

PINE (Lat. *Pinus*, Gr. *πίτυς*), a name given by the ancients to some of the resinous cone-bearing trees to which it is now applied, and, as limited by modern botanists, the designation of a large genus of true conifers, differing from the firs in their hard woody cone-scales being thickened at the apex, and in their slender needle-shaped leaves growing from a membranous sheath, either in pairs or from three to five together—each tuft representing an abortive branch, springing from the axil of a partially deciduous scale-leaf, the base of which remains closely adherent to the stem. The numerous male catkins are generally arranged in dense whorls around the bases of the young shoots; the anther-scales, surmounted by a crest-like appendage, shed their abundant pollen by longitudinal slits; the two ovules at the base of the inner side of each fertile cone-scale develop into a pair of winged seeds, which drop from the opening scales when mature—as in the allied genera.

The pines are widely distributed over the north temperate zone, in the southern portions chiefly confined to the mountains, along which, in Central America, a few are found within the tropic; in more northern regions they frequently form extensive forests, sometimes hardly mingled with other trees. Their soft, straight-grained, resinous and often durable wood gives to many kinds a high economic value, and some are among the most esteemed of timber trees.

Of the two-leaved species, *P. sylvestris*, the pine of northern Europe, may be taken as a type. When growing in perfection it is one of the finest of the group, and perhaps the most picturesque of forest trees; attaining a height of from 70 to 120 ft., it is of conical growth when young, but in maturity acquires a spreading cedar or mushroom-like top, with a straight trunk of from 2 to 4 ft. in diameter at the base, and gnarled twisted boughs, densely clothed at the extremities with glaucous green foliage, which contrasts strongly with the fiery red-brown bark. The leaves are rather short, curved, and often twisted; the male catkins, in dense cylindrical whorls, fill the air of the forest with their sulphur-like pollen in May or June, and fecundate the purple female flowers, which, at first sessile and erect, then

become recurved on a lengthening stalk; the ovate cones, about the length of the leaves, do not reach maturity until the autumn of the following year, and the seeds are seldom scattered until the third spring; the cone-scales terminate in a pyramidal



FIG. 1.—Scotch Fir (*Pinus sylvestris*).
a, Male flower and young cones; b, male catkin; c, d, outer and inner side of anther-scale.

recurved point, well marked in the green state and in some varieties in the mature cone, but in others scarcely projecting. *P. sylvestris* is found, in greater or less abundance, from the hills of Finmark and the plains of Bothnia to the mountains of Spain and even the higher forest-slopes of Etna, while in longitude its range extends from the shores of the North Sea to Kamchatka. Nowhere more abundant than in the Scandinavian peninsula, this tree is the true fir (*fur, fura*) of the old Norsemen, and still retains the name among their descendants in Britain, though botanically now classed as a pine. It grows vigorously in Lapland on the lower ground, and is found even at an elevation of 700 ft., while in south Norway it occurs up to 3000 ft., though the great forests from which "Norway pine" timber is chiefly derived are on the comparatively lower slopes of the south-eastern dales: in the highest situations it dwindles to a mere bush. It furnishes the yellow deal of the Baltic and Norway. In Germany, both on the mountains and the sandy plains, woods of "kiefer" are frequent and widely spread, while vast forests in Russia and Poland are chiefly composed of this species; in many northern habitats it is associated with the spruce and birch. In Asia it abounds in Siberia and on the mountains of the Amur region; on the European Alps it occurs at a height of 5600 ft., and on the Pyrenees it is found at still higher elevations; on the northern side of Etna it is said to grow at above 7000 ft. In Britain natural forests of Scotch fir of any extent are only now found in the Highlands, chiefly on the declivities of the Grampians. In former ages the tree covered a large portion of the more northern part of the island, as well as of Ireland; the numerous trunks found everywhere in the mosses and peat-bogs

of the northern counties of England attest its abundance there in prehistoric times; and in the remoter post-Glacial epoch its range was probably vastly more extended. The tree is not at present indigenous in southern Britain, but when planted in suitable ground multiplies rapidly by the wind-sown seeds; on many of the sandy moors and commons natural pine woods of large extent have been thus formed during the last fifty years. The Scotch fir is a very variable tree, and certain varieties have acquired a higher reputation for the qualities of their timber than others; among those most prized by foresters is the one called the Braemar pine, the remaining fragments of the great wood in the Braemar district being chiefly composed of this kind; it is mainly distinguished by its shorter and more glaucous leaves and ovoid cones with blunt recurved spines, and especially by the early horizontal growth of its ultimately drooping boughs; of all varieties this is the most picturesque. On the European continent the Hagenau pine of Westphalia is esteemed for the straightness and good quality of its timber. The heart-wood of the finer kinds of Scotch fir is of a deep brownish-red colour, abounding in the resin to which its durability is probably due. For all indoor and most outdoor purposes it is as lasting as oak, and for ship planking is perhaps little inferior; from its lightness and elasticity it is well adapted for the construction of yachts and other small fast-sailing craft, and is said to be the best of all wood for masts and large spars; its weight varies from 30 to 40 lb the cubic foot. The sap-wood is more perishable, but it is useful for fences, casks and a variety of other purposes; soaking in lime-water renders it more lasting; great numbers of young pines are annually cut for railway sleepers, mining timber and numerous agricultural applications; large quantities are consumed for wood-pavement. The quality of the timber

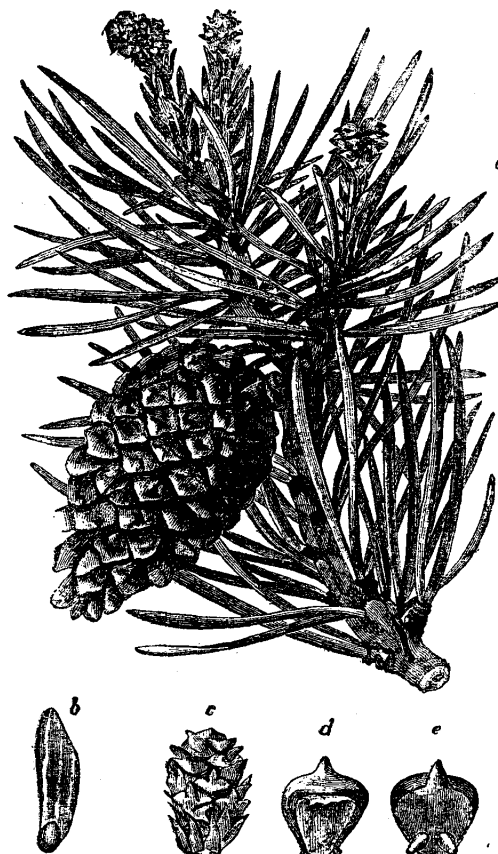


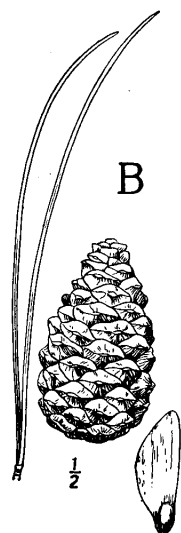
FIG. 2.—Scotch Fir (*Pinus sylvestris*).
a, Fertile flower of mature cone; b, winged seed; c, fertile catkin (or cone); d, scale and bract; e, inner side of scale.

depends greatly on the soil and position in which the trees are grown: the dry slopes of granitic or gneissic mountains, or the deep well-drained sandy gravels of the lower country seem to answer equally well; but on clay or wet peat the tree rarely

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SCOTCH FIR (*Pinus sylvestris*).
A, Cone, seed and needles.



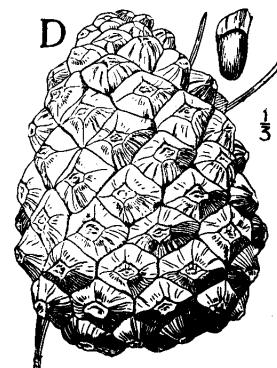
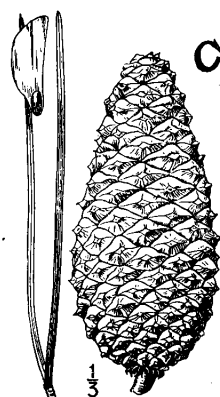
CORSICAN PINE (*Pinus Laricio*).
B, Cone, seed and needles.



CLUSTER PINE (*Pinus Pinaster*).
C, Cone, needle and seed.



STONE PINE (*Pinus Pinea*).
D, Cone and seed.



Photos by Henry Irving.

PINE

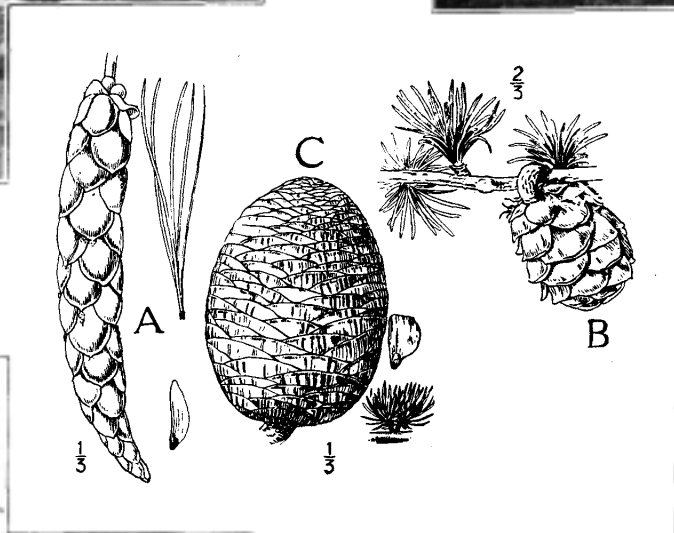
OTHER
CONIFERS



WEYMOUTH PINE
(*Pinus Strobus*).
A, Cone, needles and seed.



LARCH (*Larix europaea*).
B, Cone and foliage.



CEDAR OF LEBANON (*Cedrus Libani*).
C, Cone, foliage and seed.



DEODAR (*Cedrus Deodara*).

Photos by Henry Irving.

flourishes, and the timber is always indifferent; it is usually said that the wood is best in the cold climate of its more northern habitats, but a trunk (4 ft. in diameter) grown on the sands of Surrey had heart-wood quite equal to any produced in Glenmore or Rothiemurchus. The rapidity of growth is still more variable: in Britain full maturity is attained in from seventy to one hundred and twenty years, but in Norway the trunk increases much more slowly; Schübeler states that a tree felled in the Alten district (about 70° lat.), measuring 2 ft. 10 in. in diameter without the bark, showed four hundred circles of annual growth. In Norway the tree, growing in dense forests, is generally of but moderate girth, and probably this pine nowhere reaches a greater size than in the Scottish woods; a plank from Glenmore forest measured nearly 5½ ft. across, and from 3 to 4½ ft. is not an unusual diameter for a British pine tree.

Vast numbers of Scotch firs are raised in nurseries for artificial planting; the seed is sown in the spring, being just covered with earth, and the seedlings transplanted in the second year into rows for further culture, or taken direct from the seed-bed for final planting; sometimes the seed is sown where the trees are intended to grow. A plantation of Scotch fir requires frequent and careful thinning as the young trees increase in size; but pruning should be avoided as much as possible, excepting for the removal of dead wood. Plantations in England are generally ready for final cutting in from sixty to seventy years, and many are cleared at a much earlier stage of growth. *P. sylvestris* in Britain is liable to many insect depredations: the pine-chafer, *Hylurgus piniperda*, is destructive in some places, the larva of this beetle feeding on the young succulent shoots, especially in young plantations; *Hylobius abietis*, the fir-weevil, eats away the bark, and numerous lepidopterous larvae devour the leaves; the pine-sawfly is also injurious in some seasons; the removal of all dead branches from the trees and from the ground beneath them is recommended, as most of these insects lay their eggs among the decaying bark and dead leaves. In common with other pines, *P. sylvestris* is subject to the attacks of various fungi. *Trametes radiciperda* attacks the roots and penetrates to the stem, causing rotting of the wood; the disease is difficult to eradicate, as the mycelium of the fungus travels from root to root in the soil. Rotting of the wood at the base of the trunk is also caused by *Agaricus melleus*, which spreads from root to root in the soil by means of its long purple-black, cord-like mycelial strands known as *Rhizomorpha*. Much damage is often caused by species of *Peridermium*, which often invade the cortex and cambium to such an extent as to "ring" the stem or branch, or to cause an abnormal formation of turpentine which soaks into the wood and stops the upward passage of water; this causes the parts above the diseased area to perish. In England the pine is largely employed as a "nurse" for oak trees, its conical growth when young admirably adapting it for this purpose; its dense foliage renders it valuable as a shelter tree for protecting land from the wind; it stands the sea gales better than most conifers, but will not flourish on the shore like some other species.

The pine is an important tree in the economy of the northern nations of Europe. In Scandinavia and Russia houses are chiefly constructed of its timber; and log-huts are made of the smaller trunks and lined and roofed with the bark. The inner bark is twisted into ropes, and, like that of the spruce, is kiln-dried, ground up, and mixed with meal in times of scarcity; in Kamchatka it is macerated in water, then pounded, and made into a kind of substitute for bread without any admixture of flour. In recent days the fibre of the leaves has been extracted in some quantity and applied to textile purposes under the name of *waldwolle*, both in Germany and Sweden. It is prepared by boiling the needles in a solution of soda to remove the resin, which process loosens the fibre and renders its separation easy; it has some resemblance to coarse wool, and is spun and woven into blankets and garments that are said to be warm and durable; it is also used for stuffing cushions; an essential oil, obtained by a previous distillation of the leaves, has medicinal virtues attributed to it by some German practitioners.

Large quantities of turpentine are extracted from this pine in Sweden and Russia by removing a strip of bark, terminating below in a deep notch cut in the wood, into which the turpentine runs, and from which it is scooped as it accumulates; but the product is not equal to that of the silver fir and other species. Tar is prepared largely from *P. sylvestris*; it is chiefly obtained from the roots, which, mingled with a few logs, are arranged in a conical or funnel-shaped hollow made on the steep side of a hill or bank; after filling up, the whole is covered with turf and fired at the top, when the tar exudes slowly and runs into an iron vessel placed below, from the spout of which it is conveyed into barrels. Most of the so-called Stockholm tar is thus prepared, chiefly in the province of Bothnia.

Closely allied to the Scotch pine, and perhaps to be regarded as a mere alpine form of that species, is the dwarf *P. montana* (or *P. Pumilio*), the "krummholz" or "knieholz" of the Germans—a recumbent bush, generally only a few feet high, but with long zigzag stems, that root occasionally at the knee-like bends where they rest upon the ground. The foliage much resembles that of the Scotch fir, but is shorter, denser and more rigid; the cones are smaller but similar in form. Abounding on the higher slopes of the Bavarian and Tirolese Alps, it is a favourite shelter for the chamois; the hunters call it the "latschen," from its recumbent straggling habit. Krummholz oil, valued in Germany as an outward application in rheumatism and for bruises and sprains, is distilled from the young branches, and a fragrant white resin that exudes in some quantity from the buds is used for similar purposes and as a perfume, under the name of Hungarian balsam it is sold in the towns of Germany, being probably obtained from the Carpathians.

The red pine of Canada and New England (so called from the colour of its bark), *P. resinosa*, is a tree of considerable size, sometimes attaining the dimensions of *P. sylvestris*. The somewhat glaucous leaves form dense tufts at the ends of the branches, and are 4 or 5 in. long; the ovate blunt cones are about half that length. The tree is of quick growth and the wood strong and resinous, but it is less durable than Scotch fir, though much employed in ship-building; according to Emerson, trunks exist in Maine 4 ft. in diameter. A sandy soil seems to suit it best, and the quality of the wood probably much depends on its place of growth. Red pines abound in Nova Scotia and Newfoundland, and the tree is rather widely distributed over the northern parts of the continent; it rarely forms extensive woods, but grows chiefly in clumps among other trees, at least in its more southern habitats. Nearly allied is *P. Banksiana*, the grey or Labrador pine, sometimes called the scrub pine from its dwarfish habit; it is the most northerly representative of the genus in America, and is chiefly remarkable for its much recurved and twisted cones, about 2 in. long. The trunks are too small to be of great economic value, but the light wood is used by the natives for their canoes.

P. Laricio, the Corsican pine, is one of the noblest trees of this group, growing to a height of 100 or even 150 ft., with a straight trunk and branches in regular whorls, forming in large trees a pyramidal head; the slender leaves, of a dark green tint, are from 4 to 7 in. long; the cones, either in pairs or several together, project horizontally, and are of a light brown colour. This pine abounds in Corsica, and is found in more or less abundance in Spain, southern France, Greece, and many Mediterranean countries; it occurs on the higher mountains of Cyprus. The tree is of very rapid growth, but produces good timber, much used in southern dockyards, and very durable, though less strong than that of *P. sylvestris*; the heart-wood is of a brownish-tint. In southern France it has been planted with success on the drift-sands of the Bay of Biscay, though it does not bear the full force of the sea-blast as well as the pinaster. In England it grows well in sheltered situations and well-drained soils.

The black pine, *P. austriaca*, generally now regarded as a variety of *P. Laricio*, derives its name from the extreme depth of its foliage tints—the sharp, rigid, rather long leaves of a dark green hue giving a sombre aspect to the tree. The light-coloured, glossy, horizontal cones are generally in pairs, but sometimes three or four together. The tree is conical when young, but when old forms a spreading head; it often attains a large size. Southern Austria and the adjacent countries are the natural habitats of this pine; it seems to flourish best on rocky mountain sides, but in England grows well on sandy soils. The timber is valued in its native country, and is said to be durable and to stand exposure to the weather well; various resinous products are extracted from it. *P. pyrenaica* is a handsome species of pyramidal form, attaining a large size on the mountains of northern Spain, whence it extends through the Mediterranean region to Asia Minor, northern Persia and Afghanistan. The leaves are long and of a light bright green; the cones are solitary, oblong, conical and of a yellow tint. The timber is used in Spanish dockyards, but opinions vary as to its quality. In plantations its bright foliage, with the orange cones and young shoots, render it an ornamental tree, hardy in southern Britain. *P. brutia*, the Calabrian pine, is regarded as the same

species. *P. halepensis*, another Mediterranean form, is valued for its timber, which is white with a fine grain, and resinous products.

P. pinaster, the cluster pine or pinaster, is an important species from its vigorous growth in the sand-drifts of the coast, for the purpose of binding which it has been grown more extensively and successfully than any other tree, especially on the dunes of the Bay of Biscay. Growing to a height of from 40 to 80 ft., the deeply-furrowed trunk occasionally reaches a diameter of 3 ft. or more at the base, where, like most sand trees, it usually curves upward gradually, a form that enables the long tap-roots to withstand better the strain of the sea gale; when once established, the tree is rarely overthrown even on the loosest sand. The branches curve upwards like the stem, with their thick covering of long dark green leaves, giving a massive rounded outline to the tree; the ovate cones are from 4 to 6 in. long, of a light shining brown hue, with thick scales terminating in a pyramidal apex; they are arranged around the branches in the radiating clusters that give name to the tree. The pinaster grows naturally on sandy soils around the Mediterranean from Spain to the Levant. On the drift-sands of France, especially in the Gironde, forests have been formed mainly of this pine; the seeds, sown at first under proper shelter and protected by a thick growth of broom sown simultaneously, vegetate rapidly in the sea-sand, and the trees thus raised have, by their wind-drifted seed, covered much of the former desert of the Landes with an evergreen wood. These forests of pinaster, apart from the production of timber in a once treeless district, have a great economic value as a source of turpentine, which is largely obtained from the trees by a process analogous to that employed in its collection from *P. sylvestris*; the resin is yielded from May to the end of September, the cuts being renewed as the supply fails, until the tree is exhausted; the trunks are then felled and used in the manufacture of charcoal and lamp black; much tar and pitch is also obtained from these pinaster forests. In England the cluster-pine has been largely planted on sandy districts near the sea, and has become naturalized in Purbeck and other wild tracts in the southern counties, but the summer heat is too small to permit of its resinous products acquiring any value; the soft coarse wood, though perishable in the natural state, has been used for railway sleepers after saturation with creosote or preservative solutions.

P. pinea is the stone pine of Italy; its spreading rounded canopy of light green foliage, supported on a tall and often branchless trunk, forms a striking feature of the landscape in that country, as well as in some other Mediterranean lands. The beautiful reddish-brown shining cones, roundly ovate in shape, with pyramidal scale apices, have been prized from the ancient days of Rome for their edible nut-like seeds, which are still used as an article of food or dessert. They do not ripen until the fourth year, and are kept in the cone until required, as their abundant oil soon turns rancid. The tree has been naturalized in many warm countries, even in China; in England it seldom attains any large size, as the deficient summer heat prevents the wood from maturing; but trees occur occasionally in plantations 20 or 30 ft. in height; the wood, though soft and deficient in the resin that gives durability to the timber of some species, is valued by the southern carpenter and cabinetmaker for its lightness, its fineness of grain, and the ease with which it is worked.

P. mitis, the yellow pine of the northern and middle states of America, is rather allied to the three-leaved section, but the leaves are mostly in pairs. It is a tree of large size, often attaining a height of 70 ft. and upwards, though rarely more than 2 ft. in diameter at the root; the lower branches spread horizontally, the upper, converging towards the trunk, give the tree somewhat the aspect of a spruce, hence it is called in some districts the "spruce-pine." The leaves are long, slender, and of a bluish-green hue; the pendant cones are about 1½ in. long, with a slender point to each scale. The yellow pine is one of the most important timber trees of the genus; the heart-wood being very durable is largely employed in ship-building and for house timber, being nearly equal to that of *P. sylvestris*; large quantities are exported to Britain under the name of "New York yellow pine"; the sapwood is perishable.

The three-leaved group includes several of the most valuable trees of America; among them is *P. rigida*, the pitch pine of the northern states, a tree of from 40 to 50 ft. in height with rugged trunk, occasionally 3 ft. in diameter; the short dark-green leaves are in thick tufts, contrasting with the pale yellowish, usually clustered cones, the scales of which are furnished with small curved spines. The wood is very hard and abounds with resin, but on swampy land is of inferior quality and of little value except for fuel, for which the pitch-pine is highly prized; on drier ground the grain is fine from the numerous knots. Large quantities of tar and pitch are obtained from this species. The tree is one of the few that will flourish in salt-marshes.

P. palustris (or *P. australis*) is the "Georgia pitch pine," or yellow pine of the southern states; it abounds on the sandy soils that cover so much of Georgia, the Carolinas, and Florida, and on those dry lands attains its highest perfection, though occasionally abundant on moist ground, whence its name. The most marked feature of the tree is its long tufted foliage—the leaves, of a bright

green tint, springing from long white sheaths, being often a foot in length. The tall columnar trunk furnishes the most valued pine timber of the states; close-grained and resinous, it is very durable and polishes well; it is largely employed in American shipyards, and immense quantities are exported, especially to Britain and the West Indies. This tree yields an abundant supply of tar and turpentine of good quality, which products are collected and manufactured in the "pine-barrens" on a large scale.

P. Taeda, the "loblolly pine" of the backwoodsman, a tall tree with straight trunk and spreading top, covers great tracts of the "pine-barrens" of the southern states, but also frequently spreads over deserted arable lands that have been impoverished by long and bad farming; hence the woodsmen call it the "old-field" pine, while, from the fragrance of its abundant resin, it is also known as the frankincense pine. It is a fine species 80 or 90 ft. high, having sometimes a girth of 6 or 8 ft., with a broad spreading head; the leaves are rather long and of a light green tint, the cones generally in pairs, the scales terminating in a sharp incurved prickle. The timber of this pine is indifferent, but the forests of it are of importance from the quantity of turpentine they yield; the trees also furnish much firewood of good quality.

P. ponderosa, the yellow pine of the Pacific coast of America, belongs to this section; it is a fine timber tree deserving of notice from the extreme density of its wood, which barely floats in water; it abounds in some parts of the western range of the Rocky Mountains, and is the most widely distributed pine tree of the mountain forests of western North America. The leaves are very long and twisted, the small oval cones armed with recurved prickles; the tree is said to be of rapid growth. In Oregon and California several large pines of this group are found. *P. Coulteri* or *macrocarpa*, is remarkable for its enormous cones (sometimes a foot long, 6 in. in diameter, and weighing more than 4 lb); the scales end in long hooked points curving upwards; the leaves are long, rigid, and glaucous in hue. Nearly related to this is *P. Sabiniiana*, the nut-pine of California, the cones of which are 7 to 9 in. long and 5 to 6 in. in diameter, also with hooked scales; the large nut-like seeds are eaten by the Indians; the tree is one of the largest of the section, sometimes attaining a height of 120 ft. and upwards, while trunks have been found, it is said, 10 or 12 ft. in diameter. *P. longifolia*, a Himalayan species, is remarkable for the great length of its lax slender leaves, of a grass-green tint; the cones have the points of the scales recurved. It is known in India as the "cheer pine"; the wood is good, resinous, and moderately durable; the tree is common on the foot-hills of the Himalayas. *P. Gerardiana*, a north-west Himalayan species, is a medium-sized tree with a conical head, growing on the more elevated parts of the mountain range; it furnishes edible seeds. The leaves, short and glaucous, like those of the Scotch fir, have deciduous sheaths; the cones have recurved scale-points like those of the cheer pine. *P. canariensis*, which forms forests on the mountains of Grand Canary and Teneriffe, growing at an elevation of 6000 ft., also belongs to this group. The leaves are long, lax, and of a bright green tint; the cone-scales are without spines; the trunk attains a large size, and yields good and durable timber. The beautiful Monterey pine, *P. insignis*, distinguished by the brilliant colour of its foliage, has the leaves in tufts of three or four; the lower cone-scales have recurved points. This fine pine has been planted in the south-west of England, but is scarcely hardy.

The pines with five leaves in each tuft have generally deciduous sheaths. The most important economic species is the well-known white pine, *P. Strobus*, from its large growth and abundance, as well as the soft even grain of its white wood, one of the most valuable of North American timber trees. The tree abounds from Canada to Georgia, but in the eastern states has been so long sought for by the lumberer that most of the old trees have long disappeared, and large white pine timber is now only found in quantity in the Canadian Dominion. Formerly Maine and Vermont were celebrated for the size of their pines, but few of these great trees now exist in New England. On a deep rich soil *P. Strobus* attains a height of 150 ft., and trunks without a branch are sometimes found 80 or 90 ft. long; in the earlier stages of growth it has a pyramidal form, in open glades the lower boughs often touching the ground, but in old age it acquires a wide almost cedar-like top. The light bluish-green foliage is somewhat lax, very dense in young trees; the cones are long and rather curved, with thin smooth scales a little thickened at the apex, and generally more or less covered with exuding white resin; they are about 5 or 6 in. in length and 1½ to 2 in. broad; the male catkins are of a bluish tint; the cones ripen in the autumn of the second year. The wood of the white pine is durable for indoor use, especially when protected by paint, but when exposed to moist air it rapidly decays, and it is very liable to dry rot; it is said to be best when grown on sandy soils. Immense quantities are still exported, especially from Canada, its smooth easily-worked grain rendering it a favourite wood for the house-carpenter and joiner; it weighs about 28 lb per cubic foot. In England where it is generally known as the "Weymouth pine," it succeeds well on deep light soils when well-drained; trees have attained occasionally a height of 100 ft. and upwards in British plantations; but it is apt to be infested with American blight (*Eriosoma*). In northern Germany it also grows well. The climate of Scotland

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appears less suitable for it, probably from the want of summer heat, and it can hardly be recommended for British planting otherwise than for ornamental purposes.

Nearly approaching this is *P. excelsa*, the Bhotan pine, which differs chiefly in its longer cones and drooping glaucous foliage. It is found in Kumaon and Bhotan and on some of the Nepal ranges, but does not grow in the moist climate of the Sikkim Himalayas; it is found at a height of 7000 to 12,000 ft., and attains large dimensions; the wood is highly resinous, and is said to be durable; great quantities of a white clear turpentine exude from the branches when injured. The Bhotan pine is quite hardy in southern England, and has been largely planted of late as an ornamental tree.

P. Lambertiana, the giant pine or sugar pine of California, is the largest of the genus, rising to the height of 200 ft., with a trunk 20 to 30 ft. in girth, and, it is said, occasionally attaining much larger dimensions. The head is of a pyramidal form, the lower branches drooping like those of a Norway spruce; its foliage is of a light bright green colour. The pendent cones are very large, sometimes 18 in. long and 4 in. in diameter, with large nut-like seeds, which, pounded and baked, are eaten by the Indians. The tree abounds in some sandy districts, but more generally occurs singly or in small groups dispersed through the woods, attaining its greatest dimensions in light soils. The wood is soft and nearly white, but contains much resin, which when fire has run through the forest exudes, and, having in this half-burnt condition a sweetish taste, has given the common name to the tree; the wood seems to be formed slowly; from its smooth grain it is valued for indoor carpentry; the saccharine burnt resin is used as a laxative in California.

P. Cembra is the stone pine of Siberia and central Europe. It abounds on the Alps, the Carpathians and the Siberian ranges, in Switzerland being found at an altitude of 4000 to 6000 ft. It is a straight-growing tree, with grey bark and whorls of horizontal branches giving a cylindro-conical outline; the leaves are short, rigid and glaucous; the cones, oblong and rather pointing upwards, grow only near the top of the tree, and ripen in the second autumn; the seeds are oily like those of *P. Pinea*, and are eaten both on the Alps and by the inhabitants of Siberia; a fine oil is expressed from them which is used both for food and in lamps, but, like that of the Italian pine, it soon turns rancid. The growth of *P. Cembra* is slow, but the wood is of remarkably even grain, and is employed by the Swiss wood-carvers in preference to any other. The *Cembra* is the "zirbel" or "zirbel-kiefer" of the Germans, and is known locally in Switzerland as the "aroile," "aloies," and "arve."

P. occidentalis, a five-leaved pine with pale-green foliage and small ovate cones, is found on the high mountains of Santo Domingo and Cuba. Many members of the group occur on the Mexican isthmus, one of which, *P. cembroides*, produces edible seeds; another, *P. Montezumae*, is a valuable timber tree. *P. Ayacahuite*, the common white pine of Mexico, spreads southwards on to the mountains of Guatemala, it is a large tree with glaucous foliage like *P. Strobis*, and yields a valuable resin. *P. filifolia* and *P. macrophylla*, likewise natives of Central America, are remarkable for the extreme length of their leaves; the former is said to attain a large size.

(C. P. J.)