
Forest Trees of the Pacific Slope

By

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U. S. Department of Agriculture

Forest Service

U. S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE

GIFFORD PINCHOT, *Forester*



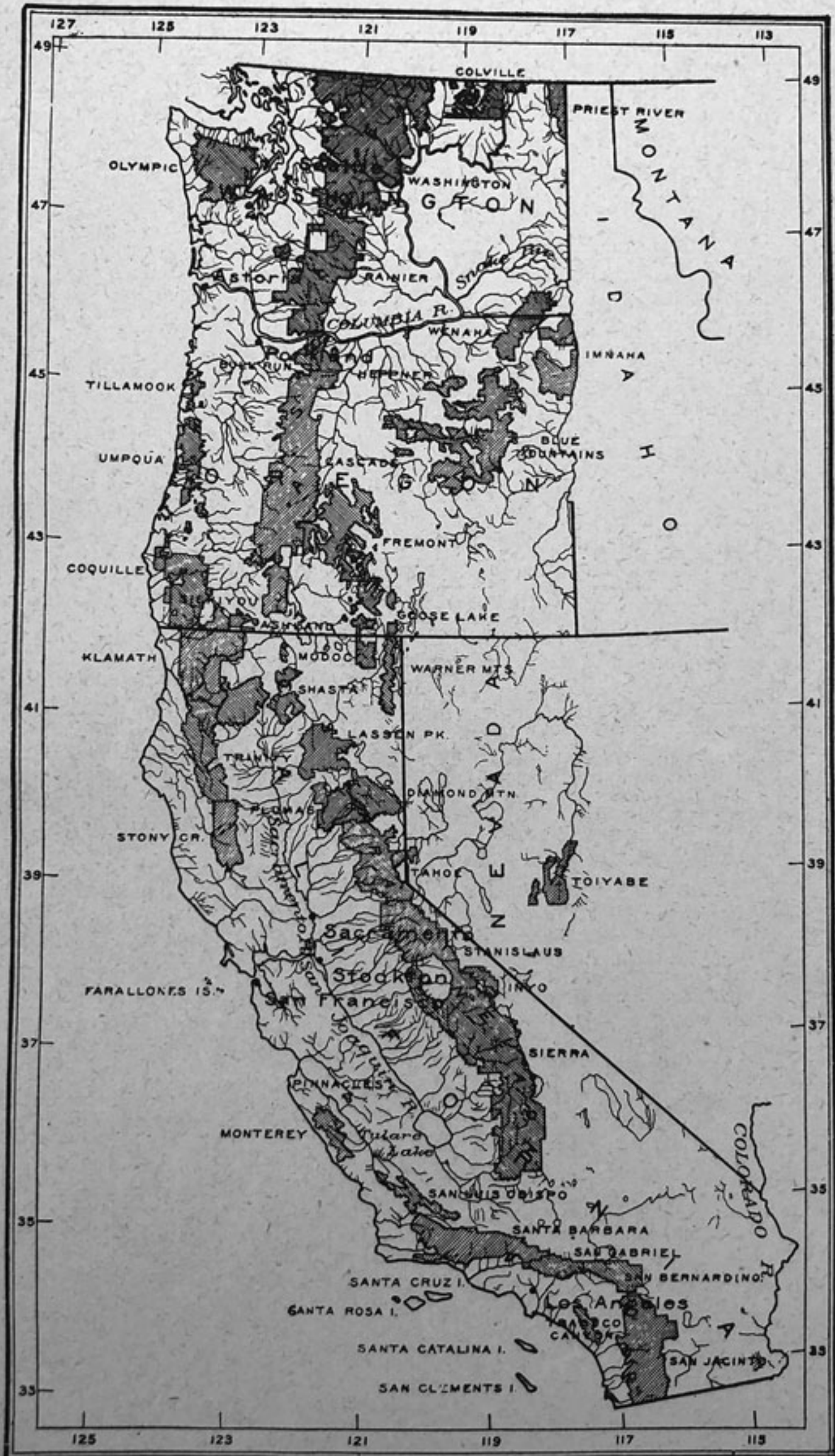
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PACIFIC COAST REGION SOUTH.

broadleaf maples, black cottonwood, western birch, red and Sitka alders, and occasionally with yellow cedar; hemlock a common associate.

CLIMATIC CONDITIONS.—Climate, humid, mild, and uniform throughout commercial range and within constant influence of ocean fogs; but at high altitudes it endures (as a shrub) a severe climate with short summers, long winters, and low temperatures (sometimes -35° F.).

TOLERANCE.—Very tolerant; tolerance varies with age, altitude, latitude, soil, moisture, and climatic conditions. Grows well in dense shade during earlier life, and even reaches maturity and old age in shade, but growth is retarded in proportion to density of shade, for although the shade is tolerated to high degree it is not required. Tolerance greatest under best conditions for growth and toward south and lower limits. Here the tree maintains a dense crown-cover throughout life and commonly forms an understory, mainly with western hemlock, alone or with redwood, Douglas fir, grand fir, western white pine, and other species.

REPRODUCTION.—Prolific seeder, with specially heavy seed years. Seed has high rate of germination, but only transient vitality. Seed usually germinates the autumn it is shed, and seedlings establish themselves before winter. Germination abundant, and best on moist duff, litter, moss, decayed logs, stumps, etc., both in open and in densest shade. Under dense shade seedlings hold their ground with remarkable power. Does not reproduce itself readily where fires have destroyed ground cover and forest cover to such an extent that soil moisture is materially reduced.

CUPRESSUS. CYPRESSES.

The trees of the cypress group, to which belongs the cypress tree (*Cupressus sempervirens* Linn.) of the Egyptians and Romans, are closely related to the species of *Chamaecyparis*. They differ from the latter group essentially, however, in having quadrangular branchlets instead of flat ones and in having them arranged not in one plane, but irregularly disposed. The overlapping minute, scale-like leaves of both groups are arranged in alternately opposite pairs, but those of *Cupressus* are minutely toothed on their margins, while in *Chamaecyparis* the margins are entire or smooth. Leaves of each season's growth remain on the trees from three to four years. Flowers are similarly arranged in both groups (see *Chamaecyparis*). The cones of *Cupressus* mature at the end of the second season, instead of in one season, as in *Chamaecyparis*, and bear about 15 to 20 seeds under each fertile cone scale, instead of only 4 or 5 seeds to one scale, as in *Chamaecyparis*. The seeds of *Cupressus* (native species) have narrow, hard wings, in place of broad, gauzy wings, as in *Chamaecyparis*. Seed leaves in *Cupressus* are 3 and only 2 in *Chamaecyparis*. Wood of the cypresses, which is strongly aromatic, is remarkably durable, but on account of the usually small size and poor timber form of our native species the wood is of little or no commercial value. The cypresses are, however, of considerable importance to the forester in assisting to form protective cover on wind-swept, sandy coasts or dry, arid slopes and little-wooded canyons.

Four species inhabit the Pacific region, all confined to California. Trees of this group are of ancient origin. Representatives once inhabited Greenland and western Europe, where, however, they are now extinct.

Monterey Cypress.

Cupressus macrocarpa Hartweg.

DISTINGUISHING CHARACTERISTICS.

Monterey cypress owes its common name to its confined habitat near the Bay of Monterey, California. It has a form in youth entirely different from its mature habit. When young the trunk is sharply conical, and its crown of rigidly straight, slender branches trending upward is a wide, sharp-pointed pyramid which extends down to the ground. Such trees are from 40 to 50 feet

high and 18 or 20 inches or more in diameter. Later, the height growth, rarely more than 60 feet, ceases, and if the trees have room the branches develop into long, massive limbs, finally reaching up to the height of the leader and spreading out into a very wide, flat-topped or umbrella-shaped crown. The trunks are then short, and the large limbs often near to the ground. The crown of crowded old trees is similar, but much less broad. Exposed to the sea winds, some trunks and their enormously developed limbs sprawl on the ground, and are grotesquely bent and gnarled. The violent swaying of branches in the wind produces, in some trees, most curious enlargements at the bases of the branches (obviously serving as braces) remotely resembling the palmated divisions in the horns of a moose. Bark of mature trunks is about seven-eighths of an inch thick. Outwardly it is weathered to an ashy white, but breaking it exposes a deep red-brown beneath, the same color as that of the protected bark of limbs and young trees. Old bark is firm, and narrowly seamed, with a network of narrow, vertical ridges and smaller diagonal ones. The bark is too thin to protect the tree from severe fires. The foliage is dark yellow-green. The minute leaves (fig. 61) are closely attached to the branchlets, their sharp points sometimes standing out slightly from the twigs. Leaves of a season's growth persist about three years, usually dying the second year. They are commonly marked on the back with a minute pit and two shallow grooves. The cones (fig. 61) mature by August of the second season, when they are ashy brown. They open slowly, shedding their russet-brown seeds during autumn, after which they may remain on the trees for several or many seasons. From 18 to 20 angled seeds (fig. 61, *a*) are borne under each perfect cone-scale. They are rather heavy, and usually fall near the parent tree. Seed-leaves, 3; about three-eighths of an inch long, narrow and pointed. Similar seedling leaves, about 4 of which stand out from the slender stem at regular intervals, succeed these. During the second season the spreading leaves are followed by shorter, pointed, less spreading leaves, from one-eighth to three-sixteenths of an inch long. Later branchlets (second and third seasons) begin to have adult foliage.

Wood, very fine-grained, rather heavy (very much heavier than any of the other native cypress woods), and clear yellow-brown, with streaks of rose-red and dull yellow. It has a faint, aromatic, "cedar-like" odor. Great durability without protection is a marked feature of this wood. The poor timber form of the tree and its very limited available supply prevent the wood from becoming commercially important. It is most important, however, as one of the rare forest trees capable of forming a cover on the wind-swept coast, even down to the water's edge. In dry situations elsewhere it is most worthy of use for protective planting. Its vigorous, rather rapid height growth in early life makes it exceedingly useful for windbreaks. The full extent to which it can be used in forest planting for cover has not been determined.

LONGEVITY.—Little is known of the longevity of this tree. It is believed to be long-lived. Trees from 14 to 19 inches in diameter are from 60 to 85 years old. Some of the larger trees are doubtless over 200 years old.

RANGE.

Central California coast, for a few miles on peninsula between Monterey Bay and Carmel Bay from Point Cypress nearly to Carmel River, and on Point Lobos south of Carmel Bay; mostly in a belt a few hundred feet wide along immediate coast, but also scattered farther inland on ridge of peninsula. Extensively cultivated elsewhere in California for windbreaks.

OCCURRENCE.

Rocky sea cliffs, on clay loam soil with dry leaf litter when shaded and with grass and other herbs in openings. Soils always fresh and porous in shade, but baked, cracked,

and much less moist in the open. Forms a transition zone between sea beach and Monterey pine belt.

Mainly in pure, more or less dense stand, but mingled on east with Monterey pine and occasional Gowen cypress.

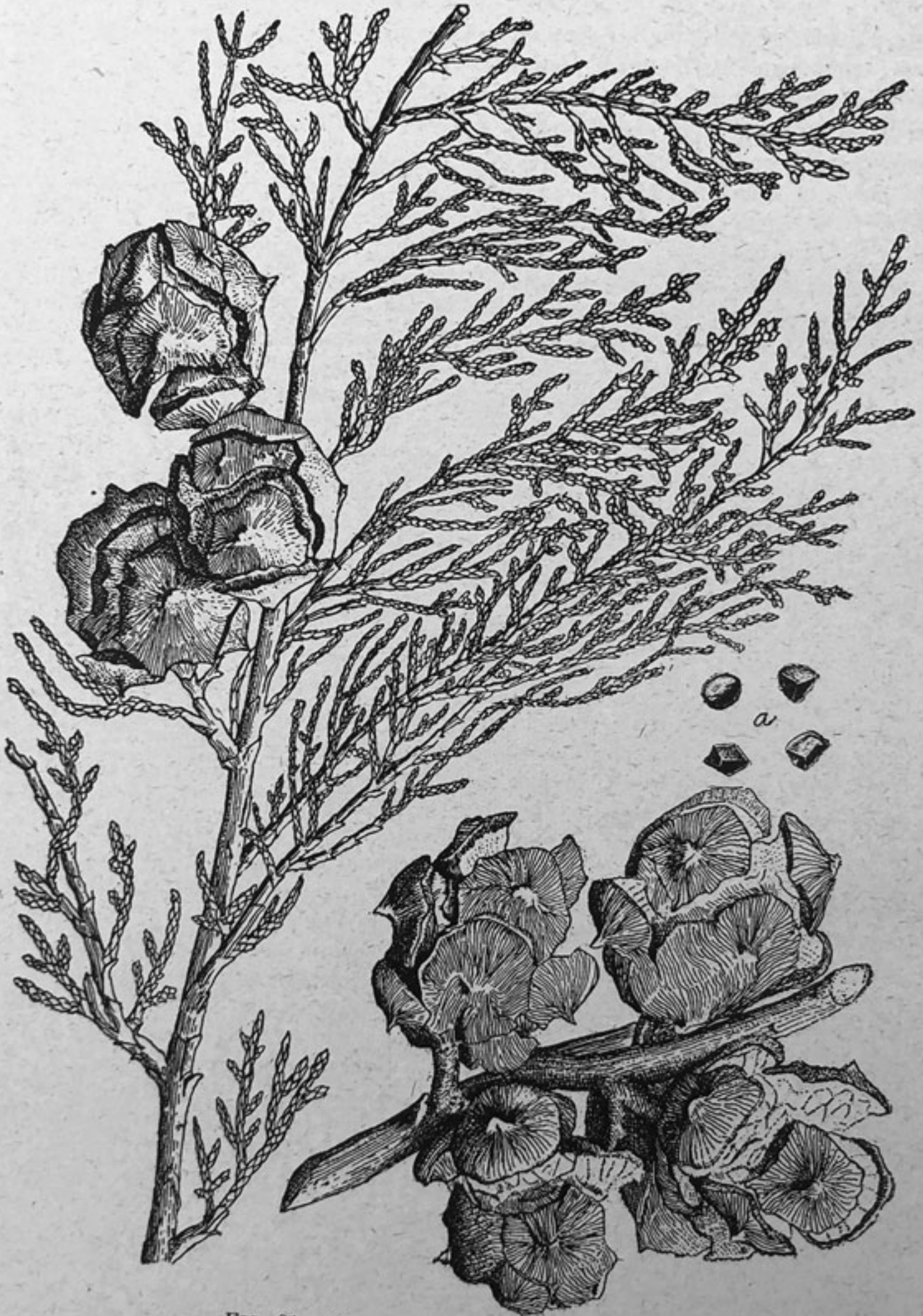


FIG. 61.—*Cupressus macrocarpa*: a, seed.

CLIMATIC CONDITIONS.—Climate mild; equable temperature, never at freezing point and rarely above 90° F. Annual rainfall about 17 inches. Strong, moist sea winds keep air humid during greater part of year, while cloudy or foggy days are frequent. Demands humid air for best growth; grows well in fresh soils away from immediate influence of

sea, but apparently much shorter lived outside its habitat. Capable of enduring wider variation in temperature than that of its natural range. If planted in dry soils, for instance, where temperature falls below freezing, it grows well and matures young wood before frost, which commonly kills back immature growth in damp, low situations.

TOLERANCE.—Decidedly tolerant of shade, but thrives in full light. Natural growth includes both widely distant, gnarled, twisted trees and extremely dense stands. In dense stands shade of crown cover is heavy, yet young growth persists under it for many years.

REPRODUCTION.—Prolific annual seeder. Seed has moderately high rate of germination and persistent vitality. Usually germinates first season, under dense stands in compact, partly decomposed leaf litter. Seedlings grow very rapidly; in cultivation, often 3 feet in as many years. Grows from cuttings made from leading twigs of year, but trees thus raised are less vigorous, branch more, and are shorter lived than those grown from seed.

Gowen Cypress.

Cupressus goveniana Gordon.

DISTINGUISHING CHARACTERISTICS.

Gowen cypress, usually a small tree, is mainly known simply as "cypress," but this name is confusing; the coined name, Gowen cypress, is preferable. Karl T. Hartweg discovered it in 1846, and later introduced it into England, where it received its technical name in honor of James R. Gowen. English writers call it "Mr. Gowen's California cypress."

It is a small, much branched, shrubby tree, about 10 to 20 feet high, and frequently much stunted and bearing cones when under 3 feet in height. Under conditions very favorable for growth, however, it is from 30 to 40 feet high, or a little more, and from 15 to 20 inches in diameter. Young trees are straight, with sharply conical stems and slender, straight branches which trend upward. When the trees are older, the lower branches stand out straight. A wide, irregular, open pyramidal crown is formed down to the ground. The crown is especially open in older trees on account of the irregular lengthening of the main branches, which become very stout. There is rarely more than a few feet of clear trunk. The bark, about one-half inch thick on old trees, is firm, and is cut by narrow seams into a network of narrow ridges connected by thinner diagonal ones. On the outside the bark is weathered to a dull reddish brown, but the interior shows a clear red-brown. The minute, closely pressed, pointed leaves (fig. 62) have a faintly marked pit (sometimes wanting) on the back, and are a dark grass-green. Those of a season's growth persist from three to four years, but die at the end of their second or third year. The cones (fig. 62), one-half to seven-eighths of an inch in diameter, mature at the close of the second season, shed their shiny, pale brown seeds (fig. 62, *a*) late in September or in October, but remain on the trees for a number of years thereafter. Mature cones are shiny and either light brown, tinged with red, or purplish brown. Nineteen or twenty angled seeds are produced under each perfect cone-scale. The seeds are not buoyant enough to be carried more than a few rods from the mother tree, even by strong winds. Seed leaves, 3, occasionally 4; about three-sixteenths of an inch long, narrow and pointed. Seedling leaves are similar, but slightly longer, and stand out from the slender stem at regular intervals in groups of 3 or 4. During the first or second season narrow scale-like leaves (about three-sixteenths of an inch long) appear on the tiny branches of seedlings. They stand slightly away from the stem, and those which succeed them, in the third and fourth years, become more and more like adult leaves in form and arrangement.

Wood, pale yellowish brown, fine grained, rather heavy, and faintly aromatic. It appears to be durable when exposed to the weather. The wood is of no

commercial value, but the tree is very important in forming a cover for barren, sandy, and rocky slopes too much exposed for most other trees. Its low growth subjects it to destructive fires, but it persistently reconquers areas on which its ranks have been severely thinned.

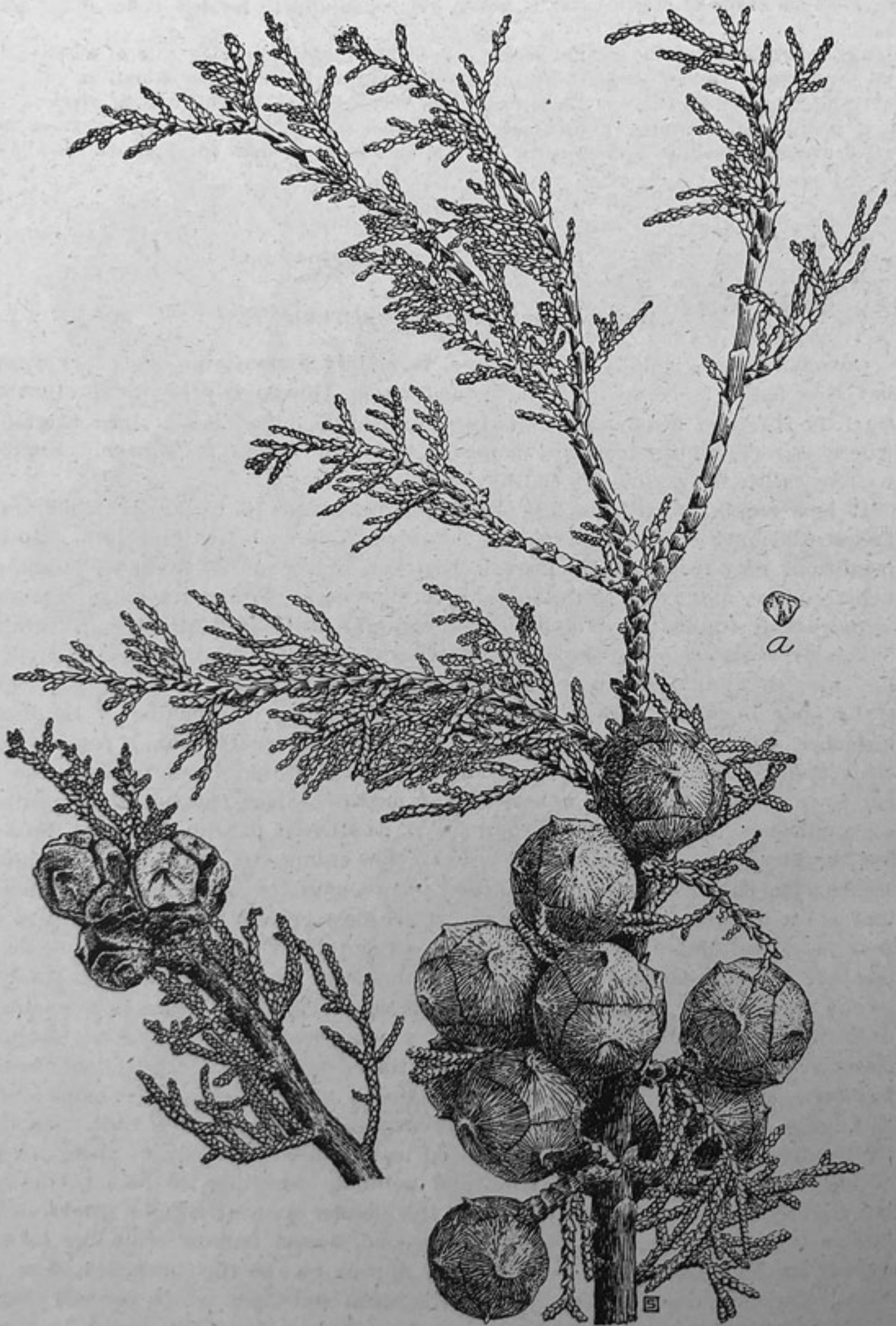


FIG. 62.—*Cupressus goveniana*: a, seed.

LONGEVITY.—Little is known of its age, but it is believed to be fairly long-lived. Trees from 8 to 14 inches in diameter are from 55 to 97 years old. The age of larger trunks is probably 150 or 200 years, or even more.

RANGE.

California coast region in an interrupted belt from Mendocino County to San Diego County; sea-level to nearly 3,000 feet. Extends from Ukiah and plains of Mendocino County to mountains at southern boundary of the State. Ascends canyons in central California coast mountains to nearly 3,000 feet. *Sonoma County*: Noted in western part of Green Valley on road between Sebastopol and Camp Meeker (about 3 miles east of Meeker); Dutch Bill Gulch, a little below Camp Meeker, on road from Meeker to Monte Rio. *Lake County*: East side of Mount St. Helena, on road from Toll House to Middletown, extending from an altitude of about 1,500 feet down to valley level for about 5 miles south of Middletown; few miles northwest of Middletown on gulch slope north of road to Cobb Valley. *Marin County*: West end crest of Mount Tamalpais. *Alameda County*: Cedar Mountain. *Monterey County*: Small grove on north side of Huckleberry Hill (Monterey Peninsula, near Monterey), at 300 to 350 feet (probably type locality of species). Sandy barrens and rocky slopes of Santa Lucia Mountains, at 1,000 to 3,000 feet, only near Los Burros, and extending over summit. San Luis Obispo National Forest, from Cerro Alto southeastward, as well as in main canyons trending eastward, at 1,100 to 2,500 feet elevation. *San Diego County*: In Jamul Valley between El Nido and Dulzura, near Mexican border (southern limit).

OCCURRENCE.

On sandy barrens or rocky slopes, canyons, and gulches, commonly in very dry soils of poorest kind. On summits and low mountain slopes of central California coast region, a shrub on dry, shallow soil overlying granitic or limestone rock; largest near mountain streams.

Occurs scattered, as individuals, or in groves, and often in broken forest over extensive tracts; nowhere abundant. Associates on slopes with Coulter pine, and near streams with Douglas fir and western yellow pine.

CLIMATIC CONDITIONS.—Climate mild; temperature, between 12° and 112° F., and annual rainfall from 53 inches in north to 5 inches at south. Proximity to sea insures frequent fogs and high humidity during most of year.

TOLERANCE.—Tolerates considerable shade, often growing in rather dense stands.

REPRODUCTION.—Prolific seeder, bearing cones abundantly when only 2 or 3 feet high. Seed has moderately high rate of germination and persistent vitality. Reproduction abundant near seed trees, where seedlings are often established in great numbers.

Dwarf Cypress.

Cupressus pygmaea (Lemm.) Sargent.

DISTINGUISHING CHARACTERISTICS.

Dwarf cypress, a small and unimportant species, was, until a dozen years ago, considered only a dwarfed form of Gowen cypress, which it resembles so closely, except in size and habit, that the casual or lay observer can not readily distinguish it. Stunted on extremely poor soil, it is bushy and bears cones when under 3 feet in height. In situations more favorable for growth it is from 10 to 25 feet high—very rarely 30 feet—and from 6 to 12 inches in diameter. The trunk is conical, and the crown narrowly conical, with slender branches trending upward. The shallowly seamed bark of large trunks is thin, clear red-brown, and differs from that of the Gowen cypress in having its flat ridges divided into long, shreddy scales. In general appearance the scale-like leaves (fig. 63) resemble those of the Gowen cypress, but they differ from them distinctly in being entirely without the glandular pits on the back, which are always found on some of the leaves of the other species. The cones (fig. 63) mature by autumn of the second season and remain on the branches for a long time after their seeds are shed. They vary from five-eighths to seven-eighths of an inch in the longer diameter; otherwise they are similar to the smaller cones of Gowen cypress. Cone-scales range in number from 6 to 10 (instead of 6 to 8, as in the Gowen cypress), while the smaller seeds (fig. 63, *a*) are black when mature, and only about 10 or fewer are borne under each perfect cone-

scale. Wood, coarse-grained; faint reddish brown (that of Gowen cypress is pale yellowish-brown). Nothing is known now of its other characteristics; but good-sized sticks are so rare that it is not likely to be used except for local domestic purposes. The tree deserves the forester's attention, however, par-

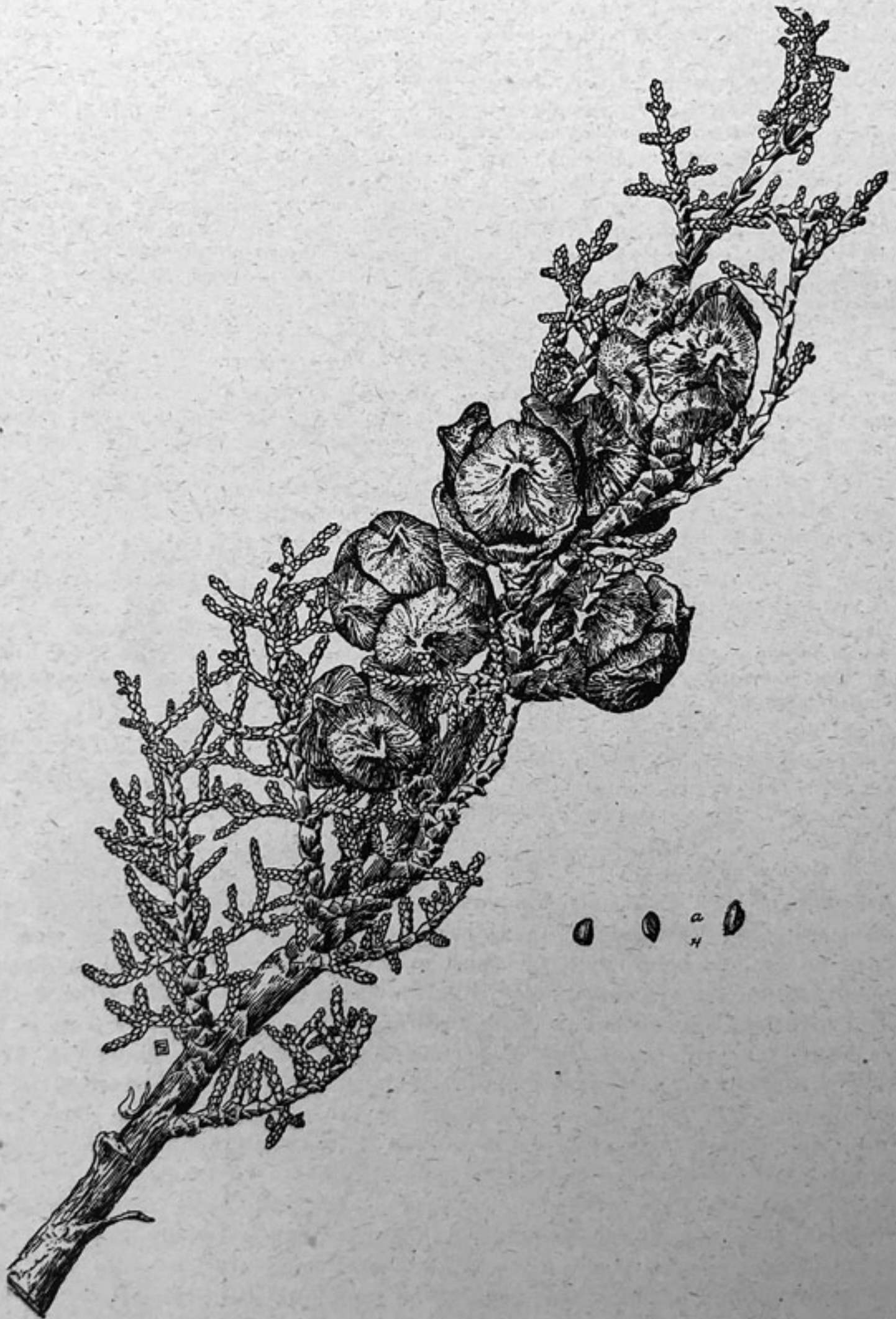


FIG. 63.—*Cupressus pygmaea*: a, seed.

ticularly on account of its remarkable ability to thrive in much-exposed coastal situations and in dry, poor soils.

LONGEVITY.—Very little is known of its age. Most of the largest trees now known in the greatly confined range are probably not over 60 years old; recur-

rent destructive fires have killed older trees. The early diameter growth appears to be rather rapid in protected situations, where trees from 6 to 10 inches in diameter are from 18 to about 35 years old. Probably it would be fairly long-lived, if protected from fire.

RANGE.

California coast barrens of Mendocino County from Ten-Mile Run southward to Navarro River, extending from about three-fourths of a mile of the sea inland for 3 or 4 miles.

OCCURRENCE.

In "peat swamps" in wet soil of poor, shallow sand overlying a stiff, yellow clay hardpan. The soil, wet by seepage from higher levels, supports low huckleberry and other shrubby plants, with some peat. In these situations its growth is stunted, but in better soil of borders of the barrens and of deep gullies in them, it reaches tree size.

On poor barrens, forms dense thickets, interspersed with groups of swamp pine and, occasionally, with lodgepole pine. Stunted growth of thickets is due partly to frequent fires and partly to the unfavorable soil; best growth is freer from fire.

CLIMATIC CONDITIONS.—Climate moderately equable, with temperature rarely up to 112° and never below 12° F. Annual rainfall, between 20 and 50 inches, with an average of about 35 inches. Summers are hot and dry, but the other seasons are usually humid.

TOLERANCE.—Similar to Gowen cypress; decided tolerance of shade is shown by retention of branches in the dense, over-crowded stands.

REPRODUCTION.—Prolific seeder. Seed similar in quality to Gowen-cypress. Bears cones when but a foot or two high. Reproduction abundant near seed trees.

Macnab Cypress.

Cupressus macnabiana Murray.

DISTINGUISHING CHARACTERISTICS.

Macnab cypress is a very rare and little known tree, though several new stations for it have been recently discovered. It is a low, open-crowned, bushy tree, under 20 feet in height. Frequently it is only a many-stemmed, low, wide-spreading shrub. The largest trees have only a few feet of clear trunk and rarely have a diameter of more than from 6 to 12 inches. Their bark is deep chocolate-brown, tinged with red, and about one-fourth of an inch thick; firm and very distinctly cut by narrow seams into a network of rather regular, flat, connected ridges, and diamond-shaped interspaces. The thin, smooth bark of branchlets is dark-brown, or, where the scaly leaves have recently fallen and exposed it, clear purple-red. The foliage is a dark grass-green, sometimes with a whitish tinge. A minute blister-like gland distinctly marks the back of each leaf (fig. 64). Except in the case of young shoots, the leaves on all branchlets are sharply or bluntly pointed and closely pressed to the stems. On young shoots they are keenly pointed and stand slightly away from the stems. This makes the foliage prickly to the touch. Cones (fig. 64, *a*) mature at the end of the second summer, shed their light chocolate-brown, flat seeds late in autumn, and usually remain attached to the tree for several or many seasons.^a At maturity the cones are reddish chocolate-brown, with a pale ashy coating. They vary from about three-fourths to nearly an inch in length. Sixteen to 18 seeds (fig. 64, *b*) are borne under each perfect scale. The rather heavy, very narrowly winged

^a Cones recently examined were found to be full of seed after adhering to the branch for six years; moreover, the cone-scales were green and spongy, appearing to be a substantial part of the living branch.

seeds are not carried more than a few rods away from the tree. Wood, exceedingly fine-grained, very light yellowish brown, and several pounds heavier per cubic foot than that of the Gowen cypress. It is of no commercial use. More-

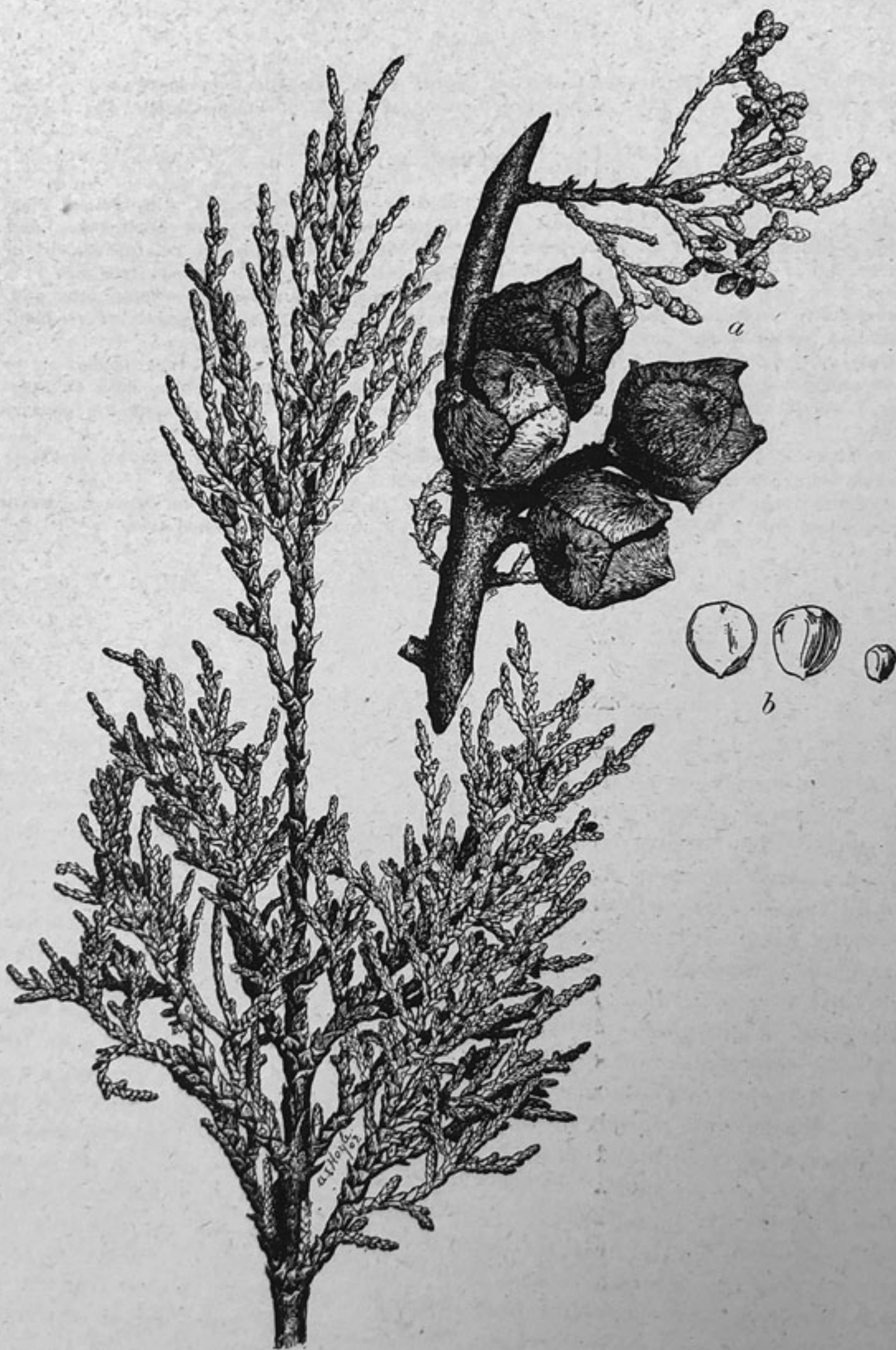


FIG. 64.—*Cupressus macnabiana*; a, cones; b, seed, natural size and enlarged.

over, the tree is too rare to have great importance in forest management, but its ability to thrive on dry, thinly covered slopes makes it worthy of investigation for planting in barren situations.

LONGEVITY.—Very little is known of its age; fuller records are required. Trees from 5 to 8 inches in diameter are from 80 to 125 years old. Probably only moderately long-lived—not exceeding 200 to 250 years.

RANGE.

In widely separated groves in coast ranges of California from Siskiyou southward to Napa County; also Sierra foothills of Shasta to Yuba counties. Occasional groves on dry hills and low slopes of northern coast mountains, from near head of Hooker Canyon (Napa Mountains, Sonoma County) and Mount Ætna (central Napa County) northward through Lake County to Red Mountain (east side of Ukiah Valley, Mendocino County). *Lake County*: Noted in gulch on Complexion Creek, beginning on stage road about 6 miles west of Leesville, and continuing thence westward down gulch for 3 miles to Indian Valley; road from Rumsey, at head of Capay Valley to Lower Lake; exceedingly abundant along rocky gulch 2 or 3 miles beyond (north of) Manhattan Mine, whence it extends northward for about 2 miles, but not quite to south end of Morgan Valley; west slope of Bartlett Mountain, a few trees at about 1,800 feet altitude on north road from Bartlett Springs to Upper Lake; west side of Clear Lake (road Highland Springs to Hopland), in gulch about 3 miles west of Highland Springs, continuing very abundant for some distance; farther south (road Cobb Valley to Middletown), in gulch a few miles northwest of Middletown; on east base of Mount St. Helena on St. Helena Creek, from about 5 miles south of Middletown at edge of valley (altitude about 1,200 feet), southward up gulch for several miles, to about 1,500 feet; scattered on Bartlett Creek (Lake County). Common in gulch near Cook Springs (Colusa County). East Trinity Mountains, between Shasta (town) and Whiskeytown at 1,300 feet, and reported elsewhere. *Siskiyou County*: Grove near Little Shasta River about 15 miles north of Mount Shasta (Sec. 14, T. 45 N., R. 4 W.); and also one (the northmost) on west end of Siskiyou, at point about 10 miles from mouth of Selad Creek (tributary Klamath River). Noted in Sierras as follows: *Shasta County*: Just west of Lassen Peak National Forest on plateau west of Burney Creek at 5,500 feet (southwest quarter of Sec. 24, T. 34 N., R. 2 E.); near head of North Fork of South Fork of Cow Creek at 4,000 to 5,000 feet (southeast quarter of Sec. 5, T. 32 N., R. 2 E.); Lassen Peak National Forest, small grove at base of Lassen buttes. *Tehama County*: Near Payne post-office and on Payne Creek Hill, just west of Payne Creek; 160 acres on Upper Butte Creek (near north line of Sec. 25, T. 30 N., R. 1 W.); several trees few miles southward on Inskip Butte (T. 29 N., R. 1 W.). *Butte County*: Magalia, at 2,300 feet. Three groves near Dobbins (Yuba County), on Dry and Indiana creeks.

OCCURRENCE.

On dry east and west slopes and ridges, in gravelly dry soils, which are often clayey and sometimes very shallow. In pure, dwarfed stands of limited area or in small groups.

CLIMATIC CONDITIONS.—Climate characterized by wide annual variations in precipitation, minimum being about 13 and maximum 62 inches. Temperature, rarely or never reaches zero, but often above 100° F. during the summer.

TOLERANCE.—Not determined; appears to be similar to other related species.

REPRODUCTION.—Moderately abundant seeder, usually producing cones every year. Seed similar in quality to that of Gowen cypress, but reproduction less abundant than latter.

CHAMÆCYPARIS. CEDARS.

The cedars are a little known, small group of evergreen trees, usually called "cypresses," and somewhat resembling the Thujas. They differ greatly from the Thujas, however, in having very much heavier and harder wood, without the characteristic "cedar odor," but with a peculiarly sweet or rather faintly aromatic odor. They differ from Thujas also very distinctly in their habit, and particularly in having small spherical cones instead of small, narrow, elongated cones. The seeds of Chamæcyparis, which are without aromatic resin cells, differ from the seeds of Thujas in form and character. The small, scale-like leaves, which fall from the branches in the third year, are arranged like those of Thujas. The delicate twigs or branchlets are distinctly flat, like those of Thujas, but are noticeably narrower (finer); they are arranged in one plane,

forming conspicuously flat sprays (figs. 65-67). The leaves of seedlings are, like those of Thuja, long, slender, sharp-pointed, and spreading in regularly distant groups of 3 to 4; becoming shorter, more scale-like, and much less spreading on some branchlets of second and third year plants, and later assuming form of adult foliage. As a rule, the 2 seed leaves of western native *Chamæcyparis* are nearly one-third longer (three-eighths of an inch) than seed leaves of the western Thujas, with which the former are often associated. The flowers, which appear early in the spring, are minute and otherwise inconspicuous bodies at the ends of the twigs. The male flowers, pollen bearing only, and female flowers, which produce cones and seed, are borne on different branches of the same tree. The very small, spherical cones, which stand erect on the branchlets, are mature at the end of the first summer or in early autumn, when they open slowly to shed their seeds, after which some of them often remain on the tree for another season. From 1 to 4 or 5 minute seeds (figs. 65, 67) are borne under each cone scale. They are provided with light wings on two sides, but are less buoyant than seeds of Thuja, and usually fall near the parent trees. Seed leaves 2 and opposite.

The cedars are important forest trees. With other species, they supply much needed cover on high, exposed crests and slopes, as well as most durable and excellent commercial timber.

Two species inhabit forests of the Pacific region, one of which extends far northward on this coast.

Yellow Cypress; Alaska Cypress.

Chamæcyparis nootkatensis (Lamb.) Spach.

DISTINGUISHING CHARACTERISTICS.

Chamæcyparis nootkatensis is little known except within its range, where it is commonly called "yellow cypress" and "Alaska cypress." It is known also as "Sitka cypress" and occasionally as "Alaska cedar" and "yellow cedar." Although distinct in habit and in foliage, it may be mistaken for the western red cedar, from which, however, its clear sulphur-yellow wood plainly distinguishes it. Yellow cypress is characterized by an open, narrowly conical crown, which in the dense forest has drooping branches, few and distant from each other, and with weeping flat sprays, and by an exceedingly slender, whip-like leader, which is too weak at its tip to stand erect and which bends over gracefully. All of the branches (slender on young trees and thicker on old trees) droop more or less, and the few flat side and terminal branchlets hang down, so that the crown as a whole has a weeping habit. It is from 75 to 80 feet high (sometimes 90 or 100 feet), and from 2 to 3 feet or not uncommonly 4 or 5 feet in diameter. Forest-grown trees are clear of branches for from 30 to 50 feet, but in the open or on the border of a forest old trees may have branches nearly to the ground. On high, exposed slopes and crests it is very much smaller, often only 10 feet or even less in height, and assumes a sprawling form. The trunk is usually conical, sharply tapering from a wide base, but in very dense stands the base is little swelled. Trunks are seldom perfectly straight, and in most old trees they have one or two slight bends. They are always more or less fluted or infolded at the base, and are rarely full and round. Bark is thin on old trunks (about five-eighths of an inch thick), affording but little protection against fire, which the trees rarely survive; ashy brown on the outside, and clear, reddish cinnamon brown when broken. The surface is irregularly and rather finely broken by shallow seams; the thin, flat ridges have frequent diagonal cross connections, and flake off in long,

narrow strips. The flat, blue-green sprays are noticeably harsh and prickly to the touch, in this respect unlike the smooth foliage of the associated western red cedar. The scale-like leaves (fig. 65), especially on thrifty leading branchlets, have very distinctive, sharp, spreading points. The cones (fig. 65), ripe

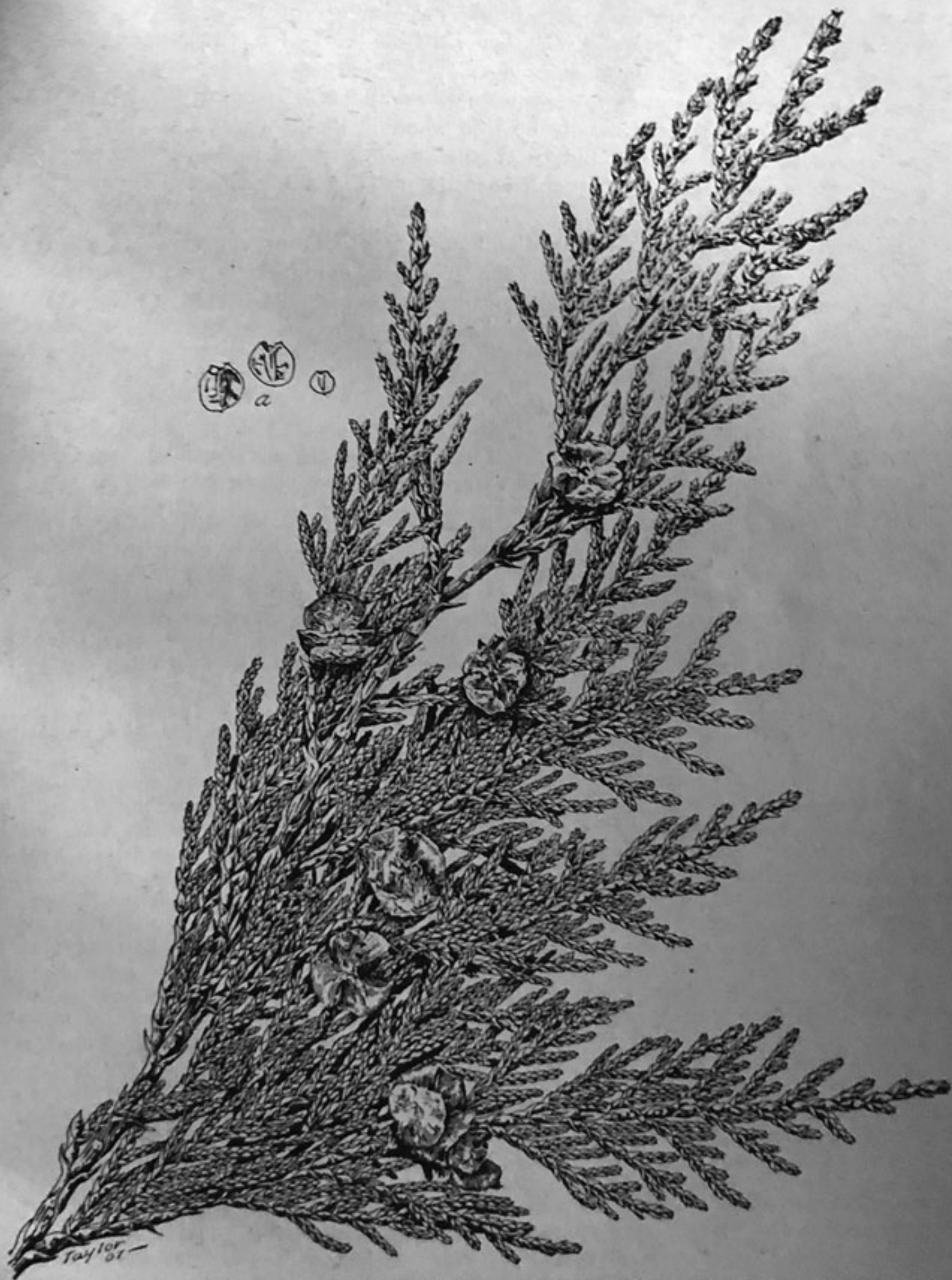


FIG. 65.—*Chamæcyparis nootkatensis*; a, seed natural size and twice natural size.

in late September or early October, are deep russet-brown, with conspicuous whitish bloom. From 2 to 4 seeds (fig. 65, a), of similar color, are borne under each of the perfect cone scales.

Wood, appropriately named "yellow" from its clear sulphur-yellow color, exceedingly fine-grained; though light, it is comparatively heavy for its class, being from 10 to 12 pounds heavier per cubic foot than western red cedar; elastic, but somewhat brittle, and firm, and splits and works very easily. It is remarkably durable when exposed to weather, earth, or water. Logs of yellow cypress have lain on moist ground for half a century with little decay. The firm structure of the wood, together with the ease with which it is worked and the attractive finish it takes, renders it especially useful for interior finish and cabinet work, as well as for special uses requiring soft, light, durable wood. The comparatively limited supply of this wood is likely always to confine its usefulness to a few special but, nevertheless, important purposes. Very important as an associate with other trees capable of forming protective cover on cold, high slopes.

LONGEVITY.—Little is known of the longevity of yellow cypress. It grows very slowly in height and diameter, however, and doubtless is very long-lived. Trees from 15 to 20 inches in diameter are from 200 to 275 years old. Very large trunks are probably from 500 to 600 years old. Further records are desirable.

RANGE.

Coast and islands of southeastern Alaska and British Columbia and southward on coast and in Cascades through Washington and northern Oregon. North of Vancouver Island at sea-level to 3,000 feet; in Cascades of Washington and Oregon at from 2,500 to 7,000 feet elevation.

ALASKA.—Sea slope of Coast Range and islands northward to Wrangell and to Prince of Wales Island, at from sea-level to timberline (2,000 to 3,000 feet); scattered, forming about 10 per cent of stand, and best growth between 1,000 and 2,000 feet. Farther north, only in isolated group at Sitka, at Icy Cape (just north of Cross Sound), a single tree on Khantaak Island (Yakutat Bay), a few trees on Hawkins Island at east end of Prince William Sound, and on opposite mainland, 6 or 7 miles from Orca; small area on Glacier Island (Prince William Sound, just west of Port Valdes), and on opposite mainland from Long Bay to Unganik Bay (lat. 61°, long. 147° 20'), the northern and western limits. Locally noted also on Ketchikan Creek and Shrimp Bay, at 700 feet; Revillagigedo Island; Peter's Mountain; Pearse Canal, at 725 feet; Kasan Bay; Prince of Wales Island, and at Wrangell.

BRITISH COLUMBIA.—Islands and sea side of Coast Range, at from sea-level to 2,000 and 3,000 feet elevation as far south as northern part of Queen Charlotte Sound (north end Vancouver Island), and at higher elevations farther south. Occurs sparingly on Queen Charlotte Islands, on exposed west coast near sea-level, near Massett, at head of West Arm of Cumshewa Inlet and of Rose Harbor, as well as other inlets of Moresby Island; abundant on mountains between 2,000 and 5,000 feet. Southward, leaving sea-level, it becomes general on slopes, appearing on Burrard Inlet at an altitude of several hundred feet; common in northern part of Vancouver Island, short distance inland, on plateaus and mountains, and sparingly on Lake Nimpkish; common in southern part, at from 1,000 feet up, in Renfrew district on Mount Edinburg (3,250 feet), and in Gordon River Valley; noted on Nanaimo River and Mount Benson (near Nanaimo). Inland on mainland, in Fraser Valley, to Silver Mountain (near Yale), at 4,000 to 5,000 feet.

WASHINGTON.—Frequent in Olympic Mountains and on west side of Cascades north of Mount Rainier, generally at from 2,000 to 7,500 feet; less abundant farther south in Cascades and on headwaters of rivers on east side. Ridges of Olympics below 3,500 feet, and to lowlands at mouths of rivers on Pacific coast; locally noted on upper part of South Fork of Skokomish River. Not recorded in Coast Range south of Olympics. Washington National Forest (west side of Cascades), moist slopes and benches at from 2,000 feet to 6,500 feet; locally noted in Green and White River valleys. Washington National Forest (east side of Cascades), moist valleys or slopes near main divide, at elevations of 2,100 feet to 6,000 feet; noted as follows: Skagit Pass; Methow River; Rattlesnake Creek; Stehekin River down to within about 5 miles of Stehekin; Horseshoe Basin, near Mount Amos; Stevens Pass, at head of tributary of Wenache River; Wenache River Valley; Mount Stuart; Yakima River Valley. Mount Rainier National Forest, at 2,600 to 7,400 feet, forming 1 to 2 per cent of forest in White, Puyallup, Cowlitz, and Cispus river water sheds (west side of Cascades), and extending south-

ward to Mount Adams, but not in Columbia River basin; on east side of Cascades, only in northern part on Natches, Tleton, Atanum, and Kllekitat river watersheds. Locally noted on Mount Rainier, at 3,500 to 6,000 feet—more common on north than on south side; Goat Mountains; Dewey Lake (head of American River), at 5,300 feet. Not detected on Mount St. Helens.

OREGON.—West side of Cascades southward to Deer Creek (tributary McKinzie River, T. 14 S., R. 6 E.), generally at 2,500 to 6,100 feet elevation. Locally noted on Mount Hood at Government Camp, and on north side (T. 1 N., R. 8 and R. 9 E.); valley of Santiam River, at 4,000 to 5,000 feet; between forks of Breitenbush River, at 4,150 feet. Reported extending 150 miles south of Mount Hood, but definite records of its occurrence there are lacking, as are also records of its reported existence in northern Idaho.

OCCURRENCE.

Common on bottomland, along streams, in basins, valleys, and gulches, and on mountain slopes. Where moisture is deficient, confined chiefly to north exposures and north sides of mountains, but where precipitation and humidity are great, exposure is less important, and the tree is common on south slopes. Chiefly in moist, rocky or gravelly soils of good quality; occasionally, of small size, on poor, dryish soils; very much like western red cedar in soil requirements. Quantity and quality of soil more important where moisture is deficient or where evaporation is rapid.

Mainly scattered singly or in groups; sometimes in pure stands of limited extent. Generally with Sitka spruce, western red cedar, western hemlock, grand fir, western yew, broadleaf and vine maples, and Sitka alder, in Washington, British Columbia, and south Alaskan coast region; higher up, with black hemlock, lodgepole pine, alpine, amabilis, and noble firs, Douglas fir, western larch, western white pine, and Engelmann spruce.

CLIMATIC CONDITIONS.—Climate of range generally favorable for tree growth. Summers comparatively cool and humid, and winters not severe. Average annual precipitation from 20 to 100 inches or more, from Oregon to Alaska. Changes in temperature are usually gradual, but in places mercury drops considerably below zero. In vicinity of ocean, climate is especially mild and uniform, while humidity and precipitation are particularly great.

TOLERANCE.—Not so tolerant as western red cedar and hemlock, but more tolerant than western white pine and noble fir. Under best conditions for growth it maintains fairly dense shade. Tolerance varies with soil, moisture, and climatic conditions. Less tolerant with age. Where soil and air are abundantly moist it thrives in the open; but partial shade and shelter (reducing evaporation and transpiration) are beneficial when soil moisture is deficient.

REPRODUCTION.—Seeding habits not fully known. Produces cones rather sparingly, but with occasional rather good seed years. Seed has only moderate rate of germination, with transient vitality. Reproduces itself freely under favorable conditions (moist soil and shade), but poorly in dry situations. Germination and growth of seedlings best on moist moss, muck, and mineral soils.

Lawson Cypress; Port Orford Cedar.

Chamaecyparis lawsoniana (Murr.) Parlatores.

DISTINGUISHING CHARACTERISTICS.

On account of its great beauty as an ornamental evergreen, Lawson cypress, the Port Orford Cedar of lumbermen, is widely known in this country and abroad. It is little known, however, as a forest tree. It is the largest tree of its genus and also the largest representative of its tribe (Cupressineæ) in North America. Height, from 125 to 180 feet, with a diameter of from 3½ to 6 feet. Trees 8 or more feet in diameter and nearly 200 feet high sometimes occur, but are now rare. In youth it is readily distinguished by its profusion of short, feathery, weeping branchlets of deep yellow-green, and its dense, sharply defined, pyramidal crown, which extends nearly to the ground and, in the open, is retained for many years. At first the branches all trend upward, but gradually, as the tree grows older, they become horizontal and drooping, especially at the bottom of the crown. The tips of the leading branchlets and the fringing side sprays hang down conspicuously, on old trees the leaf-covered twigs being shorter