torn, and reduced to half their size. Cones, from five to six inches in length, and nearly round or bluntly ovate, of a pale brownish glossy colour, very solid, and not coming to maturity before the third year. Scales, large, from two to two inches and a half in length, and one inch and a half broad, with the thickened part pyramidal, and frequently six-sided, but mostly having but four ribs, from the four angles, which terminate in a blunt prickle. Seeds, very large, three quarters of an inch long, with rather a broad, but very short wing. Seed-leaves, from nine to ten in number.

A low tree, with a round bushy appearance, from fifteen to twenty feet high, which produces the Carpathian Balsam. It is found on the sandy coasts of Tuscany, and the States of the Church; to the west of the Apennines, on the hills of Genoa and Tuscany, frequently forming forests with the Cluster Pine (*Pinus Pinaster*), and is cultivated throughout the whole of Italy, from the foot of the Alps to Sicily, but is not commonly found higher than 1,500 feet of elevation, except in the south of Italy, where it attains an elevation of 2,000 feet. It is culti-

vated along all the shores of the Mediterranean, and in Greece, attaining a height of fifty or sixty feet, where its seeds or nuts form an extensive article of commerce, as well as in Italy and the south of France. It forms a very ornamental small tree, with a rounded head, so celebrated for producing the fine effect in the grounds of Italian Villas. There are the following varieties :—

PINUS PINEA FRAGILIS, *Du Hamel*, the Thin-shelled Stone Pine.
Syn. Pinus Pinea Tarentina, *Manetti*.

This variety differs in no way from the species, except in having a very thin shell to the seeds, which is easily broken, and for that reason more cultivated in Italy, Naples, and the south of France, where there are some very large trees to be found.

PINUS PINEA CRETICA, *Loudon*.

This variety has much larger cones, and slenderer leaves, and comes from the island of Candia or Crete in the Mediterranean, where it attains a larger size than the common Stone Pine.

Cones of this pine are frequently brought from China, under the name of the 'Round-coned Chinese Pine,' but in no way differ from the European form.

No. 16. PINUS PUMILIO, *Hænke*, the Mountain Pine.

Syn. Pinus Tatarica, *Miller*.

„ „ Carpatica, *Hort*.

„ „ sylvestris Montana, *Aiton*.

„ „ Mugo humilis, *Neal*.

„ Sudeticus, *Ungrische*.

Leaves, in twos, curved, short, stiff, somewhat twisted, thickly set on the branches, from two to two inches and a half long, with long, lacerated, woolly, white sheaths when young, but which afterwards, as they get older, become much shorter, and dark brown, or nearly black. Cones, from one to one inch and a half long, and three-quarters of an inch broad near the base, two or three

growing together, pendulous, of a dull brown colour, and bluntly egg-shaped. Scales, about the size of those of the Scotch Fir, but not so much elevated in the centre. Branches, turned upwards, and very numerous, forming a dense bush, with the bottom branches creeping on the ground, but growing, in very favourable situations, into a small tree twenty or thirty feet high, with a grey and rather smoothish bark.

This Pine is found inhabiting the mountains of Middle Europe, generally on chalk formations, on the southern slope of the Alps, towards the east (Tyrol), and beyond the limits of trees, but scarcely higher than 7,500 feet, nor lower than 4,000 feet of elevation, where it prefers a swampy soil. It also grows on the northern slope of the Alps, and is very common on the Carpathians, where it forms a region above the common Spruce Fir, and at great elevations it becomes stemless and a spreading bush creeping along the ground. It produces the Hungarian Balsam.

No. 17. *PINUS PUNGENS*, *Michaux*, the Table Mountain Pine.

Leaves, in twos, from two to two inches and a half long, broad, straight, rigid, and pale, yellowish green, thickly set on the branches; sheaths short, smooth, shrivelled, and not jagged at the margins. Branches, irregular and spreading; buds, blunt-pointed, and covered with resin. Cones, top-shaped, rather large, light yellowish brown, three inches and a half long, and two inches and a half broad at the base, tapering to the point, and without footstalks, generally in whorls round the stem and top branches, pointing horizontally, and remaining on the tree for years. Scales, thick, hard, and broad at the base, elevated into a pyramid, with an incurved, strong, awl-shaped hook, exceeding a quarter of an inch in length. Seeds, rather small, rough, and black, with a narrow wing, nearly one inch long. Seed-leaves, from six to eight in number.

A tree, with the habit of the common Scotch Fir, but with a more branchy head, growing from forty to fifty feet high.

It is found on Table Mountain in North Carolina, one of the highest points of the Alleghanies, nearly 300 miles from the sea, and which summit it covers exclusively. Pursh only found it on the Grandfather and Table Mountains, and on the Blue Mountains on the frontiers of Virginia.

Timber of little value except for fuel.

No. 18. PINUS PYRENAICA, *Lapeyrouse*, the Pyrenean Pine.

Syn. Pinus penicillus, *Lapeyr.*

„ „ Hispanica, *Cook.*

„ „ Parolinianus, *Webb.*

„ „ Salzmanni, *Dunal.*

„ „ Monspeliensis, *Salzmann.*

„ „ Pseudo-Halepensis, *Denhardt.*

„ „ Halepensis Salzmanni, *Dunal.*

„ „ „ major, *Hort. Paris.*

„ „ Pinaster Hispanica, *Roxas.*

„ „ Laricio Pyrenaica, *Loudon.*

„ „ „ Monspeliensis, *Vilmorin.*

„ „ Teazleyi, *Hort.*

„ „ Frenzelei, *Vilmorin.*

Leaves, in twos, rarely in threes, long, rather fine, stiff, straight, and of a bright green colour, thickly set on the branches, and six or seven inches long, channelled on the inner sides, and sharp-pointed; sheaths half an inch long on the young leaves, smooth, entire at the margins, and dark brown, but on the old ones very short, shrivelled, rough, jagged, and nearly black. Branches, stout, of a bright orange colour, numerous, regular, spreading in all directions round the stem, and well furnished with laterals; buds, conical, with a long, tapering point, covered with downy scales, and full of resin. Cones, two inches and a half long, one inch and a quarter wide, conical, tapering a little to the base, on short, slender footstalks, mostly solitary, and pointing horizontal. Seeds, rather small, with a narrow, pointed wing, three-quarters of an inch long. Scales, small, half an inch wide, rounded on the outer margin, slightly

elevated in the centre, with an angular line terminated in the middle with a depressed, hollow scar, but sometimes with a small prickle in the centre; those nearest the base much the smallest, flat, and hollow in the centre, while those near the apex are more angularly raised, and all of a pale-yellow colour.

A majestic tree, growing from sixty to eighty feet high, regularly furnished with branches to the ground, and mostly growing intermixed with other kinds in the extensive forests of Spain and France.

It is found occupying the highest range of the extensive forests in the south of Spain, and in a corresponding situation in the vast forest region on the River Gabriel, in Upper Aragon, and on the Pyrenees, where it is called 'Pin Nazaron.' It is also found near Montpellier and the coast of the Mediterranean, in elevated positions, and attaining a great size, but not very plentiful.

No. 19. *PINUS RESINOSA*, *Solander*, the Resinous or Red American Pine.

Syn. *Pinus rubra*, *Michaux*.

„ „ *Canadensis bifolia*, *Duhamel*.

„ „ *Loiseleuriana*, *Carriere*.

Leaves, in twos, five or six inches long, straight, stiff, yellowish-green, thickly set on the shoots, compressed, and collected in bunches at the extremities of the branches; sheaths, nearly one inch long, white on the young leaves, but shorter, jagged, and darker with age on the older ones. Branches, rather naked, straight, open, and reddish-brown; the larger ones on the trunk more distant than those of the Corsican Pine (*P. Laricio*); buds, long, pointed, and very resinous. Cones, pale reddish-brown, shining, hard, ovate-conical, rounded at the base, two inches long, one inch and a quarter broad, and with very short footstalks. Scales, rhomboid, largest in the middle of the cone, slightly elevated or pyramidal, with a transverse ridge, terminated with a blunt scar, unarmed in the centre, half an inch wide, but much smaller towards the base, and

more elevated. Seeds, small, with the wing three-quarters of an inch long.

A large tree, growing seventy or eighty feet high, and two feet in diameter, in dry, sandy soil, with very distant whorls of branches, resembling the Corsican Pine.

It is found occupying small tracts near the Lake of St. John, in Canada, and not extending further south than Wilksborough, in Pennsylvania; is very scarce in all the country south of the River Hudson, but is abundant in Nova Scotia, on dry, sandy soil, and along the banks of the Genessee, in the State of New York.

Timber, fine-grained, red, full of resin, and highly esteemed in Canada for its strength and durability.

No. 20. PINUS SYLVESTRIS, *L.*, the Scotch Fir.

Syn. *Pinus sylvestris vulgaris, Clusius.*

„	„	„	Genevensis, <i>Bauhin.</i>
„	„	„	Rigensis, <i>Fischer.</i>
„	„	„	Haguenensis, <i>Loudon.</i>
„	„	„	uncinata, <i>Don.</i>
„	„	„	scariosa, <i>Loddiges.</i>
„	„	„	squamosa, <i>Bosc.</i>

Leaves, in pairs, rigid, from one inch and a half to two inches and a half in length, somewhat waved and twisted; slightly concave on the upper, and convex on the under surface, of a light bluish-green or greyish colour; finely serrulated on the edges, sheaths jagged and slightly ringed. Cones, from two to three inches long, and from one to one inch and a quarter broad at the base. Scales, from one to one inch and a quarter long, terminating in an irregular four-sided, projecting point, often recurved. Seeds, with the wing from one to one inch and a quarter long; seed-leaves, from five to seven in number.

A tall tree, from sixty to 100 feet high, found in various parts of Europe, ripening its cones in November, or in about eighteen months from the time of flowering, which is in March. It occurs frequently in Italy, on the Southern slope of the Alps,

from Frioul to Nice, especially in the sandy soil of the valleys ; it is also found in the Northern Apennines. Its upper limit on the Southern slope of the Alps is at 5,000 or 6,000 feet of elevation, while on the Northern slope it is not found higher than 4,000 feet, and as a general rule it cannot be said to exist lower than 2,000 feet above the sea. It is found in Scandinavia, its northern limit, in lat. 70°, where it constitutes immense forests of fine timber ; it also grows wild in Scotland, in the Sandy Plains of the North of Germany, in the mountains of Central Europe, and in the valley of the Rhine, the Tyrol, Bavaria, and towards the West it is found as far as the Pyrenees ; and varieties are even found in Persia and the Caucasus, but not in North America, as stated by some writers. It is like all species of trees which have an extensive geographical range, and grow on almost every kind of soil, and at great elevations as well as in the plains ; the varieties are very numerous as regards their exterior appearance, for on poor soil and very elevated situations, fully exposed to the boisterous winds, it becomes a diminutive shrub, while in lower and more favourable situations it becomes a lofty timber tree, growing 100 feet high, and four feet in diameter.

The following are the principal varieties worth distinguishing.

PINUS SYLVESTRIS HORIZONTALIS, *Don*, the Highland Pine.

Syn. *Pinus sylvestris Montana*, *Hort.*

” ” ” *rubra*, *Grigor.*

” ” *Scotica*, *Willdenow.*

It is also called the Red Scotch Pine, from the colour of the wood ; the Highland Pine, the Spayside Pine, and the Horizontal Scotch Fir.

This variety has its branches disposed in quite a horizontal direction from the stem of the tree. The leaves are broader and much more glaucous, with the bark on the trunk of the tree not so rugged. Its cones are thicker, and not so much pointed ; and the tree is more hardy when young, and grows freely in almost any kind of soil.

PINUS SYLVESTRIS MONOPHYLLA, *Hodgins*, the One-leaved
Scotch Fir.

The leaves of this variety are attached to each other throughout their length, and have the appearance of being united, but by giving them a twist they separate into two, like the ordinary Scotch Fir. It is a very singular variety.

PINUS SYLVESTRIS VARIEGATA, *Hort*, the Variegated Scotch
Fir.

This only differs from the ordinary form, in the mixture of its pale straw-coloured with the usual glaucous or bluish-green leaves, being produced on both old and young wood.

PINUS SYLVESTRIS NANA, *Hort*, the Pigmy Scotch Fir.
Syn. *Pinus sylvestris pygmæa*, *Hort*.

A very dwarf variety, not growing more than one or two feet high, but spreading widely in a horizontal direction, and having very stunted branches and leaves.

PINUS SYLVESTRIS LATIFOLIA, *Gordon*, the Persian Scotch Fir.
Syn. *Pinus Erzeroomica*, *Calvert*.

- „ „ *sylvestris Persica*, *Hort*.
„ „ *Caucasica*, *Fischer*.
„ „ *altissima*, *Ledebour*.

Leaves, much broader, more glaucous, and longer than any other variety of *P. sylvestris*. It is very robust, and grows rapidly to a great size on the mountains near Erzeroom, in Persia, and on the Caucasian mountains.

PINUS SYLVESTRIS ALTAICA, *Ledebour*, the Altai Scotch Fir.
Syn. *Pinus sylvestris Uralensis*, *Fischer*.
„ „ *Padufia*, *Ledebour*.

A compact, pyramidal, middle-sized tree, with much shorter and stiffer leaves, growing about fifty feet high on the bleak Altaian Mountains.

PINUS SYLVESTRIS ARGENTEA, *Stevens*, the Silvery Scotch Fir.
 Syn. *Pinus sylvestris hamata*, *Stevens*.

This differs from the other varieties in having its cones and leaves of a beautiful silvery hue. It is from the mountain chain east of the Black Sea, where it attains to a great size.

NEW OR DOUBTFUL KIND, HAVING THE LEAVES TWO
 IN A SHEATH, AND OF WHICH NOTHING MORE IS KNOWN.

No. 21. PINUS ARABICA, *Sieber*, the Arabian Pine.

A very doubtful kind, of which little is known, beyond that it is said to have its leaves in twos, loosely spreading, slender, and very smooth, with the edges of the older ones almost fringed.

It is said to have been found growing in Palestine and Arabia, by *Sieber*, an old botanical collector, and most probably nothing more than *Pinus Halepensis*.

Section II. TERNATÆ, OR THOSE KINDS HAVING THREE
 LEAVES IN EACH SHEATH.

No. 22. PINUS AUSTRALIS, *Michaux*, the Southern Pine.

Syn. *Pinus palustris*, *Miller*.

„ „ *Americana palustris*, *Duhamel*.

„ „ *Georgica*, *Hort*.

Leaves, in threes, very long, collected in bundles at the extremities of the branches, eight or nine inches long, with those on young plants frequently a foot long; of a brilliant green, rather stout, and reflexed, when full grown. Sheaths from one and a half to two inches long when young, but afterwards lacerated at the ends, and much shorter on the old leaves. Branches few, very robust, and irregularly placed on the trunk. Buds, very large, imbricated, and free from resinous matter. Cones, very long, cylindrical, tapering to a blunt point; seven or eight inches long, and two inches and a half broad, and of a rich

chestnut-brown colour. Scales, from one to one inch and three quarters broad, enlarged at the base, and elevated into a small pyramid, terminated by a small incurved prickle in the centre. Seeds, rather large, oval, half an inch long, of a whitish colour, and with a wing nearly one inch and a half long.

A large tree, growing sixty or seventy feet high, and one foot and a half in diameter, for two-thirds of its length, in favourable situations in East Florida.

It is found covering vast tracts, called Pine-barrens, in Virginia, Georgia, and from North Carolina to Florida, near the sea coast.

Timber, excellent, and full of resin, and known by the name of the Georgia Pitch Pine.

There is a variety, viz. :

PINUS AUSTRALIS EXCELSA, *Loudon*.
 Syn. *Pinus palustris excelsa*, *Booth*.
 „ „ *lutea*, *Makoy*.

This variety is said to have longer leaves, to grow much taller, and to come from the North-west coast of America, and to be perfectly hardy even in Germany.

No. 23. PINUS BENTHAMIANA, *Hartweg*, Mr. Bentham's Pine.
 Syn. *Pinus Sinclairii*, *Hooker*.

Leaves, in threes, thickly set on the branches, dark-green, and resembling those of *Pinus ponderosa*, but much longer, usually eleven inches in length, very stout, rather flat, with a slight elevated rib running along their inner side. Sheaths, partly persistent, and nearly an inch long on those of the young shoots, slightly shaggy, except at the extremity, where they are very ragged or torn. Seed-leaves, on the young plants, from seven to eight in number, and rather long. Branches, rather numerous, very stout, spreading, and rather irregular, with the bark rough. Buds, large, dark brown, much imbricated, and destitute of resinous matter, or nearly so. Cones, in clusters of three or four together, slightly pendulous, and quite straight,

six inches in length, and two inches and a half broad at the widest part, which is rather below the middle; the base is unequal-sided, owing to the numerous very small scales there curving to one side, and forming a kind of hood round the base of the cone, which is quite sessile, or without any footstalk. Scales, largest at the widest part of the cone, which is about one-third from the base, then diminishing gradually towards the point, which is rather blunt; those scales nearest the base are very small, particularly the first four or five rows, and more elevated in the centre, which is terminated by a stout broad point; the larger scales are rather thin, and slightly elevated, or nearly flat, three-quarters of an inch broad, and half an inch deep, with a slightly elevated ridge across the middle of each, which is terminated in the centre by a very stout spine, quite straight; each cone has from thirteen to fifteen rows of scales. Male flowers, large, cylindrical, and in large, compact clusters; each scale contains within it two seeds, which are rather below the middle size, but with wings rather more than an inch in length, and half an inch in breadth.

This noble pine, which seems to be entirely a mountain species, sometimes attains a height of 200 feet, with a stem twenty-eight feet in circumference. Mr. Hartweg first met with it on the mountains of Santa Cruz, a coast range running due north across the bay from Monterey, and distant by water about twenty-five miles, although sixty miles by land; afterwards he found it in the Sacramento country, growing upon the ridge generally termed by emigrants from the United States, the Californian Mountains. Mr. Hartweg says, "After crossing the Chuba River, you pass the prairie, and enter the mountains near Bear Creek, where you have to pass through an interminable wood of *Pinus Sabiniana*, and in ascending the gradual acclivity of the mountain, you lose the region of *Pinus Sabiniana*, and enter that of *Pinus Benthamiana*, which seems to be characteristic of the upper region." Some trees of this noble pine attain an enormous size; the largest of which Mr. Hartweg measured in this locality was twenty-eight feet in circumference, and 220 feet in height. It generally grows in masses or intermixed with a few solitary *Pinus Lambertiana*,

which is of equal dimensions in these regions. The lofty mountains surrounding Bear Valley are well wooded by *Pinus Benthamiana*.

This very valuable timber tree was named by Mr. Hartweg, in compliment to George Bentham, Esq., late Secretary to the London Horticultural Society. It is quite hardy, and the most valuable of all the tribe for timber.

No. 24. *PINUS BRACHYPTERA*, *Wislizenus*, the Short Wing-seeded Pine.

Leaves, in threes, but sometimes in twos, or fours, of a dark green, and rough at the edges ; from three inches and a half to six inches long, and mostly in bunches at the ends of the branches ; sheaths, persistent, and nearly black when old ; buds, covered with regularly acuminate, membranaceous, fringed, persistent scales. Branches, horizontal. Cones, rather erect, ovate, oblong, or somewhat conical, from two and a half to three inches long, and one inch and a half broad at the widest part. Scales, thickened at the base, elevated, recurved, and spiny-pointed. Seeds, three or four lines long, and two lines broad. Wing, shorter than the seeds.

A handsome tree, growing from eighty to a hundred feet high, and two or three feet in diameter ; found abundantly by Messrs. Wislizenus and Engelmann, on the mountains of New Mexico, producing excellent timber.

No. 25. *PINUS BUNGEANA*, *Zuccarini*, the Chinese Lace-bark Pine.

Syn. *Pinus excorticata*, *Gordon*.

Leaves, in threes, very stiff, convex on the back, and acutely keeled on the inner face ; two or three inches long, and thickly placed along the young shoots, frequently in bundles towards the ends of the branches, somewhat in whorls, and irregularly three-edged ; sheaths, composed of numerous loose scales, which soon fall off, and leave the base of the leaves naked ; buds, non-resinous, and formed of several reddish brown, smooth, fringed scales, largest at the base, and rough at the edges. Male catkins,

from five to six lines long, cylindrical, or conical; when young, placed alternately at the base of the young shoots, but frequently afterwards very distant, owing to the rapid elongation of the young shoot. Branches, long, very slender, little divided, glaucous, and covered with a smooth grey bark, rendered a little rough on the stem and older branches by the transverse scars, forming rhomboidal-shaped figures, which in due time are shed, and give the stem and branches a very peculiar appearance. Cones, ovate, or slightly conical, broadest near the base, two inches and a half long, and one inch and a half in diameter, and obtuse ended. Scales, rather more than three quarters of an inch across, and four lines deep, concave, thin, with a slightly elevated keel or ridge, transversely placed across the scale near the upper or outer margin, and furnished in the centre with a short, stout, reflexed point, a little sunken; those scales near the base of the cone are very much smaller, and numerous.

A middle-sized tree, found in the north of China, and much cultivated by the Chinese on the island of Chusan, and other parts of China in pots, as the 'Lace-bark Pine.' It is the 'Kieu lungmu' of the Chinese.

It is quite hardy.

No. 26. *PINUS CANARIENSIS*, *Smith*, the Canary Island Pine.

Leaves, in threes, wavy, very long, slender, and spreading; seven inches long, of a shining grass green, and slightly angular; frequently pendulous when full grown, and sharp-pointed. Sheaths, half an inch long, torn at the margin, and much shorter on the old leaves. Branches, rather numerous, and regularly placed on the stem, with the branchlets rather slender and drooping; the larger branches and trunk producing abundance of short shoots, and tufts of leaves. Cones, oblong, cylindrical, five inches and a half long, and two inches and a half wide, quite straight, without any footstalk, and with a hard, glossy surface. Scales, one inch broad, terminating in an irregular pyramid, not much elevated, and with a blunt point, irregularly four-sided. Seeds, half an inch long, with a wing one and three eighths of an inch long.

A large tree, growing sixty or seventy feet high, in the mountains of Teneriffe, and on the Grand Canary Island, at an elevation of 5,000 or 6,000 feet, where it forms extensive forests, from the sea shore to an altitude on the mountains of 6,000 feet. It is most abundant at elevations of from 4,000 to 6,000 feet above the level of the sea ; on the Grand Canary Island the pine forests extends from Oratava to Portillo de la Villa.

Timber, resinous, durable, and free from the ravages of insects.

It is tender.

No. 27. *PINUS CEMBROIDES*, *Gordon*, the Mexican Cembra-like Pine.

Syn. *Pinus edulis*, *Wislizenus*.

Leaves, in threes, from one inch to one inch and a half in length on the wild specimens, but rather longer on the young growing plants ; tolerably rigid, slightly twisted at the base, three-edged, very dense, and of a bright glaucous green colour ; sheaths, short, and soon falling off, or curling up. Seed-leaves, on the young plants, from ten to twelve in number when the first come up. Branches, vertical, mostly in fives, but sometimes more numerous in a whorl, rather slender, slightly incurved, and spreading, with tolerable smooth bark, and remarkably small buds, which are imbricated and non-resinous, or nearly so. Cones, single, and stalkless ; from two inches and a half to three inches in length, and one inch and three quarters broad at the base, with six or seven rows of scales, and tapering but slightly to a blunt point ; the scales are rounded at the margins, three quarters of an inch broad, slightly elevated, and nearly all of a size, except those close to the base, which are very much smaller, and more elevated ; each scale contains within it two wingless seeds, which are top-shaped, slightly angled at the smaller end, about half an inch in length, and rather thin shelled.

This Pine resembles *Pinus Llaveana* in general appearance, but differs in having shorter, more glaucous, and smaller leaves, and with cones three or four times the size of those of *P. Llaveana*,

with which most writers confound it ; the cones of *P. cembroides* have six or seven rows of scales, while those of *P. Llaveana* have but three rows.

It was first discovered in Mexico, and introduced by Hartweg, who found it in the cold districts on the mountains of Orizaba, near the village of Chichiquila, attaining a height of thirty feet at an elevation of 10,000 feet above the sea. The tree is quite hardy, and the seeds are eaten by the inhabitants of Orizaba.

No. 28. *PINUS CHIHUAHUANA*, *Wislizenus*, the Chihuahua Pine,

Leaves, in threes, very rarely in fours, finely toothed along the edges, from two to three inches long, glaucous on the upper part, and light green on the under one, very slightly striated and fringed on the edges, buds scaly, pointed, and closely in-laid. Sheaths, at first long, lacerated at the edges, but soon falling off, and leaving the base of the leaves naked. Cones, from one to one inch and a half long, and egg-shaped. Scales, transversely oval, and without any mucro.

This kind resembles *Pinus inops* in appearance, but is sufficiently distinct in its smooth cones. It is found common on the mountains of Chihuahua, in North Mexico, at an elevation of 7,000 feet above the sea, where it forms a tree from thirty to thirty-five feet high.

No. 29. *PINUS ENGELMANNI*, *Carriere*, Engelmann's Pine.
Syn. *Pinus macrophylla*, *Wislizenus*.

Leaves, in threes, but sometimes in fours, and very rarely in fives, from thirteen to fifteen inches long, clustered at the ends of the shoots, partially glaucous, keeled on all faces, and serrulated on the edges. Sheaths, at first long, scaly, jagged at the ends, and one inch long, but afterwards much lacerated and shorter. Cones, four inches long, and one inch and a half in diameter, near the base. Scales, conical, and terminating on the summit with a bent spiny mucro.

A fine tree, common on the higher mountains of Cosihuiriachi, in North Mexico, growing seventy or eighty feet high, very much resembling the Swamp Pine of the United States, but differs in having much smaller cones, and in the leaves being in three, four, and five in a sheath.

No. 30. PINUS FREMONTIANA, *Endlicher*, Colonel Fremont's
Nut Pine.

Syn. *Pinus monophylla*, *Torrey*.

„ „ *Llaveana*, with a thin-shelled seed, *Hartweg*.

Leaves, generally in threes, but not unfrequently in pairs, or singly, from one inch and a half to three inches in length, of a glaucous green, more or less curved, very stout, rigid, and ending in a spiny point. Sheaths, very short, and rolled backwards on the older leaves. Seed-leaves, from eight to ten, but mostly nine in number, rather long, and very stout. Branches, numerous, the principal ones round the stem in whorls. Bark, smooth, and of a light brown colour. Buds, small, cylindrical, and three-quarters of an inch long. Cones, of a light glossy brown colour, two inches and a half long, and one inch and three-quarters broad, in the widest part, which is near the middle; each cone contains from six to seven rows of scales. Scales, very thick, largest near the middle, bluntly pyramidal, slightly angular, and more or less recurved downwards, particularly the smaller ones nearest the base; they are also without any points. Seeds, wingless, oblong, or egg-shaped, half an inch long, bright yellow, more or less stained with dark brown, and the shells so thin, that it is very easily broken between the finger and thumb. Kernel, very pleasant in flavour, and also nutritious, as it constitutes the principal substance of the Indians who live in the mountains, where it grows for nine months out of the twelve. It was first discovered by Colonel Fremont during his exploring expedition when crossing the Sierra Nevada, or Great Californian Mountains, growing upon both sides, and extending over the top of the great snowy chain for a distance of 300 miles; the tree

seldom attains a height of more than twenty feet, or eight or ten inches in diameter, but is very branching, and has a peculiar but pleasant odour when bruised. It is perfectly hardy, for Colonel Fremont frequently found the thermometer at two degrees below zero at night, and four feet of snow, where it grew. The cones are produced in great abundance, and the seeds are gathered by the Indians for their principal winter and spring subsistence, either taken out and kept dry in their huts, or left in their natural storehouse, the cones in heaps under the trees, where they remain tolerably dry until wanted for use; the Indians are said to live upon them alone for months and months without any other kind of food.

Dr. Torrey first gave the name of *Pinus monophylla* to this pine, from a supposition that the leaves were mostly solitary; but Professor Endlicher, who afterwards examined more perfect specimens, found that the leaves were in twos and threes, and that the solitary leaves arose from Dr. Torrey's specimens being either gathered from young trees, or very stunted ones; he consequently altered Dr. Torrey's name of 'monophylla' to that of *Fremontiana*, in compliment to Colonel Fremont, its first discoverer.

It is the thin-shelled edible pine of the Californians, and is an article of commerce with the Indians, when in season, under the name of 'Nut Pine.' It is quite hardy, but a very slow-growing kind.

Mr. Jeffrey found it on Mount Jefferson, in Cascade Range, at an elevation of 6,500 feet, growing on a red sandstone soil, a tree twenty feet high, and ten inches in diameter.

No. 31. *PINUS GERARDIANA*, *Wallich*, Captain Gerard's Pine.

Syn. *Pinus Neoza*, *Govan*.

„ „ *Chilghosa*, *Elphinstone*.

„ „ *Aucklandii*, *Loddiges*.

Leaves, in threes, stiff, three-edged, stout, and bluntly terminating in a short point; from three to five inches long, of a bluish green colour, and glaucous when young. Sheaths, short

at first, and composed of dry, reddish-brown scales, but soon rolling up and falling off. Branches, ascending, lower ones spreading ; branchlets, short, rather slender and confused. Cones, ovate, oblong, or somewhat cylindrical ; widest at the base, from six to eight inches long, and from twelve to fourteen inches in circumference near the base, and of a bluish colour. Scales, thick, blunt, much recurved and spiny at the points. Seeds, nearly an inch long, cylindrical, almost wingless, pointed at both ends, of a dark brown colour, and agreeable to eat.

A tree growing fifty feet high, with a compact head, found in great abundance, forming large forests on the Northern side of the Snowy range of mountains in Kunawur, beyond the influence of the periodical rains, where it grows in very dry rocky ground ; and according to Major Madden, its manner of growth differs from that of any of the other Pines of India. Its trunk is of large girth, but scarcely exceeding fifty feet in height, furnished with numerous horizontal branches, nearly to the ground, the upper ones forming a large compact conical head. It is also found to the North of Cashmere, and on the Astor Mountains in Little Tibet. The mountains near Nijrow in the Kohistan of Cabul, are also covered with the Chilghosa Pine. Captain Gerard states its highest limits on the inner Himalayas to be from 10,000 to 12,000 feet of elevation. The exterior bark is of a silvery grey, falling off in large flakes, and never transforms itself into the rough outer coating like the other Pines. It is called 'Rhee' or 'Ree' in Kunawur, 'Shungtee' by the Thibetans, and 'Sonoubar Sukkar' (sweet Pine nut) by the Persians and Arabs. The Neoza Pine also affords abundance of fine turpentine, and the cones exude a copious white resin, and produce about 100 seeds each, which are sold in the Simla bazaars under the name of Neoza nuts, and in those of Affghanistan as Chilghoza nuts.

It is quite hardy, but very slow in growth.

No. 32. *PINUS INSIGNIS*, *Douglas*, the Remarkable Pine.

Syn. *Pinus Californica*, *Loisel*, not *Hartweg*.

- „ „ *adunca*, *Bosc*.
 „ „ *Monteragensis*, *Godefroy*.
 „ „ *Montereyensis*, *Rauch*.

Leaves, in threes, deep grass-green, rather slender, straight, or twisted in all directions, very densely set on the branches, of different lengths, from four to six inches long, ribbed on the inner sides, and sharp-pointed; sheaths very short, smooth, and rather more than a quarter of an inch long. Branches, numerous, rather irregular, and thickly set with slender branchlets at the extremities. Cones, ovate-conical, much pointed, most developed on the exposed side, particularly towards the base or outer part, three inches and a half long, and two inches and a half wide, mostly in clusters of from three to five round the stem or principal branches at the top of the tree, of a pale, yellowish-brown colour, very hard, and with a smooth, glossy surface; they point downwards, and remain for several years on the tree. Scales, radiately divided, thickest at the base, tapering into a four-sided, blunt pyramid, with a sunken scar in the centre, terminated by a very short prickle, largest on the exposed side, particularly towards the base, while those towards the points are very small and little elevated. Seeds, middle-sized, nearly black, and with an ample wing, more than an inch long. It takes two years to ripen.

This beautiful Pine is found in various parts of California, growing to the height of from 80 to 100 feet, and from two to four feet in diameter, feathered to the ground with branches.

It is found on the higher parts of the coast range of mountains, but not more than 200 or 300 feet above the level of the sea, particularly on 'Point Pinos,' near Monterey, where some of the trees become one-sided on account of the north-west winds blowing for a great part of the year upon them.

It is a very handsome kind, and quite hardy.

No. 33. *PINUS INSULARIS*, *Endlicher*, the Timor Pine.Syn. *Pinus Timoriensis*, *Loudon*.

Leaves, in threes, very slender, drooping, and from six to nine inches long ; sheaths, persistent, one inch long ; buds, scaly, non-resinous, and blunt-pointed. Cones, egg-shaped, tapering to the point, three inches long. Scales, pyramidal, angular, small, wart-shaped, and conical.

A tree of which little is known, found by Cumming in the Philippine Islands, and, according to Lambert, on the Island of Timor. It very much resembles *Pinus longifolia*, but differs in having much slenderer and darker green leaves, and very much smaller cones.

It is quite tender.

No. 34. *PINUS JEFFREYII*, *Hort*, Jeffrey's Pine.Syn. *Pinus Jeffreyana*, *Van Houtte*.

Leaves, in threes, pendulous at the ends, deep green, keeled on the inner face, rounded on the back, very acute-pointed, and from eight to nine inches long ; sheaths, persistent, one inch and a quarter long when young, but very much shorter, lacerated at the ends, and of an ashy-grey colour when old ; buds, short, stout, imbricated, and resinous. Branches, horizontal, a little declining, rather slender, and of a light, yellowish red colour. Cones, large, ovate-conical, tapering most to the point, eight inches long, and three inches and a half in diameter at the widest part, which is towards the base, and mostly produced in clusters round the branches. Scales, pyramidal, more or less projecting, one inch and a half broad on the larger ones, but much less on those towards the base and extremity, stoutly hooked towards the points, the hook being nine-tenths of an inch long, and slightly incurved on all the scales. Seeds, four-tenths of an inch long, dark brown, with a wing rather more than an inch long, beautifully striated with dark brown.

A noble tree, growing 150 feet high, and four feet in diameter, found by Jeffrey in the Shasta Valley in Northern California, growing on poor, sandy soil.

A very distinct Pine, and quite hardy.

No. 35. PINUS LLAVEANA, *Schiede*, Llave's Pine.

Syn. *Pinus osteosperma*, *Wislizenus*.

„ „ *cembroides*, *Zuccarini*.¹

Leaves, in threes, but often in twos, short, slightly twisted, sometimes incurved, rigid, narrow, bright, glaucous green, very dense, from two to two inches and a half long, ribbed on the inner side, terminated with a sharp point, and frequently intermixed with lance-shaped scales (abortive leaves), particularly on the smaller shoots near the base, and which are sometimes of a glaucous white colour, like those on the Stone Pine (*P. Pinca*); sheaths, very short on the young leaves, but soon rolling up or falling off on the adult ones. Branches, numerous, in regular whorls, smooth, of an ash-grey colour, and horizontal, with the points slightly elevated, and the branchlets spreading in all directions; buds, small, blunt-pointed, numerous, and thickly covered with brown scales, reflexed at the points, and slightly resinous. Cones, small, consisting of only three rows of scales, roundish, obtuse, wider than long, one inch and three-quarters wide, and one inch long, solitary, without any footstalk, and taking two years to ripen. Scales, thick, rounded at the margin, rhomboid, bluntly-pyramidal, hard, glossy, slightly angular, and more or less curved downwards, keel-shaped below, three-quarters of an inch broad, deeply concave on the inner side, and with two deep receptacles for the seed at the base. Seeds, very large, without wings, top-shaped, dark-brown, with a hard shell, six or seven lines long, and nearly four broad, very agreeable to eat, but thick shelled.

A low tree, with ample spreading branches, growing from fifteen to twenty feet high, and occasionally cultivated in gardens for the sake of its seeds, which the Mexicans call 'Pinones.'

It is found in Mexico, on the barren hills of Zimapan, Real del Oro, and Real del Monte, in forests at elevations of from 8,000 to 9,500 feet. Timber of little use.

No. 36. *PINUS LONGIFOLIA*, *Roxburgh*, the Long-leaved Pine.
Syn. *Pinus Serenagensis*, *Madden*.

Leaves, in threes, very slender, three-edged, of a bright, glossy green, finely serrated on the edges, and rather pendulous, or curved backwards on the young trees, from twelve to fourteen inches long, thickly set on the gross branches, particularly towards the ends and upper parts of the plant; sheaths, one inch and a quarter long, and permanent; male flowers produced in long, close clusters of many together at the ends of the branches, round at first, but elongated as they open and blossom in March. Cones, either singly or in clusters, varying from three to five in number, in regular whorls, five inches long, and two and a half or three inches in circumference near the base, more or less ovate, very smooth, glossy, and hard. Scales, much thickened at the ends, and with a large, thick, hooked beak, one inch and a quarter wide in [the larger ones, but more recurved and smaller towards the base, and full of resinous matter. Seeds, large, with rather a long, narrow wing one inch and a half long, and eaten by the hill people in India.

This Pine grows from 40 to 100 feet high, and abounds in all the lower and outer ranges of the Himalayas, from Bootan to Affghan. Dr. Griffith describes it as descending in Bhotan to the low elevation of 1,800 to 2,000 feet above the sea, while on ranges between the Jumna and Sutlej, it is abundant at 2,500 feet to 3,000 feet of elevation, and finally it becomes stunted, and disappears at Simla, at an elevation of 7,000 feet, but occurs in greatest perfection and abundance in Kamaoon and Gurhwal, north of the Pindur, from 2,500 to 7,000 feet of elevation, and which places seem little else than one great forest of the Cheer Pine. It has a rough bark, divided by deep fissures into large and longish plates, and the stems of the larger trees are about twelve feet in girth, with a clear stem forty or fifty feet from the ground, and with an exceedingly picturesque head, very irregular in outline; the branches are irregularly and thinly scattered along the stem. A large quantity of tar and turpentine is extracted from the wood in India; and Major Madden relates a curious phenomenon yet unaccounted for,

viz., in perhaps one half of the whole number of *P. longifolia* in Kamaoon, there consists a spiral arrangement of the bark and woody fibre, the coils being sometimes as much compressed and curled as those of an ordinary corkscrew; and in some instances the stem itself is contorted. The chips are used for candles in India, and are called 'Chamshing' (night-lights); and, according to Dr. Hooker, ink is made in Sikkim from the charcoal of the burnt leaves mixed with rice-water.

This is called 'Cheer' by the hill people in India; a word, according to some, meaning 'Bark,' or 'Rind,' so conspicuous on old trees; but, according to others, from its milk or turpentine, which it produces in great abundance. It is called 'Sulla' by the mountain people from Nepal to Busehur, a term denoting 'to spread fragrance,' which this tree does to a remarkable extent.

Timber excellent, and full of turpentine; but the trees are too tender for an ordinary English winter; some, however, are hardier than others, which, no doubt, arises from the locality and elevation where the seeds were gathered,—certainly not from any specific distinction.

No. 37. *PINUS MACROCARPA*, *Lindley*, Dr. Coulter's Pine.

Syn. *Pinus Coulteri*, *Don*.

„ „ *Sabiniana macrocarpa*, *Hort*.

„ „ *Sabina Coulteri*, *Loudon*.

Leaves, in threes, stout, and rather stiff, from ten to twelve inches long, and of a glaucous grey colour, ribbed on the inner side, rather flat, incurved, pointed, and compressed; sheaths, ragged, thready, persistent, one inch and a half long on the young leaves, but much shorter and torn on the old ones. Branches, stout, rather distant, but regularly placed in whorls on the stem, nearly horizontal, slightly elevated towards the extremities, and tinged with violet on the young shoots. Cones, conical-oblong, tapering to the point, solitary, very large, twelve to fourteen inches long, and six inches broad, very hard, smooth, pale yellow, with a polished surface, and frequently weighing

from three to four pounds each. Scales, wedge-shaped, with the points thickened and drawn out into a strong hook ; those nearest the apex shortest, incurved, and slightly bent, while those below the middle and at the base are elongated, deflexed, and point downwards, two inches long, and one inch and a half broad in the largest ones. Seeds, half an inch long, of a blackish colour, rather flattened, and much smaller than those of *P. Sabini*ana, with a broad wing more than an inch long.

A large tree, with spreading branches, growing from 80 to 100 feet high, and three or four feet in diameter, found on the mountains of Santa Lucia, near the Mission of San Antonia in California, within sight of the sea, at an elevation of from 3,000 to 4,000 feet. It is also plentiful in other parts of California, particularly on the 'Crusta,' an ascent from San Luis Obispo, on the brow of the mountain.

No. 38. *PINUS PARRYANA*, *Gordon*, Mr. Gambier Parry's Pine.

Leaves, in threes, rather slender, narrow, and wavy, from eight to nine inches long, rounded on the outer side, three-edged, and keeled on the inner faces, very acute-pointed, minutely serrated along the edges, and regularly tapering from the base to the point ; sheaths, rather short, scaly, and when old, very much wrinkled, jagged at the ends, and nearly black. Branches, rather long, horizontal, and much resembling those of *Pinus Benthamiana*, but slenderer. Cones, in clusters round the branches, a little declining, regularly conical, widest near the base, and tapering to the apex, six inches long, and two inches in diameter at the widest part, sessile, with a crowd of very small scales close to the base. Scales, rhomboid, numerous, glossy, hard, woody, and largest on the widest part of the cones, nearly one inch broad, and half an inch long, but much smaller at both extremities ; slightly elevated across the middle by a transverse, acute keel or ridge, highest in the centre, and terminated by a short, straight, sharp point of a dark brown colour. Seeds, below the middle size, almost round, with rather a narrow linear wing, rounded and bifid at the apex, of a greyish colour,

and not very membranaceous. The cones resemble those of the common Cluster Pine (*P. Pinaster*), and are very different from any other known Californian Pine, are of a bright, glossy, yellow colour, and entirely free from resinous matter.

A large tree, resembling *Pinus Benthamiana*, but with much narrower and slenderer leaves, and very different cones, found on the Sierra Nevada, in Upper California.

It is quite hardy.

No. 39. *PINUS PATULA*, *Schiede*, the Spreading-leaved Mexican Pine.

Leaves, in threes, but not unfrequently in fours and fives; very slender, soft, spreading, light green, and recurved, from seven to nine inches long, deeply channelled on the upper side, and convex beneath. Sheaths, on the young leaves scaly, one inch and a half long, but very much shorter, and rather jagged on the old ones. Branches, slender, smooth, numerous, but rather irregularly placed on the stem, with the ends rather pendulous, and covered with a smooth, greyish, lead-coloured bark. Cones, ovate, oblong, tapering to an obtuse point, four inches long, and one inch and three quarters broad, with a smooth polished surface, of a pale brown colour, mostly growing in clusters of from three to five in number round the stem and leading branches, slightly incurved, and pointing downwards. Scales, slightly elevated, particularly on the exposed side, widened at the point, much depressed, flattish, unequally four-sided, and with a small prickle in the centre when young. Seeds, small, with rather a broad wing, nearly an inch long.

A fine graceful tree, growing from sixty to eighty feet high, regularly furnished with spreading branches and drooping leaves, somewhat resembling a beautiful shining green fountain.

It is found plentiful in the colder regions of Mexico, particularly on the Real del Monte chain of mountains, at 'Guajalote,' and the 'Sumate,' on the highest peaks, at elevations of from 8,000 to 9,500 feet above the sea. There are the following varieties, viz. :—

PINUS PATULA STRICTA, *Bentham.*Syn. *Pinus patula erecta*, *Hort.*

This is a more slender tree, with shorter and stiffer foliage which does not droop, and only a little spreading, but with cones only half the size of those of the species.

It is found on the Real del Monte range of mountains in Mexico, a tree from fifty to sixty feet high.

PINUS PATULA MACROCARPA, *Schiede.*

Leaves, in threes, but frequently in fives, slender, and very like those of the species. Cones, very large, from six to seven inches long, and two inches broad; glossy, pale brown in colour, and with the scales less elevated, but more drawn to a flattened pyramid.

It is a much larger and taller tree than the species, growing upwards of 100 feet high, but at a much lower elevation than the species.

No. 40. PINUS PINCEANA, *Gordon*, Mr. Pince's Mexican Pine.

Leaves, in threes, but frequently in twos, very slender, three-edged, straight, and rather blunt-pointed; from three to four inches long, quite entire on the margins, and of a slightly glaucous green colour. Sheaths, scaly, and soon falling off. Branches, long, slender, flexible, and pendulous; branchlets, slender, long, and drooping. Cones, from three to three inches and a half long, and one inch and a half broad a little above the base, conical, blunt pointed, of a glossy brown colour, and on rather stout footstalks. Scales, irregularly shaped, somewhat four-sided, rounded on the upper margin, and largest one third from the base of the cone; those nearest the base being very much the smallest, more or less angular, and elevated, with the outer side keeled, and much the longest, while those along the middle of the cone are nearly flat or slightly elevated, with a sharp transverse ridge across the centre, terminated in the middle by a large oval projecting scar, a little hollow on the top, and when young furnished with a broad spine. Seeds, very large, wingless, and more than half an inch long.

A very handsome tree, growing sixty feet high, with long weeping branches like those of the Weeping Willow, and easily distinguished from all other Mexican Pines on that account.

It was first discovered in 1844 by M. Gheisbreght, near the Hacienda del Potrees, in the Ravine of Mestitlan, on the route from Mexico to Tampico, and is No. 34 of M. Gheisbreght's specimens. It was also found by Mr. Charles Ehrenberg (to whom I am indebted for my specimens, and account of the tree), upon a mountain along the road to the city of Mexico, at a place called Cuernavaca, at an elevation of from 8,000 to 9,000 feet. It has been named in compliment to Mr. Pinee, of Exeter.

No. 41. *PINUS PONDEROSA*, *Douglas*, the Heavy-wooded Pine.

Syn. *Pinus Craigiana*, *Hort.*

„ „ *Beardsleyi*, *Hort.*

Leaves, in threes, from eight to ten inches long, twisted, rather broad, and flexible, thickly set on the branches, and sharp-pointed. Sheaths, one inch long, smooth, but much shorter, and shrivelled on the old leaves. Branches, few, in regular whorls, robust, twisted, and rather drooping; buds, bluntly-domed, with a prominent point, and full of resin. Cones, straight, ovate, tapering to both ends, particularly towards the apex, three inches and a half long, and one inch and three quarters broad; in clusters round the branches, on very short stout footstalks, bent downwards. Scales, flattened, irregularly four-sided, one inch broad, with a raised centre, terminating in a conical recurved spine, slightly four-sided. Seeds, middle size, with a short broad wing three quarters of an inch long.

A tree of great size, growing upwards of 100 feet high, and four or five feet in diameter, with thirty or forty feet of the stem free from branches.

It is found abundantly on the North-west coast of America, and in California, particularly on the banks of the Flathead and Spoken Rivers, and the Kettle Falls of the Columbia, west of the Rocky Mountains, and in Rose River Valley in California, mostly growing in alluvial soils.

Timber, heavy and excellent.

It is quite hardy.

No. 42. PINUS RADIATA, *D. Don*, the Radiated Cone Pine.

Syn. *Pinus insignis macrocarpa*, *Hartweg*.

Leaves, in threes, very slender, twisted, deep green, thickly set on the branches, and from three and a half to four inches in length. Sheaths, short, smooth, a quarter of an inch long on the young leaves, but very much shorter on the older ones, and only partially persistent. Seed-leaves, on the young plants from seven to eight in number, rather long, and slender. Branches, compact, numerous, rather regular, and slender, particularly the lateral ones. Bark, light brown, and rather smooth. Buds, small, numerous, imbricated, and full of resinous matter. Cones, mostly single, but sometimes two or three together, rather conical, very hard, slightly incurved, pendulous, and of a glossy light brown colour; six inches long, three inches and a half broad near the base, which is uneven as well as the sides, the outer side being much the longest. Scales, radiant, largest at the external base and down three parts of the outer side of the cone, deeply divided, much elevated, and prolonged into a blunt-pointed nipple, half an inch in length, and three quarters of an inch broad; those scales nearest the base being bent backwards, the others more or less convex, widest at the base, bluntly conical, slightly angular, and terminated by a blunt point; the scales on the inner side of the cone, and for four or five rows round the point, very much smaller, quadrangular, and slightly elevated, with their points quite flat, or slightly depressed. Each cone contains from fourteen to sixteen rows of scales, within each of which are two small, nearly black seeds, with a very rough shell, and with wings one inch long, and three-eighths of an inch broad.

This beautiful pine resembles *Pinus insignis* in some respects, but differs very much in foliage and cones; the leaves of *P. insignis* are much longer and stouter than those of *P. radiata*, while the cones of *P. radiata* are nearly three times the size of those of *P. insignis*, and with the scales much more elevated. It was first discovered by the late Dr. Coulter in Upper California, in lat. 36°, near the level of the sea, and almost close to the beach, growing singly, and attaining the height of 100 feet, with

a straight stem feathered to the ground with branches. He says it affords excellent timber, which is very tough, and admirably adapted for boat building, for which purpose it is much used at Monterey. Mr. Hartweg met with it on the descent towards the sea on the mountains of San Antonio, sixty leagues south of Monterey, forming a small wood, extending along the beach, where the deep grass-green of its foliage formed a great contrast with the parched-up vegetation around it at the time.

It is hardy, and well adapted for planting near the sea coast.

No. 43. *PINUS RIGIDA*, *Miller*, the Stiff-leaved Pine.

Syn. *Pinus Tæda rigida*, *Aiton*.

„ „ *Fraseri*, *Loddiges*.

„ „ *Canadensis trifolia*, *Du Hamel*.

„ „ *Loddigesii*, *Loudon*.

Leaves, in threes, from three to four inches and a half long, stiff, rather broad, and sharp-pointed, light green, and spreading; sheaths, short, three-eighths of an inch long, and white on the young leaves, but afterwards becoming nearly black and shrivelled. Branches, very numerous on the upper part of the tree, and compact. Cones, ovate-oblong, from two and a half to three inches and a half long, and one inch and a half broad, on short, stout footstalks, in clusters of four or five round the top branches, and remaining on the tree for years. Scales, four-sided, half an inch broad, elevated into a compressed pyramid, terminating with an acute prickle, slightly recurved, and pointing outwards. Seeds, very small, with rather a narrow wing, three-quarters of an inch long.

A tree growing from seventy to eighty feet high, in favourable situations, with a clean stem and dense top, found abundantly throughout the whole of the United States, with the exception of the maritime parts of the Atlantic districts and the fertile regions west of the Alleghany Mountains. It is found on the plains from New England to Virginia, growing either in dry soil, or in wet, low grounds. Its most northern point is in the vicinity of Brunswick, in the district of Maine.

Timber exceedingly knotty, and full of resin, for which reason it is called in America the 'Pitch Pine.'

No. 44. PINUS SABINIANA, *Douglas*, Mr. Sabine's Pine.

Leaves, in threes, rather slender, from ten to twelve inches long, glaucous-grey in every stage, twisted, and, when fully grown, bent downwards, and drooping during winter, sharp-pointed, angular on the inner side, and rounded on the outer one; sheaths, one inch and a half long, nearly entire at the top, with numerous rings, and wrinkled when old. Branches, numerous, not very robust, covered with a violet bloom when young, and bare of leaves, except near the extremities. Cones, ovate, most developed on the outer side, particularly towards the base, pointing downwards, pressing against the stem, and remaining on the tree for a series of years, from eight to ten inches long, and six inches wide, on footstalks two inches and a half long, and full of resin, particularly towards the base. Scales, spatula-shaped, flat on the inner side, and rounded or slightly angular on the outer one, two inches and a half long, and one inch and a half broad on the larger ones, but much less on the smaller ones towards the base, terminated by a strong, sharp, incurved hook, particularly on the exposed side, and at the base, where some of the points are quite straight, and pointing upwards or towards the top of the tree. Seeds, one inch long, oblong, tapering to the base, and flattened on the inside, with a hard shell, and short, stiff wing, rather more than half an inch long, pleasant to eat, and nearly double the size of those of *P. macrocarpa*. Seed-leaves from eight to ten in number.

A beautiful large tree, regularly furnished with branches to the ground, growing from 100 to 150 feet high, and from two to five feet in diameter, on the western Cordilleras of New Albion, at a great elevation, also on the woody heights near Monterey, at El Toro, a high mountain to the east of Monterey, and in various other places in Upper California, but never in masses or forests, but intermixed with other kinds, ripening its seeds in November.

Timber, white, even-grained, but not very durable.

It was named in compliment to the late Joseph Sabine, Esq.

No. 45. PINUS SEROTINA, *Michaux*, the Fox-tail or Pond Pine.

Syn. *Pinus Tæda alopecuroides*, *Aiton*.

„ „ *rigida serotina*, *Loudon*.

„ „ *alopecuroides*, *Hort*.

Leaves, in threes, but sometimes in fours, from six to eight inches long, rather slender, sharp-pointed, and stiff, of a light, bright green, very dense, and ribbed on the inner side; sheaths, persistent, three-quarters of an inch long on the young leaves, smooth, jagged at the ends, and light-coloured, while those on the older leaves are much shorter, shrivelled, and dark-brown. Branches, numerous, rather irregular, and of a bright yellowish brown colour, frequently producing tufts of leaves, and bundles of small shoots from the main stem. Cones, ovate, with short footstalks, pointing downwards, two inches and a half long, and nearly two inches wide, mostly in opposite pairs, and ripening in the autumn of the second year, but do not shed their seeds before the third or fourth year; and on which account it is called *serotina*. Scales, rounded at their extremities, slightly elevated, four-sided, three-eighths of an inch broad, with the apex depressed, and terminating in a slender prickle, which soon disappears. Seeds, very small, with a wing three-quarters of an inch long.

A middle-sized tree, growing from forty to fifty feet high, and from fifteen to eighteen inches in diameter, on the edges of swamps and ponds, in black, miry soil, in Pennsylvania, Carolina, and New Jersey.

Timber of little use except for fuel.

No. 46. PINUS SINENSIS, *Lambert*, the Chinese Pine.

Syn. *Pinus Kasiya*, *Royle*.

„ „ *Cavendishiana*, *Paxton*.

„ „ *rubra*, *Siebold*.

Leaves, in threes, but sometimes in twos, very slender,

spreading, sharp-pointed, grass-green, five inches long, and angular on the inner sides ; sheaths, smooth, half an inch long, rather entire at the ends, and of a brownish colour. Branches, rather slender, irregularly placed on the tree, and spreading ; buds, blunt-pointed, with numerous fine scales, and entirely destitute of resin. Cones, small, ovate, blunt-pointed, two inches long, and one inch and a quarter broad, four or five in a whorl, on very short footstalks. Scales, rounded, flat, slightly elevated by a raised line, across the middle, terminated in the centre by a sunken scar, and with the scales much smaller towards the base. Seeds, rather small, with a straight wing half an inch long.

A low, branching tree, growing thirty or forty feet high, with a drooping appearance, found on the hills all over China, and in Japan. It is also found in Nepal, on the Khasiya hills, and on the mountains of Upper Assam, where it grows fifty or sixty feet high.

It is tender.

No. 47. PINUS TÆDA, *Linnaeus*, the Loblolly Pine.

Syn. *Pinus Virginiana tenuifolia*, *Pluknt.*

Leaves, in threes, rather slender, and light-green, from five to five inches and a half long, rigid, blunt-pointed, and channelled in the middle on the inner side ; sheaths, one inch long, nearly smooth, and whitish when young, but becoming much shorter and browner when old. Branches, spreading and dense ; buds pointed and very full of resin. Cones, mostly in pairs, ovate-oblong, tapering to a blunt point, three and a half to four inches long, and from one and three-quarters to two inches broad, with little or no footstalk. Scales, one inch and a quarter long, and three-quarters of an inch wide, lengthened into a low pyramid, terminated with a sharp prickle turned inwards. Seeds, small, with a longish wing, upwards of an inch in length.

A lofty tree, growing eighty feet high, with a clear stem fifty feet, and from two to three feet in diameter, with a wide-spreading head.

It is found abundantly in barren, sandy situations, from Florida to Virginia, in North Carolina, in large forests, sometimes 200 miles in extent, and in the vicinity of Charleston in South Carolina.

Timber of little use except for fuel.

It is quite hardy.

No. 48. PINUS TEOCOTE, *Schiede*, the Candle-wood Pine.

Leaves, in threes, from three to five inches long, compressed, erect, rigid, sharp-pointed, twisted at the base, light-green, channelled on the inner side, and convex below; sheaths, one inch long, persistent, jagged at the margin, but much shorter on the old leaves. Branches, rather stiff, and very leafy; buds, imbricated, and free from resin. Cones, ovate-oblong, tapering to a point, smooth, drooping, two inches and a half long, and one inch across, rounded at the base, and with rather a long footstalk. Scales, half an inch across, irregularly four-sided, slightly elevated, widened at the apex, and much depressed, but without any spine or point in the centre. Seeds, very small, with a wing rather more than half an inch long.

A tall tree, growing 100 feet high, and three or four feet in diameter, on the high lands of Mexico, particularly on the sloping sides of the mountains of Orizaba and Real del Monte. It is also plentiful on the mountains in the State of Oaxaca, at an elevation of from 5,500 to 8,000 feet above the sea.

It is the 'de'ocote' or 'Pino de'ocote' (candle wood) of the Mexicans.

Timber, durable and full of resin.

It is tolerably hardy.

No. 49. PINUS TUBERCULATA, *D. Don*, the Tuberculated Coned Pine.

Syn. *Pinus Californica*, *Hartweg*.

Leaves, in threes, thickly set on the branches, bright green, rather stiff, broad, and flat, with an elevated rib running along their middle on the inner side, four and a half to five inches in

length ; sheaths, short, smooth, and not more than half an inch long on the young leaves, but very much shorter on the older ones, and only partially persistent. Seed-leaves, on the young plants from seven to eight in number, rather slender, and not very long. Branches, not very stout, rather numerous, and irregular, with a roughish bark ; buds, below the middle size, imbricated, and not very resinous or pointed. Cones, mostly in clusters of four, but sometimes solitary or in pairs, and only produced on the main stems ; of a long, conical shape, five inches in length, and two broad, the outer surface curved, the inner straight, widest near the base, and gradually tapering to the point, quite sessile, and uneven-sided at the base, very hard, of a light-brown colour, or silvery-grey when old, very glossy, and full of resinous matter ; they stand off at nearly right angles when old, although rather pendulous when young, and remain on the trees for years, without even opening or shedding their seeds. Scales, largest and most developed at the external base, and down three parts of the outer side of the cone, deeply divided, much elevated, horizontal, and rather conical, particularly those near the base, the longest of which is three-eighths of an inch, terminated by a strong, sharp prickle ; but as they approach towards the point of the cone, they become much less elevated, more quadrangular, and blunter pointed : the scales on the inner side of the cone and round the point are very much smaller, and quite flat, with a small, dark-brown prickle in their centre ; each cone contains fifteen or sixteen rows of scales, within each of which are two very small seeds, with wings three-quarters of an inch in length.

This Pine was first discovered by Dr. Coulter, to the south of Monterey, near the level of the sea, and growing almost close to the beach, intermixed with *Pinus radiata*. Mr. Hartweg found it growing on the Santa Cruz Mountains, sixty miles to the north of Monterey by land. It is a tree of slow growth, and seldom attains more than thirty feet in height, with a trunk eight or ten inches in diameter. Mr. Jeffrey found it at an elevation of 5,000 feet, with the cones adhering to the tree ; in several instances with twenty whorls of cones on the trunk, the

growth of as many years,—the branches being covered with them in the same way as the trunk.

The timber is red and hard, and the tree of a conical form, growing about forty feet high, on poor, sandy soil.

It is quite hardy.

NEW OR DOUBTFUL KINDS, HAVING THE LEAVES THREE
IN A SHEATH, AND OF WHICH NOTHING MORE IS KNOWN.

No. 50. *PINUS ACULCENSIS*, *Roezl*, the Aculco Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in threes, five inches and a half long, of a lively glaucous green, stiff and tufted. Sheaths, three-quarters of an inch long, and silky. Cones, oval, slightly curved, three inches and a quarter long, and one inch and a quarter broad, resinous, and of a dark violet colour. Scales, irregularly-shaped, sometimes quadrangular, very elevated, and flattened on the apex; protuberance large at the base, and acute angled.

A very fine straight tree, with stout branches, found plentiful at Aculco, near San Rafael, in Mexico, growing 150 feet high, at an elevation of 13,000 feet.

Timber, excellent.

No. 51. *PINUS AMECAENSIS*, *Roezl*, the Ameca Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in threes, but sometimes in fours, on the same branch, slender, and five inches and a half long. Sheaths, nearly three-quarters of an inch long. Cones, three inches long, and one inch and a quarter in diameter, of a conical shape, and of a deep purple colour. Scales, rhomboid, small, transversely keeled, one inch broad, and three-quarters of an inch long; protuberance small, terminating in a sharp point.

A tall tree, growing 150 feet high, on the mountains of Ameca in Mexico, at an elevation of from 13,000 to 14,000 feet. (? *Pinus Hartwegii*.)

No. 52. *PINUS BESSERERIANA*, *Roezl*, Besserer's Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in threes, stiff, flattened on the inner side, and nearly six inches long. Sheaths, half an inch long. Cones, almost straight, on tolerably long footstalks, rather more than two inches long, and one inch broad. Scales, heart-shaped, three-lobed at the apex, transversely keeled, and with a large, elevated protuberance.

A large tree, growing 150 feet high, with long flexible spreading branches, found on Mount Ajusco and Las Cruces in Mexico, at an elevation of 10,000 or 11,000 feet. (? *Pinus Teocote*.)

No. 53. *PINUS IZTACIHUATLI*, *Roezl*, the Iztacihuatl Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in threes, bright glaucous green, stiff, tufted, and nearly six inches long. Sheaths, three-quarters of an inch long. Cones, nearly four inches long, and one inch and a quarter broad, violet coloured, conical, and full of resinous matter. Scales, almost quadrangular; protuberance very elevated.

A tall straight tree, with stout branches, growing 140 feet high, on the Mountains of Iztacihuatl in Mexico, at an elevation of 13,000 to 14,000 feet.

Timber, excellent.

No. 54. *PINUS MICROCARPA*, *Roezl*, the small-coned Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in threes, broad, almost flat, and seven inches long. Sheaths, three-quarters of an inch long, and silky. Cones, from one inch and a half to one and three-quarters long, and one inch broad. Scales, rhomboid, rounded, and rising to the apex; protuberance broad, and but little elevated.

A splendid tree, growing from 130 to 150 feet high, easily distinguished from all others by its very small cones, and found growing in the environs of Morelia in Mexico. (? *Pinus Teocote*.)

No. 55. *PINUS MULLERIANA*, *Roezl*, Muller's Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in threes, stout, stiff, sharp-pointed, and five inches long. Sheaths, four lines long, and silky. Cones, three inches long, one inch and a half in diameter, and of a conical shape. Scales, rhomboid, flat, and of a yellowish-grey colour; protuberance, deeper in colour, and little elevated.

A tree, growing from 80 to 100 feet high, found growing about Real del Monte at an elevation of 8,000 or 8,500 feet.

No. 56. *PINUS SCOPARIA*, *Roezl*, the Broom-like Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in threes, but frequently in fours on the same branch; bright green, sometimes glaucous, tufted, stiff, and four inches long. Sheaths, six lines long, and silky. Cones, ovate, three inches long, and one inch and a quarter in diameter, very resinous, and of a violet colour, or almost black. Scales, large, very irregular in shape, depressed at the base, half an inch broad, and a quarter of an inch long; protuberance small, and terminating in a bent mucro.

A large straight tree, growing 150 feet high, found at Popocatepetl in Mexico, at an elevation of 13,000 to 14,000 feet.

Timber, excellent. (? *Pinus Hartwegii*.)

No. 57. *PINUS VILMORINIANA*, *Roezl*, Vilmorin's Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in threes, stiff, flattened on the inner side, and five inches long. Sheaths, from three to four lines long. Cones, slightly bent, nearly two inches long, and one inch broad. Scales, comparatively large, and rounded on the apex; protuberance large, and of an ashy-grey colour.

A noble tree, growing from 130 to 160 feet high, with long flexible branches, regularly jointed, and with a majestic appearance, found between Mount Ajusco and Las Cruces in Mexico, at an elevation of 10,000 or 11,000 feet. (? *Pinus Teocote*.)

Section III. QUINÆ, OR THOSE KINDS HAVING FIVE LEAVES
IN EACH SHEATH.

No. 58. PINUS APULCENSIS, *Lindley*, the Apulco Pine. .
Syn. Pinus Acapulcensis, *Don*.

Leaves, in fives, rather short, slender, blunt-pointed, six inches long, much undulated, and of a deep glaucous green. Sheaths, rather long, and imbricated. Branches, rather robust, irregular, few, ascending at the points, and of a glaucous violet colour on the young shoots. Cones, ovate-conical, widest at the base, four inches long, and two inches and a half wide near the base ; pendulous, and growing in whorls ; surface very hard, and full of resinous matter. Scales, very rugged, unequally four-sided, pyramidal, straight, or sometimes prolonged into a curved beak, particularly those nearest the base ; the larger ones measuring three-quarters of an inch across. Seeds, rather small, with an oval-shaped wing one inch long.

A tree attaining a height of fifty feet, and inhabiting the ravines in the mountains near Apulco in Mexico, where it was first discovered by Mr. Hartweg in 1839.

It is rather tender.

No. 59. PINUS AYACAHUITE, *Ehrenberg*, the Ayacahuite Pine.

Leaves, in fives, three-edged, slender, but rather stiff, flat on the back, with a sharp projecting mid-rib and two furrows on the inner face ; from three to four inches long, straight, very glaucous on both sides, and whitish when young, with a few wide serratures near the points. Sheaths, short, scaly, membranaceous, and soon curling up and falling off. Branches, rather slender, regularly in whorls, spreading, numerous, and covered with a glossy smooth greyish bark. Cones, very long and slender, being from ten to twelve inches in length, and three inches broad at the base, and tapering regularly to a sharp point, which is slightly incurved towards the upper part, full of resinous matter, and pendant from the extremities of the

top branchlets. Scales, projecting at the points, bent downwards, and recurved at the points, two inches long, and diminishing to a point at the apex; standing free, thin, wrinkled lengthways, and of a pale yellowish-brown colour. Seeds with a broad wing one inch long.

A large tree, growing 100 feet high, and three or four feet in diameter, with very much the appearance of the Weymouth Pine (*P. Strobus*), found in the provinces of Chiapa and Oaxaca in Mexico, particularly on the higher points of the Combre Mountains in the Sierra of Oaxaca, and on the Mount Pelado or bald-mountain. It is also very common on the mountains of Quezaltenango, at an elevation of 8,500 feet, and on the neighbouring mountain of Santa Maria, where it is called 'Tablas' by the inhabitants, and 'Ayacahuite' by the Mexicans.

Timber, white and soft.

It is tolerably hardy.

No. 60. *PINUS BALFOURIANA*, *Jeffrey*, Dr. Balfour's Pine.

Leaves, in fives, but sometimes in threes, fours, and fives in a sheath on the same shoot, very dense, short, stout, glaucous below, and rigid; curved inwards, blunt-pointed, quite entire, convex on the back, concave on the inner face, resinous, and from one to one inch and a quarter long, on the adult plants. Sheaths, composed of numerous long jagged scales, which soon fall off, and leave the base of the leaves naked. Branches, pendulous, and flexible; bark, smooth, and of a reddish colour. Cones, dark brown, from four and a half to five inches long, and rather more than an inch in diameter, tapering regularly towards the point, slightly curved, mostly solitary, pendant on the points of the branches, and full of resinous matter. Scales, from one and a half to one and three-quarters of an inch long; the larger ones six lines broad, thin, flattened, slightly thickened towards the ends, four-sided, and concave; smallest near the base, sometimes partially sunken in the centre, and terminated by a dark brown umbo or scar. Seeds, middle-sized, beautifully dotted, and with an ample wing one inch long.

A fine tree, growing eighty feet high, and three feet in diameter, with an ample head, found by Mr. Jeffrey on the Mountains in Northern California, between Shasta and Scots Valley, at an elevation of from 5,000 to 8,000 feet, growing on volcanic debris.

It is quite hardy, and very distinct.

No. 61. *PINUS BUONAPARTEA*, *Roezl*, the Buonaparte Pine.

Syn. *Pinus Veitchi*, *Roezl*.

„ „ *Durangensis*, *Roezl*.

„ „ *hamata*, *Roezl*.

Leaves, in fives, but sometimes six, seven, eight, and nine are found in the same sheath; of a glaucous green colour, angular on the inner face, very slender, and five inches long. Sheaths, composed of long linear-pointed scales, which soon curl up and fall off. Branches, curved, lateral ones more or less pendant, on account of the large cones being produced on their extremities. Cones, straight, nearly cylindrical, ten or twelve inches long, and three or four inches in diameter. Scales, from one inch and three-quarters to two inches broad, and rather more than half an inch long on the exposed part; reflected, and strongly hooked backwards at the ends, thickest in the centre, with several elevated lines on the surface, and tapering to the point, which is much reflected, and half an inch long. Seeds, large, with a broad wing one inch long.

A noble tree, growing 130 feet high, with a straight trunk, furnished with long slender branches, in regular whorls, and pendant branchlets, two or three feet long, which gives the tree a most perfect and elegant appearance.

It is found growing in the department of Durango, on the Sierra Madre, a chain of mountains situated between the Table Land and Gulf of Mexico, where it is known by the name of 'Pino Real,' or Royal Pine, a name due to its great size and majestic appearance. It is also found on the eastern side of Popocatepetl, at an elevation of from 11,000 to 12,000 feet, and like *Pinus Lambertiana*, it produces a resinous substance, which

when dried and pounded becomes a kind of ash-coloured powder, very sweet, and eaten by the inhabitants instead of sugar.

It will no doubt be quite hardy.

No. 62. PINUS CEMBRA, *Linn.*, the Swiss Stone Pine.

Syn. *Pinus Cembra Helvetica*, *Loddiges*.

„ „ „ *vulgaris*, *Endlicher*.

„ „ „ *stricta*, *Hort*.

„ „ *Montana*, *Lamarck*.

„ „ *sativa*, *Amann*.

„ „ *sylvestris Cembra*, *Matthiola*.

„ „ „ *altera*, *Dodon*.

Leaves, in fives, from two to three inches long, sharp-pointed, three-ribbed, one of them green and shining, and the other two white and opaque. Sheaths, deciduous. Buds, broad, globose, with a long narrow point, whitish, without resin, and mostly solitary at the end of the shoots. Cones, about three inches long, and two inches and a half broad, ovate, erect, and of a violet colour. Scales, one inch broad, and the same in the widest part, slightly hooked, and not thickened at the point, but blunt; those nearest the base much smaller and recurved. Seeds, very large, wingless, and eaten in Switzerland.

An erect tree, of a bluntish pyramidal shape, regularly furnished with branches down to the ground, thickly clothed with foliage, and attaining a height of fifty feet. Timber very soft, but very fine in the grain; fragrant and resinous.

This tree is found in the highest regions of the Alps, from the Tyrol to Mount Cenis, between 4,000 and 6,500 feet of elevation. It is also found on the northern slope of the Alps, from Austria to Savoy, and Dauphine, and occurs on the Carpathian Mountains, and on the Altai. The varieties are from Eastern Siberia.

PINUS CEMBRA SIBIRICA, *Loudon*, the Siberian Stone Pine.

Syn. *Pinus Cembra Rossica*, *Hort.*

Leaves, in fives, much shorter, more dense and brighter green. Cones, longer, but not so broad as those of the Swiss variety, and of much slower growth ; but, according to Pallas, it is a lofty tree, destitute of branches a considerable way up the trunk, and sometimes attains a height of 100 feet, but is never found beyond the river Lena in Eastern Siberia.

Seeds, large, and eatable in Siberia.

PINUS CEMBRA PYGMÆA, *Fischer*, the Dwarf Cembra Pine.

Syn. *Pinus Peuce*, *Grisebach*.

„ „ *Cembra pumila*, *Endlicher*.

„ „ „ *fruticosa*, *Grisebach*.

„ „ *pygmæa*, *Fischer*.

„ „ *Cembra nana*, *Hort.*

„ „ „ *humistrata*, *Mudden*.

A very dwarf variety, seldom growing more than two or three feet high, with a scrubby appearance, and at times assuming a creeping form on the ground, with the leaves very much shorter and more crowded. Cones, extremely small, nearly round, and bright purple when full grown. Scales, very small, thin, rather recurved and pointed. Seeds, wingless, and very small of their kind. It is found in Eastern Siberia, covering rocks where no other vegetation grows, and in valleys, where it grows much stronger, but never attains the size of a small tree. It is said to grow also on the mountains of Rumelia in European Turkey ; and on the eastern slope of the Ural, towards the Lena, where it is called the elastic Stone Pine, or spreading Cedar of Eastern Siberia, and has several stems, sometimes twelve feet high, and three inches in diameter ; erect in summer, but completely prostrated by the snow in winter. The cones are but half the size of those of the Swiss kind, but the nuts are equally good-flavoured.

No. 63. *PINUS CORNEA*, *Roetzl*, the Horn-shaped Coned Pine.

Leaves, in fives, rather long, and slender. Cones, somewhat like those of *Pinus Pseudo-Strobus*, long, recurved, tapering from the base to a small point, quite firm, and resembling a small cow's-horn. It is found on the Popocatepetl, in Mexico, at an elevation of from 10,000 to 11,000 feet.

It appears to be quite new, and distinct.

No. 64. *PINUS DEVONIANA*, *Lindley*, the Duke of Devonshire's Pine.

Syn. *Pinus Blanco*, *Knight*.

Leaves, in fives, very long, but rather slender and pendulous, of a beautiful deep shining grass-green, from eight to nine inches long, and rather sharp-pointed. Sheaths, very long, rough at the end, imbricated, and one inch long. Branches, very robust, few, and very irregular, and like those of the Swarp Pine of the United States (*P. palustris*). Cones, from nine to ten inches long, and three inches in diameter near the base, tapering to a blunt point, three quarters of an inch wide, solitary, pendulous, curved, blunt-pointed, and not very firm or hard on the surface. Scales, rather thin, one inch broad, but smaller towards both ends, rounded at the top, and irregularly four-sided, with a slightly elevated transverse line and projecting point in the centre, which is depressed and smooth. Seeds, rather small, with the wing nearly one inch and a half long.

A large tree, growing from sixty to eighty feet high in the mining districts of Mexico, on the mountains of Ocotillo, between Real del Monte and Regla, and on the 'Cumbra,' or highest point of the mountains. It is called by the inhabitants 'Pino Blanco,' or the White Pine, on account of its timber being that colour, and 'Pino-real,' or Royal Pine, from its noble appearance and splendid long foliage.

Mr. Hartweg first discovered it in Mexico in 1839.

It is tolerably hardy.

No. 65. PINUS EXCELSA, *Wallich*, the Lofty Bhotan Pine.

Syn. Pinus *Dicksonii*, *Hort.*

„ „ *Chylla*, *Loddiges.*

„ „ *pendula*, *Griffith.*

„ „ *Strobis excelsa*, *Loudon.*

„ „ „ *Nepalensis*, *Hort.*

„ „ *Strobis*, *Hamilton.*

Leaves, in fives, very long, three-edged, very glaucous on the inner faces, bluish green, and rounded on the outer one ; from six to eight inches long, very slender, and mostly drooping. Sheaths, short at first, but soon rolling up, and finally falling off. Branches, in regular whorls and spreading, those near the bottom reflected, while the upper ones are more or less ascending ; branchlets, slender, long, and spreading ; male flowers, in dense clusters. Cones, solitary, or sometimes two or three together round the leading shoots, of a cylindrical or somewhat conical shape, from six to nine inches long, and two inches broad near the base, tapering towards the point, and with a footstalk nearly one inch long ; when young of a pea-green colour, and somewhat erect, but when fully grown completely pendulous, and of a pale brown colour, full of resinous matter in the shape of transparent drops. Scales, thickened at the ends, but without any extended or curled points, loosely imbricated, oval, blunt-pointed, thin, smooth, and nearly all of a size, being one inch and a quarter long, and about one inch in breadth. Seeds, rather small, with a wing one inch and a quarter long.

A large tree, principally found in Nepal, where it prefers the more open and cheerful aspects of the mountains. In Bhotan it forms large and beautiful woods on the southern slopes, at an elevation of from 6,000 to 10,000 feet, but stunted at the last elevation. It is not found in Sikkim, but is common at Simla on warm aspects, and is found in abundance all over the interior from 6,000 to 8,000 feet of elevation, and as high as 11,500 feet in Kamaoon, occurring above the Deodar. In Nepal it attains an immense height, some trees being 150 feet high near

the Shatool Pass, and below Chansoo, in Kunawur, with long horizontal branches, for the most part clothed to near the ground, but inclining upwards so as to form a spreading cone, rather than a large spreading head.

This is the 'Kail,' or 'Kael' (sort of Pine), of the hill people about Simla, the 'Leem,' of Kunawur, and the 'Yari,' of Cashmere; also the Weeping Fir of the Himalayan travellers, and the Chylla or Cheel of Kamaoon and Gurhwal.

Timber, soft, white, and remarkably compact, producing in great abundance a highly fragrant resinous turpentine.

Dr. Wallich and some other travellers mention what they consider varieties of this pine, some with shorter, others with greener leaves, and others with stiffer foliage, but all such varieties no doubt arise from climate and elevation.

It is quite hardy.

No. 66. *PINUS FILIFOLIA*, *Lindlen.* the Thread-leaved Pine.

Syn. *PINUS SKINNERII*, *Forbes.*

„ „ *Jostii*, *Roezl.*

Leaves, in fives, from twelve to fourteen inches long, acutely triangular, of a dull green colour, rather stout, and curved outwards, particularly the older leaves. Sheaths, long, smooth, and persistent, or not falling off. Branches, few, irregular, and very robust, resembling those of the Swamp Pine of America, and densely clothed with its beautiful long leaves. Cones, elongated, or conical, tapering from the base to a blunt point, seven or eight inches long, with a smooth and rather hard surface. Scales, one inch across, rather equally four-sided, depressed, and pyramidal in the centre, terminated by a hard blunt point. Seeds, middle sized, with the wing one inch and a quarter long.

A very handsome tree, growing from forty to sixty feet high, abundantly in Guatemala, particularly near Santiago, and on the 'Volcan del Fuego,' in exposed places, and on the mountains near Guatemala (City).

It is very tender, and produces a light white timber of little value.

No. 67. *PINUS FLEXILIS*, *Torrey*, the Contorted-branched Pine.

Leaves, in fives, but sometimes in twos, threes, fours, and fives, on the same branch; short, stout, rigid, curved, blunt-pointed, quite entire, stoutly keeled on the inner face, rounded on the outer, and from two to three inches long on the adult plants. Sheaths, composed of numerous, long, membranaceous, loose scales, which soon fall off and leave the base of the leaves naked. Branches, horizontal, very stout, and much contorted. Cones, ovate, rounded at the base, two inches and three quarters long, and nearly two inches in diameter at the widest part, and full of resinous matter. Scales, projecting into a thickened pyramidal elevation, transversely keeled, and terminating in a short, broad, incurved scar. Seeds, large, oval, and wingless.

A small tree, growing from thirty to forty feet high in Northern Mexico and California.

Mr. Jeffrey found it on the summit of a mountain near Fort Hope, on Fraser's River, and on the Shasta Mountains, growing on granite rock, where the soil is scant. It is most abundant at an elevation of from 8,000 to 9,000 feet, but ascends to 14,000 feet; at its lowest elevation, when first it makes its appearance on the mountains, it is a small tree forty feet high and one foot in diameter, with a wide spreading top, the branches being very stout, and much contorted, but dwindling down to a small shrub, on the upper part of the range not more than three feet high, of a tabular form, and so compact that a person could walk along the top of it.

No. 68. *PINUS GORDONIANA*, *Hartweg*, Gordon's Mexican Pine.

Leaves, in fives, sixteen inches long, rather slender, three-edged, very dense, light green, and longer than any of the other kinds. Sheaths, persistent, or not shedding, about one inch and a quarter in length, rather rough, and scaly. Seed-leaves, on the young plants mostly seven in number, and rather short. Branches, rather numerous, at regular distances, slightly elevated at the points, and not very robust; buds, very scaly, non-resinous, and of a moderate size; male flowers, rather large,

oblong, in dense clusters, and very numerous. Cones, pendulous, mostly solitary, slightly curved, and tapering regularly from near the base to the point, from four to five inches long, and one inch and a half broad near the base, with fourteen or fifteen rows of scales. Scales, half an inch broad, slightly elevated, particularly those about the middle and towards the point, while those next the base are nearly flat, and much smaller. The cones are quite destitute of resin, and on footstalks about half an inch long. Seeds, small, angular, with narrow wings about one inch and a quarter in length.

This handsome tree grows from sixty to eighty feet high, and has the longest and finest foliage of any kind yet known. It was first discovered by Mr. Hartweg on the Cerro de San Juan, or Saddle Mountain, near Tepic, in Mexico, where the inhabitants call it 'Ocote Hembra,' or Female Pine, on account of the numerous cones which it produces.

It is very tender in England.

No. 69. *PINUS GRENVILLEÆ*, *Gordon*, Lady Grenville's Pine.

Leaves, in fives, fourteen inches in length on the wild specimens, very robust, three-edged, thickly set on the branches, dark green, and very much resembling those of *Pinus macrophylla*, but rather longer; sheaths, persistent, or not falling off, nearly one inch and a half in length, rather rough, and scaly. Seed-leaves, on the young plants mostly ten in number, and rather long. Branches, mostly solitary, rarely in pairs, irregularly placed, and very robust; buds, very large, imbricated, non-resinous, and thickly set with long narrow brown scales. Cones, pendulous, solitary, stalkless, quite straight, tapering regularly from the base to the point, sixteen inches in length, and three inches and a half broad at the base, with from twenty-eight to thirty rows of scales. Scales, nearly all of a size, six-eighths of an inch broad, slightly elevated, and blunt, particularly towards the base, from which a small portion of clear resin sometimes exudes. Seeds, about the ordinary size, with mostly, but not always, bifid wings, which are rather broad, and more than an inch in length.

This noble pine is called 'Ocote Mache,' or Male Pine, by the inhabitants, on account of its robust habit, and is found plentiful on the highest parts of the Cerro de San Juan, a range of mountains to the South-west of Tepic, chiefly composed of crumbled pumice-stone, of volcanic origin, and which at a distance gives the place a whitish appearance.

Mr. Hartweg found it growing on the Cerro de San Juan, or Saddle Mountain, near Tepic, in Mexico, attaining a height of from sixty to eighty feet. The timber is white, soft, and not very durable.

It has been named in compliment to that excellent patron of Conifers, Lady Grenville, of Dropmore.

It is tender.

No. 70. PINUS HARTWEGII, *Lindley*, Hartweg's Pine.

Syn. *Pinus Papeleui*, *Roehl.*

„ „ *resinosa*, *Roehl.*

„ „ *Standishi*, *Roehl.*

Leaves, in fives, but frequently in fours, very dense, six inches long, rather slender, curved, and of a dark green colour. Sheaths, long on the young leaves, but with a shrivelled appearance on the old ones, and jagged at the ends. Branches, few, very robust, and irregularly placed on the stem. Cones, growing in clusters, pendulous, four or five inches long, and nearly two inches broad; oblong, tapering to the point, which is rather blunt, incurved, and of a dark brown colour. Scales, flattened, broader than long, four-sided, rather thin, with a projecting or elevated short point in the centre, but much smaller towards the extremities; narrower, and more elevated near the apex. Seeds, middle size, with a very short wing, not more than three-quarters of an inch long.

A handsome tree, growing from forty to fifty feet high, with a dense compact head, of a fine dark green, found by Mr. Hartweg on the Campanario Mountain, in Mexico, at an elevation of 9,000 feet, and beginning to appear where the Oyamel (*Picea religiosa*) ceases to grow, on the mountain. It is also found on

the mountains of Orizaba, and near Real del Monte, at an elevation of 10,000 feet, and 100 feet high.

The timber is excellent, and very durable, containing a large quantity of resinous matter, and of a reddish colour.

It is tolerably hardy.

No. 71. *PINUS KORAIENSIS*, *Siebold*, the Corean Pine.

Syn. *Pinus Strobilus*, *Thunberg*, not *Linnaeus*.

Leaves, in fives, from three to four inches long, slender, thread-shaped, glaucous, pointed, but not very acute, flat on the back, but stoutly angled or keeled on the inner part, and three-edged; sheaths, composed of long, transparent, very entire scales, which soon fall off, and leave the base of the leaves naked and jutting out. Buds, linear, oblong, and composed of eight or ten scales, of which the outer ones near the base are shortest and obtuse; those of the inner and uppermost ones, longer, linear, loosely spreading, membranaceous, entire, and dropping off before the leaves are fully grown. Branches, spread out, horizontal, rounded and covered with a smooth, ashy-brown-coloured bark; lateral ones slender, short, and when young, quite downy, and covered thickly with bright glaucous leaves, which remain on the branches for three years. Cones, straight, almost sessile, ovate-cylindrical, obtuse at the end, and swelling in the middle; scales, numerous, wedge-shaped at the base, rhomboid, reflected on the apex, leathery, smooth, woody, wrinkled lengthways, and yellowish-brown in colour, with the edges wavy and incurved. Seeds, thick, obovate, a little flattened and somewhat angular; shell hard, smooth, and of a greyish-brown colour. Seed-leaves, from eleven to thirteen in number.

A tree growing from thirty to forty feet high, rarely found wild in China or Japan, but much cultivated in gardens, where it rarely exceeds twelve or fourteen feet in height. It is found growing along the sea-coast on the peninsula of Corea, and about the bay of St. Peter and St. Paul in the Island of Koraginsk, where the seeds are eaten by the people along the coast.

The Japanese call it 'Wumi-matsu' (Sea-Coast Pine), and the Chinese name it 'Hai-sung-tse,' which also means Maritime Pine.

It is quite hardy.

No. 72. PINUS LAMBERTIANA, *Douglas*, Lambert's Pine.

Leaves, in fives, four inches and a half long, rather stiff, of a dull, but not shining green colour, rather rough at the edges, and slightly glaucous when young. Sheaths, very short, or nearly wanting in the old leaves. Branches, in whorls, numerous, and rather pendulous towards the extremities, and densely clothed with foliage. Cones, very large, from twelve to sixteen inches long, and four inches in diameter; deep brown, cylindrical, tapering to the point, mostly straight, and destitute of resinous matter; pendulous when full grown, although nearly erect when young. Scales, roundish on the upper part, rather flat, neither elevated nor projecting, and only loosely pressed on each other, nearly one inch and a half broad in the larger ones, which is near the middle of the cone, but much smaller in those near the extremities; those near the base being rather open, incurved, and more pointed. Seeds, large, oval, seven-eighths of an inch long, and with the wing one inch and three-quarters long, and dark brown; they require two years to ripen, are very pleasant to taste, and are used for food by the Indians, as well as the resin, which is freely produced by the tree when wounded; roasted as a substitute for sugar.

A gigantic tree, growing from 150 to 200 feet high, and from twenty to sixty feet in girth near the ground, with a straight stem 100 feet clear of branches, and an open pyramidal head.

It is found extending over a large tract of country, but intermixed with other Firs, in the northern parts of California, and in North-west America, at a distance of 100 miles from the sea, attaining its greatest diameter when growing in pure sand.

Timber, white and soft.

It is quite hardy.

No. 73. *PINUS LEIOPHYLLA*, *Schiede*, the Smooth-leaved Mexican Pine.

Leaves, in fives, very slender, partially three-sided, sharp-pointed, smooth, and drooping, of a pale glaucous green; from four to five inches long, closely set on the ends of the branches, and frequently growing from the stem and older branches in tufts. Sheaths, short, shrivelled, and almost disappearing on the older leaves. Branches, numerous, slender, and pendulous towards the extremities; buds, imbricated, and non-resinous. Cones, small, ovate-pointed, two inches and a half long, and one inch and a quarter broad near the base; pendulous, flattened or depressed at the base, and on short thick footstalks. Scales, rather flattened, half an inch across, slightly depressed, but with a projecting sharp point in the middle, unequally four-sided, and of a dark colour. Seeds, small and black, with a wing nearly three-quarters of an inch long, and rather broad.

A large tree, with an open but regular conical head, well clothed with its vertical branches and drooping foliage, attaining a height of from 60 to 100 feet.

It is found in many parts of the colder regions of Mexico, on the mountains of Anganguero, at an elevation of 7,000 feet, where it is called 'Ocote Chino,' from its abundance of resin, and on account of its being used for candles. The 'Ocote Chino,' or Candle-wood, is also found on the mountains, in the State of Oaxaca, attaining an immense size.

It produces a valuable timber, but so hard as to resist the plane.

It is rather tender.

No. 74. *PINUS LINDBLEYANA*, *Gordon*, Dr. Lindley's Pine.

Syn. *PINUS Montezumæ Lindleyi*, *Loudon*.

„ „ *rudis*, *Endlicher*.

Leaves, in fives, very robust, and sharp-pointed, nine inches long, three-edged on the inner face, and rounded on the back; of a deep green, a little glaucous when young, and very thickly placed on the young shoots, older ones spreading or pendant,

younger ones ascending. Sheaths, more than an inch long on the young leaves, scaly, and a little wrinkled and jagged at the ends; older ones much torn, very short, rough, and loose. Branches, very robust, curved upwards at the ends, and numerous; lateral ones, stout, short, and twisted. Buds, large, rather obtuse, and covered with close, light brown, non-resinous scales. Cones, from six to seven inches long, and two inches in diameter near the base, regularly conical, a little curved and tapering to a regular point. Scales, numerous, small, three-quarters of an inch across, regularly rhomboid, nearly flat, or slightly tuberculated on the top, or with a slightly-elevated transverse ridge across the centre, a little sunken in the middle, and furnished with a stout blunt prickle in the centre, of a dark brown colour. Seeds, small, with rather a long narrow wing.

A tree, growing fifty feet high, with a bushy appearance, found near the 'Sumate' on the Mountains of Mexico, and very distinct from *Pinus Montezumæ*,

It is quite hardy.

No. 75. *PINUS LOUDONIANA*, *Gordon*, Mr. Loudon's Pine.

Syn. *Pinus Ayacahuite macrocarpa*, *Hartweg*.

„ „ „ *colorada*, *Ehrenberg*.

„ „ sp. like *Ayacahuite*, *Loudon*.

„ „ *Popocatepetli*, *Roetzl*.

„ „ *Don Pedri*, *Roetzl*.

Leaves, in fives, and like those of *Pinus Ayacahuite*, very glaucous, but much stouter, from five to six inches long, and angular on the inner face. Sheaths, composed of very long, linear, acute-pointed scales, which soon curl up and fall off. Branches, in whorls, slender and horizontal, lateral ones long, very slender, little divided and drooping. Cones, quite straight, and tapering to the point, from twelve to fourteen inches long, and from three to four inches in diameter a little above the base. Scales, from one inch and three-quarters to two inches broad, and one inch long in the exposed part; slightly curved at the points in the upper ones, but much more so on those near the

base of the cone, where they are sometimes quite reflected, and much narrower; thickest in the centre, and tapering to a broad more or less reflexed point, with several elevated lines on the surface. Seeds, very large, with a broad ample wing, one inch long.

A noble tree, rivalling *Pinus Lambertiana*, and growing 140 feet high, with a straight stem, furnished with long slender branches in regular whorls and pendant branchlets, two or three feet long.

It is found on the east side of Popocatepetl in Mexico, at an elevation of from 11,000 to 12,000 feet; also at 'Tenango,' a beautiful tree, with large pendant cones at the points of the shoots, very much resembling Pine-apples, and called by the Mexicans, 'Pina.' It is also called 'Ayacahuite colorado,' or Red Ayacahuite by the inhabitants, on account of its highly-esteemed timber, which is of excellent quality.

This kind is very distinct from *Pinus Ayacahuite*, of Ehrenberg, as I pointed out several years ago in the 'Gardener's Magazine,' after examining cones belonging to the late Mr. Loudon, and collected by Mr. Charles Ehrenberg, in Mexico.

It has been named in compliment to the late J. C. Loudon, Esq., author of the 'Arboretum Britannicum,' the most valuable book of its kind ever published.

It no doubt will be hardy, coming, as it does, from so great an elevation, and a cold climate.

No. 76. *PINUS MACROPHYLLA*, *Lindley*, the Long-leaved Mexican Pine.

Syn. *Pinus Leroyi*, *Roehl.*

Leaves, in fives, very stout, fourteen or fifteen inches long, deep green, and slightly reflexed when full-grown, blunt-pointed, and quite straight when young; sheaths, not very long, imbricated, and persistent. Branches, very robust, not numerous, but rather regularly placed round the stem, and covered with a rough, scaly bark. Cones, solitary, six inches long, and three inches broad at the base, very hard, elongated, straight, and regularly tapering to the point, with a thick, but

short footstalk. Scales, greatly elevated, and hooked backwards, very hard, and glossy, irregularly four-sided, broader than long, and one inch wide, but much narrower and more reflexed near the base, and straight-pointed near the summit.

A small tree, from twenty to thirty feet high, with a dense, ample head, found by Mr. Hartweg very sparingly on the Ocotillo Mount, one of the highest points of the Angangueo Mountains in Mexico.

It is tolerably hardy in most parts, and a most beautiful kind, on account of its fine, ample foliage.

No. 77. PINUS MONTEZUMÆ, *Lambert*, Montezuma's Mexican Pine.

Syn. *Pinus Occidentalis*, *Humboldt and Bonpland*, not *Swartz*.

(The Rough-barked Pine of Mexico.)

Leaves, in fives, from three to four inches in length on the wild specimens, and on young plants from four to five inches long, rather stout, rigid, three-edged, and rough at the angles, thickly set upon the young branches, and supported by long, sharp-pointed, brown scales at the base of each sheath, of a dark green on the upper surface, and slightly glaucous on the under side, on the young leaves, but on old, full-grown leaves dark green on both surfaces; sheaths, persistent, or not falling off, nearly half an inch in length, and rather rough or jagged on the ends. Seed-leaves on the young plants from six to eight in number. Branches, few, very irregular, rather stout, and twisted; bark very rough, particularly on the young wood, which is covered with numerous long, broad, sharp-pointed scales; buds, few, imbricated, non-resinous, and rather lengthened. Cones, in clusters of three or four together, but frequently single, nearly horizontal, from four to five inches in length, and one inch and three-quarters in the broadest part, which is near the middle, then tapering to both ends, and slightly incurved, but especially towards the point, which is rather small. Scales, small, and nearly equal in size, from sixteen to eighteen rows in depth,

slightly elevated, and armed with a small prickle when young; seeds, small and winged.

This Pine is very distinct, both in cones and leaves, from the West India Pine, called *P. Occidentalis* by Swartz, a kind found in Cuba and other West India Islands, which is quite tender, and much smaller in its cones, and foliage, than the Mexican plant.

It is plentiful in different parts of Mexico. Hartweg found it on the Mountains of Mexico, near Ajusco, forming a tree forty feet high. It is also found on the Mountains of Orizaba, at an elevation of 11,000 feet, growing from forty to sixty feet high. Timber, resinous, and considered very good.

A very hardy kind, with a spreading head.

No. 78. *PINUS MONTICOLA*, *Douglas*, the Mountain Pine.

Syn. *Pinus Lambertiana brevifolia*, *Hort.*

Leaves, in fives, short, smooth, and blunt-pointed, from three to four inches long, rather three-sided, slender, glaucous green, and with a silvery appearance when young; sheaths, short and imbricated. Cones, long, slender, cylindrical, seven inches long, and one inch and three-quarters wide, tapering to rather a blunt point, smooth, and full of resin, generally in whorls, and on short footstalks. Branches, rather stout, short, and densely clothed with foliage. Scales, spoon-shaped, pointed, three-quarters of an inch broad at the widest part of the cone, and not closely pressed together,—the smaller ones at the base of the cone being much narrower, reflexed, pointed, and of a dark, yellowish grey. Seeds, small, with rather a narrow, hatchet-shaped wing, one inch and a quarter long.

A tall tree, growing 100 feet or more high, and from one and a half to two feet in diameter, with very much the appearance of the Weymouth Pine, but with a more dense head, and shorter and more glaucous leaves.

It is found abundantly in Northern California, on Trinity Mountain, at an elevation of 7,000 feet, growing on granite rock on a very poor, scanty soil, and on the higher mountains at the

Grand Rapids of the Columbia, and on the rocky banks of Spoken River. Timber, white, fine-grained, and tough.

There is a variety with red-coloured cones, found on the banks of Spoken River.

It is quite hardy.

No. 79. *PINUS OCCIDENTALIS*, *Swartz*, the West India Pine.
Syn. *Pinus Cubensis*, *Hort.*

Leaves, in fives, bright green, from five to six inches long, rather angular, sharp-pointed, slender, but stiff, rather distant on the shoots, a little rough at the edges, and with a lanceolate, sharp-pointed scale, half an inch long, growing at their base; sheaths, smooth, entire, more than half an inch long, and persistent. Cones, rather pendulous, three inches and a half long, and one inch and a half broad at the widest part, which is near the base; conical, and with rather a long footstalk, covered with sharp-pointed scales, like those growing at the base of the foliage. Scales, swelled or thickened at their upper extremity, half an inch broad, and angular, with a scar on the summit, terminated by a small, straight, but very slender point; the scales are nearly all of a size, except a few near the base and the apex. Seeds, very small, with a narrow, short wing.

A small tree, with the appearance of the Aleppo Pine (*P. Halepensis*), thin of foliage.

It is a native of St. Domingo and Cuba, found plentiful in the quarter of Saint Suzanne, in St. Domingo, growing to the height of from twenty-five to thirty feet, and is easily distinguished by its lance-shaped scales at the base of each bundle of leaves on the younger shoots.

It is tender, and distinct from the Pine called 'Occidentalis,' from Mexico.

No. 80. *PINUS OOCARPA*, *Schiede*, the Egg-coned Pine.

Leaves, in fives, from eight to ten inches long, slender, sharp-pointed, rather pendulous, and slightly angular, bright

green, and thickly set on the younger branches; sheaths, long, rather smooth, and persistent; shoots, rather slender, and pendulous at the extremities. Cones, egg-shaped, solitary, broadest near the base, and tapering to a point, three inches and a half long, and two inches and a half broad near the base, with a very hard, shining surface of a pale, glossy, yellow colour, free from resinous matter, and with rather a long footstalk. Scales, depressed, or bluntly pyramidal, three-quarters of an inch wide, with elevated bands from the centre to the corners, particularly towards the apex, and irregularly four-sided. Seeds, middle-sized, with rather a broad wing, one inch long. Seed-leaves, seven or eight in number.

A small tree, growing from forty to fifty feet high, with an ample spreading head, and rather pendulous branches, found on the volcanic mountain of Jorullo, and in other temperate parts of Mexico, in great abundance.

It is not hardy in England, and has the following variety:—

PINUS OOCARPOIDES, *Bentham*.

Syn. *Pinus Skinnerii*, *Hort*.

This is the Guatemala form of *Pinus oocarpa*, and only differs from it in having smaller and more pyramidal cones, and slenderer leaves than the Mexican plant. It is found in the Pine tracts abundantly in various parts of Guatemala, particularly on the low ranges of 'Choacus,' in the province of Vera Paz, at an elevation of about 4,000 feet; and although it descends nearly to the shores of the Bay of Honduras, it never occurs on the south coast, or at a higher elevation than 5,000 feet above the level of the sea.

It is a beautiful tree, fifty or sixty feet high, but quite tender in England.

No. 81. PINUS ORIZABÆ, *Gordon*, the Orizaba Pine.

Leaves, in fives, from eight to nine inches in length on the wild specimens, and rather longer on the young plants in culti-

vation, very slender, sharp-pointed, three-edged, thickly set on the branches, very rough at the edges, of a light but bright green colour, and much resembling those of *Pinus Pseudo-Strobus*; sheaths, persistent, or not falling off, about half an inch in length, rather smooth, and entire. Seed-leaves, on the young plants from seven to eight in number. Branches, numerous, spreading, rather irregular, slightly incurved, and slender, bark rough, buds large, light brown, much imbricated, and destitute of resinous matter. Cones, in clusters of four or five, and pendulous, from four to five inches long, and two inches and a half broad at the base, straight, and tapering to a point, with a footstalk nearly one inch in length, and with from twelve to sixteen rows of scales in each, which are much elevated, slightly hooked, and nearly all of a size, but rather smaller towards the extremities, and measure about half an inch across; each scale contains two very small seeds, with wings nearly an inch in length.

It was first discovered by Hartweg on the eastern declivity of the Mountain of Orizaba, in Mexico, at the same elevation (10,000 feet) as *P. cembroides*, growing in company with that species and a bushy Juniper; forming a small tree about thirty feet high, with a very graceful foliage and habit, but not abundant. It ripens its seeds in November, and is not quite hardy, as very severe winters in England kill it.

No. 82. *PINUS PARVIFLORA*, *Siebold*, the Small (male) Flowered Japan Pine.

Syn. *Pinus Cembra*, *Thunberg*, not of others.

Leaves, in fives, very glaucous on both faces, stiff, pointed, slender, and mostly bent or twisted, convex, or flat on the back, with the inner face stoutly keeled, three-edged, denticulated on the back of the keel, and varying in length on the same shoot; from three quarters of an inch to two inches in length, and remaining on the branches for three years; sheaths, composed of long membranaceous scales, which soon fall off, and leave the base of the leaves naked, jutting out, and not decurrent; male catkins, very small, not more than three or four lines long,

conical, or egg-shaped, and in clusters round the ends of the previous shoots. Branches, spreading, horizontal, slender, and covered with smooth ashy-grey bark ; lateral ones thickly covered with short, stiff, curved, glaucous leaves. Cones, oval, or elliptic, blunt at the ends, one inch and a quarter long, and composed of about twenty scales. Scales, wedge-shaped, large, somewhat orbicular at the base, and rounded above, leathery, or almost woody, concave, and of a greyish brown colour, each scale covering two large wingless seeds at its base. Seeds, oval, or elliptic, obtuse at both ends, and resembling those of the Siberian Stone Pine, but much larger, with a hard, bony, smooth shell, of a yellowish brown colour. Seed-leaves, from eight to ten in number.

A small tree, growing from twenty to twenty-five feet high, in the northern parts of Japan, on the island of 'Kuriles,' on high mountains, and on the hill sides of Fakone. It is also found cultivated in the Japanese gardens, where they call it 'Goyono Matsu' (*Pinus pentaphylla*), and distinguish different varieties, some on account of their small dimensions (Fimegajo-Matsu, the Dwarf Pine, with five leaves), and others on account of their longer leaves and less stunted appearance.

It is quite hardy.

No. 83. *PINUS PSEUDO-STROBUS*, *Lindley*, the False Strobilus Pine.
Syn. *Pinus Tenangaensis*, *Roehl.*

Leaves, in fives, very slender, eight or ten inches long, of a bluish grey or glaucous colour, rather pendulous when full grown, and slightly angular ; sheaths, one inch long, composed of imbricated scales, and jagged at the ends. Branches, diverging at right angles from the main stem as in the Weymouth Pine (*P. Strobilus*), with numerous slender branchlets. Cones, long, oval-pointed, and curved, four or five inches long, and two inches and a half broad near the middle, and growing in whorls round the branches in a horizontal direction. Scales, rather thin, and not very hard, rhomboid, and thickened at the apex, pyramidal, erect, and straightish, with a transverse elevated line, and a blunt point in the centre. Seeds, middle-sized, with a dark marbled wing one inch and a quarter long.

A tall tree, growing from sixty to eighty feet high, with the appearance of the Weymouth Pine, but with much longer leaves and cones.

It is found on the highest mountains in Anganguero, on the Campanario ; its chief range being about 8,000 feet of elevation, also on the Real del Monte, in Mexico, growing to a large size.

It is rather tender.

No. 84. *PINUS RUSSELLIANA*, *Lindley*, the Duke of Bedford's Pine.

Leaves, in fives, rather stout, seven or eight inches long, of a beautiful deep green colour ; outer ones, curved, and thickly set on the branches near the extremities, slightly angular when full grown ; sheaths, nearly one inch long, persistent, rather rough, and scaly. Branches, very stout, but not numerous, and rather irregularly placed round the stem, but sometimes in whorls. Cones, seven inches long, and one inch and three quarters broad at the base, elongated, and pointed, straight, with a very short footstalk ; horizontal, or slightly drooping in whorls round the branches, and with a hard shining surface, destitute of resinous matter. Scales, rhomboid at the apex, forming a small pyramid, with a straight blunt point, and of a dull greyish brown colour, very hard, and compact. Seeds, middle-sized, with rather a short but broadish wing.

A beautiful tree, from sixty to eighty feet high, with few, but very robust branches, loaded with fine long dark green leaves.

It is found on the highest point of the 'Cumbra' and 'Carmen,' and on the road from San Pedro to San Pablo, near Real del Monte, in Mexico.

It is tolerably hardy.

No. 85. *PINUS STROBIFORMIS*, *Wislizenus*, the Long-coned Pine.

Leaves, in fives, filiform, glaucous, slender, straight, from two to three inches long, keeled on the inner face, convex on the back, and very finely serrulated on the edges ; sheaths, composed of oval-acute, loose-spreading scales, six lines long, which soon fall off. Cones, about ten inches long, squarrose,

cylindrical, obtuse at the point, very full of resin, pendant, and resembling those of the *Pinus Strobus*, but three times the size. Scales, thin and terminal.

A very large tree, with horizontal, spreading branches, growing from 100 to 130 feet high, and very much resembling the Weymouth Pine; found on the higher peaks of the mountains about Cosiquiriachi, in North Mexico, at an elevation of 7,000 or 8,000 feet.

No. 86. *PINUS STROBUS*, *Linnaeus*, the Weymouth Pine.

Syn. *Pinus Canadensis quinquefolia*, *Duhamel*.

Leaves, in fives, very slender, three or four inches long, three-sided, soft, and of a light glaucous or bluish green colour, marked when young with silvery channels on one side; sheaths, very short, almost wanting, and soon falling off. Branches, short, in whorls, thinly clothed with foliage, and having a very smooth shining bark. Cones, long, narrow, slightly curved, cylindrical, tapering to rather a sharp point, and pendulous; from five to six inches long, and one inch and a half broad, with a footstalk three quarters of an inch long. Scales, thin, smooth, oblong, with the upper part thickened, six-eighths of an inch broad, but diminishing in size, and more pointed towards the apex, laying rather loosely over each other, and full of resinous matter. Seeds, small, ovate, of a dull grey colour, and with the wing one inch long.

A tall tree, with a smooth bark, growing from 100 to 150 feet high, and from four to six feet in diameter, forming a small conical head, and free from branches three-fourths of its height.

It is found on the sides of hills from Canada to Virginia, but attaining the largest size in the state of Vermont and New Hampshire, near the commencement of the river St. Lawrence.

The timber is white, light, free from knots, and easily worked, and is known as the Canadian White Pine, and Pumkin Pine.

It derived the name of Weymouth Pine in consequence of Lord Weymouth, shortly after its introduction into England in 1705, having had a great quantity planted at Longleat, his lordship's seat in Wiltshire. There are the following varieties:—

PINUS STROBUS ALBA, *Loudon.*Syn. Pinus Strobis brevifolia, *Booth.*" " " compressa, *Loddiges.*" " nivea, *Booth.*

This variety has much shorter, and more silvery white leaves, with the leaves growing more compressed round the shoots than the common Weymouth Pine, but in no other respect does it differ.

PINUS STROBUS NANA, *Knight.*Syn. Pinus Strobis umbraculifera, *Hort.*" " " tabuliformis, *Hort.*

A very dwarf variety, growing not more than one or two feet high, but with a dense spreading head, of a flat tabular form, with very small short leaves and branches, and quite a miniature.

No. 87. PINUS TENUIFOLIA, *Bentham*, the Slender-leaved Pine.

Leaves, in fives, very slender, from eight to ten inches long, bright, shining green, and sharp-pointed, slightly angular, and wavy ; sheaths, persistent, half an inch long, and rather jagged at the ends. Branches, numerous, very slender, drooping, and vertical. Cones, oval, rather small, tapering to the point, one inch and a half to two inches long, and one inch broad, several together on the branches, in a horizontal direction, or drooping position, when full grown, and of a dark-brown colour. Scales, rather small and numerous, half an inch across, thickened at the base, uneven-sided, oval, a little angular in the middle, depressed, with a projecting, blunt point in the centre, and the margin rounded and rather thick. Seeds, small, black, with rather a large wing, one inch long.

A large tree, found to the east of the city of Guatemala, growing in ravines, and on the mountains of 'Choacus,' in the province of Vera Paz, at an elevation of 5,000 feet, growing 100 feet high, and from three to five feet in diameter, forming dense forests, where scarcely any other plants can exist.

It is very tender, and unfit for the climate of England.

No. 88. *PINUS TORREYANA*, *C. Parry*, Torrey's Pine.

Leaves, in fives, resembling those of *Pinus macrocarpa*, but stouter, shorter, and always five in a sheath. Cones, large, and resembling those of *Pinus Sabiniana*, but much smaller, from five to six inches long, and three inches in diameter, egg-shaped, broadest at the base, slightly tapering towards the summit, which is rounded and obtuse, very hard, solid, and of a glossy, yellowish-brown colour. Scales, tetragone, pyramidal, much elevated to the point, slightly and transversely compressed into a sharp, lateral angle, terminating in a long, blunt point of a lighter colour. Seeds, nearly an inch long, and six lines broad, oval-oblong compressed, becoming narrower towards the base, and rounded at the other extremity, of a greyish-brown colour, frequently much darker on the sides, and marked with stripes or little black dots; wing large, and of a brownish colour.

A large tree, discovered by Messrs. Parry and Emorry, in California, and introduced into France in 1850, but of which nothing more is known.

It is said to differ principally from *Pinus Sabiniana* in its having five leaves in a sheath, and not three, as in that species, and in having much smaller cones.

No. 89. *PINUS WINCHESTERIANA*, *Gordon*, the Marquis of Winchester's Pine.

Syn. *Pinus Winchesteriana*, *Hort.*

Leaves, in fives, from twelve to fourteen inches in length (on the wild specimens), rather stout, three-edged, thickly set on the branches, glaucous-green, and much resembling those of *Pinus filifolia*, but broader and shorter than those of that species; sheaths, persistent or not falling off, about one inch in length, smooth, and entire, or nearly so. Seed-leaves, on the young plants, mostly eight in number, and rather short. Branches, few, spreading, irregular, and rather stout; buds, imbricated, non-resinous, and large. Cones, pendulous, on very short foot-stalks, two or three together, but sometimes single, always much incurved, and tapering pretty regularly from the base to the

point; from eight to ten inches in length, and three inches and a half broad at the base, with from twenty-six to thirty rows of scales. Scales, five-eighths of an inch broad, much elevated, particularly those upon the middle of the cone on the upper or outer side, where they become conical, and from three-eighths to a quarter of an inch high, while those on the under side and towards the extremities are much smaller, less elevated, and nearly all of a size; and from amongst which a large quantity of clear resin exudes, particularly on the outer side near the base. Seeds, rather small, and angular, with rather a broad wing one inch in length.

This Pine was first introduced by the Marquis of Winchester, but afterwards was obtained in abundance by Mr. Hartweg, who found it growing on the most elevated parts of the Cerro de San Juan, or Saddle Mountain, near Tepic, in Mexico, attaining a height of from sixty to eighty feet. It is very distinct from any other hitherto described, particularly in its very long, incurved, resinous cones.

It is not hardy in England.

NEW OR DOUBTFUL KINDS, HAVING THE LEAVES FIVE
IN A SHEATH, AND OF WHICH NOTHING MORE IS KNOWN.

No. 90. PINUS ANTOINEANA, *Roezl*, Antoine's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, one foot long, thin, slender, and three-sided; sheaths, silky, and one inch long. Cones, recurved, five inches long, and one inch and three-quarters in diameter. Scales, irregularly rhomboid, somewhat raised at the base, with a small protuberance bent towards the summit.

A handsome tree, from 80 to 100 feet high, with very tufted, long, spread-out branches, having a very beautiful appearance when full-grown, found near the Hacienda de Zavaleta, in Mexico, at an elevation of 8,000 feet. Named in compliment to M. Antoine, of Vienna. (? *Pinus Pseudo-Strobus*.)

No. 91. *PINUS AZTECAENSIS*, *Roezl*, the Azteca Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, the outer sides much larger than the inner ones, curved, of a beautiful, bright, shining green, and from ten to twelve inches long; sheaths, half an inch long. Cones, very large and handsome, slightly curved towards the points, perfectly conical, five or six inches long, and three inches in diameter. Scales, rhomboidal, one inch broad, and three-quarters of an inch long, swelled at the base, very elevated at the summit, and of a reddish-brown colour.

A tree growing sixty feet high, having a most beautiful appearance on account of its short branches, furnished with long, curved leaves, bending in a graceful, plume-like manner at the ends of the shoots. It is found growing on the Sierra of Zacatlan, on the road between Mexico and Tampico, at an elevation of 7,000 feet. (? *Pinus Apulcensis*.)

No. 92. *PINUS BOOTHIANA*, *Roezl*, Booth's Mexican Pine.Syn. *Pinus Bothiana*, *Vilmorin*.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, stiff, and nine inches long. Sheaths, one inch long, and silky. Cones, seven inches long, and one inch and a half broad. Scales, thickened at the base, four-sided, with a transverse ridge across the centre at the base; protuberance very much depressed in the centre, with a small sharp prickle in the middle, soon falling off.

A tree growing from eighty to ninety feet high, with short branches and straight stiff leaves, found on the Mexican Mountains near the Volcano of Ixtacihuatl, at an elevation of 10,000 feet.

Named in compliment to Messrs. Booth of Hamburgh.

No. 93. *PINUS BOUCHEIANA*, *Roezl*, Bouche's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, delicately toothed upon the

edges, and from eight to ten inches long. Sheaths, one inch and a quarter long, persistent and silky. Cones, slightly curved, five inches long, and two inches in diameter in the widest part. Scales, thickened at the base, rhomboidal, with a transverse ridge, and depressed at the base ; protuberance elevated into a point.

A very regularly-formed tree, growing from 100 to 110 feet high, upon the mountains west from Ixtacihuatl, near Ameca in Mexico.

No. 94. *PINUS BULLATA*, *Roezl*, the Puckered-scaled Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, three-edged, and twelve inches long. Sheaths, one inch long, and silky. Cones, from six to seven inches long, and two inches and a half in diameter. Scales, rhomboid, blistered or puckered on the surface, three-quarters of an inch wide, and six lines long ; protuberance round, with a sharp point rising up towards the summit.

A tree from fifty to seventy feet high, with its branches extending more than 100 feet in diameter, and found near the village of San Mateo in Mexico, at an elevation of about 8,000 feet.

No. 95. *PINUS CARRIEREI*, *Roezl*, Carriere's Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, twelve or thirteen inches long, sharp-pointed, and three-edged. Sheaths, one inch and a half long, and silky. Cones, five inches long, and nearly two inches in diameter. Scales, rhomboidal, elevated in the centre, transversely keeled across the middle, and of a reddish brown colour ; protuberance large, projecting, and terminated by a recurved point.

A tree from 100 to 130 feet high, growing in the forests of Tulancingo in Mexico, at an elevation of 8,000 or 9,000 feet.

Named in compliment to M. Carriere of Paris. (? *Pinus macrophylla*.)

No. 96. *PINUS CEDRUS*, *Roezl*, the Cedar-like Mexican Pine.
(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, glaucescent, three-edged, and from three to four inches long. Sheaths, very deciduous, or falling off quickly when young. Cones, two inches long, and rather more than one inch in diameter. Scales, irregularly shaped, sometimes rounded or flat; protuberance flat, and armed with a thorny spine, tolerably elevated at the base and towards the apex of the cone.

This tree very much resembles the Cedar of Lebanon when viewed from a distance; not having the least appearance of being a true Pine when seen in such a situation. It grows upwards of sixty feet high, with spreading branches, which commence near the ground, and cover the trunk so as to form a regular pyramid from the base, shading a space of 130 feet in diameter on the ground. It grows on the mountains of Cuernavaca in Mexico, at an elevation of 8,000 feet. (? *Pinus leiophylla*.)

No. 97. *PINUS COARCTATA*, *Roezl*, the Contracted Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, a little stiff, three-sided, and from six to eight inches long. Sheaths, from three quarters to one inch long, and scaly. Cones, slightly bent, from five to six inches long, and one inch and three quarters broad. Scales, rhomboid, rounded on the top, three quarters of an inch broad, and rather more than half an inch long; protuberance very broad, elevated in the centre, and terminated in the middle with a stout sharp point.

A tree from seventy to ninety feet high, with a very straight stem, and horizontal branches, a little elevated towards the points. It is found growing upon the mountain of Tzompoli, in Mexico, at an elevation of 8,000 or 9,000 feet.

No. 98. *PINUS COMONFORTI*, *Roezl*, Comonfort's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, of a bright green, and four inches long. Sheaths, short. Cones, pyramidal, two inches long, and nearly one inch and a half broad. Scales, irregularly shaped ; protuberance little elevated.

A very pretty tree, tolerably bushy, and regularly furnished with horizontal branches. It only grows from forty to fifty feet high, and is found upon the more elevated mountains about Huisquiluca in Mexico, at an elevation of more than 11,000 feet. (? *Pinus leiophylla*.)

No. 99. *PINUS DECAISNEANA*, *Roezl*, Decaisne's Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, six inches and a half long, stiff, acute-pointed, three-edged, rounded on the outer side, and glaucescent. Sheaths, six lines long. Cones, slightly bent, four inches long, and one inch and three-quarters broad. Scales, rhomboid, transversely keeled, depressed at the base, and reddish brown ; protuberance much deeper in colour.

A tree from fifty to sixty feet high, with very stout tufted branches, and very straight stiff leaves, found on the mountains of Pachuca in Mexico, at an elevation of 8,000 feet, and more resembles the Californian than Mexican Pines. (? *Pinus Montezumæ*.)

No. 100. *PINUS DECANDOLLEANA*, *Roezl*, Decandolle's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, glaucescent, and four inches long. Sheaths, short, and very deciduous, or soon falling off. Cones, pyramidal, rather more than two inches long, and one inch and a half broad. Scales, flat, irregularly formed, three-quarters of an inch wide, and half an inch long ; protuberance depressed in the centre, with a slight point in the middle.

A pyramidal tree, growing from eighty to ninety feet high, and very much resembling the Weymouth Pine (*P. Strobus*), found on the higher mountains of Mexico. (? *Pinus leiophylla*.)

No. 101. *PINUS DEPENDENS*, *Roezl*, the Pendant-branched Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, three-edged, and four inches long; sheaths, scaly and deciduous, or soon falling off. Cones, two inches long, one inch and a half broad, conical, and with very long stout footstalks. Scales, very irregular in shape, all those at the base of the cone are flat, while those towards the summit project; protuberance, large, oval, and provided with a large projecting mucro at the apex.

A very straight tree, growing sixty or seventy feet high, with its branches pendulous, in the same manner as the Weeping Cypress, and is distinguishable from all others at a great distance. It is found growing upon a mountain along the road to Mexico, at Cuernavaca, at an elevation of about 8,000 feet. (? *Pinus leiophylla pendula*.)

No. 102. *PINUS DOLLERIANA*, *Roezl*, Doller's Mexican Pine.
(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, nine inches long, three-edged, a little rounded on the outer side; sheaths, silky, and one inch and a quarter long. Cones, five inches long and two inches broad, slightly recurved. Scales, thickened at the base, rhomboid, rounded at the summit, transversely keeled, protuberance of a rich glossy colour, and closely inlaid.

A very handsome tree, growing sixty or seventy feet high, with very stout, short, horizontal branches, and leaves in tufts; found growing upon the higher mountains about Toluca in Mexico, at an elevation of 10,000 feet, and one of the most distinct.

No. 103. PINUS EHRENBERGII, *Endlicher*, Ehrenberg's Mexican Pine.

Leaves, in fives, stiff, and somewhat glaucous, from two inches and a half to three inches long; sheaths, short, three lines long, and scaly. Cones, ovate, from two to two inches and a quarter long, and rather more than an inch in diameter. Scales, rhomboid, pyramidal, depressed, thickened at the base, with an acute transverse ridge across the centre; protuberance, flattened at the top, orbicular, with different elevations, and terminating in a sharp reflexed point.

A fine tall tree, growing 100 feet high, found in Real del Monte, in Mexico, at an elevation of 8,000 feet, and about Guajimalapa at more than 10,000 feet of elevation. (? *Pinus leiophylla*.)

No. 104. PINUS ELEGANS, *Roezl*, the Elegant Mexican Pine.
(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, and eleven inches long; sheaths, one inch and a quarter long, and silky. Cones, recurved, four inches long, and rather more than an inch in diameter at the widest part. Scales, thickened at the base, very irregularly shaped, and with a slight ridge across the extremity; protuberance, seldom depressed in the centre.

A magnificent tree, growing from ninety to a hundred feet high, with an elegant appearance; found on the mountains near the Volcano of Popocatepetl, in Mexico, at an elevation of 9,000 feet.

No. 105. PINUS ENDLICHERIANA, *Roezl*, Endlicher's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, six inches long, stiff, and three-edged; sheaths, three quarters of an inch long. Cones, a little bent, five inches long, and one inch and three quarters broad. Scales, irregularly shaped; protuberance, elevated. This kind resembles *Pinus robusta*, but differs in its cones and in its leaves being less tufted.

It is found on the Mount Ajuseo, in Mexico, at an elevation of 10,000 or 11,000 feet. (? *Pinus Montezumæ*.)

There is the following variety, according to M. Roehl:—

PINUS ENDLICHERIANA LONGIFOLIA.

(Discovered by M. Roehl in 1856-7.)

Leaves, in fives, stiff, glaucous, three-edged, and seven inches long; sheaths, three quarters of an inch long, and silky. Cones, conical, nearly four inches long, and one inch and three quarters in diameter. Scales, rhomboidal, transversely keeled, depressed in the centre; protuberance, small, slightly elevated, and ending in a little prickle.

A tree about 100 feet high, of great beauty, on account of its stout glaucous leaves, found on the Mountains of Mexico, at an elevation of 10,000 feet. (? *Pinus Lindleyana*.)

No. 106. PINUS ESCANDONIANA, Roehl, the Escandon Pine.

(Discovered by M. Roehl in 1856-7.)

Leaves, in fives, very slender, three-edged, and seven inches long; sheaths, whitish, three quarters of an inch long, and silky. Cones, straight, cylindrical, blunt-pointed, three inches and a half long, and one inch and a half broad. Scales, rhomboidal, transversely keeled, seven lines broad, and five lines long; protuberance, elevated, pyramidal in shape, and with a terminal mucro.

This tree, which is very rarely met with, has an exquisite appearance, with perfectly open branches thinly clothed with leaves, and was found upon Mont Tzompoli, in Mexico, at an elevation of 9,000 feet. (? *Pinus patula*.)

No. 107. PINUS EXSERTA, Roehl, the Projecting Scaled Mexican Pine.

(Discovered by M. Roehl in 1856-7.)

Leaves, in fives, spread out, three-edged, and from twelve to

fourteen inches long; sheaths, one inch and a quarter long, and silky. Cones, slightly curved, depressed at the base, seven inches long, and two inches and a half in diameter. Scales, rhomboid, with different centres, rounded on the apex, transversely keeled, and depressed at the base, one inch broad, and half an inch long; protuberance elevated in the middle, with a large mucro in the centre.

A fine tall tree, growing from 80 to 100 feet high, with spreading branches, nearly horizontal, found growing near the Guarda, on the road to Mexico, at Cuernavaca, at an elevation of 8,000 or 9,000 feet. (? *Pinus protuberans*.)

No. 108. *PINUS GRACILIS*, *Roezl*, the Slender-leaved Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, very slender, curved, and four inches long. Cones, two inches long, rather more than one inch broad, and with middling footstalks. Scales, rhomboid, rounded at the summit, transversely keeled, protuberance mucronate.

A tree growing from 80 to 100 feet high, very branching, and with its leaves very bushy. This very pretty and distinct kind is found growing on the reverse slope of the Cordilleras, on the Pacific side, at an elevation of from 9,000 to 10,000 feet. (? *Pinus leiophylla*.)

No. 109. *PINUS GRANDIS*, *Roezl*, the Great Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, stiff, and one foot long; sheaths, silky, and nearly one inch long. Cones, six inches long, two or two inches and a half in diameter near the base, and of a conical shape. Scales, thickened at the base, rhomboidal, with a slight ridge across the middle, depressed in the centre, and terminated in a sharp point, soon falling off.

A large tree, growing 100 feet high, with large branches and firm foliage in great tufts at the ends of the shoots.

It is found growing between the Mexican volcanoes of Po-

pocatepetl and Ixtacihuatl, on the mountains, at an elevation of 10,000 feet. (? *Pinus filifolia*.)

No. 110. *PINUS HAAGEANA*, *Roezl*, the Haagean Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, and ten inches long; sheaths, one inch long, and silky. Cones, seven inches long, two inches and a quarter broad, and of a conical shape. Scales, rhomboid, a little rounded towards the summit, rising in the centre, depressed at the base, and slightly keeled transversely across the middle; protuberance large, pyramidal, with a bent prickle in the centre.

A tree upwards of 100 feet high, found growing in the environs of San Rafael in Mexico, at an elevation of 8,000 feet. (? *Pinus filifolia*.)

No. 111. *PINUS HENDERSONI*, *Roezl*, Henderson's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, ten or eleven inches long, and slender; sheaths upwards of one inch and a quarter long, and silky. Cones, slightly bent, five inches long, and one inch and three-quarters in diameter, of a very bright colour, almost the colour of straw. Scales, rhomboidal, slightly keeled transversely across the middle, and slightly rising in the centre into a small point.

A tree from 100 to 110 feet high, with robust branches and leaves in tufts or bundles at the ends of the shoots, found on the Riofrio, in Mexico.

Named in compliment to Messrs. Henderson, of the Wellington Nursery, London.

No. 112. *PINUS HETEROMORPHA*, *Roezl*, the Various-shaped Scaled Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, slender, and from eight to nine inches long; sheaths, one inch long, whitish, and silky. Cones,

five inches long, and one inch and three-quarters broad. Scales, one inch broad, and six lines long, variously shaped ; protuberance very large.

A tree growing from seventy to seventy-five feet high, with very slender branches, and curved leaves, found upon low hills on Mount Tzompoli, in Mexico, at an elevation of 9,000 feet.

No. 113. *PINUS HORIZONTALIS*, *Roezl*, the Horizontal-branched Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, three-sided, and from ten to eleven inches long ; sheaths, one inch long, and silky. Cones, six inches long, nearly two inches in diameter, and slightly bent. Scales, four-sided, transversely keeled, protuberance large, depressed, and with an acute terminal point.

A tree of great beauty, with a straight stem and perfectly horizontal branches, covered with very long leaves ; and in general appearance and form it very much resembles the *Araucaria excelsa* at a distance. It is found on the northern part of the Mountain of Tzompoli, in Mexico, at an elevation of 8,000 or 9,000 feet.

No. 114. *PINUS HOSERIANA*, *Roezl*, Hoser's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, curved, and from six to eight inches long ; sheaths, whitish, silky, and three-quarters of an inch long. Cones, four inches long, and one inch and three-quarters in diameter. Scales, rhomboid, transversely keeled, nine-tenths of an inch broad, and six-tenths of an inch long ; protuberance large, having different faces, a little curved, and of an ash-grey colour, terminating in a little spiny point in the centre.

A tree growing from sixty-five to seventy feet high, with perfectly regular branches, spreading out straight at first, but afterwards rising up again at the ends, and on account of which the tree has a very striking appearance. It is found growing

on the north side of Mount Tzompoli, in Mexico, at an elevation of about 8,000 feet. (? *Pinus patula*.)

No. 115. *PINUS HUISQUILUCAENSIS*, *Roehl*, the Huisquiluca Pine.

(Discovered by M. Roehl in 1856-7.)

Leaves, in fives, slender, bright green, and from three and a half to three inches and three-quarters long; sheaths dropping off when young. Cones, straight, two inches long, and one inch and a quarter in diameter. Scales, rhomboidal, rounded at the top; protuberance a little elevated and depressed in the centre.

This tree resembles in appearance the *Pinus Comonforti*, but it is nearly double the size and height of that species, and is found very abundant upon the more elevated Mountains of Huisquiluca, in Mexico, at an elevation of more than 11,000 feet. (? *Pinus leiophylla*.)

No. 116. *PINUS INFLEXUS*, *Roehl*, the incurved Mexican Pine.

(Discovered by M. Roehl in 1856-7.)

Leaves, in fives, stiff, three-edged, and five inches long. Sheaths, very short, and persistent. Cones, recurved, from three and a half to three inches and three-quarters long, and one inch and three-quarters broad. Scales, small, square, sharp-pointed on the apex, and of a rich brown colour.

This kind differs from *Pinus robusta* and *Pinus Endlicheriana* by its stout curved leaves, and was found upon Mount Ajusco, in Mexico, at an elevation of 9,000 feet. (? *Pinus Montezumæ*.)

No. 117. *PINUS KETELEERI*, *Roehl*, Keteleer's Pine.

(Discovered by M. Roehl in 1856-7.)

Leaves, in fives, three-sided, from eight to ten inches long, and of a superb green. Sheaths, about one inch long. Cones, six inches long, and nearly two inches and a half wide, slightly

recurved at the point. Scales, rhomboid, flat, transversely elevated by a slight ridge across the middle, forming an angled protuberance, slightly depressed in the centre, and of an ash-grey colour.

A fine tree, upwards of 100 feet high, resembling in appearance *Pinus Russelliana*, found upon the high mountains about Toluca in Mexico, at an elevation of 10,000 or 11,000 feet.

No. 118. *PINUS LERDOI*, *Roezl*, Lerdo's Mexican Pine.
(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, glaucous, and from four to five inches long; sheaths, deciduous. Cones, pyramidal, two inches and a half long, and one inch and a quarter in diameter. Scales, rounded at the summit, six lines broad, and five lines long; protuberance, of a deep brown colour, and provided with a sharp point in the centre, easily rubbed off by a slight touch.

A tree, growing from fifty to sixty feet high, with very long spreading branches, regularly placed in whorls along the stem, and with a striking and parasol appearance. It is found growing on the southern or opposite side of the mountain to Ajusco, in Mexico, at an elevation of about 11,000 feet. (? *Pinus leiophylla*.)

No. 119. *PINUS LOWI*, *Roezl*, Low's Mexican Pine.
(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, stiff, erect, three-edged, and six inches long; sheaths, rather more than half an inch long, and silky. Cones, pyramidal, slightly bent, four inches and a half long, and one inch and three-quarters broad. Scales, very irregular in appearance, sometimes rhomboid, slightly rising at the summit, and depressed at the base; protuberance, tolerably large, and slightly elevated.

A tree upwards of 100 feet high, with the branches stiff and tufted; found on the mountains of Mexico.

Named in compliment to Mr. Low, of the Clapton Nursery.

No. 120. *PINUS MAGNIFICA*, *Roezl*, the Magnificent Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, stiff, straight, and thirteen inches long; sheaths, reddish, and from one inch and a half to one inch and three quarters long. Cones, very much bent, eleven inches long, and from two inches to two inches and a half broad. Scales, rhomboid, wrinkled, transversely keeled, rising highest in the middle, and depressed at the base, one inch and a quarter broad, and more than three quarters of an inch long; protuberance, large, and slightly curved.

This magnificent tree grows from 110 to 130 feet high, with a most regular appearance, and merits its name on account of its grand foliage, forming great plumes at the ends of the shoots. It is found on the mountains of Morelia, in Mexico. (? *Pinus Devoniana*.)

No. 121. *PINUS MICHOCAENSIS*, *Roezl*, the Michoacan Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, and fourteen inches long; sheaths, from one inch to one inch and a quarter long, and silky. Cones, slightly bent, regularly conical, eight inches long, and three inches in diameter. Scales, irregularly rhomboid, one inch broad, and three quarters of an inch long, transversely keeled, very elevated at the upper part, and depressed at the base; protuberance, large and pyramidal.

This is one of the most beautiful of all the kinds, and has some resemblance to *Pinus Aztecaensis*; but its cones are much grander, and its leaves longer and much stiffer, and a much larger tree, growing upwards of 100 feet high, and found in the province of Michoacan, in Mexico.

No. 122. *PINUS MONSTROSA*, *Roezl*, the Monstrous Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, eleven inches long; sheaths, one inch and a quarter long, and silky. Cones, seven inches long, one inch and three quarters broad, and slightly curved. Scales, large,

thickened at the base, one inch across, and three quarters of an inch long, with a transverse ridge across the centre, highest in the middle, and flattened at the base, the protuberance seldom projecting or elevated, but terminated with a large stiff point.

A large tree, from 100 to 110 feet high, with straight horizontal branches regularly placed along the stem. It is found growing along the western slopes of the mountains of Ixtacihuatl, in Mexico, at an elevation of 9,000 feet.

No. 123. *PINUS MONTE-ALLEGRI*, *Roezl*, the Monte Allegro Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, glaucous, and five inches long ; sheaths, scaly, and deciduous, or soon falling off. Cones, pyramidal, rather more than two inches long, and one inch and a quarter broad. Scales, flat ; protuberance a little thickened at the base, and terminated by a very acute point.

A fine tree, growing upwards of 100 feet high, with a large trunk, and long spreading curved branches rising up towards the ends, and with the leaves in tufts at the ends of the shoots. It is the most elegant of the Mexican Pines, and was found growing in the environs of Xochiltepec (Mountain of Flowers), near to Zitacuaro, in Mexico, at an elevation of 9,500 or 10,000 feet. (? *Pinus leiophylla*.)

No. 124. *PINUS NESSELRODIANA*, *Roezl*, Count Nesselrode's Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, twelve inches long, a little stiff, and three-edged on the inner side ; sheaths, one inch and a quarter long, and silky. Cones, six inches long, and two inches broad. Scales, rhomboid, a little rounded on the top, with a transverse ridge across the middle, highest in the centre ; protuberance, large and elevated.

A most beautiful tree, on account of its fine long leaves, being in tufts or bundles at the ends of the shoots, and the branches being very regularly placed along the stem. It is found on the

mountains between the two volcanos of Popocatepetl and Ixtacihuatl, in Mexico, at an elevation never less than 10,000 feet.

No. 125. *PINUS NORTHUMBERLANDIANA*, *Roezl*, the Duke of Northumberland's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, one foot long, and tolerably stiff; sheaths, one inch and a quarter to one inch and a half long, and silky. Cones, recurved, four inches long, and one inch and three quarters broad. Scales, thickened at the base, very irregularly rhomboid, with a transverse ridge across the middle, elevated in the centre; protuberance, very large, dark brown, and smooth, with a small sharp point at the apex.

A fine tree, seventy or eighty feet high; discovered upon the side of the mountains west from Popocatepetl, in Mexico.

No. 126. *PINUS OCAMPII*, *Roezl*, Ocampo's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, and ten inches and a half long; sheaths, reddish, silky, and one inch and a quarter long. Cones, straight, seven inches long, and two inches in diameter. Scales, almost quadrangular, depressed in the centre, transversely keeled on those from the centre to the base, three quarters of an inch broad, and three quarters of an inch long; protuberance, slightly depressed, with a sharp point in the middle.

A very beautiful tree, growing from 100 to 120 feet high, with compact foliage. It is found in a forest by the Hacienda (Farm) of Mons Melchior Ocampo, near Morelia, in Mexico, at an elevation of about 7,000 feet. (? *Pinus Devoniana*.)

No. 127. *PINUS ORTGISIANA*, *Roezl*, Ortgis's Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, and nine inches long; sheaths, one inch long. Cones, six inches long, two inches in diameter, and curved. Scales, rhomboidal, rugged, transversely keeled; protuberance, large and conical, with the edges much thickened.

A tree upwards of ninety feet high, found growing upon the mountains about San-Rafael, in Mexico, at an elevation of 9,000 feet.

M. Roezl describes a variety with longer leaves found in the same locality. (? *Pinus Russelliana*.)

No. 128. *PINUS PAXTONI*, *Roezl*, Sir Joseph Paxton's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, three-sided, and eight inches long; sheaths, rather short, and silky. Cones, recurved, more than six inches long, and one inch and three quarters in diameter in the broadest part. Scales, rounded at the top, transversely keeled across the middle, depressed in the centre; protuberance, almost level, with a small sharp point in the centre.

A very handsome tree, upwards of 100 feet high, with long spreading out branches; found near Tomacoco, in Mexico, at an elevation of 9,000 feet.

No. 129. *PINUS PLANCHONI*, *Roezl*, Planchon's Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, ten inches long, and three-edged; sheaths, upwards of three quarters of an inch long. Cones, six inches long, and one inch and three quarters in diameter. Scales, transversely keeled, very much elevated, particularly at the upper part of the cone, and depressed at the base, and of a yellow-brown colour; protuberance, large, projecting and curved.

This species is nearly related to *Pinus Carrierei*, but differs in its much shorter and stiffer leaves. It is found in the forests of Tulancingo, in Mexico, at an elevation of 9,000 feet. (? *Pinus macrophylla*.)

No. 130. *PINUS PRASINA*, *Roezl*, the Bright-green Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, of a bright green, three-edged, straight, and from nine to ten inches long; sheaths, whitish, silky, and six lines long. Cones, cylindrical, from three to three inches and a half long, and one inch and a half broad. Scales, some-

what three-lobed, stout, projecting at the top, and depressed at the base ; protuberance, large, and frequently terminal.

This tree has a striking effect, and is easily distinguished at a distance by its beautiful bright grass-green foliage and clustered cones, which are in threes or fours, and of a bright brown colour. It is found growing near the village of San Mateo, in Mexico, at an elevation of 8,000 feet. (? *Pinus patula*.)

No. 131. *PINUS PROTUBERANS*, *Roetzl*, the Protuberant Mexican Pine.

(Syn. *Pinus angulata* *Roetzl*.)

(Discovered by M. *Roetzl* in 1856-7.)

Leaves, in fives, very slender, curved, and ten inches long ; sheaths, nearly one inch long. Cones, beautifully curved towards the point, in clusters of three or four together, and sharp-pointed, six inches long, and from two to two inches and a half in diameter. Scales, irregularly shaped, more than one inch broad, and half an inch long, rounded at the top, and smooth ; protuberance, very elevated, with different faces or centres set straight.

A tree upwards of 100 feet high, with its branches a little raised or elevated at the ends, and curved leaves ; a very handsome kind, found at an elevated place on the Contreras, in Mexico, at from 9,000 to 10,000 feet of elevation. (? Quite new.)

No. 132. *PINUS REGELIANA*, *Roetzl*, the Royal Pine.

(Discovered by M. *Roetzl* in 1856-7.)

Leaves, in fives, slender, and from ten to eleven inches long ; sheaths, from three quarters of an inch to one inch long, and silky. Cones, five inches long, and one inch and three quarters broad, and quite straight. Scales, elevated in the middle, transversely keeled, three quarters of an inch broad, and half an inch long ; protuberance, depressed, with a slight mucro in the centre.

This splendid tree is unequalled by any other in Mexico, with its long tufted branches, commencing within a yard of the

ground. It grows on the opposite side of the mountain west from Iztacihuatl, at an elevation of 8,000 or 9,000 feet. (? Quite new.)

No. 135. *PINUS RICHARDIANA*, *Roezl*, Richard's Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, very stiff, and from five to six inches long ; sheaths, rather more than half an inch long, and silky. Cones, pyramidal, four inches and a half long, and two inches in diameter. Scales, large, one inch broad, and half an inch long, and very depressed at the base ; protuberance, large, and level.

A tree, growing from 100 to 120 feet high, on the more elevated parts of Mount Ajusco, in Mexico, at an elevation of 11,000 or 12,000 feet.

No. 134. *PINUS RINZI*, *Roezl*, Rinz's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, three-edged, and from nine to ten inches long ; sheaths, yellowish, silky, and one inch and a quarter long. Cones, six inches long, and from two to two inches and a half in diameter, quite straight, and a little depressed at the base. Scales, very irregularly shaped, one inch and a quarter broad, three quarters of an inch long, raised up, or thickened on the edges, and depressed on the centre ; protuberance, swelled in the middle, and furnished with a little round prickle.

It is found in the North-west part of the province of Michoacan, in Mexico.

Named in compliment to M. Rinz, of Frankfort. (? *Pinus Russelliana*.)

No. 135. *PINUS ROBUSTA*, *Roezl*, the Robust Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, six inches long, very stiff, and three-edged ; sheaths, six lines long. Cones, straight, pyramidal, with short footstalks, five inches long, and from one inch and three quarters

to two inches in diameter. Scales, small, rounded on the top, with the protuberance in the form of an eye.

A superb tree, growing seventy or eighty feet high, with its branches and leaves in tufts, and very robust, forming a beautiful head, and one of the most elegant of Mexican Pines; found upon Mount Ajusco, in Mexico, at an elevation of 10,000 or 11,000 feet. (? *Pinus Lindleyana*.)

No. 136. *PINUS ROHANI*, *Roehl*, Rohan's Pine.

(Discovered by M. Roehl in 1856-7.)

Leaves, in fives, three-edged, and ten inches long; sheaths, one inch and a quarter long, and silky. Cones, curved, six inches and a half long, and two inches broad. Scales, large, one inch broad, and three-quarters of an inch long, rising in the middle, thickened at the edges, and flattened towards the apex of the protuberance, which is very little distinguished by its colour.

A lofty and striking tree, found near San Rafael, in Mexico, at an elevation of 8,000 feet.

M. Roehl distinguishes a variety of this kind by its having much longer leaves. (? *Pinus Russelliana*.)

No. 137. *PINUS RUBESCENS*, *Roehl*, the Reddish-barked Mexican Pine.

(Discovered by M. Roehl in 1856-7.)

Leaves, in fives, stiff, three-edged, and twelve inches long; sheaths, reddish, scaly, soft, and one inch and a half long. Cones, straight, depressed at the base, from six to eight inches long, and two inches broad. Scales, thick, quadrangular, transversely keeled, raised highest in the centre, three-quarters of an inch broad, and the same in length; protuberance smooth, with a small recurved point in the middle.

A tree from 80 to 100 feet high, with the bark of the trunk and branches of a very reddish colour. Branches, large, and curving upwards at the points. It is found growing about San Augustin, in Mexico, at an elevation of 8,000 feet.

No. 138. *PINUS RUMELIANA*, *Roezl*, the Rumel Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, and seven inches long ; sheaths, one inch long, and silky. Cones, slightly curved towards the ends, five inches long, and nearly two inches in diameter. Scales, thickened at the base, very smooth, elevated in the centre, and depressed round the base ; protuberance rounded, with a small, terminal sharp point.

A tree from 90 to 100 feet high, with very large branches, and few, but very compact leaves, found near San Rafael, in Mexico, on the road to Zavaleta, at an elevation of 8,000 feet.

No. 139. *PINUS SAN-RAFAELIANA*, *Roezl*, the San-Rafael Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, very slender, curved, and from eight to ten inches long ; sheaths, nearly an inch long, very thin, and persistent. Cones, four inches long, one and a half to two inches broad, and quite straight. Scales, irregularly rhomboid, striated, a little elevated, with a slight transverse line across the middle, closely inlaid, very firm, and much smaller towards the base ; protuberance terminated with a small sharp point.

A superb tree, growing upwards of 100 feet high, and much resembling, by its long and slender branches, and recurved leaves, the *Pinus patula*, but differs in having its leaves more tufted.

It grows upon the descent from Aculco to San Rafael, in Mexico, at an elevation of more than 10,000 feet. (? *Pinus patula*.)

No. 140. *PINUS SOULANGEANA*, *Roezl*, Soulange's Mexican Pine.

(Discovered by M. Roezl in 1857.)

Leaves, in fives, stiff, three-edged, ten or eleven inches long ; sheaths, one inch and a quarter long, and silky. Cones, five inches long, and two inches broad at the widest part, and

slightly recurved. Scales, thickened at the base, irregularly four-sided, with an elevated ridge across the centre, highest in the middle, and very much depressed at the base, rather more than an inch broad, and nine-tenths of an inch long, with a very small, projecting, little, recurved point on the summit.

A tree growing eighty feet high, easily distinguished by its tufted leaves, found growing on the western declivity of the Mountains of Ixtacihuatl, in Mexico.

No. 141. *PINUS SPINOSA*, *Roezl*, the Spiny-coned Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, curved, and from eight to nine inches long; sheaths, nearly an inch long, and silky. Cones, recurved, four inches long, and one inch and a quarter in diameter. Scales, irregularly rhomboid, slightly keeled transversely across the centre, highest in the middle, and flattened at the base; protuberance elevated, each terminating in a sharp recurved spine at the point.

A very regular-shaped tree, growing from eighty to ninety feet high, having a fine appearance on account of its fine curving foliage and regular appearance.

It is found on the Amecameca Mountains, in Mexico, at an elevation of 8,000 or 9,000 feet.

No. 142. *PINUS THELEMANNI*, *Roezl*, Thelemann's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, three-sided, and from eight to nine inches long; sheaths, nearly one inch long, and silky. Cones, pyramidal, six inches long, and two inches in diameter. Scales, rhomboid, rounded towards the summit, transversely keeled, three-quarters of an inch broad, and half an inch long; protuberance depressed, ashy-grey coloured, and without any terminal point.

A tree of small dimensions, growing about fifty feet high, with its branches very elevated at the ends, which fact distinguishes it from all the other species. Its cones somewhat resemble those of *Pinus grandis*, but its leaves and the form of its branches are entirely different. It is found upon the north side of the Mountain of Tzompoli, in Mexico, at an elevation of 8,000 or 9,000 feet.

No. 143. *PINUS THIBAUDIANA*, *Roezl*, Thibaud's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, and from seven to eight inches long; sheaths, silky, one inch long. Cones, very much bent, six inches long, and from one inch and a half to one inch and three-quarters in diameter. Scales, thickened at the base, rhomboid, rounded towards the ends, with a slight transverse keel across the middle; protuberance medium size, rising in the middle, and with a small, sharp point in the centre.

An elegant tree, with horizontal branches when old, found growing upon the north side of the Popocatepetl Mountain, in Mexico, at an elevation of 8,000 or 9,000 feet.

No. 144. *PINUS TROUBEZKOIANA*, *Roezl*, Troubezkoï's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, eleven inches long; sheaths, one inch and a quarter long, and silky. Cones, six inches long, two inches in diameter, and recurved. Scales, thickened at the base, rhomboidal, with a transverse ridge across the centre, highest in the middle, forming a large protuberance, very much elevated, and terminating in a small point.

A fine tree, eighty or ninety feet high, with a very straight stem and long spreading branches, very remarkable for its beautiful and regularly-arranged cones upon the branches.

It was discovered on the western slopes of the Moun-

tains of Ixtacihuatl, in Mexico, at an elevation of 9,000 or 10,000 feet.

No. 145. *PINUS TZOMPOLIANA*, *Roezl*, the Tzompoli Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, spread out, curved, and eight inches long; sheaths, whitish, silky, and three-quarters of an inch long. Cones, pyramidal, four inches long, and one inch and three-quarters in diameter, and quite straight. Scales, almost oval, elevated at the summit, transversely keeled across, and depressed at the base, three-quarters of an inch broad, and half an inch long; protuberance a little raised towards the top, and terminating in a small blunt point.

This tree grows from eighty to ninety feet high, very common upon Mont Tzompoli, in Mexico, with its branches regularly placed, and quite straight. (? *Pinus patula*.)

No. 146. *PINUS VALIDA*, *Roezl*, the Valid, or strong-growing Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, and twelve inches long; sheaths, one inch and a quarter long, and silky. Cones, oval, six inches long, and two inches in diameter. Scales, rhomboid, with a transverse ridge across the middle, highest in the centre, and depressed at the base; protuberance nearly level, with a recurved terminal sharp point.

An extremely vigorous tree, with long horizontal branches, found upon a small hillock on the Mountains of Ixtacihuatl, at an elevation of 9,000 or 10,000 feet.

No. 147. *PINUS VAN-GEERTI*, *Roezl*, Van-Geert's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, three-edged, tolerably stout, and about ten inches long; sheaths, very long, from one inch and a half to one

inch and three-quarters long, and very silky. Cones, curved, six inches long, and two inches broad in the widest part. Scales, thickened at the base, quadrangular, very level horizontally, with a slightly elevated ridge transversely, very depressed in the centre, and delicately rayed; protuberance broad and nearly level.

A tree growing from 90 to 100 feet high, with horizontal spreading branches, rising again towards the points; found near the Hacienda de Tomacoco in Mexico.

No. 148. *PINUS VAN-HOUTTEI*, *Roezl*, Van-Houtte's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, from ten to twelve inches long, and three-sided; sheaths, silky, and about an inch long. Cones, pyramidal, six inches long, and one inch and three-quarters in diameter; seldom recurved. Scales, small, irregularly shaped, with a slight transverse rib across the centre; protuberance depressed, with a sharp point in the middle, easily detached.

A tree from 80 to 100 feet high, with its leaves forming one dense mass, or plume, at the ends of the branches, each branch having a crown or group of four or five cones, and assuming a very curious appearance.

Its habitat is on the reverse side of the mountain of Ajusco, on the declivity of the Pacific, at an elevation of 9,000 or 10,000 feet.

No. 149. *PINUS VERRUCOSA*, *Roezl*, the Warted-scaled Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, straight, glaucous, and from three to four inches long; sheaths, deciduous, or falling off when young. Cones, two inches long, and one inch and a half in diameter. Scales, warted, rounded on the summit, and of a bright grey colour; protuberance slightly projecting, and glossy brown.

This species is much the smallest in its group, and grows at a little higher elevation, on the Huisquiluca Mountains in Mexico, than any of the other Pines in that locality. (? *Pinus leiophylla*.)

No. 150. *PINUS WILSONI*, *Roezl*, Wilson's Mexican Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, six inches long, three-edged, outer side larger and round, very stiff and glaucous. Cones, straight, conical, four inches long, and two inches broad. Scales, half an inch broad, and four lines long, of a rich shining brown colour; protuberance a little projecting and light grey.

It is found growing about Pachuca, in Mexico, at an elevation of 8,000 feet. (? *Pinus Montezumæ*.)

No. 151. *PINUS ZACATLANÆ*, *Roezl*, the Zacatlan Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slightly curved, and from eight to ten inches long; sheaths, three-quarters of an inch long, and silky. Cones, three inches and a half long, and two inches and a half in diameter, and of a regular conical shape. Scales, large, one inch broad, and nine-tenths of an inch long, transversely keeled, slightly rounded at the top, and of a reddish-brown colour; protuberance oval, very glossy and smooth.

This tree resembles *P. Aztecaensis*, in general appearance, but differs in its more short, stiff, horizontal leaves and much smaller cones.

It is found growing in the region of Zacatlan, in Mexico. (? *Pinus Apulcensis*.)

No. 152. *PINUS ZITACUARIA*, *Roez*, the Zitacuaro Pine.

(Discovered by M. Roezl in 1856-7.)

Leaves, in fives, slender, and from ten to twelve inches long; sheaths, from one inch and a quarter to one and a half long, and silky. Cones, curved, tapering towards the base, upwards of ten inches long, and two inches and a half in diameter. Scales, quadrangular, pyramidal; protuberance elevated and obtuse, with a stout short mucro at the apex.

A fine tree, of great beauty, growing from 90 to 100 feet high, regularly furnished with very straight branches, spread out horizontal. It is found near Zitacuaro, in Mexico, at an elevation of 8,000 or 9,000 feet. (? *Pinus Devoniana*.)

Gen. PODOCARPUS. *Heritier.*

Flowers, diœcious, rarely monœcious.

Fruit, drupaceous, inverted, and adhering.

Seeds, hard, and bony shelled.

Leaves, either opposite, alternate or scattered, linear or oblong, and one-nerved.

Seed-leaves, in twos.

Name, derived from ‘*πους*,’ a foot, and ‘*καρπος*,’ a fruit, fruit foot-stalked.

All natives of the temperate zones of Asia, Africa, and America.

Section I. EUPODOCARPUS, *Endlicher*, OR THE TRUE
PODOCARPS.

Fruit, solitary.

Receptacle, fleshy, connected with the bracts by the axis of the short spike.

Leaves, alternate or scattered, linear, and one-nerved.

No. 1. PODOCARPUS ALPINA, *R. Brown*, the Alpine Podocarpus.

This very doubtful species is said to be found on Mount Wellington, in Tasmania, at an elevation of 4,000 feet, and on the elevated plains of Malborough, at a height of 3,000 feet above the sea.

It probably is nothing but *Arthrotaxis selaginoides*, which is sometimes called *A. Alpina*.

No. 2. PODOCARPUS AMARA, *Blume*, the Bitter Podocarpus.

Syn. *Podocarpus cuspidata*, *Hort. Par.*

Leaves, alternate, or frequently opposite, somewhat in two

rows, smooth on the margins, linear-lanceolate, closely set along the shoots, and tapering to a long point; from two to four inches long, and three-quarters of an inch broad, with a prominent rib on the under side, and channelled above; green on both sides, on short footstalks, slightly undulated and flexible. Branches, in whorls, very spreading and slender; lateral ones somewhat in whorls, and swelled round the base. Buds, small, somewhat globular, and covered with scales. Male flowers in axillary bundles, of from three to five, on short stout peduncles, from half to one inch in length, and naked at the base; fruit unknown.

A tall tree, growing 200 feet high, with a spreading head, found on the highest parts of the volcanic mountains of Salak, Gede, &c., on the western part of the Island of Java.

It is very tender.

No. 3. *PODOCARPUS ANTARCTICA*, *Van Houtte*, the Antarctic Podocarpus.

Syn. *Podocarpus curvifolia*, *Carriere*.

Leaves, ovate-oblong, alternate, thick, leathery, smooth, shining, stiff, revolute, and closely placed along the shoots; from two to five inches long, slightly concave on the back near the margins, flat on the upper surface, a little reflected on the edges, and with a projecting rib along the middle, on both faces, tapering at the base into a short stout footstalk, regularly and briefly terminating in a thick obtuse point, never acute, but frequently black.

A large tree, supposed to be found on the Andes of Patagonia and Chili, but of which little is known.

No. 4. *PODOCARPUS BIDWILLI*, *Hoibrenk*, Bidwill's Podocarpus.

Leaves, linear-lanceolate, alternate, spread out, and without any nerves, from one to one inch and a half long, and from one to two lines broad, tapering to both extremities, and furnished on the apex with a sharp point. Fruit unknown.

A tree of which little is known beyond what is here stated,

and that it comes from the east coast of New Holland, and very much resembles the *Podocarpus læta*, from the same country, of which it may only be a variety.

No. 5. *PODOCARPUS BRACTEATA*, *Blume*, the Bracteated Podocarpus.

Leaves, scattered, but sometimes in close whorls, straight, or somewhat falcate, linear-lanceolate, and regularly tapering to the base, flat on the edges, and furnished with scales at the base, slightly twisted, very acute pointed, leathery, and a little glossy, from three to five inches long, and from four to six lines broad on the adult trees, but from eight to nine inches long, and from eight to ten lines broad on the young plants. Branches, horizontal, cylindrical, and covered with reddish-grey bark; branchlets, opposite; male catkins, collected in bundles, rarely solitary, oval, and almost sessile; females axillary, solitary, and furnished at the base with a bractiform involucre; receptacle thick. Fruit globose.

A large tree, growing eighty feet high, with a straight stem, covered with a smooth bark, and the top much branched, found in the forests of Amboyna, on the volcanic mountains of Burangrang, and in the western parts of Java.

It gets very much reduced in size and stature as it ascends the mountains, and has the following variety, according to Dr. Blume:—

PODOCARPUS BRACTEATA BREVIPES, *Blume*.

This variety has much shorter and narrower leaves, and shorter peduncles. Fruit, elliptic, or somewhat globular, and very much smaller.

It is found on the western mountains of Java.

No. 6. *PODOCARPUS CHILINA*, *Richard*, the Chili Podocarpus.
Syn. *Podocarpus saligna*, *Don*.

Leaves, linear-lanceolate, acute-pointed, straight, rarely falcate, alternate, spreading, sessile, entire, flat, smooth, of a bright

green colour, and tapering to both ends, but most towards the point; from three to four inches long, and from two to four lines broad, with a single nerve along the middle of a paler colour. Branches, very numerous, scattered, alternate, very rarely opposite, or in threes. Flowers, diœcious, the male ones very small, and sessile on the ends of the branchlets; the females, on one-flowered peduncles, solitary, and rising from the base of the leaves on the branches. Fruit, solitary, very rarely two in number, at the extremity of the receptacle, fleshy, ovate, obtuse, dark purple, smooth, shining, and with a slight point on the apex, and from two to four lines long.

A tree forty feet high, found abundantly on the mountains of Chili, where it is called 'Manigui.'

No. 7. *PODOCARPUS CHINENSIS*, *Wallich*, the Chinese Podocarpus.

Syn. *Podocarpus macrophylla* Maki, *Endlicher*.

- „ „ Makoya, *Pin. Wob.*
- „ „ Maki, *Siebold.*
- „ „ Makayi, *Lawson.*
- „ „ Makoyi, *Hort.*
- „ *Taxus Chinensis*, *Roxburgh.*
- „ „ Makoya, *Hort.*

Leaves, linear-lanceolate, slightly pointed, closely placed, alternate, somewhat two-rowed, and reflected on the margins, green above and glaucous below on the younger ones, but the older ones are of a paler colour, with an elevated straight rib along the middle on the upper surface, terminating in an obtuse point. Branches, erect, spreading, alternate, or opposite, or sometimes somewhat vertical; branchlets, short and slender. Male flowers, numerous, axillary towards the extremities of the branches, frequently connected in threes on the same peduncle, and rather more than an inch long; female flowers, on lateral footstalks, with a fleshy receptacle nearly an inch long. Fruit, cylindrical, oblong, obtuse-pointed, or slightly tapering to the base when young, but when old more globular, of a shining green, tolerably intense, and covered with a glaucous powder. The males and females are on separate plants, the male one

being in general more delicate, its branches more erect, much shorter, and not so thickly furnished with leaves, which in general is more glaucous, not so long, a little broader, and more obtuse than those on the female plant.

A large bush, or small tree, with a straight stem, found abundantly in China and Japan, where it is called 'Maki.'

No. 8. *PODOCARPUS CORIACEA*, *Richard*, the Leathery-leaved Podocarpus.

Syn. Podocarpus Yacca, *Don*.

„ „ Antillarum, *R. Brown*.

„ *Taxus lancifolia*, *Wickstræm*.

Leaves, elliptic, lanceolate, tolerably thick, leathery, shining, sessile, or tapering to the base into a very short footstalk, getting narrower to the apex, and terminating in an almost obtuse point; from one to two inches long, and nearly half an inch broad in the widest part, with an elevated mid-rib running along the centre on both sides, but largest on the under surface. Branches, spreading, horizontal, alternate, or sometimes opposite, or in whorls, frequently slender, and naked on the greater part of the larger ones, and tuberculated by the falling leaves. Fruit, solitary, axillary, and very small, on short footstalks, with a fleshy receptacle, thickened, and sloping to the top. Seeds, oval, oblong, slightly curved, and terminating on the top in a short blunt point.

A small tree, from forty to fifty feet high, found on the Antilles, the Island of Montserrat, and on the Blue Mountains of Jamaica, where it is called 'Yacca.'

It is not hardy.

No. 9. *PODOCARPUS DISCOLOR*, *Blume*, the Discoloured Podocarpus.

Leaves, thickly set on, or scattered along the shoots, linear-lanceolate, quite straight, leathery, stiff, and tapering to a sharp pungent point, from one inch and a half to two inches and a half long, and rather more than a quarter of an inch wide,

attenuated at the base, and more or less reflected on the margins, slightly concave, and of a bright glossy green above and glaucous below, with an elevated rib on both faces, but most projecting on the under one. Branches, in whorls, lateral ones ascending; buds, oval, terminal one solitary, and covered with scales. Flowers and fruit unknown.

A large tree, covered with a reddish bark; found in the vast forests on the eastern part of Java, particularly on the most elevated parts of the volcanic mountains of Tjerimai and Cheribon.

It is very tender.

No. 10. *PODOCARPUS ELATA*, *R. Brown*, the Lofty Podocarpus.

Leaves, alternate, spreading, linear, tapering to an obtuse point at both extremities, from three inches and a half to four inches long, and about four lines broad. Fruit, axillary, solitary, and one-seeded on a slender receptacle; receptacle, cylindrical, almost club-shaped, with the seed globular.

A tree, of which little is known, found on the eastern part of New Holland.

No. 11. *PODOCARPUS ELONGATA*, *L'Heritier*, the Elongated Podocarpus.

Syn. Podocarpus pruinosa, *Meyer*.

„ „ linearis, *Van Houtte*.

„ „ mucronata, *Hort*.

„ *Taxus elongata*, *Solander*.

„ „ capensis, *Lamarck*.

„ Podocarpus Meyeriana, *Endlicher*.

Leaves, linear, or oblong-lanceolate, straight, rarely falcate, attenuated, stiff, tolerably thick, and rather smooth at the edges; from one and a quarter to one inch and three quarters long, and two lines broad, of a dark green or glaucous blue colour, with a rib along the upper surface, a little elevated, but hardly visible on the under side, sessile, or regularly tapering to a short footstalk at the base, very bluntly and regularly rounded on the top, and terminating in a short mucro; sometimes a little pointed or obtuse, but frequently wanting.

Branches, opposite, or in whorls, upper ones ascending, lower ones sometimes deflected, and spreading; branchlets, short, and slightly angular. Male flowers, cylindrical, with numerous spirally imbricated anthers. Peduncles, axillary, solitary, and from four to five lines long, terminated by a much shorter receptacle; receptacle, frequently fleshy, thick, oblique, slightly bifid on the top, and carrying an oval or globular seed about the size of a gooseberry, which is marbled on the outside.

A large tree, covered with a greyish brown bark when old, and glaucous on the young shoots; found at the Cape of Good Hope, and in Abyssinia, on the mountains in the province of Goodjam, at an elevation of 6,000 feet, where it is called 'Sigha' by the people. It is rather tender.

No. 12. *PODOCARPUS ENDLICHERIANUS*, *Carriere*, Endlicher's
Podocarpus.

Syn. *Podocarpus nobilis*, *Hort.*

Leaves, alternate, closely arranged on the branches, somewhat two-rowed, straight, or very slightly falcate, undulated, and not thickened in the margins on the adult trees; those on the branchlets are almost oval, or elliptic, with several leaves in a whorl, more rounded at both extremities, and much shorter; from four to seven inches long, and from six to eight lines broad, pale green on both sides, but frequently much yellower on the under one, and with short stout footstalks. Branches, mostly in whorls of three, (very rarely scattered), ascending, and little divided; branchlets, very short, stout, and covered with a yellowish bark. Fruit, unknown.

A tall tree, covered with a yellowish brown bark, smooth at first, but afterwards much wrinkled when old, and of which little is known, except that it is a very handsome and robust kind, remarkable for its large ample foliage. It is supposed to come from the northern parts of India, and most probably from Nepal.

No. 13. *PODOCARPUS ENSIFOLIA*, *R. Brown*, the Sword-leaved Podocarpus.

Syn. *Podocarpus acicularis*, *Van Houtte*.

Leaves, linear, spreading, long, narrow, thick, and regularly tapering to both ends, with a single nerve slightly elevated along the middle, and terminating in a slender acute point at the apex; from two to three inches long and from one to two lines broad. Male flowers, solitary, cylindrical, obtuse, closely placed on the axillary branchlets, and forming loose taper bunches on the terminal branches, accompanied by scale-like leaves of variable sizes. Fruit, unknown.

A small tree, found in Tasmania and the eastern parts of New Holland.

No. 14. *PODOCARPUS JAPONICA*, *Siebold*, the Japan Podocarpus.

Syn. *Podocarpus lanceolata*, *Hort*.

Leaves, alternate, flat, linear-lanceolate, elongated, obtuse-pointed, thick, leathery, and stiff; from four to eight inches long, and about half an inch wide, with an elevated rib, almost acute along the upper surface, but rounded on the under one, and tapering into a long slender point at the apex, and into a short stout footstalk at the base.

A small tree, found plentiful in Japan by Dr. Siebold.

No. 15. *PODOCARPUS KORAIANA*, *Siebold*, the Corean Podocarpus.

Syn. *Cephalotaxus Koraiana*, *Hort*.

„ *Taxus japonica*, *Loddiges*.

Leaves, regularly linear, somewhat falcate, alternate, or nearly spiral by their closeness along the shoots, leathery, stiff, revolute, and terminating in rather an obtuse end, furnished with a hard, acute point, from one inch and a quarter to two inches and a quarter long, and one line and a half broad, without, or on very short footstalks, of a deep glossy green, with a narrow, acute rib along the middle, on the upper surface, and glaucous on the under side, except on the centre nerve and raised margins,

which are of a bright glossy green, and all terminating at the apex in a short spiny point, more or less acute. Buds, covered with numerous persistent, oval, imbricated scales, keeled on the back, and pointed. Branches, strictly erect, twiggy, stiff, and thinly furnished with laterals; branchlets very short, and with the branches channelled along their surface by the long decurrent base of the leaves, which, after they fall off, cause the branches and stems to become more or less tuberculated along the surface. Fruit unknown.

A small fastigiate bush, full of erect branches, thickly clothed with leaves, and not growing more than two or three feet high, found on the Chinese peninsula of Corea, and in Japan, where it is abundantly grown in their town gardens, and found wild on the mountains of Nagasaki.

It is quite hardy, and a very desirable little evergreen for small gardens.

No. 16. *PODOCARPUS LÆTA*, *Hoibrenk*, the Red-nerved Podocarpus.

Leaves, spreading out, or deflected, linear-falcate, sessile, or tapering to a very short footstalk, from one inch and a half to one inch and three-quarters long, and a quarter of an inch wide, with a sharp, rigid mucro at the point, slightly thickened and convex on the upper surface, with a slight furrow, or little concave glaucous bands on the under part, on each side, of a reddish mid-rib. Branches, verticillate, very rarely alternate, spread out, or declining, and not numerous or branching. Branchlets, few in number, spreading, opposite, or in threes, very rarely scattered singly, but slightly channelled. Fruit unknown.

A tall tree, with a straight cylindrical stem, found on the east coast of New Holland.

No. 17. *PODOCARPUS LAMBERTI*, *Klotzsch*, Lambert's Podocarpus.

Leaves, regularly linear, sharp-pointed, and tapering to the

base, straight or falcate, without any footstalks, slender, and loosely scattered, smooth, or nearly so, on the upper surface, and flat, from one inch and a quarter to one inch and three-quarters long, and two lines broad. Male catkins, short, in fascicules, on axillary footstalks, scaly at the base, footstalks of the fruit much longer than those of the receptacle, which is one-fruited. Fruit, globular or oblong, shining, small, and about one quarter of an inch long.

A robust tree, found on the mountains of Brazil.

No. 18. *PODOCARPUS LAWRENCII*, *Hooker*, Lawrence's Podocarpus.

Leaves, somewhat in two rows, lax, spreading, linear, narrow, and tapering to both ends, of a pale-green colour above, and glaucous below, furnished with a very sharp, rigid point. Branches, slender. Flowers and fruit unknown.³

A small tree, found by Gunn in Tasmania, of which little further is known.

No. 19. *PODOCARPUS LEPTOSTACHYA*, *Blume*, the Slender-spiked Podocarpus.

Leaves, somewhat in whorls, linear-lanceolate, alternate, straight, or sometimes slightly falcate, leathery, and closely placed on the shoots, from two to five inches long, and from three to six lines broad, tolerably thick, acute, with a pungent point, flat, shining, and tapering to the base, which is frequently a little twisted, of a dull green colour on the upper surface, but much paler below. Branches and branchlets much divided, somewhat in whorls, cylindrical, and with the stem and principal branches covered with a rough bark, full of cracks. Male catkins sometimes solitary, or in pairs, or in threes, furnished at the base with thin, shrivelled scales, two or three in number, and more or less deciduous. Fruit unknown.

A tree fifty or sixty feet high, found on the mountains in the Island of Borneo.

No. 20. *PODOCARPUS MACROPHYLLA*, *Don*, the Long-leaved
Podocarpus.

Syn. *Podocarpus verticillata*, *Hort.*

„ „ *longifolia*, *Hort.*

„ *Taxus macrophylla*, *Banks.*

„ „ *longifolia*, *Hort.*

„ *Maki-fætens*, *Kämpfer.*

Leaves, alternate or scattered, linear-lanceolate, or somewhat oblong, flat on the edges, distant, spread out, and of a dry, leathery texture, from two to four inches long, and about half an inch wide, with an elevated rib on both sides, but principally on the upper one, very rarely falcate, mostly straight, of a pale, shining green, and tapering to a short, round footstalk at the base, and obtuse point at the apex, sometimes withered, or furnished with a stiff, blackish point. Branches, numerous, mostly in whorls; branchlets, slightly angular, and rough from the fallen leaves. Male catkins, furnished at the base with scales; female peduncles axillary, solitary, one-fruited, and furnished with two bracteas on the top. Fruit, oval, smooth, and about the size of a pea.

A tree growing from forty to fifty feet high, with vertical branches, and an ample head, found abundantly in Japan, and much cultivated by the Japanese in their gardens as the ‘Fonmaki,’ or true Maki.

The timber is white, light, excellent, and free from the attacks of insects.

No. 21. *PODOCARPUS NEGLECTA*, *Blume*, the Neglected
Podocarpus.

Leaves, somewhat in two rows, or scattered, linear-lanceolate, acute-pointed, and more or less reflected on the margins, from two to four inches long, and from half to three-quarters of an inch broad, with an elevated rib on both sides, but most on the under side, and tapering into a very short twisted footstalk. Branches, opposite, or in whorls, cylindrical, and reddish-brown; branchlets, opposite, two-rowed, and almost angular;

buds covered with scales. Male catkins, cylindrical, in bundles, on short, axillary peduncles, surrounded at the base with concave membranaceous scales, which soon fall off.

A tall tree, growing upwards of 100 feet high, found in forests on the western part of the Island of Java, at an elevation of 5,000 feet, particularly at 'Karang,' in the province of Bantam, and about 'Pangaranghu.'

It is very tender.

No. 22. *PODOCARPUS NEREIFOLIA*, *R. Brown*, the Nerium-leaved Podocarpus.

Syn. *Podocarpus macrophylla*, *Wallich*, not *Don*.

Leaves, alternate, but mostly very closely placed on the branchlets, erect or spreading, lanceolate, and acute-pointed, frequently reflected on the under side, and regularly attenuated to the base with a stout petiole, very thick, flat, and leathery, from three to six inches long, and from one quarter to three-quarters of an inch broad, of a bright green on the upper surface, but much paler below, and traversed along the middle by a very elevated rib, almost acute on the upper side, but less elevated and more enlarged on the under one. Branches, slender, and provided with bracts at the base. Male catkins, long, axillary, and solitary; females on axillary, one-flowered peduncles, longer than the receptacles; receptacle oblong, and obliquely lobed. Fruit, eatable, with a sweetish taste.

A large tree, found in Nepal, Sincapore, and Penang, growing forty feet high.

It is very tender.

No. 23. *PODOCARPUS NIVALIS*, *Hooker*, the Snowy Podocarpus.

Leaves, oblong, or elliptic, obtuse, recurved, and spreading, tapering to the base and apex, very closely placed, thick on the edges, sessile, or on very short footstalks, and with a single nerve along the middle of the leaf, scarcely visible, or almost wanting on the upper surface, but rather projecting on the under one; from three to four lines long, and from one

to one line and a half broad in the widest part. Male flowers, small, cylindrical, obtuse, and united in threes on the top of the axillary peduncle. Fruit, unknown.

A very small bush, found near the limits of perpetual snow, on the mountain of Tongariro, in the northern part of New Zealand.

It is not yet introduced.

No. 24. *PODOCARPUS NUBIGÆNA*, *Lindley*, the Nubigean Podocarpus.

Syn. *Saxe-Gothæa gracilis*, *Hort.*

Leaves, linear, or oval elliptic, somewhat falcate, thick, flat, and attenuated at the base, with a short stout footstalk, and terminating in a short acute point at the apex; from three quarters of an inch to one inch and three quarters long, and a quarter of an inch broad, with a single nerve along the middle; green above, and marked on the under side on each side of the rib by a broad band more or less glaucous. Fruit, oblong, growing singly in the axil of the leaves, on very short stalks, with the receptacle two-lobed, obovate, and unequal-sided. Seeds, oblong, slightly bossed, and curved inwards at the point.

A large tree, found on the colder parts of Chili, the Andes of Patagonia, in the province of Valdivia, and the Island of Chiloe, where it is called 'Pino.'

No. 25. *PODOCARPUS OLEIFOLIA*, *Don*, the Olive-leaved Podocarpus.

Leaves, lanceolate, acute, very entire, leathery, smooth on both sides, one-nerved, with a sunken channel on the upper surface along the middle nerve, reflected on the edges, and tapering a little to the base; from one to one inch and a half long, and from two to three lines broad. Branches, crowded, smooth, and thickly furnished with leaves. Male catkins, without footstalks, cylindrical, solitary, and about one inch long; footstalks of the fruit, filiform, two-lobed, smooth, about three quarters of an inch long, and two-flowered, one always abortive. Fruit, oval, solitary, very smooth, and reflected.

A tufted tree, with close branches, and covered with a yellowish brown bark ; found on the Mountains of Chili.

It is not hardy.

No. 26. *PODOCARPUS POLYSTACHYA*, *R. Brown*, the Many-spiked Podocarpus.

Leaves, lanceolate, sharp-pointed, and curved at the margins. Male flowers, axillary, somewhat in threes, and provided at the base with a scale-formed involucre. Fruit, on axillary footstalks, and solitary.

A large tree, with a straight stem and very branching ample head ; found at Sincapore, and on the Prince of Wales Island, where it is called the Wax-Dammara. This species is very like *Podocarpus bracteata*, but differs in having the leaves and catkins much shorter but stouter, and in the receptacle being much thicker, and the fruit more globular.

No. 27. *PODOCARPUS PURDIEANA*, *Hooker*, Purdie's Jamaica Podocarpus.

Syn. *Podocarpus Jamaicaensis*, *Hort.*

Leaves, elliptic, or oblong-lanceolate, thick, leathery, very smooth, and shining on the upper surface, flat, straight, very rarely falcate, and slightly recurved on the margins ; from three to five inches long, and from three quarters of an inch to one inch broad, of a bright green, regularly tapering into a short stout footstalk at the base, and from the middle of the leaf on each side to the point, which is terminated by a stout, short, mostly black, obtuse point, but sometimes variable, those of the young plants being acute and spiny. Branches, spreading, horizontal, and marked by the scars caused by the falling off of the old leaves. Fruit, with the footstalks much shorter than the receptacle, which is bifid, and one-fruited. Seeds, somewhat globose, terminating on the upper part in an oblique little flexible point.

A large tree, growing upwards of 100 feet high, found on the eastern side of the Island of Jamaica, at an elevation of from 2,500 to 3,500 feet.

It is very tender.

No. 28. *PODOCARPUS RIGIDA*, *Klotzsch*, the Rigid Podocarpus.
Syn. *Podocarpus glomerata*, *Don*.

Leaves, linear-lanceolate, stiff, very sharp-pointed, alternate, flat, one-nerved, attenuated at the base, shining, and smooth on both surfaces; from one to one inch and three quarters long, and from one to two lines broad. Branches, numerous, cylindrical, leafy, and covered with a yellowish brown smooth bark. Male catkins, short, three quarters of an inch long, cylindrical, united in a fascicle of five or six on an axillary footstalk. Fruit, unknown.

A tree, found in the neighbourhood of 'Panao,' in Peru.

No. 29. *PODOCARPUS RUMPHII*, *Blume*, Rumphius's Podocarpus.
Syn. *Lignum emanum*, *Rumphius*.

Leaves, sometimes in whorls of from three to four on the young shoots, but scattered, or somewhat in two rows on the more adult trees, linear-lanceolate, spreading, acute-pointed, very rarely blunt at the ends, straight, or somewhat falcate, leathery, and on very short footstalks; from five to nine inches long, and from three quarters of an inch to one inch broad, with an acute rib on the under side, but hardly prominent, and somewhat keeled above, and of a bright shining green on the upper surface. Branches, long and smooth; buds, small, ovate, and covered with scales; footstalks, axillary, solitary, and about one inch long, furnished on the top with from one to three flowers; receptacle, turban-shaped, obliquely truncated on the ends, fleshy, of a dark violet colour, and containing one, but sometimes two seeds. Fruit, elliptic, or somewhat globular, covered when ripe with a glaucous bloom.

A tall tree, growing from eighty to a hundred feet high, with a straight stem, covered with a reddish brown bark, slightly wrinkled, found in the most elevated forests in the Moluccas, and New Guinea.

No. 30. *PODOCARPUS SALICIFOLIA*, *Klotzsch*, the Willow-leaved Podocarpus.

Leaves, somewhat falcate, very long, and tapering to the point, leathery, stiff, of a pale green, and shining on the upper

surface; from three to five inches long, and very rarely more than half an inch broad. Male catkins, axillary, solitary, cylindrical, obtuse, a little incurved, and three quarters of an inch long, with angular footstalks; footstalks of the fruit, from three quarters of an inch to one inch long, and much thicker than that of the receptacle, which is two-lobed, but only one-fruited. Fruit, oblong, or globular, smooth, and furnished with a shortish point on the apex.

A small tree, found on the mountains of Colombia, and in the North-western part of South America.

It is very tender.

No. 31. *PODOCARPUS SELLOWII*, *Klotzsch*, Sellow's Podocarpus.

Leaves, long, lanceolate, acute-pointed, and tapering to the base; from two to three inches long, and from three to six lines broad in the widest part. Male flowers, axillary, elongated, and solitary; footstalks of the fruit slender, with the upper part two-flowered, but only one-fruited, the other being always abortive. Fruit, smooth.

A tree, found on the mountains of Brazil, by Sellow, but not hardy.

No. 32. *PODOCARPUS SPINULOSA*, *R. Brown*, the Spiny-leaved Podocarpus.

Syn. *Podocarpus excelsa*, *Loddiges*.

„ „ *pungens*, *Don*.

„ *Taxus spinulosa*, *Smith*.

Leaves, alternate, or opposite, or in whorls, linear-falcate, leathery, spreading in all directions, pungent, smooth, and thick, from one to one inch and three-quarters long, and one line broad, tapering to a very sharp point, thickened on the edges, and with an elevated rib along the middle. Branches, slender, and spreading. Male flowers, in clusters, and axillary. Fruit, on axillary footstalks, much longer than those of the receptacles, which are somewhat club-shaped, and one-fruited. Seed, globular, solitary, and about as large as a pea.

A tree, found growing about Port Jackson, and in the eastern part of New Holland. It is not hardy.

No. 33. *PODOCARPUS THEVETIÆFOLIA*, *Blume*, the Thevetia-leaved Podocarpus.

Leaves, linear-lanceolate, or sometimes spoon-shaped on the shorter branchlets, very straight, without footstalks, acute or obtuse-pointed, tapering to the base, and frequently a little twisted, from one and a half to three inches long, and from a quarter to half an inch broad, leathery, flat, concolor, and shining, with a prominent rib on the under side, a little elevated also on the upper one. Branches, straggling, mostly forked, the younger ones angled and channelled along the surface; peduncles axillary, filiform, and solitary, from three to four lines long, with a turban-shaped receptacle, obliquely truncated, furrowed on the back, fleshy, and of a dark-green colour, double the size of the seed, which is about half an inch long, and elliptic.

A very branching tree, growing from forty to fifty feet high, found growing amongst the rocks, along the coast of New Guinea, and probably on other islands in the South Pacific.

It is very tender.

No. 34. *PODOCARPUS THUNBERGII*, *Hooker*, Thunberg's Podocarpus.

Syn. *Taxus latifolia*, *Thunberg*.

„ *Podocarpus latifolia*, *R. Brown*.

Leaves, oblong-lanceolate, straight, or very slightly falcate, obtuse at the extremities, or with a dry, blunt point at the apex, and regularly attenuating into a very short footstalk at the base, one-nerved, the same colour on both sides, and of a leathery texture; from one and a half to two inches and a half long, and half an inch broad, sometimes acute or blunt-pointed; peduncles axillary, solitary, one-flowered, from two to three lines long, and about the same length as the receptacle; receptacle thick, angular, bidented on the top, and containing a single seed. Seeds, elliptic, or frequently nearly round, with a little curved point on the top.

A large evergreen tree, found at the Cape of Good Hope, where the colonists call it 'Geelhout' (yellow wood).

It is not hardy.

No. 35. *PODOCARPUS TOTARA*, *Don*, the Totarra Pine.

Syn. *Podocarpus pungens*, *Van Houtte*.

„ „ *Totarra*, *Hort*.

Leaves, spreading in all directions, alternate, distant, linear-lanceolate, pungent, rigid, and very sharp pointed, slightly tapering to the base, of a yellowish-green colour on the upper surface, very pale and glaucous below, with a single nerve, very little projecting along the middle, and slightly bent round the margins, from three-quarters to one inch and a half long, and about one line broad. Branches, slender, rounded, and long; branchlets, forked, but sometimes in threes, twiggy, rounded, and of a pale-yellowish-green colour; male and female on separate plants; male flowers, solitary, axillary, without footstalks, cylindrical, and longer than the leaves; female ones on solitary footstalks, with one or two flowers on each axillary, and hardly one line long, thickening into a very ample, fleshy receptacle. Seeds, when young, oblong; when mature, oval and solitary, very rarely in twos on the same footstalk.

A tall tree, growing from eighty to ninety feet high, and twenty feet in circumference, found on the northern island of New Zealand, where it is called 'Totarra' by the natives.

Timber, excellent, and of a reddish colour.

It is nearly hardy.

Section II. *STACHYCARPUS*, *Endlicher*, OR THE SPIKE-FRUITED *PODOCARPUS*.

Flowers, in spikes, provided with bracts, and frequently all abortive except the upper ones.

Fleshy receptacle wanting.

Leaves, alternate, or more frequently in two rows, linear, and one-nerved.

All trees or bushes; natives of the Cape of Good Hope, New Zealand, and the temperate parts of South America.

No. 36. *PODOCARPUS ANDINA*, *Pæppig*, the Andes Podocarpus.

Syn. *Podocarpus spicata*, *Pæppig*, not *Brown*.
 ,, (?) *Taxus spicata*, *Dombey*.

Leaves, regularly linear, and tapering to both ends, either scattered or two-rowed along the branchlets, those on the lower parts being scattered, while those on the upper ones are mostly in two rows, with very short footstalks, from three-quarters to one inch and a quarter long, and about one line and a half broad, of a dark glossy green colour, more or less rusty on the edges, and delicately freckled on the upper surface, without any rib, and glaucous below, leathery, stiff, very smooth, and dense. Branches, numerous; branchlets, short, stout, spreading, scattered, but frequently alternate and angular near the top. Flower-spike, axillary and alternate; peduncle, two or three-flowered, but one-fruited from abortion; bracts, small and sessile; receptacle, oval, on the end of a long neck, obscurely three-lobed, and oblique, smooth, plump, purple, and persistent after the fruit is ripe. Fruit, globular, smooth, fleshy, succulent, without any footstalk, and about the size of a common cherry. Seeds, with a hard, bony shell.

A small tree, growing from ten to twenty feet high, with a cylindrical stem, covered with a smooth, reddish-brown bark, found in the shaded valleys of Quillai Leuvu, in the neighbourhood of Antuco, on the colder alpine regions of South Chili.

Timber, hard and yellow.

Probably quite hardy.

No. 37. *PODOCARPUS FALCATA*, *R. Brown*, the Sickle-leaved Podocarpus.

Syn. *Taxus falcata*, *Thunberg*.

Leaves, somewhat in two rows, linear subfalcate, acute-

pointed, one-nerved, alternate, and mucronate. Flower-spikes, short, axillary, abortional, and single-fruited. Seeds, globular, tapering to the base, and without the fleshy receptacle.

A species of which little seems to be known, and said to be found at the Cape of Good Hope by Professor Thunberg.

No. 38. *PODOCARPUS FERRUGINEA*, *Don*, the Rusty-coloured Podocarpus.

Leaves, in two rows, narrow, linear, somewhat falcate, very dense, and acute-pointed, from three-quarters to one inch and a quarter long, and one line broad; those on the branches and larger branchlets needle or awl-shaped, scale-formed, and disposed all round, somewhat depressed, and, like the others, of a brownish tint; rib very prominent on the upper part, but very slightly so on the under one, and of a rusty-brown colour, tapering to a fine acute point, sometimes, but very rarely, to an obtuse one. Branches, spreading, frequently alternate, lateral ones and branchlets two-rowed, slender, spreading, horizontal, or bent downwards, and covered with a reddish-brown bark. Male catkins, cylindrical, or oblong, axillary, and solitary; female flower-spikes, one-flowered, axillary, or erect on the ends of the branchlets, with numerous bracteas. Fruit, oval or globular, about the size of a hazel-nut, of a fine red colour, and covered when ripe with a glaucous powder, soft, and with the odour of turpentine.

A tree, from forty to sixty feet high, and three feet in diameter, found on the northern island of New Zealand, where it is called Miro, or Mairo, by the New Zealanders. Timber, durable, and of a fine red tint.

It is not hardy.

No. 39. *PODOCARPUS SPICATA*, *R. Brown*, the Spike-flowered Podocarpus.

Syn. *Dacrydium Mai*, *Cunningham*.

„ „ *taxifolium*, *Banks*.

„ „ *Mayi*, *Van Houtte*.

Leaves, mostly in two rows, but sometimes those on the larger

branches are alternate and scattered ; from a quarter to one inch and a quarter long, and one line broad, needle-shaped, imbricated, placed all round, and glaucous below, while those on the small lateral ones and branchlets are regularly linear, acute-pointed, and mostly falcate, of a dull green, or reddish brown on the upper surface, and with two glaucous bands below, recurved at the edges, oblique at the base, and placed on very short slender footstalks, rounded at the ends, sometimes spoon-shaped, and furnished with a very fine and short mucro. Branches and branchlets, numerous, flexuose, ascending, or spreading horizontal, or sometimes deflected, and covered with a reddish bark. Male catkins, from ten to twenty in number, sessile, and disposed in erect axillary spikes, those of the female ones in loose, many-fruited spikes. Fruit, globular, nearly sessile, and from four to seven on each.

An enormous tree, growing from 150 to 200 feet high, with a straight stem, found growing in swampy places on the Northern Island of New Zealand, where the natives call it 'Mai.'

It is quite tender.

No 40. *PODOCARPUS TAXIFOLIA*, *Humboldt*, the Yew-leaved Podocarpus.

- Syn. *Taxus montana*, *Willdenow*, not *Nuttall*.
 „ *Podocarpus montana*, *Loddiges*.
 „ *Torreya Humboldti*, *Knight*.
 „ *Dacrydium distichum*, *Don*.
 „ *Podocarpus Humboldti*, *Hort*.

Leaves, somewhat in two rows, or scattered, broadly linear, frequently more or less sickle-shaped, bluntly rounded at the ends, rarely pointed, but mostly furnished with a very short mucro, entire, leathery, flat, smooth, of a bright glossy green, a little convex above, and much paler below ; from one inch to one inch and a quarter long, and one line and a half, rarely two lines broad, with a slight rib along the upper surface, but hardly visible on the under one except by its colour. Branches, ascending or spreading, but sometimes on old trees drooping ; branchlets, in two rows, and alternate. Flower spikes, branch-

ing, axillary, and terminating in two or three flowers, but abortive, and only one-fruited. Seeds, ovate, or globular.

A tree about sixty feet high, found on the mountains of Saragura, in Peru, and between Ona and Loxa, at an elevation of from 6,000 to 8,000 feet.

There is the following variety:—

PODOCARPUS TAXIFOLIA DENSIFOLIA, *Kunth.*

Syn. *Taxus montana*, *Var. Willdenow.*

Leaves, much denser, and not more than half the length of those of the species, but in other respects the same.

It is found on the mountains of Quindiu, between Moral and Passo-del-Machin, in Peru, at an elevation of from 6,000 to 8,000 feet.

Section III. DACRYCARPUS. *Endlicher*, OR THE DACRYDIUM-FRUITED PODOCARPS.

Flowers, solitary and terminal.

Receptacle, fleshy, with the axis of the short spike, without bracts.

Leaves, many-formed, either three-sided, needle-shaped, and in five rows, or in two rows, spreading, linear, and flat.

Large trees, natives of Java and New Zealand.

No. 41. PODOCARPUS CUPRESSINA, *R. Brown*, the Cypress-like Podocarpus.

Syn. *Podocarpus imbricata*, *Blume.*

„ „ *Horsfieldii*, *Wallich.*

„ *Taxodium Horsfieldii*, *Knight.*

Leaves, opposite, linear-falcate, and spreading in two rows on the lesser branchlets, but arranged in five rows, loosely imbricated, needle-shaped, three-sided or awl-shaped, acute, and spiny-pointed on the principal and lateral branches; from

three to eight lines long, and from one half to three quarters of a line broad, of a bright glossy green colour on both faces, very slender, soft, slightly concave, tapering to each end, but least to the base, and very acute at the point on the adult ones. Branches, slender, reflected, or pendant, but sometimes with the upper ones ascending, regularly divided, very numerous, and covered with scale-formed leaves of various lengths, closely adhering at the base; lateral ones much divided, very slender, alternate, in two rows, and more or less distant; branchlets, very short, slender, two-rowed, and thickly covered with spreading leaves, until they almost touch each other. Fruit, solitary, terminal, on short pendant branchlets, surrounded by leaves, a little longer, and more spreading than the others; receptacle, fleshy, almost the length of the fruit, and a little thickened.

A fine tall tree, growing 180 feet high, well furnished with spreading branches, clothed with vivid green foliage, found in Java, the Pulo-Penang, and the Philippine Islands, where the natives call it 'Kimerak.'

It is quite tender.

No. 42. *PODOCARPUS DACRYOIDES*, *Richard*, the *Dacrydium*-like *Podocarpus*.

Syn. *Dacrydium thuioides*, *Solander*.

„ „ *excelsum*, *Don*.

„ „ *ferrugineum*, *Van Houtte*.

„ *Podocarpus thuioides*, *R. Brown*.

Leaves, generally awl-shaped, decurrent, spiny-pointed, often loosely imbricated, and from one to two lines long; those on the larger branches and lateral ones, scale-formed, scattered all round, adhering at the base, more or less spreading, and very acute-pointed, while those on the branchlets are flat, horizontal, linear, curved backwards, sickle-shaped, and closely placed in two rows; from two to three lines long, and about one-third of a line broad, and all more or less of a rusty brown or copper colour, somewhat glaucous when young. Branches, spreading, or bent downwards, rarely ascending, very slender, long, and

scattered at irregular distances along the stem ; lateral ones, rounded, spreading, or drooping, frequently abortive, but producing numerous short ramules, full of leaves, which sometimes are so plentiful as to entirely hide the branches, while at other times they are very distant ; female flowers, solitary, terminal, and without, or on very short footstalks ; receptacle, fleshy, connected at the base, and open only on the top, which is obtuse. Fruit, inversely egg-shaped, almost drupaceous, about the size of a pea, and furnished on the apex with a little flexible point.

A large tree, growing 200 feet high in swampy places, with a greyish-white bark ; found on the Northern Island of New Zealand, where it is called by the natives ' Kahi-Katea ;' and its little succulent fruit, which is sweetish, and produced in great abundance, is eaten by the inhabitants.

It is quite tender.

Gen. PSEUDOLARIX. *Gordon.* The False or Chinese Larch.

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

Cones, oblong, pendant, brittle, and like the head of the common Artichoke, covered with divergent scales.

Scales, very deciduous, extended at the points, heart-shaped at the base, and enclosing at the bottom two soft-coated seeds.

Seeds, irregularly shaped, with a soft, thin, whitish, skin-like covering, more or less enclosed by the wing, but free, and full of turpentine.

Wings, oval lanceolate on the outer side, but quite straight on the inner one, and entirely covering the inner face of the scale.

Leaves, deciduous, soft, linear, flat, and collected in bundles on the adult plants, but scattered singly along the young shoots, and very long on the young plants.

Seed-leaves, from five to seven in number.

Name derived from 'Pseudo,' false or bastard, and 'larix,' the Larch. The false or Chinese Larch.

A noble hardy tree, of great commercial value, found by Dr. Fortune, in the central and North-east provinces of China, and very distinct from the European Larches, in the cones having deciduous scales, with divergent points.

PSEUDOLARIX KÆMPFERI, *Gordon*, the Golden or Chinese Larch.

Syn. Larix Kæmpferi, *Fortune*.

„ Abies Kæmpferi, *Lindley*.

„ Pinus Kæmpferi, *Lambert*.

Leaves, in bundles on the adult branches, and singly on the leading shoots and young plants, very slim, linear-lanceolate, tapering to the point, and quite deciduous; from one inch and a half to two inches and a half long, and rather more than one line broad, of a beautiful light green when young, but before

falling off in the autumn, of a fine golden yellow. Branches, exactly similar to those of the common Larch. Cones, pendulous, three inches long, and two inches and a half wide near the base, conical, with deciduous scales, diverging out at the points like those on the head of the common Artichoke, and very brittle when young, excessively deciduous when ripe, falling asunder from the least pressure, but adhering very loosely in bunches by long woody threads, one of which passes out of the base of each scale to the axis of the cone, round which the scales originally grew. Scales, heart-shaped, flat, woody, entire on the margins, tapering gradually to an obtuse point, and rather more than an inch long, with a very small sharp-pointed bract at the base of each scale on the outer side, keeled on the back. Seeds, in twos at the base of each scale, rather irregularly shaped, with a soft membranaceous covering, of a whitish colour, full of turpentine, enveloped on the outer side by the wing. Wings, more than an inch long, broadest at the base, regularly tapering to a rounded point, and of a glossy light brown colour.

A noble tree, found by Fortune in the Northern, Eastern, and central provinces of China. It is the 'Seosi,' or 'Kara-Mats-Momi' of the Chinese.

It is quite hardy.

Gen. RETINISPORA. *Siebold.*

Flowers, monœcious, or male and female on the same plant, but separate, and terminal, the males cylindrical, female solitary, very small, and on the same branchlets as the males.

Cones, very small, globular, ligneous, and solitary.

Scales, ovate, in alternate cross pairs, ten or twelve in number, wedge-shaped at the base, peltated on the top, and woody.

Seeds, in a channel, coated with resin, and two at the base of each scale, with a membranaceous wing, marked with resinous bands.

Leaves, persistent, in threes, or opposite pairs, linear, or scale-formed, and mostly spreading.

Seed-leaves, in twos.

Name derived from 'rhetine,' resin, and 'spore,' seed,—the seeds being coated with resin.

All evergreen trees or shrubs, natives of Japan.

No. 1. RETINISPORA ERICOIDES, *Zucc.*, the Heath-like
Retinispora.

Syn. *Chamæcyparis ericoides*, *Carriere.*

„ *Widdringtonia ericoides*, *Knight.*

Leaves, in threes, but sometimes in opposite pairs, spread out or bent downwards, linear, flat, a quarter of an inch long, frequently slightly convex, and marked on the upper side with two little glaucous bands, tapering regularly to the point, decurrent at the base, and mucronate.

This kind forms a regular, conical, compact, pyramidal bush, from four to six feet high, with numerous horizontal branchlets, which are very slender and compact. It is cultivated by the Japanese in pots, under the name of 'Nezu' (dwarf).

It is very near *Retinispora squarrosa*, and probably not different from what Dr. Siebold calls *Retinispora squarrosa leptoclada*, or the slender variety. It, however, is very much more compact, and dwarfer than *Retinispora squarrosa*.

It is tolerably hardy.

No. 2. *RETINISPORA OBTUSA*, *Siebold*, the Obtuse-leaved
Japan Cypress.

Syn. *Chamæcyparis obtusa*, *Endlicher*.

Leaves, mostly in whorls of four, ovate-rhomboid, blunt, seldom pointed, decussate, all scale-formed, closely pressed along the branchlets, and adhering almost as far as the points, the lower part only being visible; those along the upper and under rows are ovate-rhomboid, obtuse, and seldom acute, while the side or lateral ones are keeled, and lap over at the edges, are somewhat pointed, and almost sickle-shaped; those on the younger plants are more open, longer, and remain on for several years. Branches, spreading, lateral ones in two rows, very dense, spreading out like a fan, and of a light shining green colour. Cones, solitary on the ends of the branchlets, globular, about the size of a small grape, with eight or ten scales, in alternate opposite pairs. Scales, wedge-shaped at the base, widest at the apex, with a plain surface, seldom wrinkled, and of a rich brown colour, with two short-winged seeds at the base of each scale.

A tall evergreen tree, growing from seventy to one hundred feet high, and from three to five feet in diameter, with an erect straight stem.

It constitutes a large portion of the forests in the mountains on the Island of Nippon, in Japan. Its timber is white, fine-grained, compact, and acquires, when worked, the brilliancy of silk; and in consequence of its valuable properties, the Japanese dedicate it to the God of the Sun, and construct chapels and small temples out of its timber, for divine purposes. It is the *Hinoki* (*i. e.* Tree of the Sun), and the glory of eastern forests.

No. 3. *RETINISPORA PISIFERA*, *Siebold*, the Pea-fruited
Retinispora.

Syn. *Chamæcyparis pisifera*, *Siebold*.

Leaves, in four rows, decussate, all scale-formed on the adult plants, and remaining on the plant for five years, those growing over the axis of the branchlets almost adnate even to the apex,

but those on the sides adhere only by the lower face ; the upper and lower ones are ovate-lanceolate, tapering to a hard point, keeled on the back, and smooth, the lateral ones compressed at the edges on both sides, almost sickle-shaped, equally long, acute-pointed, and marked on the under side with two white glaucous bands. Branches, numerous, thickly covered with branchlets, the lateral ones in two rows, and very thickly covered with leaves ; male and female flowers on the same plants ; the male catkins terminal on the upper branchlets, cylindrical, obtuse, and numerous ; female ones terminal also in the same manner as the males. Cones, ovate-globose, about the size of a large pea, and composed of ten or twelve scales in opposite cross pairs, regularly imbricated. Scales, ovate-rhomboid, a little pointed, crenulate, wedge-shaped, and fleshy at the base, attenuated, and spread out horizontal at the apex, dilated, raised in the centre, woody, and of a yellowish-brown colour, with a smooth surface. Seeds, in twos at the base of each scale, with a large membranaceous brownish wing, frequently much broader than the seed.

A much smaller tree, and slenderer than *Retinispora obtusa*, with its stem much less elevated, and darker-coloured bark, found upon the Island of Nippon, in Japan, where it is called ‘Sawara.’

No. 4. *RETINISPORA SQUARROSA*, *Siebold*, the Squarrose-leaved Japan Cypress.

Syn. *Chamæcyparis squarrosa*, *Endlicher*.

„ *Cupressus squarrosa*, *Lawson*.

Leaves, spiral, or in alternate whorls, spreading, linear, sharp-pointed, decurrent, dense, smooth, and frequently bent, or curved backwards, but somewhat scale-formed, and slightly adpressed on the male and cone-bearing branchlets, those on the young plants longer, linear, sharp-pointed, spread out, reflexed, and bright glaucous green above, and furnished with two white glaucous bands on the under side, from three to four lines long, and half a line broad. Branches, slender, gracefully curved

towards the extremities; branchlets, numerous, spreading in every direction, and thickly furnished with extended leaves. Male and female flowers separate, but on the same plant. Cones, globular, solitary, about the size of a small pea, terminal on the ends of the preceding year's branches. Scales, ten or twelve in number, in opposite decussate pairs, at first close, afterwards, when mature, irregularly separated, and spread out, wedge-shaped at the base, extended at the summit, and of a brown colour, with two seeds at the base of each scale, surrounded by a large, membranaceous, brown wing, much longer than the seeds, and irregularly marked with numerous little resinous bands.

A large bush or small tree, inhabiting the Island of Kiusiu, in the province of Figo, and the wooded mountains of Sukejama, in Japan. It is also found cultivated in the Japanese gardens as a bush, from four to six feet high, where they have the following varieties also in cultivation. It is tender, and called 'Sinobu-hiba,' in Japan.

RETINISPORA SQUARROSA LEPTOCLADA, Siebold.

Syn. *Chamæcyparis squarrosa leptoclada, Endlicher.*

This differs in having its branches much slenderer, and its branchlets and leaves much smaller.

It is a compact little bush, with very numerous slender branchlets, closely covered with leaves, sometimes in threes, but frequently in opposite pairs, and growing from two to four feet high, and cultivated by the Japanese in pots, under the name of 'Nezu' (dwarf).

RETINISPORA SQUARROSA VARIEGATA, Siebold.

Syn. *Chamæcyparis squarrosa variegata, Endlicher.*

This variety differs in having some of its branchlets and leaves of a white colour, intermixed with the ordinary green ones in a variegated manner.

Gen. SALISBURIA. *Smith.* The Maiden-hair or Ginkgo Tree.

Flowers, diœcious, or male and female on different plants ; the males in spikes, axillary, and without footstalks ; the females in terminal clusters, on long petioles.

Fruit, drupaceous, or covered with a fleshy pulp, and smooth externally, mostly single from abortion, and enclosed at the base in a small fleshy cup.

Seeds, solitary in each fruit, and covered with a smooth, hard, bony shell.

Leaves, fan-shaped, on long footstalks, lobed, and jagged on the outer margins, and covered on both sides with minute fan-shaped, straight nerves.

Seed-leaves, in twos.

Named in honour of R. A. Salisbury, F.R.S., an eminent English botanist.

A large deciduous tree, native of China and Japan.

SALISBURIA ADIANTIFOLIA, *Smith*, the Maiden-hair Tree.

Syn. Ginkgo biloba, *Linnaeus*.

Leaves, deciduous, broadly fan-shaped, flat, leathery, thick, rounded on the upper margins, and the same colour and texture on both sides, closely clustered on the short spur-like branchlets, but distant and alternate on the young shoots, fan-like, wedge-shaped at the base, somewhat triangular, and with from two to four lobes, more or less deeply divided, the lobes again irregularly toothed or jagged, and somewhat undulated at the edges, with numerous minute parallel ribs, elevated on both sides, and tapering to the base, where they are united with the footstalk, which is as long as the blade of the leaf, of a fine light or yellowish green, pliant, smooth, and glossy. Branches, alternate, mostly ascending, or horizontal, but sometimes declining on the lower part of the tree, lateral ones spreading ; branchlets, very short, spur-like, and producing each year a

cluster of from three to five leaves on the top of each, very closely placed, somewhat vertical. The male catkins appear with the leaves in May, on the wood of the preceding year, or on old spurs, are without footstalks, of a yellow colour, and one inch and a half long. The female flowers are produced in (more or less) clusters, on very long footstalks, each in part enclosed in small cups at the base, formed by the enlargement of the peduncle. Fruit, globular or ovate, one inch in diameter, drupaceous, or fleshy outside, on very long, slender footstalks, each containing a single bony nut or seed, of a whitish colour. Seeds, somewhat globular, tolerably large, covered with a hard, bony shell, smooth externally, and tapering to both ends, and enveloped in a light green or yellowish fleshy pulp, covered with a smooth, glossy, yellowish skin outside. Seed-leaves in twos.

A large, deciduous tree, with rather a conical-shaped head, and straight stem, covered with a greyish, rough bark when old, and with the sexes on separate trees.

It is found abundantly in China and Japan, where it is called 'Ginkgo,' growing from 80 to 100 feet high, and from six to twelve feet in diameter.

Professor Bunge, who accompanied the Russian Mission to Peking, states that he saw near a pagoda an immense 'Ginkgo,' with a trunk nearly forty feet in circumference, and of prodigious height, but still in perfect vigour.

It is quite hardy, and has the following varieties:—

SALISBURIA ADIANTIFOLIA MACROPHYLLA, *Hort.*

Syn. *Salisburia adiantifolia laciniata*, *Carriere.*

„ „ *macrophylla*, *Reynier.*

This variety differs from the species, by its leaves being very much larger, some of them measuring ten inches in circumference, and divided in two, three, or five lobes,—the principal lobes being again subdivided, and undulated, and irregularly lacinated, or dentated on the edges; a very fine variety, of French origin.

SALISBURIA ADIANTIFOLIA VARIEGATA, *Carriere*.

This variety differs from the ordinary form, by its leaves being variegated and striped with yellow. It is a very nice variety.

Gen. SAXE-GOTHÆA. *Lindley*. Prince Albert's Yew.

Flowers, monœcious, or male and female separate, but on the same plant; male flowers in spikes, female ones in globular heads.

Fruit, composed of several consolidated free scales, formed into a solid fleshy cone.

Seeds, a pale brown, glossy, oval nut, with a short, thin, jagged membrane, enveloping the base of the seed only.

Leaves, alternate, scattered, or somewhat two-rowed, leathery, and flat.

Named in compliment to his Royal Highness Prince Albert.

A large bush or small tree, found on the mountains of Patagonia.

SAXE-GOTHÆA CONSPICUA, *Lindley*, the Remarkable Saxe-Gothæa.

Syn. Taxus Patagonica, *Hort*.

Leaves, alternate, and scattered, or somewhat in two rows on the branchlets, leathery, stiff, linear, or oblong-lanceolate, somewhat sickle-shaped, slightly twisted and reflected, from half to one inch and a half long, and from one to two lines broad, slightly convex on the upper surface, and with a tolerably elevated rib, marked on each side with glaucous bands on the under one, furnished with a very short footstalk at the base, and terminating at the summit in an acute point, sometimes a little rounded. Male catkins, in terminal spikes or racemes; female flowers, in spherical heads in the form of a little cone, on long, slender, terminal footstalks, sometimes drooping. Fruit,

composed of several consolidated free scales, formed into a solid fleshy cone, of a depressed form, with a very irregular surface, owing to many of the scales being abortive, while the ends of the whole retain their original form, are free, rather spiny, and constitute so many tough, sharp tubercles, pointing in all directions. Seeds, a pale brown, glossy, ovate nut, with a short, thin, jagged membrane, enveloping the base of the seed only.

A small tree or bush, growing thirty feet high on the mountains of Patagonia, with very much the appearance of the common yew, but wanting its fine sombre green. It is, as a botanical curiosity, very interesting, but of little value as an ornamental plant in England, being more or less tender.

Gen. SCIADOPITYS. *Siebold.* The Umbrella Pine.

Flowers, monœcious, or male and female on the same plant, but separate, the male ones terminal, the females solitary, and growing from among the scaly buds.

Cones, elliptic or cylindrical, obtuse at the ends, large, and solitary.

Scales, persistent, leathery, thin, regularly imbricated, wedge-shaped, half-rounded on the upper part, and with a short bractea adhering.

Seeds, elliptic, compressed, seven under each scale, with a leathery covering, tapering into a membranaceous wing, attenuating to the base and apex.

Leaves, in whorls like an umbrella, persistent, without any footstalks, linear, flat, and obtuse-pointed.

Name derived from 'skidos,' shade, and 'pitys,' pine, the Umbrella Pine.

A large shrub or small tree, found on the mountains in Japan, but even there very rare.

SCIADOPITYS VERTICILLATA, *Siebold*, the Whorl-leaved
Sciadopitys.

Syn. *Pinus verticillata*, *Siebold*.

„ *Taxus verticillata*, *Thunberg*.

Leaves, long, linear, or somewhat falcate, smooth, entire, alternate, persistent, without any footstalks, and tapering to an obtuse point, concave and ribbed on the under side, in close tufts of from thirty to forty in number on the ends of the shoots, in a sort of whorl in the form of an extended parasol, and remaining on the branches for three or four years. Branches, alternate, or in whorls, with the young shoots cylindrical, and without leaves, except towards the top, but covered with persistent scales, which when old fall off, and leave the adult branches marked by their scars; buds, terminal, vertically numerous, and scaly, at first imbricated, but afterwards scattered. Male and female flowers on the same plant; the male catkins terminal, somewhat globular; female, solitary, growing from among the scaly buds. Cones, elliptic, cylindrical, obtuse at the ends, solitary, two inches and a half long, and one inch and a half in diameter, and somewhat resembling those of the *Pinus cembra*. Scales, regularly imbricated, wedge-shaped, half-rounded on the outer part, leathery, irregularly reflexed round the edges, rather thin, persistent, and of a greyish brown colour, bracteas adhering to the scale, and shorter. Seeds, elliptic, compressed, seven in number under each scale near the upper parts, with a coriaceous covering, tapering into a membranaceous wing, attenuating to the base and summit.

A handsome and very singular evergreen shrub or small tree, with a straight stem and horizontal spreading branches, growing from twelve to fifteen feet high, flowering in the spring.

It is found in the eastern part of the Island of Nippon, upon the mountains of 'Koja-San,' in the province of 'Kii,' and probably on other of the Japan Islands. The Chinese call it 'Kin-Sung,' and the Japanese 'Koja-Maki,' and plant it in their gardens and around their Sacred Temples; but it is by no means plentiful or abundant in Japan, where, according to Dr. Siebold, there are several varieties.

Gen. SEQUOIA. *Endlicher.* The Californian Redwood.

Flowers, monœcious, or male and female separate, but on the same plant, solitary and terminal.

Cones, small, sub-globular, or obtusely oval, and ligneous.

Seeds, from three to five under each scale, variously-shaped, and winged.

Leaves, two-rowed, flat, and evergreen.

Name, not explained.

A lofty tree, found in California and North-west America.

SEQUOIA SEMPERVIRENS, *Endlicher*, the Redwood or Bastard Cedar.

Syn. *Taxodium sempervirens*, *Lambert*.

„ „ *Nutkaense*, *Lambert*.

„ *Schubertia sempervirens*, *Spach*.

Leaves, on the lateral branches and branchlets, linear, blunt-pointed, two-rowed, spread out, flat, alternate, straight, rarely falcate, leathery, persistent, shining, dark green, and smooth above, more or less glaucous, and channelled below; from half an inch to an inch long, but much shorter and smaller near the extremities of the shoots; those on the principal branches and terminal points of the flower-bearing branchlets are very short, narrow, sharp-pointed, or scale-formed, somewhat imbricated, or closely spiral, decurrent at the base, ribbed, and glaucous below, those on the leading shoots distant and very acute. Branches, spreading, horizontal, rather distant, irregularly scattered alternately along the stem, and furnished with numerous lateral ones in two rows, those nearest the base frequently bent downwards, while those towards the extremity are more elevated; branchlets, very numerous, in two rows, and frequently drooping. Male flowers, globular, solitary at the extremities of the branchlets, on slender footstalks, thickly covered with very small scale-like leaves. Cones, solitary, terminal, somewhat globular, or egg-shaped, rather blunt at the ends, and one inch

long. Scales, numerous, wedge-shaped, from sixteen to twenty in number, smallest near the base, transversely keeled, very much sunken in the middle, irregularly shaped, wrinkled on the summit, and furnished in the middle of the hollow centre with a stout horn-shaped blunt point directed outwards. Seeds, from three to five under each scale, variously-shaped, and winged.

A lofty evergreen tree, growing from 200 to 300 feet high, and from twenty to thirty feet in circumference. One tree, called by the American settlers 'the Giant of the Forest,' measures 270 feet high, and fifty-five feet in circumference, six feet from the ground; and there is at St. Petersburg a horizontal slab of the wood, received by the late Dr. Fischer from the North-west coast of America, which measures fifteen feet in diameter, and 1008 annual rings mark its age. The timber is of a beautiful red colour, fine, and close-grained, but light and brittle, and never attacked by insects. It is the Californian Redwood or Bastard Cedar of the settlers, and was first discovered by Menzies in 1796, on the North-west coast of America, but has since been found abundantly all over Upper California. Hartweg found it plentiful on the mountains of Santa Cruz, about sixty miles from Monterey, 270 feet high, with a stem clear of branches sixty or seventy feet.

It is quite hardy.

Gen. TAXODIUM. *Richard.* The Deciduous Cypress.

Flowers, monœcious, or male and female on the same plant, but separate; the male ones in compound pyramidal spikes, the females two or three together, near the base of the spike of male flowers.

Cones, globular, ligneous, and with an uneven surface.

Scales, imbricated spirally, thick, and raised in the centre.

Seeds, irregularly-shaped, woody, and two at the base of each scale.

Leaves, in two-rows, flat, linear, and deciduous.

Seed-leaves, from five to nine in number.

Name, derived from τάξος (Yew) and εἶδος (like), from its supposed resemblance to the common Yew.

All deciduous trees, found in North America, Mexico, and China.

No. 1. TAXODIUM DISTICHUM, *Richard*, the Deciduous Cypress.

Syn. Cupressus Virginiana, *Plukenett*.

„ „ „ Tradescanti, *Ray*.

„ „ „ Americana, *Catesby*.

„ „ „ disticha, *Linnæus*.

„ Schubertia disticha, *Mirbel*.

„ Taxodium distichum patens, *Endlicher*.

„ „ „ nigrum, *Hort*.

„ Cupressus disticha patens, *Aiton*.

Leaves, in two rows, flat, rather distant, pectinate, spread out horizontal, and twisted at the base; linear, tapering to a sharp point, bright green, and thin at the margins, half an inch long, and one line broad, somewhat arched with the convex side outwards, and changing in the autumn from a light green to a dull red, and soon after falling off. Branches, stout, stiff, horizontal, or rising upwards at the ends, lateral

ones rather pendulous ; branchlets, very slender, and elegantly pinnated. Male and female flowers on the same plant. The male catkins are produced in flexible pendulous aments, and the female ones in very small bunches. Cones, somewhat rounded, or roundish-ovate, from one to one inch and a half in diameter, and about the size of a pigeon's egg, hard, and uneven on the surface. Scales, thick, slightly striated, dull brown, raised in the middle, with a small mucro in the centre, which soon disappears after maturity ; seeds compressed. This tree is rather pyramidal when young, but when old and full grown, has flat, horizontal branches, and becomes a lofty tree, 120 feet high, and from twenty-five to forty feet in circumference at the base, covering large tracts of country in the swamps of the southern states of North America.

The Deciduous Cypress is found growing along the banks of rivers, and in swamps from the Delaware, which may be considered its northern boundary, to Florida ; in Maryland and Virginia it is confined to within view of the sea, where the winters are milder, and the summer more intense. In Carolina and Georgia, it occupies a great part of the swamps, which border the rivers in the lowlands, and in East Florida, Louisiana, and those parts of the marshes, where the deciduous Cypress almost alone occupy, are called Cypress swamps, and cover thousands of acres. The Americans call it the ' Bald Cypress,' the ' Black Cypress,' and the ' White Cypress,' as it varies very much in appearance according to soil and situation. The roots of large trees, particularly in very moist situations, produce conical protuberances above ground, frequently from one to two feet high, and sometimes three or four feet in thickness, but always hollow in the centre, smooth on the outside, and covered with a reddish bark, and called Cypress knees by the Indians.

There are the following varieties :—

TAXODIUM DISTICHUM FASTIGIATUM, *Knight*.Syn. *Taxodium fastigiatum*, *Hort*.,, ,, *adscendens*, *Brongniart*.,, *Schubertia disticha imbricata*, *Spach*.,, ,, ,, *excelsa*, *Booth*.,, *Cupressus imbricata*, *Nuttall*.

Branches, short, erect, slightly spreading at the top. Leaves two-rowed, and resembling those of the species. This very distinct variety is a much smaller and a more compact tree, with the form of a regular conical pyramid, or fastigiated head. It is found in the marshy grounds, along the sea-shore, in Florida and Carolina, forming a small tree.

A very distinct-looking small tree, but certainly not a distinct species.

TAXODIUM DISTICHUM MEXICANUM, *Gordon*, the Montezuma Cypress.Syn. *Taxodium pinnatum*, *Hort*.,, ,, *virens*, *Knight*.,, ,, *Montezumæ*, *Dunal*.,, ,, *Hugeli*, *Lawson*.,, ,, *Mexicanum*, *Carriere*.,, ,, *distichum pinnatum*, *Hort*.,, ,, *mucronatum*, *Hort*.

Leaves, linear, pointed, evergreen, or nearly so, in two rows, straight, flat, and tapering to a point, with the leaves slenderer, and more persistent than those of the common deciduous Cypress. Branches spread out and slender. Cones, large, with the scales strongly mucronated.

This variety differs from the species in being nearly evergreen, and much tenderer. It is found growing in Mexico, forming large trees, 120 feet high, and sometimes ninety feet in circumference, close to the ground. It forms large forests between Chapultepec and Tescoco, near Popotla in Mexico.

The great Montezuma Cypress at Chapultepec near Mexico, is of this kind, and measures ninety-nine feet in circumference near the ground. It is tender.

TAXODIUM DISTICHUM DENUDATUM, *Leroy.*

Branches, slender, long, horizontal, or drooping towards the ends, irregularly, and little divided; branchlets, fringed, with scattered, variable, and unequally-distant leaves.

This variety was raised by M. Leroy, nurseryman, at Angers, in the South of France.

TAXODIUM DISTICHUM NANUM, *Carriere.*

Branches, numerous, almost horizontal, short, and resembling the species, but easily distinguished by its very small dimensions, forming a very compact little bush, ten or twelve feet high.

It was raised by a nurseryman near Tours in France.

No. 2. TAXODIUM MICROPHYLLUM, *Brongniart*, the Small-leaved
Deciduous Cypress.

Syn. *Taxodium distichum microphyllum*, *Spach.*

Leaves, very variable, in some linear, or ovate-lanceolate, alternate, in two rows, or scattered, those at the base of the shoots, from four to six lines long, tapering to a point, but becoming very much smaller towards the extremities of the branchlets, where they are hardly more than one or two lines long; oval, blunt-ended, and having the appearance of being imbricated.

Nothing is known of this kind beyond the description given by M. Brongniart, who states that it is found in North America. It in all probability is nothing more than a mountain form of the common deciduous Cypress, as no collector or traveller in the United States has discovered it since his time; and the circumstance of the leaves becoming much smaller towards the ends of the shoots, is quite a common occurrence in the deciduous Cypress in dry seasons.

No. 3. TAXODIUM SINENSE, *Noisette*, the Chinese Deciduous
Cypress.

- Syn. *Taxodium Sinense pendulum*, *Forbes*.
 „ „ *distichum pendulum*, *Loudon*.
 „ „ „ *nutans*, *Loudon*.
 „ „ „ *Sinense*, *Loudon*.
 „ *Glyptostrobus pendulus*, *Endlicher*.
 „ *Cupressus disticha nutans*, *Aiton*.

Leaves, alternate, linear-lanceolate, distant, and deciduous; from three to six lines long, without any footstalks at the base, and tapering into a sharp point at the summit; those on the young shoots in the early part of the season, are twisted, and compressed round the stem, but more expanded and spread out, like those of the common deciduous Cypress by the autumn. Branches, horizontal, spread out straight, or slightly bent downwards towards the extremities, with the young shoots slender, pendulous, and closely covered with light green leaves, which fall off during winter, and frequently the ends of the young shoots get killed at the same time by the cold. Cones, ovate, or somewhat globular, woody, and light brown. Scales, mucronate, and peltate, with two seeds at their base.

A very elegant small tree, growing from twelve to twenty feet high; found in the Northern parts of China, and probably in Japan, growing in swampy places.

It is quite hardy.

Gen. TAXUS. *Tournefort.* The Yew.

Flowers, dioecious, or male and female on different plants, and axillary.

Fruit, solitary, and one-seeded.

Disk, a fleshy open cup, and viscid.

Seeds, nut-like, with a bony shell, free, and exposed on the upper part.

Leaves, linear, decurrent, and alternate.

Seed-leaves, in twos, and very short.

Name, derived either from 'taxis,' arrangement, from the leaves being placed on the branchlets like the teeth of a comb; or from 'toxon,' a bow, the wood being much used for that purpose; or from 'toxicum,' poison, the common Yew being considered poisonous.

All evergreen trees, or bushes, found in the temperate parts of Europe, Asia, and America.

No. 1. TAXUS ADPRESSA, *Knight*, the Flattened or Creeping Yew.

Syn. *Taxus tardiva*, *Lawson*.

„ „ *Sinensis tardiva*, *Knight*.

„ „ *baccata adpressa*, *Carriere*.

„ „ *brevifolia*, *Hort*.

„ *Cephalotaxus adpressa*, *Hort*.

„ „ *tardiva*, *Siebold*.

„ „ *brevifolia*, *Hort*.

Leaves, oblong, or bluntly oval, rounded at both ends on the lesser branchlets, but much longer and more pointed on those of the leading shoots; more or less two-rowed, flat, rather distant, on very short footstalks, decurrent, and terminated at the apex in a very short spiny point, sometimes wanting on the adult ones; from two to four lines long, and one line and a half broad, of a dark glossy green above, and glaucous below on

both sides of the middle nerve, the margins and mid-rib being of a glossy light green colour; buds, very small, oval, and covered with a few blunt persistent scales. Branches, numerous, much divided, horizontally spreading, and sometimes in whorls; lateral ones and branchlets, in two rows, flat, slender, closely placed in clusters towards the extremities, frequently confused, short, and spreading. Fruit, said to be like that of the common Yew, but much smaller.

A low, spreading, depressed shrub, with numerous flat spreading branches, thickly covered with flat sombre green leaves, seldom growing more than two or three feet high, and found on the mountains of Japan.

It is quite hardy.

No. 2. *TAXUS BACCATA*, *Linnaeus*, the Common Yew.

Syn. *Taxus baccata vulgaris*, *Endlicher*.

Leaves, in two rows, crowded, linear, slightly curved, or falcate, pointed, flat, entire, and slightly revolute on the margins; from three quarters of an inch to an inch and a quarter long, and one line and a half broad, of a dark shining green above, much paler below, with a prominent mid-rib, terminating in a small point at the apex. Branches, spreading, much divided, and dense; branchlets, long, slender, and drooping. Male flowers, axillary. Berries, rounded, glutinous, drooping, open at the top, and enclosing a brown oval partially naked nut, unconnected with the fleshy disk, which is of a scarlet colour, and sweet. Seed-leaves, in twos.

A small tree, or large bush, but when fully grown thirty or forty feet high, with a short stem, and ample spreading head, thickly clothed with branches, and densely set with drooping sombre-green leaves.

It is found in most parts of Europe at elevations of from 1,000 to 4,000 feet, is frequent on the Apennines, the Alps, Greece, Spain, Piedmont, Great Britain, the Pyrenees, the Caucasus, and even in Scandinavia, but is wanting in the Russian empire, except on the mountains of the Crimea and Caucasus. There are the following numerous varieties: —

TAXUS BACCATA FRUCTU-LUTEO, *Loudon*, the Yellow-berried Yew.

This only differs from the common Yew in the colour of its berries, which are of a beautiful golden yellow, and very handsome.

TAXUS BACCATA DOVASTONI, *Loudon*, Dovaston's Yew.

Syn. TAXUS Dovastoni, *Hort.*

„ „ imperialis, *Hort.*

„ „ pendula, *Hort.*

„ „ baccata horizontalis, *Hort.*

„ „ horizontalis, *Hort.*

„ „ umbraculifera, *Hort.*

This variety only differs from the ordinary kind in having its principal branches growing horizontal or pendant, and its branchlets quite drooping ; a very striking and handsome variety.

TAXUS BACCATA ERECTA, *Loudon*, the Erect Common Yew.

Syn. TAXUS stricta, *Hort.*

„ „ erecta, *Hort.*

„ „ pyramidalis, *Knight.*

This is a slender variety, with smaller foliage than the common kind, but with a much stiffer and more erect habit, and is called in some collections the Fulham Yew, or Upright Common Yew. A very nice variety.

TAXUS BACCATA VARIEGATA, *Loudon*, the Variegated Yew.

Syn. TAXUS baccata variegata aurea, *Carriere.*

This is a very handsome variety, with its leaves mostly edged with a golden yellow colour.

TAXUS BACCATA ARGENTEA, *Loudon*, the Silver Variegated Yew.

Syn. TAXUS baccata, foliis variegatis, *Hort.*

„ „ elegantissima, *Hort.*

„ „ marginata, *Hort.*

„ „ baccata variegata alba, *Carrière.*

This very handsome variety differs, in having silvery white striped leaves, sometimes changing to straw colour.

TAXUS BACCATA NANA, *Knight*, Fox's Dwarf Yew.

Syn. *Taxus baccata* Foxii, *Hort.*

„ „ Foxii, *Hort.*

A very dwarf kind, with smaller leaves than the species, growing little more than one or two feet high, but spreading.

TAXUS BACCATA ERICOIDES, *Hort*, the Heath-like Yew.

Syn. *Taxus ericoides*, *Hort.*

„ „ microphylla, *Hort.*

„ „ baccata microphylla, *Hort.*

A small slender variety, with small foliage, and rather erect slender twigs, very distinct in appearance.

TAXUS BACCATA SPARSIFOLIA, *Loudon*, the Scattered-leaved Yew.

Syn. *Taxus baccata* monstrosa, *Hort.*

„ „ monstrosa, *Hort.*

„ „ Mitchelli, *Hort.*

This variety has its leaves disposed round the branches as in the Irish Yew, but with its branches spreading like the common Yew.

TAXUS BACCATA GLAUCA, *Carriere*, the Glauous Yew.

Syn. *Taxus baccata* sub-glaucescens, *Jacques.*

This is a very vigorous kind, with the leaves dark green above, and bluish or glaucous grey on the under part, with the bark on the young shoots of a rusty brown colour.

TAXUS BACCATA RECURVATA, *Carriere.*

Syn. *Taxus recurvata*, *Lawson.*

This kind has long straggling branches spread out, little divided, but most frequently reflected. Leaves, longer and straighter than the common kind, with the margins involute.

TAXUS BACCATA FASTIGIATA, *Loudon*, the Irish Yew.

Syn. *Taxus baccata Hibernica*, *Hort.*

„ „ *Hibernica*, *Hooker.*

„ „ *fastigiata*, *Lindley.*

„ „ *pyramidalis*, *Hort*, not *Knight.*

This very distinct and singular variety has its leaves in tufts, or scattered along the branchlets, and not two-rowed as in the common Yew, with a fastigiata or broom-shaped head, having all the branches erect, and closely compressed, like those of the Lombardy Poplar. It also differs in having oblong berries, and not rounded ones, as in the common kind ; there is the following variety of it :—

TAXUS BACCATA FASTIGIATA VARIEGATA, *Carriere.*

Syn. *Taxus baccata Hibernica variegata*, *Hort.*

„ „ *fastigiata argentea*, *Knight.*

This variety only differs from the Irish Yew, in having a portion of its foliage striped and margined with silvery white or pale straw-coloured blotches.

A very striking variety, of the Florence Court, or Irish Yew, when well variegated.

No. 3. TAXUS CANADENSIS, *Willdenow*, the Canadian Yew.

Syn. *Taxus baccata Canadensis*, *Loudon.*

„ „ „ *minor*, *Michaux.*

„ „ *procumbens*, *Loddiges.*

„ „ *Canadensis major*, *Knight.*

Leaves, linear, crowded, rather narrow, mostly straight, but sometimes slightly curved, extended, somewhat in two rows, revolute on the edges, decurrent at the base, on very short footstalks, abruptly tapering to the end, and terminating in a spiny acute point, from three-quarters to one inch long, and one line broad, of a pale yellowish glossy green above, and a little rusty below ; buds, covered with blunt, ovate, persistent scales, which remain on for a long time at the base of each successive growth, in a withered state. Branches, slender, rather nume-

rous, and spreading out horizontal, seldom ascending, but sometimes more or less bent down at the extremities; branchlets, arranged in two rows, and somewhat pendant. Male catkins, globular, always solitary, and at the base of the leaf on the under side of the branchlets. Fruit, like those of the common Yew, but very much smaller. Seed-leaves, in twos.

A low, spreading bush, growing three or four feet high, and readily distinguished from the *Taxus baccata* by the brownish appearance both of its leaves and bark, found in North America, in Canada, and along the banks of the Anticem River, in Maryland, and in shady rocky places along the Columbia River.

It is quite hardy.

4. *TAXUS CUSPIDATA*, *Siebold*, the Abrupt-pointed Yew.

Leaves, linear, all more or less curved upwards, alternate, stiff, leathery, and scattered along the principal leading shoots, but somewhat two-rowed, and denser on the branchlets, from three-quarters to one inch long, and one line broad, on rather long footstalks, broadly decurrent at the base, abruptly pointed, with a short, rigid, spiny point at the apex, deep glossy green above, and pale yellowish green below, but not glaucous, and with the thickened margins and mid-rib of a glossy green; buds, covered with oval, acute-pointed, imbricated scales, keeled on the back. Branches, numerous and spreading; branchlets, rather stiff and angular, on account of the wide decurrent base of the leaves. Fruit, unknown.

A large, handsome bush, densely clothed with somewhat ascending branches, and dark-green foliage, growing from fifteen to twenty feet high, found on the Island of Jezo, in Japan, where it is much cultivated in their town gardens, and called by the Japanese 'Araraji.'

It is quite hardy.

No. 5. *TAXUS GLOBOSA*, *Schlechtendahl*, the Mexican Yew.

Syn. *Taxus baccata Mexicana*, *Hartweg*.

Leaves, linear, slightly curved or falcate, narrow, rather

closely placed in two rows along the shoots, tapering to both ends, and furnished with an acute, spiny point, from three-quarters to one inch long, and one line broad, on rather long, twisted footstalks, decurrent at the base, dark glossy green, with an elevated nerve along the middle on the upper surface, but very much paler below, with the mid-rib and margins of a dark green colour; buds, furnished with persistent blunt-pointed scales, keeled on the back. Branches, long, spreading, much divided, and thickly furnished with extended branchlets; branchlets, very slender, more or less drooping at the points, scattered irregularly in two flat horizontal rows, mostly forked, and very extended. Male and female flowers on separate trees, lateral and solitary on the under side of the branchlets. Fruit, about the size of those of the common kind, but with the cup more cylindrical and bell-shaped, and the nut or seed flattened, globular, and more exposed. Seed-leaves, in twos.

A handsome, large bush or small tree, with quite the appearance of the common Yew, furnished with numerous branches to the ground, found plentiful on the mountains of Guajolota and Real del Monte, in Mexico.

It is tolerably hardy.

No. 6. *TAXUS LINDLEYANA*, *Lawson*, the Californian Yew.

Syn. *Taxus Boursieri*, *Carriere*.

„ „ *baccata Americana*, *Douglas*.

Leaves, arranged in two rows, flat, narrow, acute-pointed, and somewhat curved on the branchlets, but more or less scattered on the leading shoots and principal branches, from three-quarters to an inch long, and nearly a line broad, linear-falcate, rarely straight, of a glossy yellowish green, with a projecting rib down the middle on the upper surface, and glaucous below, except on the margins and mid-rib, which are of a glossy green, with a yellowish footstalk one line long, a little enlarged at the base, and decurrent. Branches, slender, very long, pendulous, and covered with a yellowish bark. Fruit, solitary on the under side of the branches, and exactly like those of the Irish Yew

(*Taxus baccata fastigiata*). Seeds, nearly globular, and yellowish brown. Wood, very elastic, and used by the Indians to make bows of.

This kind, according to Murray, is a handsome tree, growing thirty or forty feet high, and from four to five feet in girth five feet from the ground, and found growing on the sides of glens, under the shade of large trees, in Northern California. M. Boursier, the French traveller, discovered this species in 1854, growing along the banks of running streams on the higher mountains of Northern California, in company with large trees of *Abies Douglasii* and *Pinus Lambertiana*. Douglas found it abundantly at the confluence of the Columbia, in 1825, and to the northwards, but slightly differing in appearance from the common Yew.

No. 7. *TAXUS WALLICHIANA*, *Zuccarini*, Dr. Wallich's Yew.

Syn. *Taxus virgata*, *Wallich*.

„ „ *nucifera*, { *Royle*, and other writers on
Indian Coniferæ.
„ „ *baccata Indica*, *Madden*.

Leaves, linear, tapering to an acute point, rather distant, slightly curved or falcate, regularly two-rowed, alternate, convex above, and revolute on the margins, from one inch to one inch and a half long, and one line broad, with rather a long, twisted footstalk, decurrent at the base, of a deep glossy green, with an elevated nerve along the middle on the upper surface, much paler and not glossy below; buds, small, with persistent, ovate, blunt-pointed scales. Branches, long, slender, much spreading, and of a light-brown colour; branchlets, very slender, long, undivided, more or less pendant, and nearly the same size all their length. Male flowers lateral on the under side of the branchlets, and consisting of a number of scales, out of which eight or ten connected anthers grow, like minute clusters of primroses; the female ones, which are on a separate plant, are enveloped in scales, from which they gradually emerge, and when ripe, are open at the top, displaying the nut or bony-shelled seeds seated in a red, fleshy cup. Seed-leaves, in twos.

A fine evergreen tree, forming beautiful forests in Northern India, some trees measuring fifteen feet in girth four feet from the ground. It is common on the Mountains of Nepal, between 8,000 and 10,000 feet of elevation, and in Kamaoon, Gurhwal, Kedarkanta, Sirmore, on the Mountains of Tibet, and between Moulmein and Northern Siam, as well as in Sikkim, where it does not descend below 9,000 feet.

The leaves and bark are used for tea by the hill people, and is called 'Thoona,' or 'Thooner-Birmee,' in the British Himalayas; 'Loosah,' by the mountain people in Kamaoon; 'Ting-shi,' in Sikkim; 'Pung-cha,' in Kunawur; and 'Dheyri,' or 'Lolsi,' in Nepal. The people of Ludakh import the leaves and bark of the 'Pung-cha' (Tea-tree) from Kunawur, not only for tea, but also as yielding a red dye, under its Cashmere name of 'Chatoong.' The leaves when gathered for tea, are first exposed in the sun for two days, and afterwards, when dry, mixed with gum, to give them the appearance of tea.

Most writers on Indian Coniferæ, unaccountably confound this kind with the Japan *Taxus nucifera* of Thunberg (now *Torreya nucifera*), an error which Professor Zuccarini pointed out in his *Morphology of the Coniferæ*, pp. 52, 53, after examining Dr. Wallich's specimens; and, ascertaining that the Indian plant was a true Yew, and not a *Torreya*, gave it the name of *Taxus Wallichiana*, in compliment to Dr. Wallich.

It is quite hardy, and worthy of being tried, along with the common Yew, as a substitute for Tea, in the same way as used by the hill people of India; for it is very well known that cattle, eating the fresh green leaves and shoots of the common Yew, are poisoned, while if eaten in a dried state, they are perfectly harmless.

Gen. THUIOPSIS. *Siebold.* The Broad-leaved
Arbor-Vitæ.

Flowers, monœcious, or male and female on the same plant, but separate, solitary, and terminal, the male ones cylindrical catkins, the females somewhat globular.

Cones, ligneous, sub-globular, and composed of eight or ten valvated, opposite, imbricated scales.

Scales, wedge-shaped, leathery, valvate, more or less orbicular, concave, smooth, and persistent.

Seeds, five at the base of each scale, orbicular, compressed, and free, with a membranaceous wing on each side.

Leaves, scale-formed, in opposite cross pairs, regularly and closely imbricated in four rows, flattened on the upper and under surfaces.

Name, derived from 'Thuia,' the Arbor-Vitæ, and 'opsis,' like, resemblance to the Arbor-Vitæ.

A majestic evergreen tree, found in moist situations in Japan.

THUIOPSIS DOLABRATA, *Siebold*, the Hatchet-leaved Arbor-Vitæ.

Syn. Thuja dolabrata, *Thunberg*.

„ Platycladus dolabrata, *Spach*.

Leaves, in four rows, scale-formed decussate, broad, thick, ovate, rounded at the points, and imbricated, convex above, furrowed along the middle, and of a beautiful shining deep green, concave-margined, and silvery-white beneath, with the marginal ones clasping over on each side, and connected at the base with the adpressed flat upper and lower ones to such an extent as to appear on the under side of the branchlet, as one leaf surrounding the branchlet, and three-rowed on both sides, with the two outer ones narrowest and slightly curved inwards at the points, while the centre one is very broad, and quite rounded. Branches vertical, open, and pendulous at the ends,

lesser or lateral ones flattened, with the branchlets placed in two rows; branchlets, two-edged, very numerous, alternate, flattened, and irregularly divided. Cones, very small, ovate, without any footstalks, and squarrose, consisting of eight or ten woody scales, reflexed at the apex, and covering five two-winged seeds.

A tall evergreen tree, with a pyramidal-shaped head, and vertical branches drooping towards the points.

It is found on the moist slopes of valleys in the Island of Nippon, in Japan, and at Fakonia, where, after passing over the mountains of that name on the road to Jeddo, it is planted by the road sides between Miaco and Jeddo. It is also cultivated in pots by the Japanese, and a dwarf kind is said to exist in Japan, under the name of 'Nezu,' which is used for pot culture, but probably not different from the species. Professor Thunberg says in the countries of 'Oygawa' and 'Fakonia,' it is plentiful along the high roads, particularly on the hill sides, and that it is of vast height and dimensions, and the most beautiful of all evergreen trees.

The Japanese call it 'Asunaro' or 'Asufi,' and 'Hiba,' and the Chinese 'Rakan-hac,' and 'Gan-si-hak.'

It no doubt will prove hardy in England.

Gen. THUJA. *Linnæus.* The American Arbor Vitæ.

Flowers, monœcious, or male and female on the same plant, but separate; the male catkins oval, the female ones solitary and terminal.

Cones, ovate-oblong, solitary, terminal, leathery, and smooth, with a projecting tubercle below the apex of each scale.

Scales, from four to six in number, in opposite pairs, and mostly unequal in size.

Seeds, in twos at the base of each scale, and furnished with a transparent wing.

Seed-leaves, in twos.

Leaves, in opposite pairs, very small, scale-like, imbricated, compressed, and in four rows.

Name, derived from *θύον*, sacrifice, the wood when burnt giving out an agreeable perfume like incense.

All large evergreen trees or bushes, found in North America and California.

No. 1. THUJA GIGANTEA, *Nuttall*, the Gigantic Arbor Vitæ.

Syn. Thuja Craigiana, *Jeffrey*.

„ „ „ glauca, *Lawson*.

„ Libocedrus decurrens, *Torrey*.

„ Abies microphylla, *Rafinesque*.

Leaves, on the young plants awl-shaped, somewhat lanceolate, decurrent at the base, extended at the summit, and sharp-pointed, loosely imbricated in four rows, thickly set on the branchlets in opposite pairs, the outer pair or marginal ones being longest, and folded partially over the inner pair on both sides, giving the young shoots a jointed, trident-like appearance.

Leaves, on the adult plants, very small, scale-formed, one twelfth of an inch long, and one twenty-fourth of an inch wide, ovate, blunt-pointed, thick in texture, in close opposite pairs,

rather distant along the branchlets, pale green, and shining, the marginal ones overlapping the sides, and having the appearance of being in three rows on each side. Branches, rather erect, long, slender, and spreading laterally, with numerous smaller ones ; branchlets, short, flattened, channelled along the sides, distantly jointed, proliferous, short, and alternate. Cones, erect, solitary on the ends of the upper branchlets, oblong, tapering to the ends, one inch or more long, and half an inch wide near the base, composed of two opposite pairs of scales, with a flat one down the middle, and of a pale olive-brown colour. Scales, fleshy, upper pair pressed together at the margins, and containing two seeds under each ; the lower ones overlapping, much shorter and smaller, but varying very much in size, abortive, and with a double margin, having the appearance as if a thin scale had grown to the back of the others, the outer one having a raised edge all round, and terminating in a thin blunt reflexed point. Seeds, soft, somewhat angular, rounded on one side, and with the elliptic wing ; measure three-quarters of an inch in length, and covering the inner face of the scale. Seed-leaves, in twos.

A noble evergreen tree, with an umbrella-shaped top, and straight stem when old, growing from 40 to 140 feet high, and from three to five feet in diameter.

It is found plentiful along the banks of the Columbia River, and at Nootka Sound, on the North-west coast of America, also on the Mountains of Klamat, in California, at an elevation of 5,000 feet; Jeffrey found it growing along the banks of Scots River, in Upper California, in sandy soil, attaining a height of 140 feet, and five feet in diameter.

Timber, white and tough, but rather porous, and with but little resin in it.

It is quite hardy.

No. 2. THUJA MENZIESII, *Douglas*, Menzies Arbor Vitæ.

Syn. Thuja plicata, *Lambert*, not *Donn*.

„ „ Lobbiai, *Hort*.

„ „ Lobbiana, *Hort*.

„ „ gigantea, *Hooker*, not *Nuttall*.

Leaves, in alternate opposite pairs, closely imbricated, and without any gland on the back; those on the branches are more distant, enlarged at the base, decurrent, and tapering to an acute point, while those on the branchlets are very flat, closely placed, regularly imbricated in four rows, much shorter, more rounded, and furnished with a short spiny point; the marginal ones being more or less lanceolate, bristle-pointed, and lapping over on each side, but extended at the points. Branches, spreading, flat, more or less horizontal, irregularly scattered along the stem, slender, and of a deep brown colour; branchlets, flattened, short, slender, flexible, alternately two-rowed, and nearly all on the inner side, quite straight, linear, and undivided. Cones, small, oval, tapering to both ends, nodding, and solitary at the extremities of the short branchlets, and very much resemble those of the common American Arbor Vitæ, but much more swelled in the middle, and more regularly attenuated, or tapering to both ends, and with the scales much larger, more tapering, and much rounder or obtuse at the apex.

A fine graceful tree, found on the North-west coast of America and California, by Douglas, growing from forty to fifty feet high, with long flexible branches, thickly clothed with branchlets.

It is quite hardy.

No. 3. THUJA OCCIDENTALIS, *Linnaeus*, the American Arbor-Vitæ.

Syn. Thuja Theophrasti, *Bauhin*.

„ „ obtusa, *Mænoch*.

„ „ odorata, *Marsh*.

„ Cupressus Arbor-Vitæ, *Turgioni-Tozzetti*.

„ Thuja Sibirica, *Linnaeus*.

Leaves, very small, in opposite pairs, ovate-rhomboid, blunt

pointed, closely imbricated and flattened, thickly pressed along the branchlets, in four rows, and with an elevated gland on the back of the upper and under ones, which are the broadest, while the marginal ones lap over on both sides; those on the older branches are more distant, acute, extended at the points, decurrent, and of a dull yellowish green, strongly scented when bruised. Branches, distant, horizontal, and irregularly scattered along the stem; smaller ones drooping, and twisted in various directions; branchlets, spread out laterally, numerous, two-edged, alternate, short, flattened, ramified, and covered with numerous small leaves of a bright shining green colour. Cones, obovate, four lines long, solitary, on short footstalks, covered with small, scale-like leaves. Scales, mostly six in number, oblong, spreading at the points, centre one truncate and divided to the base, each containing two seeds. Seeds, very small, surmounted by a short wing.

A large bush or tree, growing in its native country from forty to fifty feet high, covered to the ground with loose, spreading branches, found in most parts of North America, from Canada to the Mountains of Virginia and Carolina, but rather scarce in the Southern States, and only on the banks of mountain streams. It is found abundantly on the Hudson, and very common in Lower Canada, New Brunswick, Vermont, and the district of Maine. There are the following varieties:—

THUJA OCCIDENTALIS VARIEGATA, *Loudon*.

Syn. *Thuja variegata*, *Marsh*.

This only differs in having some of the branchlets of a pale yellow colour, intermixed with the ordinary light green foliage on the plant.

THUJA OCCIDENTALIS ARGENTEA, *Carriere*.

This has some of the branchlets of a silvery white colour, intermixed with the ordinary foliage on the plant.

No. 4. *THUJA Plicata*, *Donn*, the Nootka Sound Arbor-Vitæ.

Syn. *Thuja Occidentalis plicata*, *Loudon*.

” ” ” *compacta*, *Knight*.

” ” ” *asplenifolia*, *Hort*.

” ” ” *robusta*, *Carriere*.

” ” *Warreana*, *Booth*.

” ” *flagelliformis*, *Hort*.

Leaves, on the adult plants, ovate, blunt-pointed, regularly imbricated in four rows, quite flat, entire, smooth, shining bright green above, and dull glaucous green below; those on the upper and under sides of the branches and branchlets having a conspicuous elevated gland on the back rib towards the point, and are much broader and less pointed than the side or marginal ones, which lap over on both sides, and appear shorter, more pointed, and regularly jointed, while those on the young plants are very much pointed, particularly the marginal ones, which appear nearly lanceolate, and extended at the points, decurrent at the base, loosely imbricated, and rarely showing the gland on the back; but as the plant matures, they gradually develop, and the leaves become ovate, more closely flattened along the stems, blunt-pointed, and the branches more rounded along the edges, jointed, and two-edged. Branches, horizontal, rather short, flattened lengthways, spreading, rather compact, and scattered along the stem, with the smaller or lateral ones alternate, regularly two-rowed, straight, quite flat, and pointing outwards at an acute angle; branchlets, long, straight, linear, flat, and two-edged, regularly jointed, and entirely covered with ovate, blunt-pointed, closely flattened leaves, in opposite pairs, as if plaited, with a row of transparent glands along both sides on the back of the leaves. Cones, small, solitary, nodding, scattered, and ovate-oblong. Scales, elliptic, blunt at the ends, flat, partially furrowed, and mostly six in number, each containing two seeds, inversely heart-shaped, and surrounded by a transparent wing, emarginated at the apex.

A small tree, resembling the American Arbor-Vitæ, thickly clothed with spreading, light green branches, found along the

western shores of North America at Nootka Sound, and, according to some writers, extending into Northern Mexico.

It is quite hardy, and differs from the common American *Arbor-Vitæ* in having the branches very much shorter, more compact, stouter, and densely covered with small ovate, flattened leaves, bluntly pointed, and in four rows, with a plaited and jointed appearance.

Gen. TORREYA. *Arnott.* The Stinking Yews.

Flowers, diœcious, or male and female on different plants. Males, solitary; females, in twos or threes, and erect, all axillary.

Fruit, one-seeded, drupaceous, or fleshy on the outside like the common plum.

Seeds, singly in each fruit, with the albumen ruminated like the inside of the common nutmeg, and covered with a hard bony shell.

Leaves, linear, or lanceolate, decurrent at the base, and either opposite or alternate.

Seed-leaves, in twos.

Named in compliment to Dr. Torrey, the celebrated American botanist, and one of the authors of the North American Flora.

All small evergreen trees, found either in North America, China, or Japan, and emitting a strong disagreeable smell from all parts when bruised.

No. 1. TORREYA (?) GRANDIS, *Fortune*, the Grand Torreya.

Leaves, in opposite pairs, two-rowed, linear-lanceolate, distant, extended, and three quarters of an inch long; dull, glossy green above, but with two narrow sunken whitish bands below, acute-pointed, on very short footstalks, twisted, and decurrent at the base. *Fruit*, oval, three-quarters of an inch long, drupaceous, and of a green colour.

This is said by Fortune, who gave it the above name, to be a large tree, with a spreading head, found on the mountains in the Northern part of China, and to be a species of *Torreya*; but upon what grounds I am unable to tell, as the fruit wants the principal characteristics of that genus, it not having a marbled or veined kernel, or what botanists call a ruminated albumen, like the interior of the common nutmeg; it also wants that strong rue-like smell so peculiar to all the species from America and Japan, and which no doubt led to their being called 'the Stinking Nutmegs;' the specific name 'grandis' also seems an imaginary qualification. It, however, may be a new and distinct species of *Cephalotaxus*, which will be very desirable, particularly if it should prove hardy in England.

No. 2. *TORREYA MYRISTICA*, *Hooker*, the Californian Nutmeg.

Leaves, in two rows, long, narrow, and opposite on the branchlets, but somewhat alternate and scattered round the stems and principal shoots, linear-lanceolate, mostly quite straight, but sometimes slightly falcate, tapering to a long acute spiny point, somewhat lanceolate at the summit, and attenuated into a very short twisted footstalk, decurrent at the base; from two to two inches and a half long, and one line and a half broad, of a pale yellowish green, without any mid-rib, and slightly convex on the upper surface, but much paler on the under one, and marked longitudinally on each side of the centre nerve, with a narrow sunken band, whitish when young, but afterwards assuming a brown colour; buds, covered with persistent oval scales. Male catkins, axillary, and solitary; female flowers, in twos or threes on short peduncles, and axillary. Fruit, elliptic, and from one inch and a quarter to one inch and a half long, with a thin fleshy or leathery green covering, quite smooth when ripe outside, and very similar to that of *Torreya taxifolia*. Seeds, with a hard bony shell. Seed-leaves, in twos.

A small bushy-headed tree, growing from twenty to forty feet high, with spreading more or less horizontal branches; found growing on the Sierra Nevada Mountains in California.

Timber, yellowish, heavy, and fine-grained; but all parts of

the tree emit a very disagreeable odour, when either bruised or burned, and is called by the Californian emigrants the Stinking Yew, or Californian Nutmeg.

It is quite hardy.

No. 3. TORREYA NUCIFERA, *Zuccarini*, the Nut-bearing Torreya.

- Syn. *Taxus nucifera*, { *Thunberg*, not *Wallich*, and
other Indian writers.
,, *Caryotaxus nucifera*, *Zuccarini*.
,, *Podocarpus nucifera*, *Hort*.
,, ,, *Coreana*, *Van Houtte*.

Leaves, linear, rounded at the base, and somewhat two-rowed on the branchlets, but more or less distant, and scattered round the leading shoots, quite straight, flat, leathery, and tapering to rather a long, spiny acute point, mostly curved downwards; from one to one inch and three-quarters long, and one line and a half broad, on very short footstalks, of a deep glossy green, and convex on both sides of the mid-rib, which is a little sunk on the upper surface, and glaucous white below, except on the centre nerve and margins, which are of a deep glossy green, and rather elevated; buds, furnished with persistent, extended, acute-pointed scales. Branches, numerous, either in whorls, alternate, or scattered along the stem, spread out, horizontal, and covered with scaly bark; branchlets, two-rowed, spreading, and rather short. Male catkins, oval, or cylindrical, female flowers, in pairs, or in threes in close heads on short peduncles. Fruit, the size of a large nut, three-quarters of an inch long, and half an inch broad, oval, or ovate-oblong, largest at the base, slightly tapering to a small point at the apex, and covered with a firm, fleshy, thin, green tissue, very smooth, and glossy outside. Seed, oval, with a hard bony shell. Seed-leaves, in twos.

A small tree, growing from twenty to thirty feet high on the mountains on the Islands of Nippon and Sikok, in Japan, but cultivated all over Japan, where an oil is made from the kernels of the nuts, which is said to be used for culinary purposes, though the kernel itself is too astringent to be eaten,

and all parts of the plant when bruised emit a disagreeable odour.

It is tolerably hardy in most places.

No. 4. *TORREYA TAXIFOLIA*, *Arnott*, the Yew-leaved *Torreya*.

Syn. *Taxus Montana*, *Nuttall*.

„ *Torreya Montana*, *Hort*.

Leaves, on the stems and principal shoots alternate, spreading, or reflected, and rather distant, those on the branchlets closely placed in two rows, nearly or quite opposite, rounded at the base, and somewhat recurved at the extremity, linear, frequently falcate, stiff, of a leathery texture, on very short footstalks, twisted, and decurrent at the base, and tapering to a long acute spiny point at the apex, somewhat lanceolate; from one to one inch and three quarters long, and one line and a half broad, of a light green, glossy, and convex on the upper surface, but without any nerve along the middle, while the under one is slightly concave near the edges, pale glaucous grey, and marked on each side of the mid-rib with two reddish narrow sunken bands. Branches, numerous, mostly in whorls, spreading, smooth, and two or three forked at each division; branchlets, somewhat two-rowed, and horizontal. Male catkins, linear; female flowers, without footstalks, and erect. Fruit, when ripe, oval, a little pointed, nearly as large as an ordinary walnut, with the external coat fleshy or rather leathery, and covering the whole surface of the seed, except a minute perforation at the top. Seed, solitary, and when deprived of its succulent external covering, very much resembling a large acorn, with a beautiful ruminated albumen, resembling the inside of a nutmeg, and covered with a hard bony shell. Seed-leaves, in twos.

A handsome pyramidal-shaped evergreen tree, with numerous spreading branches, growing from forty to fifty feet high, and eighteen inches in diameter; found in the middle and Northern parts of Florida, growing abundantly about Aspalaga, on Calcareous Rocks, and along the banks of rivers near Flat Creek. The whole plant has a strong and particularly disagreeable smell, especially when bruised or burned, and is called by the Ameri-

cans 'Stinking Cedar,' and by the people in the country where it grows, 'wild nutmeg.'

Timber, dense, close-grained, heavy, and of a reddish colour. It is not quite hardy in some parts.

Gen. WELLINGTONIA. *Lindley.* The Mammoth Tree.

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

Cones, large, solitary, obtusely oval, and woody.

Scales, placed at right angles upon the axis of the cone, wedge-shaped, persistent, and peltated.

Seeds, from three to five under each scale, but mostly five.

Seed-leaves, from three to six, but mostly in fours.

Leaves, needle-shaped, spiral, and persistent, or scale-formed, and imbricated on adult trees.

Named in compliment to the late Duke of Wellington.

A gigantic tree from California.

WELLINGTONIA GIGANTEA, *Lindley*, the Mammoth Tree.

Syn. *Sequoia gigantea*, *Endlicher*.

„ *Washingtonia gigantea*, *of the Americans*.

„ *Americanus giganteus*, *Hort. Amer.*

„ *Taxodii* sp., *Douglas*.

Leaves, needle-shaped, spirally alternate, spreading, persistent, and of a light-green colour on the young plants; those on the adult trees scale-formed, closely inlaid, rounded on the back, and concave on the inner face; those on the branchlets much shorter, very close, and regularly imbricated; those on the larger branches longer, looser, decurrent at the base, and tapering to an acute point, but sometimes rather obtuse. Branches, spread out horizontal, much divided, and furnished

with numerous laterals; branchlets, cylindrical, frequently pendulous, and thickly covered with light-green glaucous foliage, cone-bearing ones slightly thickened, and entirely covered with scale-formed leaves, closely imbricated, the upper ones oval, and broadest at the base. Cones, solitary on the ends of the branchlets, two inches long, and more than one inch in diameter, ovate, blunt-ended, and slightly tapering towards both extremities. Scales, in series, placed nearly at right angles upon the axis of the cone, stipitate, thickened, and enlarged from the point of insertion as far as the summit, which is depressed and wrinkled on the external face, and furnished with a small prickle in the centre of the little hollow. Seeds, from three to five under each scale, but mostly five. Seed-leaves, from three to six in number, but mostly in fours.

This magnificent evergreen tree was first discovered by Douglas in 1831, and on account of its extraordinary height and dimensions, is called by the American settlers in California the 'Mammoth Tree;' and, according to Mr. G. L. Trask, who has been exhibiting a portion of the bark set up, so as to show the great size this tree attains in its native state, the following are the dimensions of one of the largest of eighty trees, growing in a grove, viz:—height, 363 feet; circumference near the ground, 93 feet; circumference 100 feet from the ground, 45 feet; bark, 18 inches thick; age, according to annual rings, from 3,000 to 4,000 years.

It is found growing on the slopes of the Sierra Nevada, near the sources of the Stanislaus and San Antonio, in Upper California, in a sheltered valley, at an elevation of about 5,000 feet.

It is tolerably hardy in favourable situations, but generally gets its foliage more or less browned in winter, and is much injured in severe ones.

Gen. WIDDRINGTONIA. *Endlicher.* The African Cypress.

Flowers, diœcious, or male and female on separate plants, and terminal; the male catkins oblong or cylindrical; the female ones globular, and without footstalks.

Cones, globular, either solitary or two or three together, and composed of four valves or scales.

Scales, or *valves*, four in number, oval, mucronate, somewhat in whorls round a depressed axis, with the edges converging.

Seeds, frequently few from abortion, but with from five to ten ovules at the base of each scale, in one or two series, and covered with a somewhat crustaceous tegument, spreading on each side into a membranaceous wing.

Seed-leaves, in twos.

Leaves, thickly set, alternately or in whorls, linear or needle-shaped, spreading, but sometimes very small, scale-formed, and approaching imbricate, with a gland on the back.

Named in compliment to Captain Widdrington (formerly Cook), who travelled in Spain.

All evergreen bushes or small trees, found at the Cape of Good Hope and Madagascar.

No. 1. WIDDRINGTONIA COMMERSONII, *Endlicher.*

Syn. *Thuja quadrangularis*, *Ventenat.*

„ *Pachylepis Commersonii*, *Brongniart.*

Leaves, very short, acute and distant on the branches, obtuse, closely set together, and disposed in four rows on the branchlets. Branches, numerous, spread out and close together along the stem; branchlets, slender, numerous, and rather pendant. Cones, globular, almost the size of a walnut, and quite smooth. Valves, very thick, without any points, but rounded in the centre, slightly swelling towards the summit on the outer side, keeled on the inner one, and huddled together at the points.

A species of which little is known beyond its being found in Madagascar, and was formerly in the Botanic Garden of the Mauritius, but not yet introduced into England, and, no doubt very tender.

No. 2. WIDDRINGTONIA CUPRESSOIDES, *Endlicher*.

Syn. *Thuja cupressoides*, *Linnaeus*.

„ „ *aphylla*, *Burmman*.

„ *Callitris Capensis*, *Schrader*.

„ „ *stricta*, *Schrader*.

„ *Pachylepis cupressoides*, *Brongn*.

„ *Callitris cupressoides*, *Schrader*.

Leaves, on the branches, acute, somewhat spreading at the points; those on the branchlets, four-rowed, much shorter, and imbricated. Branches, elongated, erect, and pyramidal; branchlets, slender, bent downwards, or pendant at the ends, and covered with leaves. Cones, ovate-obtuse, from nine to ten lines long, and much larger than those of the *Widdringtonia juniperoides*. Valves, woody, slightly convex, pointed, erect, huddled together at the summit, and terminated with a little conical point, sharply keeled on the inner face, and enclosing two seeds.

A bush, from four to ten feet high, found in the southern parts of the Cape of Good Hope, at elevations of from 1,000 to 3,000 feet.

It is quite tender.

No. 3. WIDDRINGTONIA JUNIPEROIDES, *Endlicher*.Syn. Cupressus juniperoides, *Linnæus*.,, ,, *Africana*, *Miller*.,, *Juniperus Capensis*, *Lamarck*.,, *Taxodium juniperoides*, *Hort*.,, ,, *Capense*, *Hort*.,, *Schubertia Capensis*, *Schrader*.,, *Pachylepis juniperoides*, *Brong*.,, *Callitris arborea*, *Schrader*.

Leaves, without any footstalks, but adhering at the base, and running down the stem, leathery, and glaucous-green, the younger ones mostly linear, needle-shaped, smooth, sharp-pointed, and slightly three-nerved, spreading, slightly curved, opposite, or in whorls of three, from three-quarters to an inch long, and three-quarters of a line broad at the base; the adult ones scattered; those on the branchlets sometimes ovate-lanceolate, or rhomboid-obtuse, or sharp-pointed, terminating in a small bristle-point, or erect and loosely imbricated, with a slightly sunken gland on the back. Branches, spreading, and pointing upwards at the ends; branchlets, erect, sometimes spreading, angular, frequently very short, and covered with needle-shaped leaves. Male flowers, oblong-cylindrical, and terminal. Cones, on the laterals, in clusters of three or four together, rounded, and slightly depressed. Valves, oval, woody, reddish brown, shining, and closing upwards to the top, level on the interior face, with two seeds under each.

A middle-sized tree, with a straight stem, and ample head, found in the western parts of the Cape of Good Hope, on the Mountains of Blauwberg, at an elevation of from 3,000 to 4,000 feet, and plentiful on Cedernberg (Cedar Mount).

It is quite tender.

No. 4. WIDDRINGTONIA NATALENSIS, *Endlicher*.

This kind is said to resemble *Widdringtonia cupressoides*, but with many more slender branchlets, and with the leaves all

acute, having a gland upon the back, and with the female flowers in twins, in loose terminal spikes.

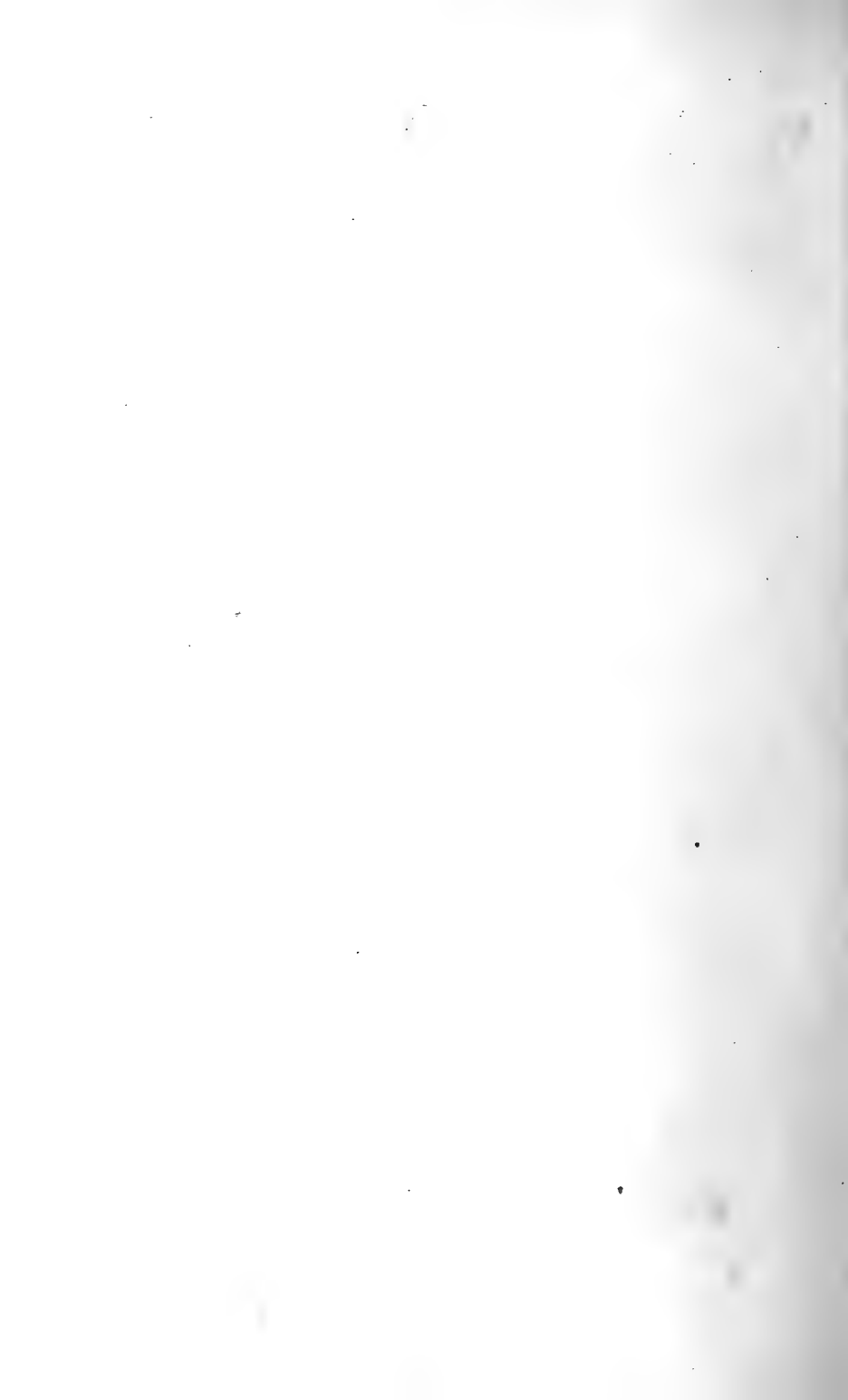
A kind of which little further is known beyond its being found at Port Natal in South Africa.

It is not yet introduced, and certainly tender.

No. 5. WIDDRINGTONIA WALLICHII, *Endlicher*.

This species is closely related to *Widdringtonia cupressoides*, but certainly different, according to Sir Wm. Hooker in his *Journal of Botany*.

It was first discovered by Dr. Wallich, in the environs of the Cape of Good Hope, but has not yet been introduced into England, and most certainly will prove tender.



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* * * Genera are indicated by Capitals, Species by Roman type, and Synonymes by *Italic*.

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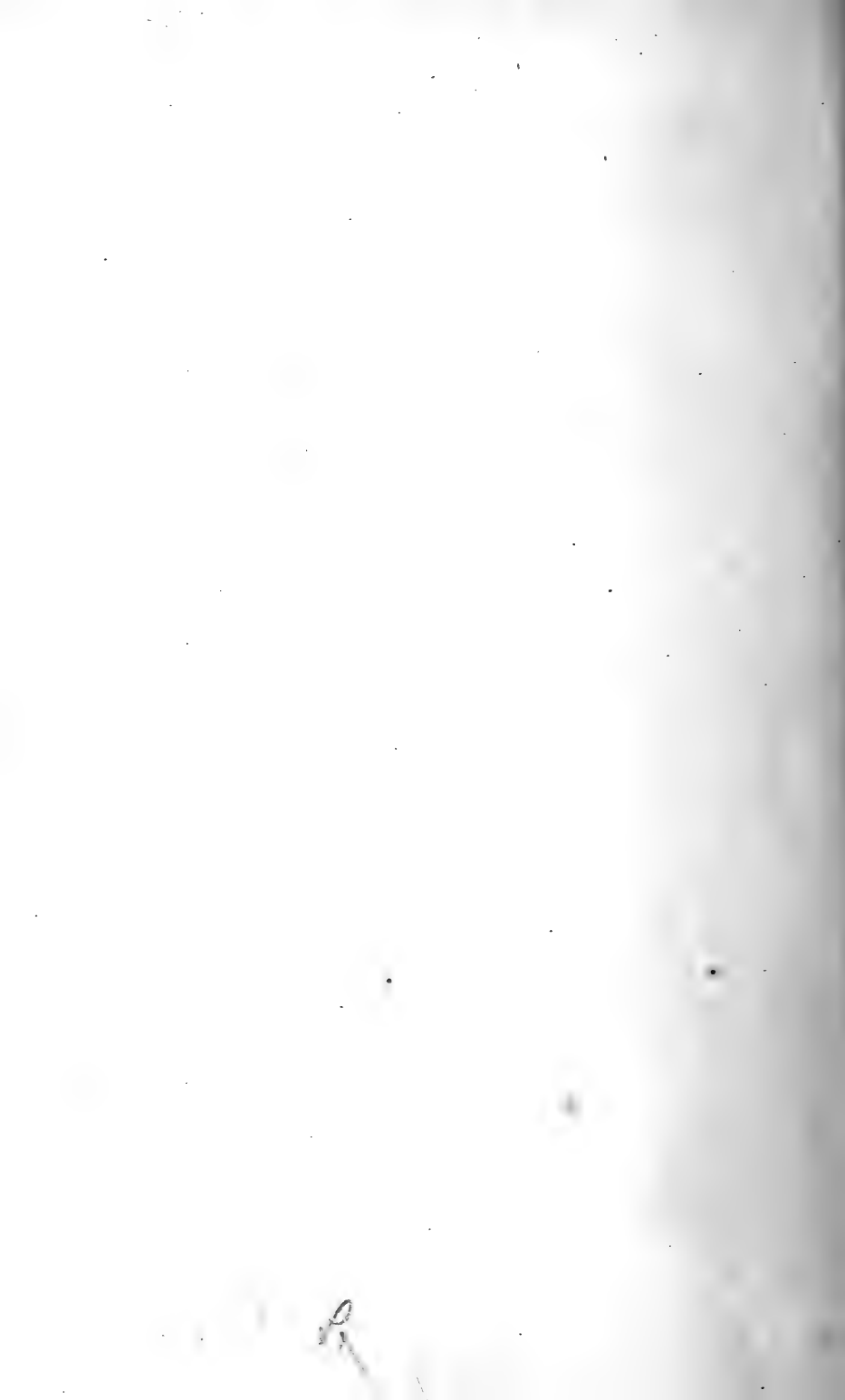
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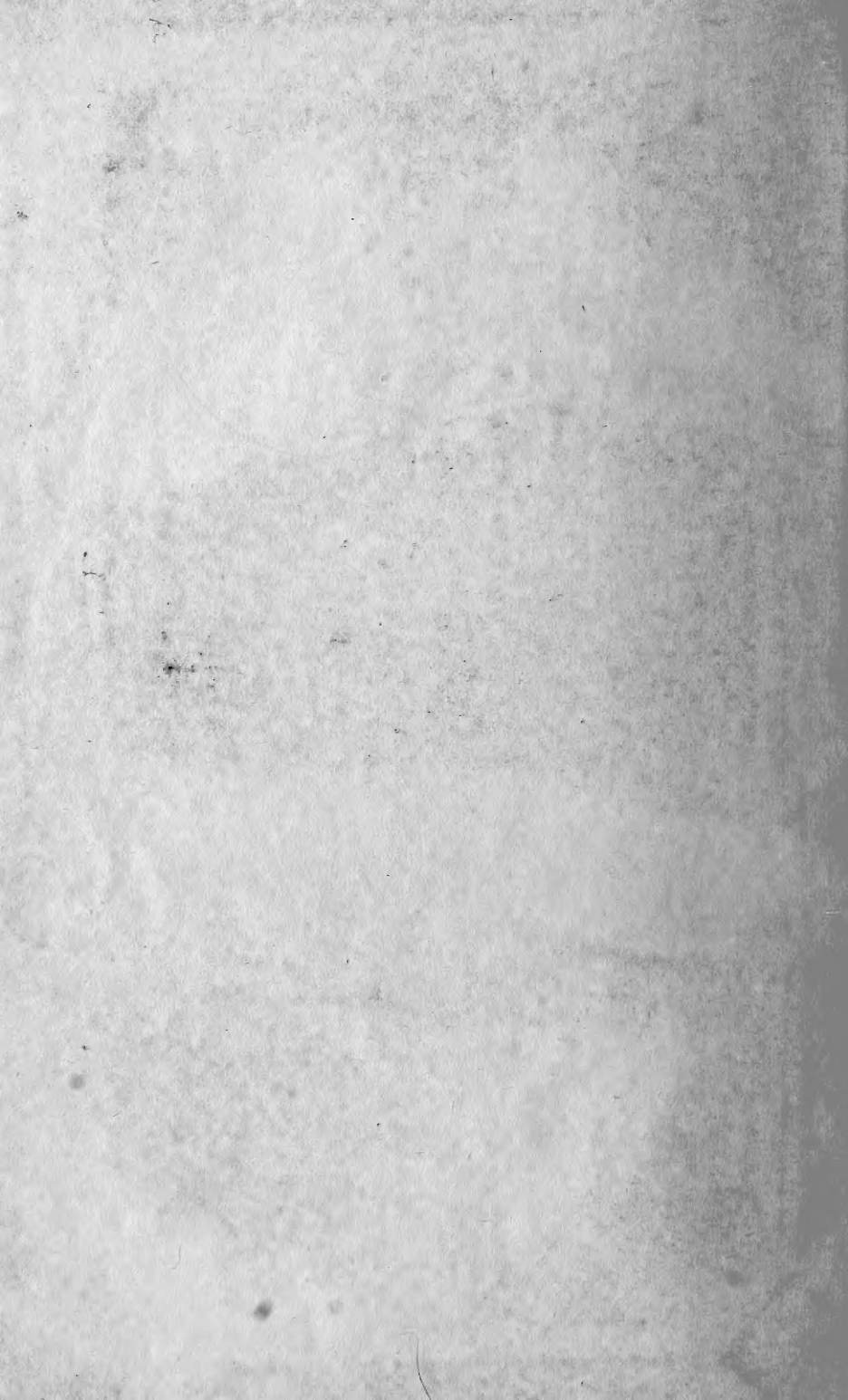
ERRATA.

- Page 6, for "*variegata*," read "*variegatis*."
 21, for "*Jessieu*," read "*Jussieu*."
 44, for "*Libana*," read "*Libani*."
 78, 79, for "*Moor*," read "*Moore*."
 104, for "*Deppiana*," read "*Deppeana*."
 112, for "*Koophora unze*," read "*oophora*, Kunze."
 152, for "*Fur*," read "*Fir*."
 165, for "*M'Intoshiana*," read "*Mac-Intoshiana*."
 292, for "*Dr*," read "*Mr*."

THE END,







Gordon, George / The pinetum : being a syn



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