PLATANACEÆ.

235.—Platanus occidentalis, Linnæus,

Spec. 1 ed. 999.—Du Roi, Harbk. ii, 134.—Marshall, Arbustum, 105.—Wangenheim, Amer. 31, t. 13, f. 31.—Walter, Fl. Caroliniana, 236.—Aiton, Hort. Kew. iii, 365; 2 ed. v, 305.—Mœnch, Meth. 358.—Abbot, Insects Georgia, ii, t. 55.—Michaux, Fl. Bor.-Am. ii, 163.—Lamarck, Dict. v, 438.—Nouveau Duhamel, ii, 6, t. 2.—Willdenow, Spec. iv, 474; Enum. 984; Berl. Baumz. 284.—Persoon, Syn. ii, 575.—Desfontaines Hist. Arb. ii, 545.—Schkuhr, Handb. iii, 274, t. 306.—Robin, Voyages, iii, 524.—Michaux f. Hist. Arb. Am. iii, 184, t. 3; N. American Sylva, 3 ed. ii, 48, t. 63.—Pursh, Fl. Am. Sept. ii, 635.—Barton, Prodr. Fl. Philadelph. 91; Compend. Fl. Philadelph. 176.—Eaton, Manual, 110; 6 ed. 267.—Nuttall, Genera, ii, 219.—Hayne, Dend. Fl. 171.—James in Long's Exped. i, 23.—Elliott, Sk. ii, 620.—Sprengel, Syst. iii, 865.—Watson, Dend. Brit. i, t. 100.—Torrey, Compend. Fl. N. States, 356; Fl. N. York, ii, 218; Bot. Mex. Boundary Survey, 205.—Audubon, Birds, t. 206.—Loudon, Arboretum, iv, 2043, f. 1959 & t.—Eaton & Wright, Bot. 361.—Hooker, Fl. Bor.-Am. ii, 158.—Bigelow, Fl. Boston. 3 ed. 384.—Emerson, Trees Massachusetts, 227; 2 ed. i, 261 & t.—Scheele in Rœmer, Texas, 446.—Buckley in Am. Jour. Sci. 2 ser. xiii, 399.—Darlington, Fl. Cestrica, 3 ed. 282.—Darby, Bot. S. States, 509.—Agardh, Theor. & Syst. Pl. t. xiii, f. 1, 2.—Cooper in Smithsonian Rep. 1858, 254.—Hartig, Forst. 446, t. 54.—Chapman, Fl. S. States, 418.—Curtis in Rep. Geological Surv. N. Carolina, 76.—Lesquereux in Owen's 2d Rep. Arkansas, 386.—Wood, Cl. Book, 640; Bot. & Fl. 303.—Engelmann in Trans. Am. Phil. Soc. new ser. xii, 209.—A. De Candolle, Prodr. xvi², 159.—Gray, Manual N. States, 5 ed. 447; Hall's Pl. Texas, 21.—Koch, Dendrologie, ii, 468.—Schnizlein, Icon. t. 97, f. 1–24.—Young, Bot. Texas, 498.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 121.—Vasey, Cat. Forest Trees, 22.—Ridgway in Proc. U. S. Nat. Mus. 1882, 73.—Bell in Geological Rep. Canada, 1879–'80, 55c.

P. lobata, Mœnch, Meth. 358.

P. hybridas, Brotero, Fl. Lus. ii, 487.

P. vulgaris, var. *angulosa*, Spach in Ann. Sci. Nat. 2 ser. xv, 293; Hist. Veg. xi, 79.

SYCAMORE. BUTTON WOOD. BUTTON-BALL TREE. WATER BEECH.

Southern Maine and southeastern New Hampshire to northern Vermont and the northern shores of lakes Ontario and Erie, west to eastern Nebraska and Kansas, south to northern Florida, central Alabama and Mississippi, and the valley of the Nueces river, Texas, extending southwest to the valley of the Devil's river.

The largest tree of the Atlantic forests, often 30 to 40 meters in height, with a trunk 2.40 to 4.20 meters in diameter; generally along streams and river bottoms, in rich, moist soil; very common and reaching its greatest development in the bottom lands of the Ohio and Mississippi rivers; the large specimens generally hollow.

Wood heavy, hard, not strong, very close-grained, compact, difficult to split and work; layers of annual growth clearly marked by broad bands of small ducts; the numerous medullary rays very conspicuous, as in that of all the North American species; color, brown tinged with red, the sap-wood lighter; specific gravity, 0.5678; ash, 0.46; largely used for tobacco boxes (its principal use), ox-yokes, butchers' blocks, and, rarely, in the manufacture of cheap furniture.

236.—Platanus racemosa, Nuttall;

Audubon, Birds, t. 362; Sylva, i, 47, t. 15; 2 ed. i, 63, t. 15.—Bentham, Pl. Hartweg. 336.—Newberry in Pacific R. R. Rep. vi, 33, 89, t. 11, f. 10.—Cooper in Smithsonian Rep. 1858, 260.—Torrey, Bot. Mex. Boundary Survey, 204; Ives' Rep. 27; Bot. Wilkes Exped. 457.—A. De Candolle, Prodr. xvi², 160.—Koch, Dendrologie, ii, 469.—Vasey, Cat. Forest Trees, 23.—Watson, Bot. California, ii, 66.

P. occidentalis, Hooker & Arnott, Bot. Beechey, 160, 380 [not Linnæus].

P. Californica, Bentham, Bot. Sulphur, 54.

P. Mexicana, Moricand, Pl. Rar. Amer. t. 13?—Torrey in Sitgreaves' Rep. 172; Pacific R. R. Rep. vii, 20.

SYCAMORE. BUTTON WOOD.

California, valley of the Sacramento river, south through the interior valleys and coast ranges to the southern boundary of the state.

A large tree, 24 to 30 meters in height, with a trunk 0.90 to 1.20 meter in diameter; borders of streams, in rich soil.

Wood light, soft, not strong, very close-grained, compact, difficult to split; layers of annual growth clearly marked by narrow bands of small ducts; medullary rays numerous, conspicuous; color, light brown tinged with red, the sap-wood lighter; specific gravity, 0.4880; ash, 1.11.

237.—Platanus Wrightii, Watson,

Proc. Am. Acad. x, 349.—Vasey, Cat. Forest Trees, 23.—Rusby in Bull. Torrey Bot. Club, ix, 54.

P. Mexicana, Torrey in Emory's Rep. 151 [not Moricand].

P. racemosa, Watson, Pl. Wheeler, 16 [not Nuttall].—Rothrock in Wheeler's Rep. vi, 239.

SYCAMORE.

Valleys of southwestern New Mexico to the valley of the San Pedro river, Arizona; southward into Mexico.

A tree sometimes 15 to 18 meters in height, with a trunk 0.45 to 0.60 meter in diameter; banks of streams and high mountain cañons.

Wood light, soft, weak, very close-grained, compact; layers of annual growth clearly marked by several rows of open ducts; medullary rays numerous, thin, very conspicuous; color, light brown tinged with red, the sap-wood lighter; specific gravity, 0.4736; ash, 1.35.

JUGLANDACEÆ.

238.—Juglans cinerea, Linnæus,

Spec. 2 ed. 1415.—Jacquin, Icon. Rar. i, t. 193.—Wangenheim, Amer. 21, t. 9, f. 21.—Walter, Fl. Caroliniana, 235.—Aiton, Hort. Kew. iii, 361; 2 ed. v, 296.—Lamarck, Dict. iv, 503; Ill. iii, 365, t. 781, f. 7.—B. S. Barton, Coll. i, 22, 31; ii, 43.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 388.—Michaux, Fl. Bor.-Am. ii, 191.—Willdenow, Spec. iv, 456; Enum. 978; Berl. Baumz. 193.—Persoon, Syn. ii, 556.—Desfontaines, Hist. Arb. ii, 347.—Pursh, Fl. Am. Sept. ii, 636.—Barton, Prodr. Fl. Philadelph. 92.—Bigelow, Med. Bot. ii, 115, t. 32; Fl. Boston. 3 ed. 378.—Eaton, Manual, 108; 6 ed. 192.—Nuttall, Genera, ii, 220; Sylva, i, 41; 2 ed. i, 37.—Hayne, Dend. Fl. 163.—Elliott, Sk. ii, 622.—Sprengel, Syst. iii, 865.—Torrey, Compend. Fl. N. States, 357; Fl. N. York, ii, 180.—Rafinesque, Med. Bot. ii, 234.—Audubon, Birds, t. 142.—Beck, Bot. 335.—Spach, Hist. Veg. ii, 170.—Lindley, Fl. Med. 307.—Loudon, Arboretum, iii, 1439, f. 1262.—Hooker, Fl. Bor.-Am. ii, 143.—Eaton & Wright, Bot. 287.—Emerson, Trees Massachusetts, 182; 2 ed. i, 207 & t.—Griffith, Med. Bot. 589.—Carson, Med. Bot. ii, 42, t. 86.—Parry in Owen's Rep. 618.—Darlington, Fl. Cestrica, 3 ed. 262.—Darby, Bot. S. States, 513.—Cooper in Smithsonian Rep. 1858, 254.—Chapman, Fl. S. States, 419.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 45.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 640; Bot. & Fl. 304.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 16, t. 4, f. 45; Prodr. xvi², 137.—Porcher, Resources S. Forests, 317.—Engelmann in Trans. Am. Phil. Soc. new ser. xii, 209.—Gray, Manual N. States, 5 ed. 447.—Koch, Dendrologie, i, 589.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 121.—Vasey, Cat. Forest Trees, 23.—Broadhead in Coulter's Bot. Gazette, iii, 60.—Bentley & Trimen, Med. Pl. iv, 247, t. 247.—Beal in Am. Nat. xv, 36, f. 6.—Sears in Bull. Essex Inst. xiii, 178.—Bell in Geological Rep. Canada, 1878–'80, 53c.—Ridgway in Proc. U. S. Nat. Mus. 1882, 76.

J. oblonga, Miller, Dict. No. 3.—Du Roi, Harbk. i, 332—Mœnch, Meth. 696.—Retzius, Obs. i, 10.

J. oblonga alba, Marshall, Arbustum, 67.

J. cathartica, Michaux f. Hist. Arb. Am. i, 165, t. 2; N. American Sylva, 3 ed. i, 109, t. 31.

Carya cathartica, Barton, Compend. Fl. Philadelph. ii, 178.

Wallia cinerea, Alefeld in Bonplandia, 1861, 334.

BUTTERNUT. WHITE WALNUT.

Southern New Brunswick, valley of the Saint Lawrence river, Ontario and southern Michigan to northern Minnesota (lake Pokegoma, *Garrison*) and central Iowa, south to Delaware and along the Alleghany mountains to northern Georgia, central Alabama and Mississippi, northern Arkansas, and southeastern Kansas.

A tree 18 to 24 or, exceptionally, 30 to 35 meters (*Ridgway*) in height, with a trunk 0.60 to 0.90 meter in diameter; rich woodlands; rare at the south; most common and reaching its greatest development in the Ohio River basin.

Wood light, soft, not strong, rather coarse-grained, compact, easily worked, satiny, susceptible of a beautiful polish, containing numerous regularly-distributed, large, open ducts; medullary rays distant, thin, obscure; color, bright light brown, turning dark with exposure, the sap-wood lighter; specific gravity, 0.4086; ash, 0.51; largely used for interior finish, cabinet work, etc.

The inner bark, especially that of the root, is employed medicinally as a mild cathartic (*Am. Jour. Pharm.* 1874, 169.—*U. S. Dispensatory*, 14 ed. 526.—*Nat. Dispensatory*, 2 ed. 794), and furnishes a yellow dye.

239.—Juglans nigra, Linnæus,

Spec. 1 ed. 997.—Jacquin, Icon. Rar. i, t. 191.—Wangenheim, Amer. 20, t. 8, f. 20.—Walter, Fl. Caroliniana, 235.—Aiton, Hort. Kew, iii, 360; 2 ed. v, 296.—Mœnch, Meth. 696.—Lamarck, Dict. iv, 502; Ill. iii, 365, t. 781, f. 6.—Abbot, Insects Georgia, i, t. 88.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 388.—Michaux, Fl. Bor.-Am. ii, 191.—Willdenow, Spec. iv, 456; Enum. 978; Berl. Baumz. 193.—Smith in Rees' Cycl. xx, No. 3.—Persoon, Syn. ii, 566.—Desfontaines, Hist. Arb. ii, 347.—Nouveau Duhamel, iv, 179, t. 48.—Michaux f. Hist. Arb. Am. i, 158, t. 1; N. American Sylva, 3 ed. i, 140, t. 30.—Pursh, Fl. Am. Sept. ii, 636.—Barton, Prodr. Fl. Philadelph. 92; Compend. Fl. Philadelph. ii, 177.—Eaton, Manual, 108; 6 ed. 192.—Nuttall, Genera, ii, 220; Sylva, i, 41; 2 ed. i, 57.—Hayne, Dend. Fl. 163.—Elliott, Sk. ii, 622.—Sprengel, Syst. iii, 865.—Torrey, Compend. Fl. N. States, 357; Fl. N. York, ii, 179.—Watson, Dend. Brit. ii, t. 158.—Audubon, Birds, t. 84, 156.—Rafinesque, Med. Bot. ii, 233.—Beck, Bot. 335.—Spach, Hist. Veg. ii, 168.—Loudon, Arboretum, iii, 1435, f. 1260 & t.—Eaton & Wright, Bot. 287.—Emerson, Trees Massachusetts, 185; 2 ed. i, 211 & t.—Griffith, Med. Bot. 589.—Parry in Owen's Rep. 618.—Darlington, Fl. Cestrica, 3 ed. 262.—Darby, Bot. S. States, 513.—Cooper in Smithsonian Rep. 1858, 254.—Chapman, Fl. S. States, 419.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 45.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 640; Bot. & Fl. 304.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 34, t. 1, f. 1, 8–10; Prodr. xvi², 137.—Engelmann in Trans. Am. Phil. Soc. new ser. xii, 209.—Porcher, Resources S. Forests, 318.—Gray, Manual N. States, 5 ed. 447.—Koch, Dendrologie, i, 587.—Schnizlein, Icon. t. 244, f. 1, 8, 12, 13.—Young, Bot. Texas, 500.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 121.—Vasey, Cat. Forest Trees, 23.—Guibourt, Hist. Drogues, 7 ed. ii, 302.—Beal in Am. Nat. xv, 36, f. 5.—Sears in Bull. Essex Inst. xiii, 178.—Bell in Geological Rep. Canada, 1879–'80, 53c.—Ridgway in Proc. U. S. Nat. Mus. 1882, 76.—Nicholson in London Gard. Chronicle, 1882, 780.—Watson in Proc. Am. Acad. xviii, 155.

J. nigra oblonga, Marshall, Arbustum, 67.

Wallia nigra, Alefeld in Bonplandia, 1861, 334.

BLACK WALNUT.

Western Massachusetts, west along the southern shores of lake Erie through southern Michigan to southern Minnesota, eastern Nebraska, and eastern Kansas, south to the Chattahoochee region of northern Florida, central Alabama and Mississippi, and the valley of the San Antonio river, Texas.

A large tree, often 30 to 45 meters in height, with a trunk 1.80 to 3 meters in diameter; rich bottom lands and hillsides; most common and reaching its greatest development on the western slopes of the southern Alleghany mountains and in the rich bottoms of southwestern Arkansas and the Indian territory; less common east of the Alleghany mountains, and now everywhere scarce.

Wood heavy, hard, strong, rather coarse-grained, liable to check if not carefully seasoned, easily worked, susceptible of a beautiful polish, durable in contact with the soil, containing numerous large, regularly-distributed, open ducts; medullary rays numerous, thin, not conspicuous; color, rich dark brown, the thin sap-wood much lighter; specific gravity, 0.6115; ash, 0.79; more generally used in cabinet-making, interior finish, and for gun stocks than that of any other North American tree.

240.—Juglans rupestris, Engelmann;

Sitgreaves' Rep. 171, t. 15.—Torrey, Bot. Mex. Boundary Survey, 205; Ives' Rep. 27.—Cooper in Smithsonian Rep. 1858, 260.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 28, t. 2, f. 11; Prodr. xvi², 138.—Vasey, Cat. Forest Trees, 24.—Watson, Bot. California, ii, 93; Proc. Am. Acad. xviii, 155.—Rusby in Bull. Torrey Bot. Club. ix, 54.

J. rupestris, var. *major*, Torrey in Sitgreaves' Rep. 171, t. 16; Bot. Mex. Boundary Survey, 205; Pacific R. R. Rep. vii, 20.—C. De Candolle, Prodr. xvi², 138.—Hemsley, Bot. Am.-Cent. iii, 164.

J. Californica, Watson in Proc. Am. Acad. x, 349; Bot. California, ii, 93.—Vasey, Cat. Forest Trees, 24.—Rothrock in Wheeler's Rep. vi, 249.

WALNUT.

Valley of the Colorado river (near Austin), west through western Texas, southern New Mexico, and Arizona from 5,000 to 7,000 feet elevation, and in the California Coast ranges from the San Bernardino mountains to the neighborhood of San Francisco bay and the valley of the Sacramento river.

A tree rarely 15 to 22 meters in height, with a trunk 0.30 to 0.90 meter in diameter, reaching its greatest development in the neighborhood of San Francisco bay; in Texas generally reduced to a low, much-branched shrub; borders of streams and mountain cañons, in rich soil.

Wood heavy, hard, not strong, coarse-grained, checking in drying, susceptible of a good polish, containing numerous regularly-distributed, large, open ducts; medullary rays distant, thin, obscure; color, rich dark brown, the sap-wood lighter; specific gravity, 0.6554; ash, 1.01.

The small nuts sweet and edible.

241.—Carya olivæformis, Nuttall,

Genera, ii, 221.—Sprengel, Syst. ii, 849.—Eaton, Manual, 6 ed. 83.—Spach. Hist. Veg. ii, 173.—Penn. Cycl. vi, 331.—Loudon, Arboretum, iii, 1441, f. 1263.—Eaton & Wright, Bot. 183.—Scheele in Rœmer, Texas, 447.—Belg. Hort. vi, 223, t. 45, f. 2.—Torrey, Bot. Mex. Boundary Survey 205.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 418.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 641; Bot. & Fl. 304.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 36, t. 1, f. 3, t. 5, f. 59; Prodr. xvi², 144.—Porcher, Resources S. Forests, 333.—Gray, Manual N. States, 5 ed. 448.—Young, Bot. Texas, 499.—Vasey, Cat. Forest Trees, 24.—Broadhead in Coulter's Bot. Gazette, iii, 60.—Ridgway in Proc. U. S. Nat. Mus. 1882, 77.—Hemsley, Bot. Am.-Cent. iii, 163.—Watson in Proc. Am. Acad. xviii, 155.

Juglans Pecan, Marshall, Arbustum, 69.—Walter, Fl. Caroliniana, 236.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 392.

Juglans Illinoinensis, Wangenheim, Amer. 54, t. 18, f. 43.

Juglans angustifolia, Aiton, Hort. Kew. iii, 361; 2 ed. v, 296.

Juglans rubra, Gærtner, Fruct. ii, 51, t. 89, f. 1.—Lamarck, Ill. iii, 365, t. 781, f. 4.

Juglans cylindrica, Lamarck, Dict. iv, 505; Ill. iii, 365, t. 781, f. 5.—Nouveau Duhamel, iv, 179.

Juglans olivæformis, Michaux, Fl. Bor.-Am. ii, 192.—Willdenow, Spec. iv, 457; Enum. 979; Berl. Baumz. 194.—Persoon, Syn. ii, 566.—Desfontaines, Hist. Arb. ii, 348.—Michaux f. Hist. Arb. Am. i, 175, t. 3; N. American Sylva, 3 ed. i, 114, t. 32.—Muhlenberg, Cat. 88.—Aiton, Hort. Kew. 2 ed. v, 296.—Pursh, Fl. Am. Sept. ii, 636.—Hayne, Dend. Fl. 163.—Regel, Gartenflora, xviii, 89.

C. angustifolia, Nuttall, Sylva, i, 41; 2 ed. i, 57.

? C. tetraptera, Liebmann in Dansk. Vidensk. Selsk. Forhand. 1850, 80.

Hickorea species, LeConte in Proc. Philadelphia Acad. vi, 402.

C. Illinoensis, Koch, Dendrologie, i, 593.

PECAN. ILLINOIS NUT.

Near Davenport, Iowa (*C. C. Parry*), southern Illinois, and Indiana, northwestern Kentucky, south and southwest through Missouri and Arkansas to eastern Kansas, the Indian territory, and through western Louisiana and Texas to the valley of the Concho river.

A tree 30 to 52 meters in height, with a trunk 0.90 to 1.80 meter in diameter; borders of streams in low, rich soil; very common and reaching its greatest development in the bottom lands of Arkansas and the Indian territory; the largest species of the genus and the largest and most important tree of western Texas.

Wood heavy, hard, not strong, brittle, close-grained, compact; layers of annual growth marked by one or two rows of large open ducts; medullary rays numerous, thin; color, light brown tinged with red; the sap-wood lighter brown; specific gravity, 0.7180; ash, 1.13; less valuable than the wood of the other species and hardly used except for fuel.

The sweet, edible nuts are collected in great quantities, affording an important article of commerce.

242.—Carya alba, Nuttall,

Genera, ii, 221.—Elliott, Sk. ii, 624.—Watson, Dend. Brit. ii, t. 148.—Sprengel, Syst. ii, 849.—Torrey, Compend. Fl. N. States, 357; Fl. N. York, 181.—Beck, Bot. 336.—Eaton, Manual, 6 ed. 83.—Spach, Hist. Veg. ii, 174.—Penn. Cycl. vi, 332.—Loudon, Arboretum, iii, 1446, f. 1269 & t.—Eaton & Wright, Bot. 183.—Hooker, Fl. Bor.-Am. ii, 143.—Emerson, Trees Massachusetts, 191; 2 ed. i, 217 & t.—Darlington, Fl. Cestrica, 3 ed. 263.—Darby, Bot. S. States, 513.—Belg. Hort. vi, 223, t. 48, f. 8.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 418.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 43.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 641; Bot. & Fl. 304.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 36, t. 2, f. 13, 14, 18, t. 3, f. 24, t. 4, f. 44, 46; Prodr. xvi², 142.—Gray, Manual N. States, 5 ed. 448.—Young, Bot. Texas, 499.—Vasey, Cat. Forest Trees, 24.—Aldrich in Am. Nat. xv, 227.—Sears in Bull. Essex Inst. xiii, 179.—Ridgway in Proc. U. S. Nat. Mus. 1882, 72.—Bell in Geological Rep. Canada, 1879–'80, 55c.

Juglans ovata, Miller, Dict.

Juglans alba ovata, Marshall, Arbustum, 69.

Juglans oualis, Wangenheim, Amer. 24, t. 10, f. 23.

Juglans compressa, Gærtner, Fruct. ii, 50, t. 89, f. 1.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 300.—Willdenow, Spec. iv, 458; Enum. 979; Berl. Baumz. 195.—Persoon, Syn. ii, 566.—Desfontaines, Hist. Arb. ii, 347.—Aiton, Hort. Kew. 2 ed. v, 297.—Hayne, Dend. Fl. 164.—Lamarck, Ill. iii, 365, t. 781, f. 3.

? Juglans exaltata, Bartram, Travels, 2 ed. 38.

Juglans squamosa, Lamarck, Dict. iv, 504.—Desfontaines, Hist. Arb. ii, 348.—Michaux f. Hist. Arb. Am. i, 190, t. 7; N. American Sylva, 3 ed. i, 123, t. 36.—Barton, Prodr. Fl. Philadelph. 92; Compend. Fl. Philadelph. ii, 179.—Bigelow, Fl. Boston. 3 ed. 380.

Juglans alba, Michaux, Fl. Bor. Am. ii 193 [not Linnæus].—Pursh, Fl. Am. Sept. ii, 637.—Eaton, Manual, 108.

C. microcarpa, Nuttall, Genera, ii, 221; Sylva, i, 38, t. 13; 2 ed. i, 55, t. 13.—Sprengel, Syst. ii, 849.—Penn. Cycl. vi, 332.—Loudon, Arboretum, iii, 1451.—Darlington, Fl. Cestrica, 3 ed. 264.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 419.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 44.—*Wood, Cl. Book, 642; Bot. & Fl. 304.*—C. De Candolle, Prodr. xvi², 143.—Gray, Manual N. States, 5 ed. 448.—Koch, Dendrologie, i, 596.—Young, Bot. Texas, 499.—Vasey, Cat. Forest Trees, 24.—Ridgway in Proc. U. S. Nat. Mus. 1882, 77.

SHELL-BARK HICKORY. SHAG-BARK HICKORY.

Valley of the Saint Lawrence river, along the northern shores of lakes Ontario and Erie to southern Michigan and southeastern Minnesota, south to the Chattahoochee region of western Florida, central Alabama and Mississippi, and west to eastern Kansas, the Indian territory, and eastern Texas.

A large tree of the first economic value, 24 to 30 or, exceptionally, 30 to 45 meters in height (*Ridgway*), with a trunk 0.90 to 1.20 meter in diameter; rich hillsides and sandy ridges; common and reaching its greatest development west of the Alleghany mountains; varying greatly in the size and shape of the fruit. A form with small, thin-shelled nuts (*C. microcarpa, Nuttall l. c.*) is not rare from Delaware southward, and in Michigan.

Wood heavy, very hard and strong, tough, close-grained, compact, flexible; layers of annual growth clearly marked with one to three rows of large open ducts; medullary rays numerous, thin; color, brown, the thin and more valuable sap-wood nearly white; specific gravity, 0.8372; ash, 0.73; largely used in the manufacture of agricultural implements, carriages, ax handles, baskets, etc.

The sweet and edible nuts afford an important article of commerce.

243.—Carya sulcata, Nuttall,

Genera, ii, 221.—Elliott, Sk. ii, 624.—Sprengel, Syst. ii, 849.—Torrey, Compend. Fl. N. States, 357.—Beck, Bot. 336.—Eaton, Manual, 6 ed. 83.—Spach, Hist. Veg. ii, 174.—Penn. Cycl. vi, 332.—Loudon, Arboretum, iii, 1448, f. 1271.—Eaton & Wright, Bot. 183.—Darby, Bot. S. States, 513.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 418.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 43.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 641; Bot. & Fl. 304.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 36, t. 5, f. 51, 52; Prodr. xvi², 143.—*Gray, Manual N. States, 5 ed. 449.—Young, Bot. Texas, 499.*—Vasey, Cat. Forest Trees, 24.—Ridgway in Proc. U. S. Nat. Mus. 1882, 78.

Juglans sulcata, Willdenow, Berl. Baumz. 1 ed. 154, t. 7; Spec. iv, 457.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 391.—Persoon, Syn. ii, 566.—Desfontaines, Hist. Arb. ii, 348.—Pursh, Fl. Am. Sept. ii, 637.

Juglans mucronata, Michaux, Fl. Bor.-Am. ii, 192.

Juglans laciniosa, Michaux f. Hist. Arb. Am. i, 199, t. 8; N. American Sylva, 3 ed. i, 128, t. 37.—Barton, Prodr. Fl. Philadelph. 92.—Poiret, Suppl. iv, 112.—Audubon, Birds, t. 101.

C. cordiformis, Koch, Dendrologie, i, 597.

BIG SHELL-BARK. BOTTOM SHELL-BARK.

Chester county, Pennsylvania, west to southern Indiana and Illinois, eastern Kansas, and the Indian territory.

A tree 24 to 30 or, exceptionally, 37 (*Ridgway*) meters in height, with a trunk 0.60 to 1.20 meter in diameter; bottom lands, in low, rich soil; rare and local; most common and reaching its greatest development along the streams of southern Arkansas and the Indian territory.

Wood heavy, very hard, strong and tough, very close-grained, compact, flexible; layers of annual growth marked by one or two rows of large open ducts; medullary rays numerous, obscure; color, dark brown, the sap-wood nearly white; specific gravity, 0.8108; ash, 0.90; used for the same purposes as that of the shell-bark hickory.

The large nuts sweet and edible.

244.—Carya tomentosa, Nuttall,

Genera, ii, 221.—Barton, Compend. Fl. Philadelph. ii, 179.—Elliott, Sk. ii, 625.—Sprengel, Syst. ii, 849.—Torrey, Compend. Fl. N. States, 357; Fl. N. York, ii, 182.—Beck, Bot. 336.—Eaton, Manual, 6 ed. 83.—Spach, Hist. Veg. ii, 176.—Penn. Cycl. vi, 332.—Loudon, Arboretum, iii, 1444, f. 1267.—Eaton & Wright, Bot. 183.—Emerson, Trees Massachusetts, 194, t. 13; 2 ed. i, 222 & t.—Darlington, Fl. Cestrica, 3 ed. 263.—Darby, Bot. S. States, 513.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 419.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 43.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 641; Bot. & Fl. 304.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 36; Prodr. xvi², 143.—Gray, Manual N. States, 5 ed. 449.—Young, Bot. Texas, 499.—Vasey, Cat. Forest Trees, 24.—Ridgway in Proc. U. S. Nat. Mus. 1882, 78.

Juglans alba, Linnæus, Spec. 1 ed. 997.—Du Roi, Harbk. i, 333.—Kalm in Act. Holm. 1769, 117.—Wangenheim, Amer. 23, t. 10, f. 2.—Walter, Fl. Caroliniana, 235.—Aiton, Hort. Kew. iii, 360; 2 ed. v, 296.—Gærtner, Fruct. ii, 50, t. 89, f. 1.—Mœnch, Meth. 696.—Abbot, Insects Georgia, i, t. 29.—Lamarck, Dict. iv, 503; Ill. iii, 364, t. 781, f. 2.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 389.—Smith in Rees' Cycl. xx, No. 2.—Willdenow, Spec. iv, 457; Berl. Baumz. 154.—Desfontaines, Hist. Arb. ii, 347.—Bigelow, Fl. Boston. 3 ed. 379.

Juglans tomentosa, Lamarck, Dict. iv, 504.—Michaux, Fl. Bor.-Am. ii, 192.—Michaux f. Hist. Arb. Am. i, 184, t. 6; N. American Sylva, 3 ed. i, 120, t. 35.—Pursh, Fl. Am. Sept. ii, 637.—Barton, Prodr. Fl. Philadelph. 92.

C. tomentosa, var. *maxima*, Nuttall, Genera, ii, 221; Sylva, i, 40; 2 ed. i, 56.—Sweet, Hort. Brit. ed. 1830.—Beck, Bot. 336.—Loudon, Arboretum, iii, 1445.—C. De Candolle, Prodr. xvi², 143.

C. alba, Koch, Dendrologie, i, 596 [not Nuttall].

MOCKER NUT. BLACK HICKORY. BULL NUT. BIG-BUD HICKORY. WHITE-HEART HICKORY. KING NUT.

Valley of the Saint Lawrence river, northern shores of lakes Ontario and Erie to eastern Nebraska, eastern Kansas, and the Indian territory, south to cape Canaveral and Tampa bay, Florida, and the valley of the Brazos river, Texas.

A tree 24 to 30 or, exceptionally, 33 (*Ridgway*) meters in height, with a trunk 0.90 to 1.20 meter in diameter; generally on rich upland hillsides—less commonly in low river bottom lands; very common in the Gulf states, and throughout the south the most widely-distributed species of the genus.

Wood heavy, very hard, strong, tough, very close-grained, checking in drying, flexible, containing few large, regularly-distributed, open ducts; medullary rays numerous, thin, obscure; color, rich dark brown, the thick sap-wood nearly white; specific gravity, 0.8216; ash, 1.06; used for the same purposes as that of the shell-bark hickory.

245.—Carya porcina, Nuttall,

Genera, ii, 222.—Barton, Compend. Fl. Philadelph. ii, 180.—Elliott, Sk. ii, 627.—Watson, Dend. Brit. ii, t. 167.—Sprengel, Syst. ii, 849.—Torrey, Compend. Fl. N. States, 358.—Beck, Bot. 336.—Eaton, Manual, 6 ed. 83.—Spach, Hist. Veg. ii, 178.—Penn. Cycl. vi, 332.—Darlington, Fl. Cestrica, 2 ed. 546.—Loudon, Arboretum, iii, 1449, f. 1272–1274.—Eaton & Wright, Bot. 183.—Spach, Hist. Veg. ii, 178.—Emerson, Trees Massachusetts, 197, t. 14; 2 ed, i, 224 & t.—Wood, Bot. & Fl. 304.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 36, t. 1, f. 5, t. 5, f. 54; Prodr. xvi², 143.—Porcher, Resources S. Forests, 332.—Gray, Manual N. States, 5 ed. 449; Hall's Pl. Texas, 21.—Vasey, Cat. Forest Trees, 24.—Ridgway in Proc. U. S. Nat. Mus. 1882, 78.

Juglans glabra, Miller, Dict. No. 5.—Wangenheim, Amer. 25, t. 10, f. 24.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 391.—Willdenow, Spec. iv, 458; Berl. Baumz. 196.—Persoon, Syn. ii, 566.—Aiton, Hort. Kew. 2 ed. v, 297.—Eaton, Manual, 108.—Hayne, Dend. Fl. 164.

Juglans alba acuminata, Marshall, Arbustum, 68.

Juglans obcordata, Lamarck Dict. iv, 504.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 391.—Willdenow, Spec. iv, 458.—Persoon, Syn. 566.

Juglans porcina, Michaux f. Hist. Arb. Am. i, 206, t. 9; N. American Sylva, 3 ed. i, 132, t. 38.—Pursh, Fl. Am. Sept. ii, 638.—Barton, Prodr. Fl. Philadelph. 92.—Audubon, Birds, t. 91.

Juglans pyriformis, Muhlenberg, Cat. 92.

Juglans porcina, var. *obcordata*, Pursh, Fl. Am. Sept. ii, 638.—Barton, Compend. Fl. Philadelph. ii, 180.—Watson, Dend. Brit. ii, 167.

Juglans porcina, var. *pisiformis*, Pursh, Fl. Am. Sept. ii, 638.—Barton, Compend. Fl. Philadelph. ii, 180.

C. glabra, Torrey, Fl. N. York, ii, 182, t. 101.—Gray, Manual N. States, 1 ed. 412.—Darlington, Fl. Cestrica, 3 ed. 264.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 419.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 44.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Koch, Dendrologie, i, 594.—Young, Bot. Texas, 499.

C. amara, var. *porcina*, Darby; Bot. S. States, 513.

PIG NUT. BROWN HICKORY. BLACK HICKORY. SWITCH-BUD HICKORY.

Southern Maine to southern Ontario, southern Michigan and Minnesota, eastern Nebraska, eastern Kansas, and the Indian territory, south to cape Canaveral and Pease creek, Florida, and the valley of the Nueces river, Texas.

A tree 24 to 30 or, exceptionally, 40 (*Ridgway*) meters in height, with a trunk 0.90 to 1.50 meter in diameter; dry hills and uplands; common.

Wood heavy, hard, very strong and tough, flexible, close-grained, checking in drying, containing many large open ducts; color, dark or light brown, the thick sap-wood lighter, often nearly white; specific gravity, 0.8217; ash, 0.99; used for the same purposes as that of the shell-bark hickory.

246.—Carya amara, Nuttall,

Genera, ii, 222.—Barton, Compend. Fl. Philadelph. ii, 180.—Elliott, Sk. ii, 626.—Sprengel, Syst. ii, 849.—Torrey, Compend. Fl. N. States, 358; Fl. N. York, ii, 183.—Beck, Bot. 336.—Spach, Hist. Veg. ii, 177.—Penn. Cycl. vi, 332.—Loudon, Arboretum, iii, 1443, f. 1264.—Hooker, Fl. Bor.-Am. ii, 144.—Emerson, Trees Massachusetts, 199, t. 15; 2 ed. i, 226 & t.—Darlington, Fl. Cestrica, 3 ed. 264.—Darby, Bot. S. States, 513.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 419.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 44.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 641; *Bot. & Fl. 304.—C. De Candolle in Ann.* Sci. Nat. 4 ser. xviii, 36, t. 1, f. 2, t. 5, f. 53-55; Prodr. xvi², 144.—Gray, Manual N. States, 5 ed. 449; Hall's Pl. Texas, 21.—Koch, Dendrologie, i, 592.—Young, Bot. Texas, 500.—Vasey, Cat. Forest Trees, 24.—Sears in Bull. Essex Inst. xiii, 178.—Bell in Geological Rep. Canada, 1879-'80, 52c.—Ridgway in Proc. U. S. Nat. Mus. 1882, 77.

Juglans alba minima, Marshall, Arbustum, 68.

Juglans cordiformis, Wangenheim, Amer. 25, t. 10, f. 25.

Juglans angustifolia, Lamarck, Dict. iv, 504 [not Aiton].

Juglans amara, Michaux f. Hist. Arb. Am. i, 177, t. 4; 3 ed. i, 116, t. 33.—Pursh, Fl. Am. Sept. ii, 638.

Hickorius amara, Rafinesque, Fl. Ludoviciana, 109.

BITTER NUT. SWAMP HICKORY.

Southern Maine to the valley of the Saint Lawrence river, west through Ontario, central Michigan and Minnesota to eastern Nebraska, eastern Kansas, and the Indian territory, south to the Chattahoochee region of western Florida and the valley of the Trinity river, Texas.

A tree 18 to 24 meters in height, with a trunk 0.60 to 0.90 meter in diameter; borders of streams and swamps, in low ground, or often on dry, rich uplands.

Wood heavy, very hard, strong, tough, close-grained, checking in drying; layers of annual growth marked by several rows of large open ducts; medullary rays numerous, obscure; color, dark brown, the thick sap-wood light brown, or often nearly white; specific gravity, 0.7552; ash, 1.03; largely used for hoops, ox-yokes, etc.

247.—Carya myristicæformis, Nuttall,

Genera, ii, 222.—Elliott, Sk. ii, 626.—Sprengel, Syst. ii, 849.—Eaton, Manual, 6 ed. 83.—Spach, Hist. Veg. ii, 179.—Penn. Cycl. v, 332.—Loudon, Arboretum, iii, 1451, f. 1275.—Eaton & Wright, Bot. 1833.—Chapman, Fl. S. States, 419.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 36, t. 6, f. 58; Prodr. xvi², 145.—Koch, Dendrologie, i, 595.—Young, Bot. Texas, 500.—Vasey, Cat. Forest Trees, 24.—Ravenel in Bull. Torrey Bot. Club. vi, 81.

Juglans myristicæformis, Michaux f. Hist. Arb. Am. i, 211, t. 10; N. American Sylva, 3 ed. i, 135, t. 39.—Pursh, Fl. Am. Sept. ii, 638.—Poiret, Suppl. iv, 112.—Rafinesque, Fl. Ludoviciana, 161.

C. amara, var. *myristicæformis*, Cooper in Smithsonian Rep. 1858, 255.

NUTMEG HICKORY.

South Carolina, "Goose creek" (*Michaux*), "Berkeley district" (*Ravenel*); Arkansas, valley of the Arkansas river (Pine Bluff, *Letterman*), south to the Red River valley.

A tree 24 to 30 meters in height, with a trunk 0.60 to 0.90 meter in diameter; sandy ridges along the borders of streams and swamps; rare and very local in South Carolina; more common and reaching its greatest development in southern Arkansas.

Wood heavy, hard, very strong and tough, close-grained, compact, containing numerous small open ducts, layers of annual growth marked by one or two rows of larger ducts; medullary rays numerous, thin, not conspicuous; color, light brown, the sap-wood lighter; specific gravity, 0.8016; ash, 1.06.

248.—Carya aquatica, Nuttall,

Genera, ii, 222.—Elliott, Sk. ii, 627.—Sprengel, Syst. ii, 849.—Eaton, Manual, 6 ed. 83.—Spach, Hist. Veg. ii, 179.—Penn. Cycl. vi, 332.—Loudon, Arboretum, iii, 1444, f. 1265, 1266.—Eaton & Wright, Bot. 183.—Scheele in Rœmer, Texas, 447.—Darby, Bot. S. States, 514.—Chapman, Fl. S. States, 419.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 44.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 641; Bot. & Fl. 304.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 36, t. 1, f. 4, t. 5, f. 56, 57; Prodr. xvi², 144.—Koch, Dendrologie, i, 593.—Young, Bot. Texas, 500.—Vasey, Cat. Forest Trees, 24.

Juglans aquatica, Michaux f. Hist. Arb. Am. i, 182, t. 5; N. American Sylva, 3 ed. i, 119, t. 34.—Pursh, Fl. Am. Sept. ii, 638.—Poiret, Suppl. iv, 112.

Hicorius integrifolia, Rafinesque, Fl. Ludoviciana, 109.

C. integrifolia, Sprengel, Syst. ii, 849.—Loudon, Arboretum, iii, 1451.

WATER HICKORY. SWAMP HICKORY. BITTER PECAN.

North Carolina, in the lower districts, south to cape Malabar and the Caloosa river, Florida (in Florida not detected within 8 or 10 miles of the coast), through the Gulf states to western Louisiana, northeastern Arkansas, and the valley of the Brazos river, Texas.

A tree 18 to 21 meters in height, with a trunk 0.60 to 0.90 meter in diameter, or generally much smaller; low river swamps; most common and reaching its greatest development in the bottom lands of the lower Mississippi and Yazoo rivers.

Wood heavy, soft, strong, rather brittle, very close-grained, compact, containing few scattered, open ducts; layers of annual growth less clearly marked than in the other species of the genus; medullary rays numerous, thin; color, dark brown, the sap-wood light, often nearly white; specific gravity, 0.7407; ash, 1.27; used for fencing, fuel, etc.

MYRICACEÆ.

249.—Myrica cerifera, Linnæus,

Spec. 1 ed. 1024.—Kalm, Travels, English ed. i, 92.—Marshall, Arbustum, 94.—Lamarck, Dict. ii, 592; Ill. iii, 402, t. 809, f. 1.—Gærtner, Fruct. i, 190, t. 39, f. 7.—Walter, Fl. Caroliniana, 242.—Aiton, Hort. Kew. iii, 396; 2 ed. v, 379.—Mœnch, Meth. 362.—B. S. Barton, Coll. ii, 4.—Nouveau Duhamel, ii, 190.—Schkuhr, Handb. iii, 465, t. 322.—Michaux, Fl. Bor.-Am. ii, 227.—Willdenow, Spec. iv, 745; Enum. 1011; Berl. Baumz. 254.—Persoon, Syn. ii, 614.—Desfontaines, Hist. Arb. ii, 472.—Titford, Hort. Bot. Am. 100.—Pursh, Fl. Am. Sept. ii, 620.—Nuttall, Genera, ii, 235; Trans. Am. Phil. Soc. 2 ser. v, 167.—Bigelow, Med. Bot. iii, 32, t. 43; Fl. Boston. 3 ed. 394.—Hayne, Dend. Fl. 197.—Elliott, Sk. ii, 678.—Sprengel, Syst. i, 493.—Torrey, Compend. Fl. N. States, 372; Fl. N. York, ii, 197.—Rafinesque, Med. Bot. ii, 244.—Eaton, Manual, 6 ed. 231.—Beck, Bot. 324.—Loudon, Arboretum, iv, 2057, f. 1968.—Lindley, Fl. Med. 305.—Dietrich, Syn. i, 551.—Eaton & Wright, Bot. 324.—Spach, Hist. Veg. xi, 263.—Emerson, Trees Massachusetts, 224; 2 ed. i, 256 & t.—Darby, Bot. S. States, 507.—Chapman, Fl. S. States, 426.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 106.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 650; Bot. & Fl. 309.—Porcher, Resources S. Forests, 312.—C. De Candolle in Ann. Sci. Nat. 4 ser. xviii, 21, t. 3, f. 32; Prodr. xvi², 148.—Lawson in Trans. Bot. Soc. Edinburgh, viii, 108.—Gray, Manual N. States, 5 ed. 457.—Koch, Dendrologie, ii, 663.—Young, Bot. Texas, 511.—Vasey, Cat. Forest Trees, 28.

M. Pennsylvanica, Lamarck, Dict. ii, 592.—Desfontaines, Hist. Arb. ii, 472.—Nouveau Duhamel, ii, 190, t. 55.—Pursh, Fl. Am. Sept. ii, 620.—Sprengel, Syst. i, 493.—Eaton, Manual, 6 ed. 232.—Eaton & Wright, Bot. 325.—Spach, Hist. Veg. xi, 262.

M. Carolinensis, Miller, Dict. No. 3.—Wangenheim, Amer. 102.—Willdenow, Spec. iv, 746; Enum. 1011.—Aiton, Hort. Kew. 2 ed. v, 379.—Pursh, Fl. Am. Sept. ii, 620.—Nuttall, Genera, ii, 235.—Elliott, Sk. ii, 678.—Eaton, Manual, 6 ed. 232.—Eaton & Wright, Bot. 324.—Darby, Bot. S. States, 507.

M. cerifera humilis, Marshall, Arbustum, 95.

M. cerifera, var. *latifolia*, Aiton, Hort. Kew. iii, 396.

M. cerifera, var. *media*, Michaux, Fl. Bor.-Am. ii, 227.—Chapman, Fl. S. States, 427.

M. cerifera, var. *arborescens*, Michaux, Fl. Bor.-Am. ii, 227.

M. cerifera, var. *pumila*, Michaux, Fl. Bor.-Am. ii, 227.—Pursh, Fl. Am. Sept. ii, 620.—Chapman, Fl. S. States, 427.

M. cerifera, var. *angustifolia*, C. De Candolle, Prodr. xvi², 148.

M. cerifera sempervirens, Hort.

BAYBERRY. WAX MYRTLE.

Shores of lake Erie; Maine, and south near the coast to the Florida keys and southern Alabama.

A tree sometimes 12 meters in height, with a trunk 0.30 to 0.45 meter in diameter, or, except in the southern states, a low, much-branched shrub; usually on sandy beaches and dry hillsides, reaching its greatest development in the bottoms and rich hummocks of the Georgia and Florida coasts.

Wood light, soft, strong, brittle, very close-grained, compact; medullary rays numerous, thin; color, dark brown, the sap-wood lighter; specific gravity, 0.5637; ash, 0.51.

The leaves and stimulant and astringent bark of the roots sometimes employed by herbalists (*Am. Jour. Pharm.* 1863, 193.—*U. S. Dispensatory*, 14 ed. 257, 1706.—*Nat. Dispensatory*, 2 ed. 944). The wax which covers the small globular fruit, formerly largely collected and made into candles, and now, under the name of myrtle-wax, a popular remedy in the treatment of dysentery.

250.—Myrica Californica, Chamisso,

Linnæa, vi, 535.—Bentham, Pl. Hartweg. 336; Bot. Sulphur, 55.—Hooker, Fl. Bor.-Am. ii, 160.—Hooker & Arnott, Bot. Beechey, 390.—Lindley in Jour. London Hort. Soc. vii, 282.—Torrey in Pacific R. R. Rep. iv, 137; Bot. Wilkes Exped. 465.—*Newberry* in Pacific R. R. Rep. vi, 89.—Cooper in Pacific R. R. Rep. xii², 68.—C. De Candolle, Prodr. xvi², 153.—Gray in Proc. Am. Acad. vii, 401.—Vasey, Cat. Forest Trees, 28.—Hall in Coulter's Bot. Gazette, ii, 91.—Watson, Bot. California, ii, 81.

† *M. Xalapensis*, Hooker & Arnott, Bot. Beechey, 160.

Cape Foulweather, Oregon, south near the coast to the bay of Monterey, California.

A small evergreen tree, rarely exceeding 9 meters in height, with a trunk 0.30 to 0.45 meter in diameter, or toward its northern limits reduced to a low shrub; sandy beaches and gravelly hillsides.

Wood heavy, very hard, strong, brittle, very close-grained, compact; medullary rays numerous, thin, conspicuous; color, light rose, the sap-wood lighter; specific gravity, 0.6703; ash, 0.33.

CUPULIFERÆ.

251.—Quercus alba, Linnæus,

Spec. 1 ed. 996.—Du Roi, Harbk. ii, 270, t. 5, f. 5.—Lamarck, Dict. i, 720.—Marshall, Arbustum, 119.—Wangenheim, Amer. 12, t. 3, f. 6.—Walter, Fl. Caroliniana, 235.—Aiton, Hort. Kew. iii, 358; 2 ed. v, 293.—Abbot, Insects Georgia, ii, t. 80, 87.—Michaux, Fl. Bor.-Am. ii, 195.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 395.—Willdenow, Spec. iv, 448; Enum. 977; Berl. Baumz. 346.—Persoon, Syn. ii, 570.—Desfontaines, Hist. Arb. ii, 508.—Michaux f. Hist. Arb. Am. ii, 13, t. 1; N. American Sylva, 3 ed. i, 22, t. 1.—Pursh, Fl. Am. Sept. ii, 633.—Barton, Prodr. Fl. Philadelph. 91; Compend. Fl. Philadelph. ii, 17.—Eaton, Manual, 108; 6 ed. 293.—Nuttall, Genera, ii, 215; Sylva, i, 14; 2 ed. i, 24.—Nouveau Duhamel, vii, 175.—Hayne, Dend. Fl. 158.—Elliott, Sk. ii, 607.—Sprengel, Syst. iii, 864.—Torrey, Compend. Fl. N. States, 359; Fl. N. York, ii, 192.—Audubon, Birds, t. 107, 147.—Beck, Bot. 330.—Loudon, Arboretum, iii, 1864, f. 1723–1726 & t.—Hooker, Fl. Bor.-Am. ii, 158.—*Eaton & Wright*, Bot. 385.—Bigelow, Fl. Boston. 3 ed. 375.—Spach, Hist. Veg. xi, 155.—Emerson, Trees Massachusetts, 127, t. 1; 2 ed. i, 145 & t.—Griffith, Med. Bot. 585.—Penn. Cycl. xix, 216.—Richardson, Arctic Exped. 437.—Darlington, Fl. Cestrica, 3 ed. 266.—Darby, Bot. S. States, 511.—Cooper in Smithsonian Rep. 1858, 255.—Brendel in Trans. Illinois Ag. Soc. iii, 613, t. 1.—Chapman, *Fl. S. States*, 423.—*Curtis* in Rep. Geological Surv. N. Carolina, 1860, iii, 31.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 645; Bot. & Fl. 306.—Porcher, Resources S. Forests, 257.—A. De Candolle, Prodr. xvi², 22.—Örsted in Saerskitt. Afhyk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 1866, 66.—Lebmann, Chênes Am. Trop. t. xxxiii, 29, 30, 58, 59.—Gray, Manual N. States, 5 ed. 450; Hall's Pl. Texas, 21.—Koch, Dendrologie, ii², 50.—Young, Bot. Texas, 505.—Vasey, Cat. Forest Trees, 25.—Broadhead in Coulter's Bot. Gazette, iii, 60.—Sears in Bull. Essex Inst. xiii, 179.—Britton in Bull. Torrey Bot. Club, viii, 126.—Bell in Geological Rep. Canada, 1870–'80, 52ᵉ.—Ridgway in Proc. U. S. Nat. Mus. 78.

† *Q. sinuata*, Walter, Fl. Caroliniana, 235.

Q. alba, var. *pinnatifida*, Michaux, Hist. Chênes Am. No. 4, t. 5, f. 1; Fl. Bor.-Am. ii, 195.—Loudon, Arboretum, iii, 1864.

Q. alba, var. *repanda*, Michaux, Hist. Chênes Am. No. 4, t. 5, f. 2.—Pursh, Fl. Am. Sept. ii, 633.—Hayne, Dend. Fl. 159.—Loudon, Arboretum, iii, 1864.

Q. alba, var. *pinnatifido-sinuata*, Hayne, Dend. Fl. 158.

Q. alba, var. *sinuata*, Hayne, Dend. Fl. 159.

Q. alba, var. *microcarpa*, A. De Candolle, Prodr. xvi², 22.

WHITE OAK.

Northern Maine, valley of the Saint Lawrence river, Ontario, lower peninsula of Michigan to southeastern Minnesota, south to the Saint John's river and Tampa bay, Florida, west to the valley of Nodaway river, Missouri, western Arkansas, and the valley of the Brazos river, Texas.

A large tree of the first economic value, 24 to 45 meters in height, with a trunk 1.20 to 2.40 meters in diameter; all soils; very common and reaching its greatest development along the western slopes of the Alleghany mountains and in the valley of the Ohio river and its tributaries, here often forming more than half the forest growth.

Wood strong, very heavy, hard, tough, close-grained, liable to check unless carefully seasoned, durable in contact with the soil; layers of annual growth strongly marked by several rows of large open ducts; medullary rays broad, prominent; color, brown, the sap-wood lighter brown; specific gravity, 0.7470; ash, 0.41; largely used in ship-building, construction of all sorts, cooperage, in the manufacture of carriages, agricultural implements, and baskets, and for railway ties, fencing, interior finish, cabinet-making, fuel, etc.

A decoction of the astringent inner bark is employed medicinally in cases of hemorrhage, dysentery, etc. (*U. S. Dispensatory*, 14 ed. 755.—*Nat. Dispensatory*, 2 ed. 1196).

252.—Quercus lobata, Née,

Ann. Cienc. Nat. iii, 278.—Smith in Rees' Cycl. xxx, No. 77.—Persoon, Syn. ii, 571.—Nouveau Duhamel, vii, 180.—Poiret, Suppl. ii, 224.—Bentham, Pl. Hartweg. 337.—Liebmann in Dansk. Vidensk. Selsk. Forhandl. 1854, 14; Chênes Am. Trop. 23, t. 42, f. 1-3.—Torrey, Bot. Mex. Boundary Survey, 205; Bot. Wilkes Exped. 461, t. 15.—A. De Candolle, Prodr. xvi², 24.—Koch, Dendrologie, ii², 53.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans. St. Louis Acad. iii, 388; Wheeler's Rep. vi, 374; Bot. California. ii, 95.

Q. Hindsii, Bentham, Bot. Sulphur, 55.—Endlicher, Genera, Suppl. iv. 24.—Walpers, Ann. i, 635.—Torrey in Pacific R. R. Rep. iv, 138; v, 365.—Newberry in Pacific R. R. Rep. vi, 29, 89, t. 1, f. 7.—Cooper in Smithsonian Rep. 1858, 261.—Bolander in Proc. California Acad. iii, 230.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. 1866, Nos. 1-6, 66.—Liebmann, Chênes Am. Trop. t. 42, f. 4.—R. Brown Campst. Horæ Sylvanæ, 52, f. 1-3.

Q. longiglanda, Torrey in Fremont's Geographical Mem. California, 15, 17.

Q. Ransomi, Kellogg in Proc. California Acad. i, 25.

WHITE OAK. WEEPING OAK.

California, west of the Sierra Nevadas from the valley of the upper Sacramento river south through the foothills and interior valleys to the San Bernardino mountains.

The largest of the Pacific oaks, often 30 meters in height, with a trunk 0.90 to 2.40 meters in diameter; very common through the central part of the state.

Wood moderately hard, fine-grained, compact; layers of annual growth marked by few large open ducts and containing few smaller ducts arranged in lines parallel to the broad, conspicuous medullary rays; color, light brown, the sap-wood lighter; specific gravity, 0.7409; ash, 0.30; of little economic value, and only used for fuel.

253.—Quercus Garryana, Douglas;

Hooker, Fl. Bor.-Am. ii, 159.—Hooker & Arnott, Bot. Beechey, 391.—Nuttall, Sylva, i, 1, t. 1; 2 ed. i, 14, t. 1.—Torrey in Pacific R. R. Rep. iv, 138; Bot. Wilkes Exped. 462.—Newberry in Pacific R. R. Rep. vi, 89.—Cooper in Smithsonian Rep. 1858, 260; Pacific R. R. Rep. xii², 28, 68; Am. Nat. iii, 407.—Lyall in Jour. Linnæan Soc. vii, 131, 144.—A. De Candolle, Prodr. xvi², 24.—Bolander in Proc. California Acad. iii, 229.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. 1866, Nos. 1-6, 66.—Rothrock in Smithsonian Rep. 1858, 435.—Liebmann, Chênes Am. Trop. t. 40, f. 3.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans. St. Louis Acad. iii, 389; Bot. California, ii, 95.—Macoun in Geological Rep. Canada, 1875-'76, 210.—G. M. Dawson in Canadian Nat. new ser. ix, 330.

Q. Neœi, Liebmann in Dansk. Vidensk. Selsk. Forhandl. 1854, 173; Chênes Am. Trop. 23, t. xli, f. 1, 2.

Q. Douglasii, var. *?Neœi*, A. De Candolle, Prodr. xvi², 24.

Q. Œrstediana, R. Brown Campst. in Ann. & Mag. Nat. Hist. April, 1871, 2.

Q. Jacobi, R. Brown Campst. in Ann. & Mag. Nat. Hist. April, 1871, 7.

WHITE OAK.

Vancouver's island, shores of Puget sound, south through western Washington territory, Oregon, and California to San Francisco bay; in Washington territory and Oregon extending to the eastern slopes of the Cascade mountains.

A tree 21 to 30 meters in height, with a trunk 0.60 to 0.90 meter in diameter, or at high elevations reduced to a low shrub; dry, gravelly soil; common.

Wood strong, hard, that of the young trees tough, close-grained, compact; layers of annual growth marked by one to three rows of open ducts; medullary rays, varying greatly in width, often conspicuous; color, light brown or yellow, the sap-wood lighter, often nearly white; specific gravity, 0.7453; ash, 0.39; somewhat used for carriage and cooperage stock, in cabinet-making, ship-building, and very largely for fuel; the best substitute for eastern white oak produced in the Pacific forests.

254.—Quercus obtusiloba, Michaux,

Hist. Chênes Am. No. 1, t. 1; Fl. Bor.-Am. ii, 194.—Smith in Rees' Cycl. xxx, No. 78.—Michaux f. Hist. Arb. Am. ii, 36, t. 4; N. American Sylva, 3 ed. i, 36, t. 5.—Pursh, Fl. Am. Sept. ii, 632.—Nuttall, Genera, ii, 215.—Barton, Compend. Fl. Philadelph. ii, 171.—Elliott, Sk. ii, 606.—Torrey, Compend. Fl. N. States, 359; Fl. N. York, ii, 190.—Beck, Bot. 329.—Eaton, Manual, 6 ed. 293.—Loudon, Arboretum, iii, 1870, f. 1732 & t.—Hooker, Fl. Bor.-Am. ii, 158.—Eaton & Wright, Bot. 384.—Scheele in Rœmer, Texas, 446. —Darlington, Fl. Cestrica, 3 ed. 265.—Darby, Bot. S. States, 511.—Cooper in Smithsonian Rep. 1858, 255.—Brendel in Trans. Illinois Ag. Soc. iii, 615, t. 11.—Chapman, Fl. S. States, 423.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 32.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 645; Bot. & Fl. 306.—Engelmann in Trans. Am. Phil. Soc. new ser. xii, 209.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. 1866, Nos. 1-6, 66.—Liebmann, Chênes Am. Trop. t. H, t. 33, f. 60.—Gray, Manual N. States, 5 ed. 451; Hall's, Pl. Texas, 21.—Young, Bot. Texas, 505.

Q. alba minor, Marshall, Arbustum, 120.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 395.

Q. stellata, Wangenheim, Amer. 78, t. 6, f. 15.—Abbot, Insects Georgia, ii, t. 77.—Willdenow, Spec. iv, 452; Enum, 977; Berl. Baumz. 349.—Persoon, Syn. ii, 570.—Aiton, Hort. Kew. 2 ed. v, 294.—Nouveau Duhamel, vii, 180.—Hayne, Dend. Fl. 161.—Nuttall, Sylva, i, 13; 2 ed. i, 23.—Spach, Hist. Veg. xi, 156.—Emerson, Trees Massachusetts, 133, t. 3; 2 ed. i, 151 & t.—A. De Candolle, Prodr. xvi², 22.—Koch, Dendrologie, iii, 52.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans St. Louis Acad. iii, 389.—Ridgway in Proc. U. S. Nat. Mus. 1882, 84.—Watson in Proc. Am. Acad, xviii, 156.

? Q. villosa, Walter, Fl. Caroliniana, 235.

Q. lobulata, Abbot, Insects Georgia, i, 47.

? Q. Drummondii, Liebmann in Dansk. Vidensk. Selsk. Forhandl. 1854, 170.—A. De Candolle, Prodr. xvi², 24.

Q. obtusiloba, var. *parvifolia*, Chapman, Fl. S. States, 423.

Q. stellata, var. *Floridana*, A. De Candolle, Prodr. xvi², 22.

POST OAK. IRON OAK.

Martha's Vineyard, Massachusetts, south to northern Florida, west through southern Ontario and Michigan to eastern Nebraska, Kansas, the Indian territory, and extending to the one hundredth meridian in central Texas.

A tree rarely exceeding 24 meters in height, with a trunk 0.90 to 1.50 meter in diameter, or on the Florida coast reduced to a low shrub (var. *parvifolia*, etc.); dry, gravelly uplands, clay barrens, or in the southwest on Cretaceous formations; the most common and widely-distributed oak of the Gulf states west of the Mississippi river, forming the principal growth of the Texas "cross-timbers."

Wood heavy, hard, close-grained, compact, checking badly in drying, very durable in contact with the soil; layers of annual growth marked by one to three rows of not large open ducts; medullary rays numerous, conspicuous; color, dark or light brown, the sap-wood lighter; specific gravity, 0.8367; ash, 0.79; largely used, especially in the southwest, for fencing, railway ties, and fuel, and somewhat for carriage stock, cooperage, construction, etc.

255.—Quercus undulata, var. Gambelii, Engelmann,

Wheeler's Rep. vi, 249.

Q. Gambelii, Nuttall in Jour. Philadelphia Acad. new ser. i, 179.—Torrey in Sitgreaves' Rep. 172, t. 18; Bot. Mex. Boundary Survey, 205.—Cooper in Smithsonian Rep. 1858, 260.—Liebmann, Chênes Am. Trop. 22, t. 40, f. 1.—Hemsley, Bot. Am.-Cent. iii, 171.

Q. alba, var. *? Gunnisonii*, Torrey in Pacific R. R. Rep. ii, 130.—Watson in King's Rep. v, 321.—Porter in Hayden's Rep. 1871, 493.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 127.—Macoun in Geological Rep. Canada, 1875–'76, 209.

Q. Douglasii, var. *Gambelii*, A. De Candolle, Prodr. xvi², 23.

Q. stellata, var. *Utahensis*, A. De Candolle, Prodr. xvi², 22.

? Q. Emoryi, Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 127 [not Torrey].

SCRUB OAK.

Near the mouth of the Pecos river (*Havard*), through the mountains of western Texas, and New Mexico to the Santa Catalina (*Lemmon*, *Pringle*) and San Francisco mountains, Arizona, eastern slopes of the Rocky mountains of Colorado north to the valley of the Platte river, and through the Wahsatch mountains of Utah.

A small tree, rarely 15 meters in height, with a trunk sometimes 0.60 meter in diameter, or often a low shrub spreading from underground shoots and forming dense thickets, reaching its greatest development on the high mountains of southern New Mexico and Arizona; the large specimens generally hollow and defective.

Wood heavy, hard, strong, that of young trees quite tough, close-grained, checking badly in drying; layers of annual growth marked by few not large open ducts; medullary rays numerous, conspicuous; color, rich dark brown, the sap-wood lighter; specific gravity, 0.8407; ash, 0.99; largely used for fuel, and in Utah the bark in tanning.

256.—Quercus macrocarpa, Michaux,

Hist. Chênes Am. No. 2, t. 2, 3; Fl. Bor.-Am. ii, 194.—Willdenow, Spec. iv, 453; Enum. 977; Berl. Baumz. 350.—Smith in Rees' Cycl. xxx, No. 80.—Persoon, Syn. ii, 570.—Poiret, Suppl. ii, 224.—Michaux f. Hist. Arb. Am. ii, 34, t. 3; N. American Sylva, 3 ed. i, 35, t. 4.—Pursh, Fl. Am. Sept. ii, 632.—Nuttall, Genera, ii, 215.—Nouveau Duhamel, vii, 182.—Hayne, Dend. Fl. 161.—Sprengel, Syst. iii, 863.—Torrey, Compend. Fl. N. States, 359; Nicollet's Rep. 160; Fl. N. York, ii, 191, t. 108.—Beck, Bot. 330.—Eaton, Manual, 6 ed. 293.—Loudon, Arboretum, iii, 1869, f. 1731 & t.—Eaton & Wright, Bot. 385.—Spach, Hist. Veg. xi, 159.—Emerson, Trees Massachusetts, 132, t. 2; 2 ed. i, 149 & t.—Scheele in Rœmer, Texas, 446.—Richardson, Arctic Exped. 437.—Cooper in Smithsonian Rep. 1858, 255.—Brendel in Trans. Illinois Ag. Soc. 131, t. 5, f. 21.—Chapman, Fl. S. States, 423.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 645; Bot. & Fl. 306.—Engelmann in Trans. Am. Phil. Soc. new ser. xii, 209; Trans. St. Louis Acad. iii, 389.—A. De Candolle, Prodr. xvi², 20.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 1866, 67.—Liebmann, Chênes Am. Trop. t. G, t. 33, f. 27, 28.—Gray, Manual N. States, 5 ed. 451.—Koch, Dendrologie, ii², 51.—Young, Bot. Texas, 506.—Winchell in Ludlow's Rep. Black Hills, 68.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 121.—Vasey, Cat. Forest Trees, 24.—Broadhead in Coulter's Bot. Gazette, iii, 60.—J. F. James in Jour. Cincinnati Soc. Nat. Hist. iv, 1 & t.—Ridgway in Proc. U. S. Nat. Mus. 1882, 81.—Bell in Geological Rep. Canada, 1879–'80, 49c.—Watson in Proc. Am. Acad. xviii, 156.

Q. olivæformis, Michaux f. Hist. Arb. Am, ii, 32, t. 2; N. American Sylva, 3 ed. i, 33, t. 3.—Smith in Rees' Cycl. xxx, No. 91.—Pursh, Fl. Am. Sept. ii, 632.—Nuttall, Genera, ii, 215; Sylva, i, 14; 2 ed. i, 24.—Nouveau Duhamel, vii, 181.—Sprengel, Syst. iii, 864.—Torrey, Compend. Fl. N. States, 359.—Fl. N. York, ii, 191.—Beck, Bot. 330.—Eaton, Manual, 6 ed. 293.—Loudon, Arboretum, iii, 1869, f. 1730.—Eaton & Wright, Bot. 385.—Spach, Hist. Veg. xi, 159.—Gray, Manual N. States, 1 ed. 414.—A. De Candolle, Prodr. xvi², 20.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 1866, 67.—Engelmann in Trans. St. Louis Acad. iii, 391.

Q. obtusiloba, var. *depressa*, Nuttall, Genera, ii, 215.

Q. macrocarpa, var. *olivæformis*, Gray, Manual N. States, 2 ed. 404; 5 ed. 451.

Q. macrocarpa, var. *abbreviata*, A. De Candolle, Prodr. xvi², 20.

Q. macrocarpa, var. *minor*, A. De Candolle, Prodr. xvi², 20.

Q. stellata, var. *depressa*, A. De Candolle, Prodr. xvi², 23.

BURR OAK. MOSSY-CUP OAK. OVER-CUP OAK.

Nova Scotia, New Brunswick, northern shores of lake Huron to lake Winnipeg, south to the valley of the Penobscot river, Maine (*C. E. Hamlin*), and along the shores of lake Champlain and the valley of the Ware river, Massachusetts, to Lancaster county, Pennsylvania, west to the eastern foot-hills of the Rocky mountains of Montana, central Nebraska and Kansas, southwest to the Indian territory and the valley of the Nueces river, Texas.

A large tree of the first economic value, 24 to 30 or, exceptionally, 50 meters in height, with a trunk 1.20 to 2.10 meters in diameter; rich bottoms and prairies; in the prairie region the principal growth of the "oak openings", and extending farther west and northwest than any oak of the Atlantic forests.

Wood heavy, strong, hard, tough, close-grained, compact, more durable in contact with the soil than that of other American oaks; layers of annual growth marked by one to three rows of small open ducts; medullary rays often broad and conspicuous; color, dark or rich light brown, the sap-wood much lighter; specific gravity, 0.7453; ash, 0.71; generally confounded with the less valuable white oak (*Q. alba*), and employed for the same purposes.

257.—Quercus lyrata, Walter,

Fl. Caroliniana, 235.—Abbot, Insects Georgia, ii, t. 83.—Michaux, Hist. Chênes Am. No. 3, t. 4; Fl. Bor.-Am. ii, 195.—Willdenow, Spec. iv, 453.—Smith in Rees' Cycl. xxx, No. 79.—Persoon, Syn. ii, 570.—Poiret, Suppl. ii, 224.—Michaux f. Hist. Arb. Am. ii, 42, t. 5; N. American Sylva, 3 ed. i, 39, t. 6.—Aiton, Hort. Kew. 2 ed. v, 295.—Pursh, Fl. Am. Sept. ii, 632.—Nouveau Duhamel, vii, 181.—Nuttall, Genera, ii, 215.—Elliott, Sk. ii, 607.—Sprengel, Syst. xi, 156.—Eaton, Manual, 6 ed. 295.—Loudon, Arboretum, iii, 1871, f. 1733, 1734.—Eaton & Wright, Bot. 386.—Spach, Hist. Veg. xi, 156.—Darby, Bot. S. States, 511.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 423.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 33.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Bot. & Fl. 306.—A. De Candolle, Prodr. xvi², 19.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 1886, 66.—Koch, Dendrologie, ii², 53.—Gray, Hall's Pl. Texas, 21.—Young, Bot. Texas, 506.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans. St. Louis Acad. iii, 389.—Ridgway in Proc. U. S. Nat. Mus, 1882, 80.

OVER-CUP OAK. SWAMP POST OAK. WATER WHITE OAK.

North Carolina, south near the coast to the Chattahoochee region of northern Florida, west through Alabama, Mississippi, and Louisiana to the valley of the Trinity river, Texas, and through Arkansas and southeastern Missouri (Allenton, *Letterman*) to middle Tennessee, southern Indiana and Illinois.

A tree 24 to 30 meters in height, with a trunk 0.60 to 0.90 meter in diameter; deep, often submerged, river swamps; rare in the Atlantic states; more common and reaching its greatest development in the valley of the Red river and the adjacent portions of Arkansas and Texas.

Wood heavy, hard, strong, tough, very durable in contact with the ground, close-grained, inclined to check in drying; layers of annual growth marked by one to three rows of large open ducts; medullary rays broad, numerous, conspicuous; color, rich dark brown, the sap-wood much lighter; specific gravity, 0.8313; ash, 0.65; used for the same purposes as that of the white oak (*Q. alba*).

258.—Quercus bicolor, Willdenow,

Neue Schriften Gesell. Nat. Fr. Berlin, iii, 396; Spec. iv, 440.—Smith in Rees' Cycl. xxx, No. 50.—Persoon, Syn. ii, 569.—Poiret, Suppl. ii, 219.—Pursh, Fl. Am. Sept. ii, 633.—Eaton, Manual, 107; 6 ed. 294.—Barton, Compend. Fl. Philadelph. ii, 172.—Nuttall, Genera, ii, 215; Sylva, i, 13; 2 ed. i, 23.—Nouveau Duhamel, vii, 165.—Sprengel, Syst. iii, 860.—Torrey, Compend. Fl. N. States, 359; Fl. N. York, ii, 192.—Beck, Bot. 331.—Bigelow, Fl. Boston. 3 ed. 375.—Eaton & Wright, Bot. 385.—Emerson, Trees Massachusetts, 135, t. 4; 2 ed. i, 153 & t.—Buckley in Am. Jour. Sci. 2 ser. xiii, 397.—Darlington, Fl. Cestrica, 3 ed. 266.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 646; Bot. & Fl. 306.—A. De Candolle, Prodr. xvi², 20.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 67.—Gray, Manual N. States, 5 ed. 451.—Koch, Dendrologie, ii², 47.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans. St. Louis Acad. iii, 389.—Broadhead in Coulter's Bot. Gazette, iii, 60.—Sears in Bull. Essex Inst. xiii, 179.—Bell in Geological Rep. Canada, 1879-'80, 55ᶜ.—Ridgway in Proc. U. S. Nat. Mus. 1882, 79.

? *Q. Prinus platanoides*, Lamarck, Dict. i, 21.

Q. alba palustris, Marshall, Arbustum, 120.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 395.

Q. Prinus tomentosa, Michaux, Hist. Chênes Am. No. 5, t. 9, f. 2; Fl. Bor.-Am. ii, 196.—Loudon, Arboretum, iii, 1876, f. 1739.

Q. Prinus, var. *discolor*, Michaux f. Hist. Arb. Am. ii, 46, t. 6; N. American Sylva, 3 ed. i, 41, t. 7.—Cooper in Smithsonian Rep. 1858, 255.—Brendel in Trans. Illinois Ag. Soc. iii, 617, t. 3.—Chapman, Fl. S. States, 424.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 34.

Q. bicolor, var. *mollis*, Nuttall, Genera, ii, 215.—Torrey, Compend. Fl. N. States, 359.

Q. Prinus, var. *bicolor*, Spach, Hist. Veg. xi, 158.

? *Q. bicolor*, var. *platanoides*, A. De Candolle, Prodr. xvi², 21.

SWAMP WHITE OAK.

Southern Maine, valley of the upper Saint Lawrence river, Ontario, southern peninsula of Michigan to southeastern Iowa and western Missouri, south to Delaware, and along the Alleghany mountains to northern Georgia, northern Kentucky, and northern Arkansas.

A large tree, 24 to 36 meters in height, with a trunk 1.20 to 2.40 or, exceptionally, over 3 meters ("Wadsworth Oak", Geneseo, New York) in diameter; borders of streams and swamps, in deep alluvial soil; common and reaching its greatest development in the region south of the great lakes.

Wood heavy, hard, strong, tough, close-grained, inclined to check in seasoning; layers of annual growth marked by one to three rows of large open ducts; medullary rays broad and conspicuous; color, light brown, the sap-wood hardly distinguishable; specific gravity, 0.7662; ash, 0.58; used for the same purposes as that of the white oak (*Q. alba*).

259.—Quercus Michauxii, Nuttall,

Genera, ii, 215 (excl. syn.).—Elliott, Sk. ii, 609.—Sprengel, Syst. iii, 860.—Eaton, Manual, 6 ed. 295.—Eaton & Wright, Bot. 386.—Darby, Bot. S. States, 511.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans. St. Louis Acad. iii, 382.—Ward in Bull. U. S. Nat. Mus. No. 22, 113.—Ridgway in Proc. U. S. Nat. Mus. 1882, 81.

Q. Prinus palustris, Michaux, Hist. Chênes Am. No. 5, t. 6; Fl. Bor-Am. ii, 196.—Michaux f. Hist. Arb. Am. ii, 51, t. 7; N. American Sylva, 3 ed. i, 44, t. 8.—Barton, Prodr. Fl. Philadelph. 91.—Loudon, Arboretum, iii, 1872, f. 1735 & t.

Q. Prinus, var. *Michauxii*, Chapman, Fl. S. States, 424.

Q. Prinus, Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 33, in part.

Q. bicolor, var. *Michauxii*, Engelmann in Trans. St. Louis Acad. iii, 390.

BASKET OAK. COW OAK.

New Castle county, Delaware, south through the lower and middle districts to northern Florida, through the Gulf states to the valley of the Trinity river, Texas, and through Arkansas and southwestern Missouri to central Tennessee and Kentucky, and the valley of the lower Wabash river.

A tree 24 to 36 meters in height, with a trunk 1.20 to 2.10 meters in diameter; borders of streams and deep, often submerged, swamps; the common and most valuable white oak of the Gulf states, reaching its greatest development in the rich bottom lands of southeastern Arkansas and Louisiana.

Wood heavy, hard, very strong, tough, close-grained, compact, very durable in contact with the soil, easily split; layers of annual growth marked by few rather large open ducts; medullary rays broad, conspicuous; color, light brown, the sap-wood darker; specific gravity, 0.8039; ash, 0.45; largely used in the manufacture of agricultural implements, wheel stocks, baskets, for which it is unsurpassed, for cooperage, fencing, construction, and fuel.

The large, sweet, edible acorns eagerly devoured by cattle and other animals.

260.—Quercus Prinus, Linnæus,

Spec. 1 ed. 995.—Du Roi, Harbk. ii, 276, t. 6, f. 3.—Lamarck, Dict. i, 720.—Marshall, Arbustum, 125.—Wangenheim, Amer. 15, t. 4, f. 8.—Aiton, Hort. Kew. iii, 356; 2 ed. v, 290.—Mœnch, Meth. 348.—Abbot, Insects Georgia, ii, t. 82.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 397.—Michaux, Fl. Bor.-Am. ii, 195.—Willdenow, Spec. iv, 439; Enum. 975; Berl. Baumz. 339.—Smith in Rees' Cycl. xxx, No. 47.—Persoon, Syn. ii, 568.—Desfontaines, Hist. Arb. ii, 509.—Pursh, Fl. Am. Sept. ii, 633.—Barton, Compend. Fl. Philadelph. ii, 171.—Nuttall, Genera, ii, 215.—Nouveau Duhamel, vii, 164.—Hayne, Dend. Fl. 155.—Elliott, Sk. ii, 608.—Sprengel, Syst. iii, 859.—Torrey, Compend. Fl. N. States, 359.—Audubon, Birds, t. 50, 131.—Beck, Bot. 331.—Eaton, Manual, 6 ed. 294.—Loudon, Arboretum, iii, 1872.—Eaton & Wright, Bot. 385.—Spach, Hist. Veg. xi, 157.—Penn. Cycl. xix, 216.—Darlington, Fl. Cestrica, 3 ed. 267.—Darby, Bot. S. States, 511.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 423.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 645; Bot. & Fl. 306.—Porcher, Resources S. Forests, 264.—A. De Candolle, Prodr. xvi², 21.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 67.—Gray, Manual N. States, 5 ed. 451.—Young, Bot. Texas, 506.—Koch, Dendrologie, ii², 48.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans. St. Louis Acad. iii, 390.

Q. Prinus, var. *monticola*, Michaux, Hist. Chênes Am. No. 5, t. 7; Fl. Bor.-Am. ii, 196.—Michaux f. Hist. Arb. Am. ii, 55, t. 8; N. American Sylva, 3 ed. i, 46, t. 9.—Barton, Prodr. Fl. Philadelph. 91.—Loudon, Arboretum, iii, 1873, f. 1736.—Spach, Hist. Veg. xi, 158.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 424.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 34.—Wood, Cl. Book, 646.—A. De Candolle, Prodr. xvi², 21.—Gray, Manual N. States, 5 ed. 451.—Vasey, Cat. Forest Trees, 25.—Bailey in Am. Nat. xiv, 892, f. 1-4.

Q. montana, Willdenow, Spec. iv, 440; Enum. 975; Berl. Baumz. 340.—Persoon, Syn. ii, 569.—Smith in Rees' Cycl. xxx, No. 49.—Pursh, Fl. Am. Sept. ii, 634.—Eaton, Manual, 107, 6 ed. 294.—Barton, Compend. Fl. Philadelph. ii, 172.—Nuttall, Genera, ii, 216.—Nouveau Duhamel, vii, 165, t. 47, f. 2.—Hayne, Dend. Fl. 156.—Elliott, Sk. ii, 609.—Sprengel, Syst. iii, 860.—Torrey, Compend. Fl. N. States, 354; Fl. N. York, ii, 192.—Beck, Bot. 331.—Bigelow, Fl. Boston. 3 ed. 377.—Eaton & Wright, Bot. 385.—Emerson, Trees Massachusetts, 138, t. 6; 2 ed. i, 156 & t.—Gray, Manual N. States, 1 ed. 414.—Darlington, Fl. Cestrica, 3 ed. 266.—Darby, Bot. S. States, 511.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Porcher, Resources S. Forests, 263.—Burgess in Coulter's Bot. Gazette, vii, 95.

Q. Prinus, var. *lata*, Aiton, Hort. Kew. 2 ed. v, 290.

Q. Castanea, Emerson, Trees Massachusetts, 137, t. 5; 2 ed. i, 155 & t. [not Muhlenberg & Willdenow].

CHESTNUT OAK. ROCK CHESTNUT OAK.

Blue hills, eastern Massachusetts, west to the shores of lake Champlain, shores of Quinté bay, Ontario (*Macoun*), and the valley of the Genesee river, New York, south to Delaware, and through the Alleghany Mountain region to northern Alabama, extending west to central Kentucky and Tennessee.

A tree 24 to 30 meters in height, with a trunk 0.90 to 1.20 meter in diameter; rocky banks and hillsides; very common and reaching its greatest development in the southern Alleghany region, here often forming a large portion of the forest growth.

Wood heavy, hard, strong, rather tough, close-grained, inclined to check in drying, durable in contact with the soil, containing few open ducts; medullary rays very broad, conspicuous; color, dark brown, the sap-wood lighter; specific gravity, 0.7499; ash, 0.77; largely used in fencing, for railway ties, etc.

The bark, rich in tannin, is largely used in preference to that of other North American white oaks in tanning leather.

261.—Quercus prinoides, Willdenow,

Neue Schriften Gesell. Nat. Fr. Berlin, iii, 397; Spec. iv, 440.—Persoon, Syn. ii, 569.—Poiret, Suppl. ii, 219.—Nouveau Duhamel, vii, 166.—Torrey, Fl. N. York, ii, 193, t. 109.—Gray, Manual N. States, 1 ed. 415.—Darlington, Fl. Cestrica, 3 ed. 267.—Chapman, Fl. S. States, 424.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 35.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 646.—Koch, Dendrologie, ii², 49.—Young, Bot. Texas, 506.—Engelmann in Trans. St. Louis Acad. iii, 391.

Q. Prinus humilis, Marshall, Arbustum, 125.—Gray, Manual N. States, 5 ed. 452.

Q. Castanea, Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 396 [not Née].—Willdenow, Spec. iv, 441; Enum. 976; Berl. Baumz. 341.—Persoon, Syn. ii, 569.—Pursh, Fl. Am. Sept. ii, 634.—Smith in Rees' Cycl. xxx, No. 51.—Poiret, Suppl. ii, 219.—Eaton, Manual, 107; 6 ed. 294.—Barton, Compend. Fl. Philadelph. ii, 172.—Nuttall, Genera, ii, 216.—Hayne, Dend. Fl. 156.—Elliott, Sk. ii, 610.—Sprengel, Syst. iii, 860.—Torrey, Compend. Fl. N. States, 354; Fl. N. York, ii, 193.—Beck, Bot. 331.—Eaton & Wright, Bot. 385.—Gray, Manual N. States, 1 ed. 415.—Darlington, Fl. Cestrica, 3 ed. 267.—Darby, Bot. S. States, 511.—Brendel in Trans. Illinois Ag. Soc. iii, 619, t. 4.—Chapman, Fl. S. States, 424.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 34.—Lesquereux in Owen's 2d Rep. Arkansas, 387.—Wood, Cl. Book, 646.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 68.—Liebmann, Chênes Am. Trop. t. H, K. & 33, f. 31, 32.—Young, Bot. Texas, 506.

Q. Prinus, var. *acuminata*, Michaux, Hist. Chênes Am. No. 5, t. 8; Fl. Bor.-Am. ii, 196.—Michaux f. Hist. Arb. Am. ii, 61, t. 9; N. American Sylva, 3 ed. i, 49, t. 10.—Nouveau Duhamel, vii, 167.—Loudon, Arboretum, iii, 1875, f. 1637.—Cooper in Smithsonian Rep. 1858, 255.—Wood, Bot. & Fl. 306.—Gray, Manual N. States, 5 ed. 451.—Vasey, Cat. Forest Trees, 25.

Q. Prinus pumila, Michaux, Hist. Chênes Am. No. 5, t. 9, f. 1; Fl. Bor.-Am. ii, 196.—Loudon, Arboretum, iii, 1875, f. 1738.

Q. Prinus Chinquapin, Michaux f. Hist. Arb. Am. ii, 65, t. 10; N. American Sylva, 3 ed. i, 50, t. 11.—A. De Candolle, Prodr. xvi², 21.

Q. Chinquapin, Pursh, Fl. Am. Sept. ii, 634.—Smith in Rees' Cycl. xxx, No. 48.—Nuttall, Genera, ii, 216.—Elliott, Sk. ii, 611.—Torrey, Compend. Fl. N. States, 354.—Beck, Bot. 331.—Eaton, Manual, 6 ed. 294.—Darlington, Fl. Cestrica, 2 ed. 536.—Eaton & Wright, Bot. 385.—Bigelow, Fl. Boston. 3 ed. 377.—Emerson, Trees Massachusetts, 140; 2 ed. i, 158 & t.—Darby, Bot. S. States, 511.

Q. Prinus, var. *oblongata*, Aiton, Hort. Kew. v, 290.

Q. Prinus, var. *prinoides*, Wood, Bot. & Fl. 306.

Q. Muhlenbergii, Engelmann in Trans. St. Louis Acad. iii, 591.—G. D. Butler in Coulter's Bot. Gazette, iii, 77.—Ridgway in Proc. U. S. Nat. Mus. 1882, 82.

YELLOW OAK. CHESTNUT OAK. CHINQUAPIN OAK.

Eastern Massachusetts, shores of lake Champlain, west along the northern shores of lakes Ontario and Erie, through southern Michigan to eastern Nebraska, eastern Kansas, and the Indian territory; south to Delaware and through the Alleghany region to northern Alabama and Mississippi, southwest to the Guadalupe mountains, western Texas (*Havard*).

A tree 24 to 30 or, exceptionally, 39 meters (*Ridgway*) in height, with a trunk 0.60 to 0.90 meter in diameter (*Q. Muhlenbergii*), or often, especially toward the eastern and western limits of its range, reduced to a low, slender shrub (*Q. prinoides*); dry hillsides and low, rich bottoms; rare, except as a shrub, east of the Alleghany mountains; very common in the Mississippi River basin, and reaching its greatest development in southern Arkansas.

Wood heavy, hard, very strong, close-grained, checking badly in drying, very durable in contact with the soil; layers of annual growth marked by rows of small open ducts; medullary rays broad, conspicuous; color, dark brown, the sap-wood much lighter; specific gravity, 0.8605; ash, 1.14; used for cooperage, wheel stock, fencing, railway ties, etc.

The small acorns sweet and edible.

NOTE.—Differences in the size and habit of individuals of this species, thus enlarged, seem to be dependent upon soil and climate, numerous intermediate forms connecting the extremes of eastern Massachusetts and the Mississippi valley.

262.—Quercus Douglasii, Hooker & Arnott,

Bot. Beechey, 391.—Hooker, Icon. iv, t. 382, 383.—Bentham, Pl. Hartweg. 337; Bot. Sulphur, 55.—Nuttall, Sylva, i, 10, t. 4; 2 ed. i, 20, t. 4.—Torrey in Pacific R. R. Rep. v, 365; Bot. Wilkes Exped. 462.—Cooper in Smithsonian Rep. 1858, 260.—A. De Candolle, Prodr. xvi², 23.—Bolander in Proc. California Acad. iii, 230.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 66.—Liebmann, Chênes Am. Trop. t. 41, f. 3, 4.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans. St. Louis Acad. iii, 392; Bot. California, ii, 95.—Hall in Coulter's Bot. Gazette, ii, 91.

Q. oblongifolia, var. *brevilobata*, Torrey in Bot. Wilkes Exped. 460.

MOUNTAIN WHITE OAK. BLUE OAK.

California, from about latitude 39°, south along the western foot-hills of the Sierra Nevadas below 4,000 feet elevation, and through the Coast ranges to the San Gabriel mountains.

A tree 18 to 24 meters in height, with a trunk 0.60 to 1.20 meter in diameter; common on the low foot-hills of the sierras.

Wood very hard, heavy, strong, brittle, inclined to check in drying; layers of annual growth marked by several rows of small open ducts and containing many scattered groups of smaller ducts; medullary rays numerous, varying greatly in width; color, dark brown, becoming nearly black with exposure, the thick sap-wood light brown; specific gravity, 0.8928; ash, 0.84.

263.—Quercus oblongifolia, Torrey,

Sitgreaves' Rep. 173; Bot. Mex. Boundary Survey, 206; Ives' Rep. 28.—Cooper in Smithsonian Rep. 1858, 261.—A. De Candolle, Prodr. xvi², 36.—Watson, Pl. Wheeler, 17.—Vasey, Cat. Forest Trees, 26.—Engelmann in Trans. St. Louis Acad. iii, 393; Bot. California, ii, 96.

Q. undulata, var. *oblongata*, Engelmann in Wheeler's Rep. vi, 250.

WHITE OAK.

California, foot-hills of the San Gabriel mountains, and in San Diego county (here occupying a narrow belt, 30 miles in width some 30 miles from the coast, *Parish Brothers*); foot-hills of the mountain ranges of southern Arizona and New Mexico; southward into Mexico.

A small evergreen tree, 12 to 15 meters in height, with a trunk 0.45 to 0.60 meter in diameter; the large specimens generally hollow and defective.

Wood very heavy, hard, strong, brittle, very close-grained, checking badly in drying; layers of annual growth hardly distinguishable, containing few small open ducts arranged in many groups parallel to the broad and very conspicuous medullary rays; color, very dark brown or almost black, the thick sap-wood brown; specific gravity, 0.9441; ash, 2.61; of little economic value except as fuel.

264.—Quercus grisea, Liebmann,

Dansk. Vidensk. Selsk. Forhandl. 1854, 13; Chênes Am. Trop. t. 46, f. 1, 2.—A. De Candolle, Prodr. xvi², 35.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 1866, 69.—Rusby in Bull. Torrey Bot. Club, ix, 78.—Watson in Proc. Am. Acad. xviii, 156.

Q. pungens, Liebmann in Dansk. Vidensk. Selsk. Forhandl. 1854, 13; Chênes Am. Trop. 22, t. 45, f. 1–3.—A. De Candolle, Prodr. xvi², 36.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 69.—Rusby in Bull. Torrey Bot. Club ix, 78.

Q. undulata, var. *grisea*, Engelmann in Trans. St. Louis Acad. iii, 382; Wheeler's Rep. vi, 250.

Q. undulata, var. *pungens*, Engelmann in Trans. St. Louis Acad. iii, 392; Wheeler's Rep. vi, 250; Bot. California, ii, 96.—Palmer in Am. Nat. xii, 596.

Q. undulata, var. *Wrightii*, Engelmann in Trans. St. Louis Acad. iii, 382, 392.

WHITE OAK.

Mountains of southern Colorado and western Texas (*Havard*), southern New Mexico and Arizona from 5,000 to 10,000 feet elevation, west to the Colorado desert of California; southward into northern Mexico.

A tree 15 to 24 meters in height, with a trunk rarely exceeding 0.60 meter in diameter, or reduced to a low, much-branched shrub; a polymorphous species, varying greatly in habit and in the shape and texture of the leaves, but apparently well characterized by its connate cotyledons; the large specimens generally hollow and defective.

Wood very heavy, strong, hard, close-grained, checking badly in drying; layers of annual growth marked by one or two rows of small open ducts, these connected by rows of similar ducts parallel to the numerous conspicuous medullary rays; color, very dark brown, the thick sap-wood much lighter; specific gravity, 1.0092; ash, 1.82.

265.—Quercus reticulata, Humboldt & Bonpland,

Pl. Æquin. ii, 40, t. 86.—Poiret, Suppl. v, 609.—Sprengel, Syst. iii, 860.—Loudon, Arboretum, iii, 1944, f. 1865.—Michaux f. N. American Sylva, 3 ed. i, 90.—A. De Candolle, Prodr. xvi², 33.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 67.—Liebmann, Chênes Am. Trop. t. H, t. 34, *f. 10–16*, t. 35, f. 15–22.—Vasey, Cat. Forest Trees, 26.—Engelmann in Trans. St. Louis Acad. iii, 383; Wheeler's Rep. vi, 250.—Hemsley, Bot. Am.-Cent. iii, 176.—Watson in Proc. Am. Acad. xviii, 156. ?

Q. spicata, Humbolt & Bonpland, Pl. Æquin. ii, 46, t. 89.—Bentham, Pl. Hartweg. No. 429.

Q. decipiens, Martens & Galeotti in Bull. Brux. v, 10.

? Q. reticulata, var. *Greggii*, A. De Candolle, Prodr. xvi², 34.—Hemsley, Bot. Am.-Cent. iii, 176.

Southeastern Arizona, San Francisco and Santa Rita mountains from 7,000 to 10,000 feet elevation; southward into northern Mexico.

A small tree, 9 to 12 meters in height, with a trunk 0.30 to 0.45 meter in diameter; dry, gravelly slopes.

Wood very heavy, hard, close-grained, checking badly in drying, containing many small, scattered, open ducts; medullary rays numerous, very broad; color, dark brown, the sap-wood lighter; specific gravity, 0.9479; ash, 0.52.

266.—Quercus Durandii, Buckley,

Proc. Philadelphia Acad. 1860, 445; 1881, 121.—Gray, Hall's Pl. Texas, 21.—Young, Bot. Texas, 507.—Vasey, Cat. Forest Trees, 26.—Watson in Proc. Am. Acad. xviii, 156.

Q. obtusifolia, var. *? brevilobа*, Torrey, Bot. Mex. Boundary Survey, 206.

Q. annulata, Buckley in Proc. Philadelphia Acad. 1860, 445.

Q. San-Sabeana, Buckley in Young, Bot. Texas, 507.

Q. undulata, Engelmann in Trans. St. Louis Acad. iii, 392, in part [not Torrey].

Alabama, Wilcox county (*Buckley*), valley of the Little Cahaba river, Bibb county (*Mohr*); Shreveport, Louisiana?, (*Buckley*); Texas, Dallas (*Reverchon*), valley of the Colorado river (*Buckley, Mohr, Sargent*), west and south.

A tree 21 to 24 meters in height, with a trunk 0.60 to 1.20 meter in diameter; rich bottom lands or dry *mesas* and limestone hills, then reduced to a low shrub, forming dense, impenetrable thickets of great extent (*Q. San-Sabeana*); rare and local in Alabama; the common and most valuable white oak of western Texas.

Wood very heavy and hard, strong, brittle, close-grained, inclined to check in drying; layers of annual growth marked by few large open ducts; medullary rays numerous, conspicuous; color, brown, the sap-wood lighter; specific gravity, 0.9507; ash, 1.78; used for the same purposes as that of the white oak (*Q. alba*).

267.—Quercus virens, Aiton,

Hort. Kew. iii, 356; 2 ed. v, 287.—Bartram, Travels, 2 ed. 82.—Michaux, Hist. Chênes Am. No. 6, t. 10, 11; Fl. Bor.-Am. ii, 196.—Willdenow, Spec. iv, 425; Enum. 974.—Robin, Voyages, iii, 264.—Smith in Rees' Cycl. xxx, No. 5.—Persoon, Syn. ii, 567.—Desfontaines, Hist. Arb. ii, 507.—Poiret, Suppl. ii, 213.—Michaux f. Hist. Arb. Am. ii, 67, t. 11; N. American Sylva, 3 ed. i, 52, t. 12.—Pursh, Fl. Am. Sept. ii, 626.—Nuttall, Genera, ii, 214; Sylva, i, 16; 2 ed, i, 28.—Nouveau Duhamel, vii, 151.—Elliott, Sk. ii, 595.—Sprengel, Syst. iii, 858.—Cobbett, Woodlands, 446.—Eaton, Manual, 6 ed. 294.—Loudon, Arboretum, iii, 1918, f. 1802, 1803 & t.—Eaton & Wright, Bot. 385.—Spach, Hist. Veg. xi, 177.—Engelmann & Gray in Jour. Boston Soc. Nat. Hist. v, 234.—Scheele in Rœmer, Texas, 446; Appx. 147.—Penn. Cycl. xix, 216.—Darby, Bot. S. States, 510.—Torrey, Bot. Mex. Boundary Survey, 206.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl, S. States, 421.—Curtis in Rep. Geological Surv. N. Carolina, 35.—Wood, Cl. Book, 643; Bot. & Fl. 305.—Porcher, Resources S. Forests, 263.—A. De Candolle, Prodr. xvi², 37.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 69.—Gray, Manual N. States, 5 ed. 452; Hall's Pl. Texas, 21.—Liebmann, Chênes Am. Trop. t. 33, f. 50-57.—Young, Bot. Texas, 503.—Vasey, Cat. Forest Trees, 26.—Engelmann in Trans. St. Louis Acad. iii, 383; iv, 191.—Hemsley, Bot. Am.-Cent. iii, 178.—Watson in Proc. Am. Acad. xviii, 155.

Q. Virginiana, Miller, Dict. 7 ed. No. 17.—Koch, Dendrologie, ii², 57.

Q. Phellos, var. *sempervirens*, Marshall, Arbustum, 124.

Q. sempervirens, Walter, Fl. Caroliniana, 234.

Q. oleoides, Chamisso & Schlechtendal in Linnæa, v, 79.—Martens & Galeotti in Bull. Brux. x, No. 3.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 69.

Q. retusa, Liebmann in Dansk. Vidensk. Selsk. Forhandl. 1854, 187.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 69.

LIVE OAK.

Mob Jack bay, Virginia, south along the coast to bay Biscayne and cape Romano, Florida, along the Gulf coast to Mexico, extending through western Texas to the valley of the Red river, the Apache and Gaudalupe mountains and the mountains of northern Mexico south of the Rio Grande at 6,000 to 8,000 feet elevation (*Havard*); in Costa Rica (*Q. retusa*).

An evergreen tree of great economic value, 15 to 18 meters in height, with a trunk 1.50 to 2.10 meters in diameter, or in the interior of Texas much smaller, often shrubby; on the coast, rich hummocks and ridges, a few feet above water-level; common and reaching its greatest development in the south Atlantic states.

Wood very heavy, hard, strong, tough, very close-grained, compact, difficult to work, susceptible of a beautiful polish; layers of annual growth obscure, often hardly distinguishable, containing many small open ducts arranged in short broken rows parallel to the broad, conspicuous medullary rays; color, light brown or yellow, the sap-wood nearly white; specific gravity, 0.9501; ash, 1.14; formerly very largely and now occasionally used in ship-building.

268.—Quercus chrysolepis, Liebmann,

Dansk. Vidensk. Selsk. Forhandl. 1854, 173; Chênes Am. Trop. 23, t. 47.—Torrey, Bot. Mex. Boundary Survey, 206; Bot. Wilkes Exped. 458.—Cooper in Smithsonian Rep. 1858, 260.—Kellogg in Proc. California Acad. ii, 45.—A. De Candolle, Prodr. xvi², 37.—Bolander in Proc. California Acad. iii, 231.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 69.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans. St. Louis Acad. iii, 383, 393; Wheeler's Rep. vi, 374; Bot. California, ii, 97.—Watson in Proc. Am. Acad. xi, 119.—Palmer in Am. Nat. xii, 596.

Q. fulvescens, Kellogg in Proc. California Acad. i, 67, 71.—Newberry in Pacific R. R. Rep. vi, 27, 89.

Q. crassipocula, Torrey in Pacific R. R. Rep. iv, 137; v, 365, t. 9.

? *Q. oblongifolia*, R. Brown Campst. in Ann. & Mag. Nat. Hist. April, 1871, 4 [not Torrey].

LIVE OAK. MAUL OAK. VALPARAISO OAK.

Cow Creek valley, Oregon, south through the California Coast ranges and along the western slopes of the Sierra Nevada and San Bernardino mountains between 3,000 and 8,000 feet elevation, and south into Lower California; southeastern Arizona, San Francisco (*Greene*) and Santa Catalina mountains (*Pringle*).

An evergreen tree of great economic value, 18 to 27 meters in height, with a trunk sometimes 1.50 meter in diameter, or at high elevations reduced to a low, narrow-leaved shrub (var. *vaccinifolia*, *Engelmann in Trans. St. Louis Acad.* iii, 393; *Bot. California*, ii, 97.—*Q. vaccinifolia*, *Kellogg in Trans. California Acad.* ii, 96).

Wood heavy, very strong and hard, tough, close-grained, compact, difficult to work, containing many rather small open ducts arranged in wide bands parallel to the broad, conspicuous medullary rays; color, light brown, the sap-wood darker; specific gravity, 0.8493; ash, 0.60; somewhat used in the manufacture of agricultural implements, wagons, etc.; the most valuable oak of the Pacific forests.

269.—Quercus Emoryi, Torrey,

Emory's Rep. 151, t. 9; Bot. Mex. Boundary Survey, 206; Pacific R. R. Rep. iv, 138; Ives' Rep. 28.—Watson in Pl. Wheeler, 17.—Vasey, Cat. Forest Trees, 26.—Engelmann in Trans. St. Louis Acad. iii, 382, 387, 394; Wheeler's Rep. vi, 250.—Palmer in Am. Nat. xii, 596.—Hemsley, Bot. Am.-Cent. iii, 170.

Q. hastata, Liebmann in Dansk. Vidensk. Selsk. Forhandl. 1854, 13; Chênes Am. Trop. 22.—A. De Candolle, Prodr. xvi², 36.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 69.

BLACK OAK.

Bexar and Comal counties, Texas, through the mountain ranges of western Texas, of southern New Mexico, and of eastern and southern Arizona.

A tree 12 to 15 meters in height, with a trunk 0.30 to 0.90 meter in diameter, or toward its eastern limits in Texas reduced to a low shrub; common and reaching its greatest development in southwestern New Mexico and southern Arizona between 5,000 and 7,000 feet elevation near streams in open cañons; dry, gravelly soil, the large specimens hollow and defective.

Wood very heavy, not hard, strong, brittle, close-grained, compact; layers of annual growth marked by several rows of small open ducts, these connected by narrow groups of similar ducts parallel to the broad, conspicuous medullary rays; color, dark brown or almost black, the thick sap-wood bright brown tinged with red; specific gravity, 0.9263; ash, 2.36.

270.—Quercus agrifolia, Née,

Ann. Cienc. Nat. iii, 271.—Fischer, Misc. Hisp. i, 108.—Willdenow, Spec. iv, 431.—Persoon, Syn. ii, 568.—Smith in Rees' Cycl. xxx, No. 29.—Pursh, Fl. Am. Sept. ii, 627.—Nuttall, Genera, ii, 214; Sylva, i, 5, t. 2; 2 ed. i, 16, t. 2.—Nouveau Duhamel, vii, 156.—Sprengel, Syst. iii, 859.—Eaton, Manual, 6 ed. 292.—Loudon, Arboretum, iii, 1894.—Bentham, Pl. Hartweg. 337; Bot. Sulphur, 55.—Eaton & Wright, Bot. 384.—Hooker, Icon. iv, t. 377.—Hooker & Arnott, Bot. Beechey, 391.—Jour. Hort. Soc. London, vi, 157 & t.—Carrière in Fl. des Serres, vii, 137 & f.—Torrey in Sitgreaves' Rep. 173; Pacific R. R. Rep. iv, 138; v, 365; vii, 20; Bot. Mex. Boundary Survey, 206; Ives' Rep. 28; Bot. Wilkes Exped. 460.—Paxton's Brit. Flower Gard. ii, 44.—Newberry in Pacific R. R. Rep. vi, 32, f. 9.—Bolander in Proc. California Acad. iii, 229.—A. De Candolle, Prodr. xvi², 37.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 69.—Liebmann, Chênes Am. Trop. t. 44.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans. St. Louis Acad. iii, 383; Wheeler's Rep. vi, 374; Bot. California, ii, 98.—Hemsley, Bot. Am.-Cent. iii, 167.

Q. oxyadenia, Torrey in Sitgreaves' Rep. 172, t. 17.—Cooper in Smithsonian Rep. 1858, 261.

Q. acutiglandis, Kellogg in Proc. California Acad. i, 25.

ENCENO. COAST LIVE OAK.

California, Mendocino county, south through the Coast Range valleys to Lower California.

A large evergreen tree, 24 to 30 meters in height, with a trunk 1.20 to 2.10 meters in diameter, or, rarely, reduced to a low shrub (var. *frutescens*, *Engelmann in Bot. California*, ii, 98); rare at the north; common south of San Francisco bay, and the largest and most generally distributed oak in the extreme southwestern part of the state; dry slopes and ridges.

Wood heavy, hard, strong, brittle, close-grained, compact; layers of annual growth hardly distinguishable, containing many large open ducts arranged in several rows parallel to the broad, conspicuous medullary rays; color, light brown or red, the sap-wood darker brown; specific gravity, 0.8253; ash, 1.28; of little value except as fuel.

271.—Quercus Wislizeni, A. De Candolle,

Prodr. xvi², 67.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 1866, 73.—Vasey, Cat. Forest Trees, 27.—Engelmann in Trans. St. Louis Acad. iii, 385, 396; Bot. California, ii, 98.

Q. Morehus, Kellogg in Proc. California Acad. ii, 36.

LIVE OAK.

California, mount Shasta region, south along the western slopes of the Sierra Nevadas to Tulare county, and in the Coast ranges south to the Santa Lucia mountains.

An evergreen tree, 15 to 18 meters in height, with a trunk 0.90 to 1.80 meter in diameter, or toward its northeastern limits reduced to a shrub 0.90 to 3 meters in height (var. *frutescens*, *Engelmann in Bot. California*, ii, 99); not common.

Wood heavy, very hard, strong, close-grained, compact, containing numerous large open ducts arranged in irregular bands parallel to the broad, conspicuous medullary rays; color, light brown tinged with red, the sap-wood lighter; specific gravity, 0.7855; ash, 1.02.

272.—Quercus rubra, Linnæus,

Spec. 1 ed. 996.—Du Roi, Harbk. ii, 265.—Lamarck, Dict. i, 720.—Walter, Fl. Caroliniana, 234.—Aiton, Hort. Kew. iii, 357; 2 ed. v, 292.—Mœnch, Meth. 348.—Abbot, Insects Georgia, ii, t. 103.—Michaux, Hist. Chênes No. 2, t. 35, 36; Fl. Bor.-Am. ii, 200.—Willdenow, Spec. iv, 445; Enum. 976; Berl. Baumz. 342.—Smith in Rees' Cycl. xxx, No. 60.—Persoon, Syn. ii, 569.—Desfontaines, Hist. Arb. ii, 511.—Michaux f. Hist. Arb. Am. ii, 126, t. 26; N. American Sylva, 3 ed. i, 84, t. 28.—Pursh, Fl. Am. Sept. ii, 630.—Eaton, Manual, 108; 6 ed. 293.—Nuttall, Genera, ii, 214.—Barton, Compend. Fl. Philadelph. ii, 169.—Nouveau Duhamel, vii, 170.—Hayne, Dend. Fl. 157.—Elliott, Sk. ii, 602.—Sprengel, Syst. iii, 863.—Torrey, Compend. Fl. N. States, 358; Nicollet's Rep. 160; Fl. N. York, 189, t. 106.—Beck, Bot. 329.—Loudon, Arboretum, iii, 1877, f. 1740–1744 & t.—Hooker, Fl. Bor.-Am. ii, 158.—Bigelow, Fl. Boston. 3 ed. 376.—Eaton & Wright, Bot. 384.—Spach, Hist. Veg. xi, 165.—Emerson, Trees Massachusetts, 48, t. 10; 2 ed. i, 163 & t.—Scheele in Rœmer, Texas, 446.—Penn. Cycl. xix, 216.—Darlington, Fl. Cestrica, 3 ed. 269.—Darby, Bot. S. States, 510.—Cooper in Smithsonian Rep. 1858, 255.—Brendel in Trans. Illinois Ag. Soc. iii, 369, t. 9.—Chapman, Fl. S. States, 422.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 41.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 644; Bot. & Fl. 306.—Porcher, Resources S. Forests, 262.—Engelmann in Trans. Am. Phil. Soc. new ser. v, 209; Trans. St. Louis Acad. iii, 394.—A. De Candolle, Prodr. xvi², 60.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 1866, 72.—Gray, Manual N. States, 5 ed. 454; Hall's Pl. Texas, 21.—Liebmann, Chênes Am. Trop. t. A, B.—Koch, Dendrologie, ii², 70.—Young, Bot. Texas, 504.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 121.—Vasey, Cat. Forest Trees, 26.—Macoun in Geological Rep. Canada, 1875–'76, 209.—Sears in Bull. Essex Inst. xiii, 179.—Ridgway in Proc. U. S. Nat. Mus. 1882, 83.—Bell in Geological Rep. Canada, 1879–'80, 51c.

Q. rubra maxima, Marshall, Arbustum, 122.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 395.

Q. rubra, var. *latifolia*, Lamarck, Dict. i, 720.—Aiton, Hort. Kew. 2 ed. v, 292.—Loudon, Arboretum, iii, 1877.

Q. rubra, var. *montana*, Aiton, Hort. Kew. 2 ed. v, 292.—Loudon, Arboretum, iii, 1877.

Q. ambigua, Michaux f. Hist. Arb. Am. ii, 120, t. 24; N. American Sylva, 3 ed. i, 81, t. 26 [not HBK.].—Pursh, Fl. Am. Sept. ii, 630.—Nuttall, Genera, ii, 214.—Eaton, Manual, 6 ed. 293.—Loudon, Arboretum, iii, 1881, f. 1749 & t.—Eaton & Wright, Bot. 384.

Q. coccinea, var. *rubra*, Spach, Hist. Veg. xi, 165.

Q. coccinea, var. *ambigua*, Gray, Manual N. States, 5 ed. 454.

Q. rubra, var. *runcinata*, A. De Candolle, Prodr. xvi², 60.—Engelmann in Trans. St. Louis Acad. iii, 542.

RED OAK. BLACK OAK.

Nova Scotia, southern New Brunswick to eastern Minnesota, western Iowa, eastern Kansas, and the Indian territory, south to northern Florida, southern Alabama and Mississippi, and the valley of the San Antonio river, Texas.

A large tree, 24 to 30 or, exceptionally, 45 meters (*Ridgway*) in height, with a trunk 1.20 to 2.10 meters in diameter; very common, especially at the north, in all soils and extending farther north than any Atlantic oak.

Wood heavy, hard, strong, coarse-grained, inclined to check in drying; layers of annual growth marked by several rows of very large open ducts; medullary rays few, conspicuous; color, light brown or red, the sap-wood somewhat darker; specific gravity, 0.6540; ash, 0.26; now largely used for clapboards, cooperage, and somewhat for interior finish, in the manufacture of chairs, etc.

Var. **Texana**, Buckley,

Proc. Philadelphia Acad. 1881, 123.—Engelmann in Coulter's Bot. Gazette, vii, 14.

Q. palustris, Torrey & Gray in Pacific R. R. Rep. ii, 175 [not Du Roi].

Q. coccinea, var. *microcarpa*, Torrey, Bot. Mex. Boundary Survey, 206.

Q. Texana, Buckley in Proc. Philadelphia Acad. 1860, 445.—Young, Bot. Texas, 507.

RED OAK.

Western Texas, valley of the Colorado river with the species and replacing it south and west, extending to the valley of the Nueces river and the Limpia mountains (*Havard*).

A tree 21 to 24 meters in height, with a trunk rarely exceeding 0.60 meter in diameter.

Wood heavier, harder, much closer-grained than the species, not checking in drying; layers of annual growth marked with fewer and smaller open ducts; specific gravity, 0.9080; ash, 0.85.

273.—Quercus coccinea, Wangenheim,

Amer. 44, t. 4. f. 9.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 398.—Michaux, Hist. Chênes Am. No. 18, t. 31, 32; Fl. Bor.-Am. ii, 199.—Willdenow, Spec. iv, 445; Enum. 976; Berl. Baumz. 343.—Smith in Rees' Cycl. xxx, 61.—Persoon, Syn. ii, 569.—Desfontaines, Hist. Arb. ii, 511.—Poiret, Suppl. ii, 221.—Michaux f. Hist. Arb. Am. ii, 116, t. 23; N. American Sylva, 3 ed. i, 79, t. 25.—Aiton, Hort. Kew. 2 ed. v, 292.—Pursh, Fl. Am. Sept. ii, 630.—Eaton, Manual, 108; 6 ed. 292.—Nuttall, Genera, ii, 214.—Barton, Compend. Fl. Philadelph. ii, 169.—Nouveau Duhamel, vii, 171.—Hayne, Dend. Fl. 157.—Elliott, Sk. ii, 602.—Sprengel, Syst. iii, 863.—Torrey, Compend. Fl. N. States, 358; Fl. N. York, ii, 189.—Beck, Bot. 329.—Loudon, Arboretum, iii, 1879, f. 1746–1748 & t.—Eaton & Wright, Bot. 384.—Bigelow, Fl. Boston. 3 ed. 376.—Spach, Hist. Veg. xi, 165.—Emerson, Trees Massachusetts, 144, t. 9; 2 ed. i, 163 & t.—Scheele in Rœmer, Texas, 446.—Penn. Cycl. xix, 216.—Darlington, Fl. Cestrica, 3 ed. 268.—Darby, Bot. S. States, 510.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 422.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 40.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 645; Bot. & Fl. 306.—A. De Candolle, Prodr. xvi^2, 61.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 72.—Gray, Manual N. States, 5 ed. 453.—Liebmann, Chênes Am. Trop. t. B.—Koch, Dendrologie, ii^2, 69.—Young, Bot. Texas, 504.—Vasey, Cat. Forest Trees, 26.—Engelmann in Trans. St. Louis Acad. iii, 385, 394.—Ridgway in Proc. U. S. Nat. Mus. 1882, 80.—Watson in Proc. Am. Acad. xviii, 156.

Q. rubra, β. Linnæus, Spec. 1 ed. 996.—Aiton, Hort. Kew. iii, 357.

SCARLET OAK.

Southern Maine to northern New York, Ontario, northern Michigan and Minnesota, eastern Iowa and northeastern Missouri, south to Delaware and southern Tennessee, and through the Alleghany region to northern Florida.

A tree 24 to 30 or, exceptionally, 54 meters (*Ridgway*) in height, with a trunk rarely exceeding 0.60 to 1.20 meter in diameter; at the east in dry, sandy soil or, less commonly, in rich, deep soil; in the northwestern prairie region with *Q. macrocarpa* forming the oak-opening growth; not common and reaching its greatest development in the basin of the lower Ohio river.

Wood heavy, hard, strong, coarse-grained; layers of annual growth strongly marked by several rows of large open ducts; medullary rays thin, conspicuous; color, light brown or red, the sap-wood rather darker; specific gravity, 0.7405; ash, 0.19; if used at all, confounded with that of *Q. rubra*.

274.—Quercus tinctoria, Bartram,

Travels, 2 ed. 37.—Abbot, Insects Georgia, ii, t. 56.—Michaux, Hist. Chênes Am. No. 13, t. 24, 25; Fl. Bor.-Am. ii, 198.—Willdenow, Spec. iv, 444; Enum. 976; Berl. Baumz. 344.—Desfontaines, Hist. Arb. ii, 509.—Poiret, Suppl. ii, 221.—Michaux f. Hist. Arb. Am. ii, 110, t. 22; N. American Sylva, 3 ed. i, 76, t. 24.—Aiton, Hort. Kew. 2 ed. v, 291.—Pursh, Fl. Am. Sept. ii, 629.—Smith in Rees' Cycl. xxx, No. 58.—Barton, Prodr. Fl. Philadelph. 91; Compend. Fl. Philadelph. ii, 168.—Eaton, Manual, 108; 6 ed. 292.—Nuttall, Genera, ii, 214; Sylva, i, 21; 2 ed. i, 32.—Nouveau Duhamel, vii, 169.—Hayne, Dend. Fl. 156.—Elliott, Sk. ii, 601.—Sprengel, Syst. iii, 862.—Torrey, Compend. Fl. N. States, 357; Fl. N. York, ii, 188.—Audubon, Birds, t. 32.—Beck, Bot. 328.—Loudon, Arboretum, iii, 1884, f. 1753, 1754.—Hooker, Fl. Bor.-Am. ii, 158.—Bigelow, Fl. Boston. 3 ed. 376.—Eaton & Wright, Bot. 384.—Spach, Hist. Veg. xi, 164.—Emerson, Trees Massachusetts, 141, t. 7; 2 ed. i, 160 & t.—Griffith, Med. Bot. 586.—Gray, Manual N. States, 1 ed. 416.—Darlington, Fl. Cestrica, 3 ed. 268.—Darby, Bot. S. States, 510.—Cooper in Smithsonian Rep. 1858, 255.—Brendel in Trans. Illinois Ag. Soc. iii, 627, t. 8.—Chapman, Fl. S. States, 422.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 39.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 645.—Engelmann in Proc. Am. Phil. Soc. new ser. xii, 209; Trans. St. Louis Acad. iii, 395.—Porcher, Resources S. Forests, 238.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 1866, 45, 72, f. 18.—Liebmann, Chênes Am. Trop. 9, f. 6.—Young, Bot. Texas, 504.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 121.—Guibourt, Hist. Drogues, 7 ed. ii, 288.—Vasey, Cat. Forest Trees, 27.—Bentley & Trimen, Med. Fl. iv, 251, t. 251.—Ridgway in Proc. U. S. Nat. Mus. 1882, 84.

? *Q. velutina*, Lamarck, Dict. i, 172.—Koch, Dendrologie, ii², 68.

Q. nigra, Marshall, Arbustum, 120 [not Linnæus].—Wangenheim, Amer. 79, t. 6, f. 16.

Q. rubra, Wangenheim, Amer. 14, t. 3, f. 7 [not Linnæus].—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 399.

Q. discolor, Aiton, Hort. Kew. iii, 358.—Abbot, Insects Georgia, ii, 111.—Willdenow, Spec. iv, 444; Berl. Baumz. 345.—Poiret, Suppl. ii, 221.—Smith in Rees' Cycl. xxx, No. 59.—Nuttall, Genera, ii, 214.—Elliott, Sk. ii, 601.—Sprengel, Syst. iii, 863.—Beck, Bot. 329.—Eaton, Manual, 6 ed. 292.—Eaton & Wright, Bot. 384.

Q. tinctoria, var. *angulosa*, Michaux, Fl. Bor.-Am. ii, 198.—Loudon, Arboretum, iii, 1858.

Q. tinctoria, var. *sinuosa*, Michaux, Fl. Bor.-Am. ii, 198.—Loudon, Arboretum, iii, 1885, f. 1755–1757.—Liebmann, Chênes Am. Trop. t. C.

? *Q. Shumardii*, Buckley in Proc. Philadelphia Acad. 1860, 445.

Q. coccinea, var. *tinctoria*, Gray, Manual N. States, 5 ed. 454.—Wood, Cl. Book, 306.—A. De Candolle, Prodr. xvi², 61.

BLACK OAK. YELLOW-BARK OAK. QUERCITRON OAK. YELLOW OAK.

Southern Maine to northern Vermont, Ontario, southern Minnesota, eastern Nebraska, eastern Kansas, and the Indian territory, south to the Chattahoochee region of western Florida, southern Alabama and Mississippi, and eastern Texas.

A large tree, 24 to 36 or, exceptionally, 48 meters (*Ridgway*) in height, with a trunk 0.90 to 1.80 meter in diameter; generally on dry or gravelly uplands; very common.

Wood heavy, hard, strong, not tough, coarse-grained, liable to check in drying; layers of annual growth marked by several rows of very large open ducts; color, bright brown tinged with red, the sap-wood much lighter; specific gravity, 0.7045; ash, 0.28; somewhat used for cooperage, construction, etc.

The bark largely used in tanning; the intensely bitter inner bark yields a valuable yellow dye, and is occasionally used medicinally in the form of decoctions, etc., in the treatment of hemorrhage (*U. S. Dispensatory*, 14 ed. 756.—*Nat. Dispensatory*, 2 ed. 1196).

275.—Quercus Kelloggii, Newberry,

Pacific R. R. Rep. vi, 89, 286, f. 6.—Torrey, Bot. Wilkes Exped. 466.—R. Brown Campst. Horæ Sylvanæ, 58, f. 4–6.—Engelmann in Bot. California, ii, 99.

Q. rubra, Bentham, Pl. Hartweg. 337 [not Linnæus].

Q. tinctoria, var. *Californica*, Torrey in Pacific R. R. Rep. iv, 138; Bot. Mex. Boundary Survey, 205; Ives' Rep. 28.

Q. Californica, Cooper in Smithsonian Rep. 1858, 261.

Q. Sonomensis, Bentham in De Candolle Prodr. xvi², 62.—Bolander in Proc. California Acad. iii, 230.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 1866, 72.—Vasey, Cat. Forest Trees, 27.—Engelmann in Wheeler's Rep. vi, 374.—Palmer in Am. Nat. xii, 596.

BLACK OAK.

Valley of the Mackenzie river, Oregon, south through the Coast ranges and along the western slopes of the Sierra Nevada and San Bernardino mountains to the southern borders of California.

A large tree, 18 to 24 meters in height, with a trunk 0.90 to 1.20 meter in diameter, or at high elevations reduced to a shrub; the most common and important oak of the valleys of southwestern Oregon and the California Sierras.

Wood heavy, hard, strong, very brittle, close-grained, compact; layers of annual growth marked by several rows of large open ducts; medullary rays few, broad, conspicuous; color, light red, the thin sap-wood lighter; specific gravity, 0.6435; ash, 0.26; of little value, except as fuel; the bark somewhat used in tanning.

276.—Quercus nigra, Linnæus,

Spec. 1 ed. 995.—Lamarck, Dict, i, 721.—Wangenheim, Amer. 77, t. 5, f. 13.—Walter, Fl. Caroliniana, 234.—Aiton, Hort. Kew. iii, 357; 2 ed. v, 291.—Abbot, Insects Georgia, i, 50; ii, 58.—Michaux, Hist. Chênes Am. No. 17, t. 22, 23; Fl. Bor.-Am. ii, 198.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 399.—Willdenow, Spec. iv, 442.—Smith in Rees' Cycl. xxx, No. 53.—Persoon, Syn. ii, 569.—Desfontaines, Hist. Arb. ii, 509.—Pursh, Fl. Am. Sept. ii, 629.—Eaton, Manual, 108; 6 ed. 292.—Barton, Compend. Fl. Philadelph. ii, 168.—Nouveau Duhamel, vii, 168.—Elliott, Sk. ii, 600.—Sprengel, Syst. iii, 862.—Torrey, Compend. Fl. N. States, 357; Fl. N. York, ii, 188; Bot. Mex. Boundary Survey, 206.—Audubon, Birds, t. 116.—Beck, Bot. 328.—Loudon, Arboretum, iii, 1890, f. 1764, 1765.—Eaton & Wright, Bot. 384.—Spach, Hist. Veg. xi, 162.—Darlington, Fl. Cestrica, 3 ed. 267.—Darby, Bot. S. States, 510.—Cooper in Smithsonian Rep. 1858, 255.—Brendel in Trans. Illinois Ag. Soc. iii, 625, t. 7.—Chapman, Fl. S. States, 421.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 38.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 644; Bot. & Fl. 305.—A. De Candolle, Prodr. xvi², 63.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 72.—Gray, Manual N. States, 5 ed. 453; Hall's Pl. Texas, 21.—Liebmann, Chênes Am. Trop. t. A.—Koch, Dendrologie, ii², 61.—Young, Bot. Texas, 503.—Vasey, Cat. Forest Trees, 26.—Ridgway in Proc. Nat. Mus. 1882, 82.—Watson in Proc. Am. Acad. xviii, 156.

Q. nigra, var. *latifolia*, Lamarck, Dict. i, 721.

Q. nigra integrifolia, Marshall, Arbustum, 121.

? *Q. aquatica*, Walter, Fl. Caroliniana, 234.

Q. Marylandica, Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 399.

BLACK JACK. JACK OAK.

Long island, New York, west through northern Ohio and Indiana to about latitude 55° N. in Wisconsin, southern Minnesota, eastern Nebraska, Kansas, and the Indian territory to about 99° west longitude, south to Matanzas inlet and Tampa bay, Florida, and the valley of the Nueces river, Texas.

A small tree, sometimes 12 or even 18 meters in height, with a trunk rarely exceeding 0.60 meter in diameter, or more often much smaller; dry, barren uplands, or often on heavy clay soils; very common through the southern states, and reaching its greatest development in southwestern Arkansas, Indian territory, and eastern Texas, forming, with the post-oak (*Q. obtusiloba*), the growth of the Texas cross-timbers.

Wood heavy, hard, strong, checking badly in drying; layers of annual growth marked by several rows of large open ducts; medullary rays broad, conspicuous; color, rather dark rich brown, the sap-wood much lighter; specific gravity, 0.7324; ash, 1.16; of little value except as fuel.

277.—Quercus falcata, Michaux,

Hist. Chênes Am. No. 16, t. 28; Fl. Bor.-Am. ii, 199.—Persoon, Syn. ii, 569.—Poiret, Suppl. ii, 221.—Michaux f. Hist. Arb. Am. ii, 104, t. 21; N. American Sylva, 3 ed. i, 73, t. 23.—Pursh, Fl. Am. Sept. ii, 630.—Nuttall, Genera, ii, 214.—Barton, Compend. Fl. Philadelph. ii, 170.—Nouveau Duhamel, vii, 169.—Elliott, Sk. ii, 604.—Torrey, Compend. Fl. N. States, 358.—Beck, Bot. 329.—Eaton, Manual, 6 ed. 293.—Loudon, Arboretum, iii, 1882, f. 1750, 1751.—Lindley, Fl. Med. 292.—Eaton & Wright, Bot. 384.—Darlington, Fl. Cestrica, 3 ed. 269.—Darby, Bot. S. States, 510.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 422.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 39.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 644; Bot. & Fl. 306.—Porcher, Resources S. Forests, 256.—A. De Candolle, Prodr. xvi², 59.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 72.—Gray, Manual N. States, 5 ed. 453; Hall's Pl. Texas, 21.—Liebmann, Chênes Am. Trop. t. A, t. 22, f. 3.—Young, Bot. Texas, 505.—Vasey, Cat. Forest Trees, 26.—Ridgway in Proc. U. S. Nat. Mus. 1882, 80.

Q. rubra montana, Marshall, Arbustum, 123.

Q. nigra digitata, Marshall, Arbustum, 121.

Q. cuneata, Wangenheim, Amer. 78, t. 5, f. 14.—Koch, Dendrologie, ii², 64.

Q. elongata, Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 400.—Willdenow, Spec. iv, 444.—Smith in Rees' Cycl. xxx, 57.—Aiton, Hort. Kew. 2 ed. v, 291.

Q. triloba, Michaux, Hist. Chênes Am. No. 14, t. 26.—Willdenow, Spec. iv, 443; Berl. Baumz. 342.—Smith in Rees' Cycl. xxx, No. 54.—Persoon, Syn. ii, 569.—Poiret, Suppl. ii, 220.—Aiton, Hort. Kew. 2 ed. v, 291.—Pursh, Fl. Am. Sept. ii, 628.—Hayne, Dend. Fl. 156.—Sprengel, Syst. iii, 862.—Torrey, Compend. Fl. N. States, 357.—Beck. Bot. 328.—Eaton, Manual, 6 ed. 292.—Eaton & Wright, Bot. 384.—Wood, Cl. Book, 644; Bot. & Fl. 306.

Q. falcata, var. *triloba*, Nuttall, Genera, ii, 214.—Elliott, Sk. ii, 604.—Darby, Bot. S. States, 511.—A. De Candolle, Prodr. xvi², 59.

Q. falcata, var. *pagodæfolia*, Elliott, Sk. ii, 605.—Darby, Bot. S. States, 511.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 39.

Q. discolor, var. *triloba*, Spach, Hist. Veg. xi, 163.

Q. falcata, var. *Ludoviciana*, A. De Candolle, Prodr. xvi², 59.

SPANISH OAK. RED OAK.

Long island, New York, south to Hernando county, Florida, through the Gulf states to the valley of the Brazos river, Texas, and through Arkansas and southeastern Missouri to central Tennessee and Kentucky, southern Illinois and Indiana.

A large tree, 24 to 30 meters in height, with a trunk 0.90 to 1.80 meter in diameter; dry, gravelly uplands and barrens; in the north Atlantic states only near the coast; rare; most common and reaching its greatest development in the south Atlantic and Gulf states, where, in the middle districts, it is the most common forest tree.

Wood heavy, very hard and strong, not durable, coarse-grained, checking badly in drying; layers of annual growth strongly marked by several rows of large open ducts; medullary rays few, conspicuous; color, light red, the sap-wood lighter; specific gravity, 0.6928; ash, 0.25; somewhat used for cooperage, construction, etc., and very largely for fuel.

The bark rich in tannin.

278.—Quercus Catesbæi, Michaux,

Hist. Chênes Am. No. 17, t. 29, 30; Fl. Bor.-Am. ii, 199,—Abbot, Insects Georgia, i, 27, t. 14.—Willdenow, Spec. iv, 446.—Smith in Rees Cycl. xxx, No. 62.—Persoon, Syn. 569.—Desfontaines, Hist. Arb. ii, 511.—Poiret, Suppl. ii, 221.—Michaux f. Hist. Arb. Am. ii, 101, t. 20; N. American Sylva, 3 ed. i, 71, t. 22.—Pursh, Fl. Am. Sept. ii, 630.—Nuttall, Genera, ii, 214.—Nouveau Duhamel, vii, 172.—Elliott, Sk. ii, 603.—Sprengel, Syst. iii, 866.—Torrey, Compend. Fl. N. States, 358.—Beck, Bot. 329.—Eaton, Manual, 6 ed. 293.—Loudon, Arboretum, iii, 1889, f. 1762, 1763.—Eaton & Wright, Bot. 384.—Spach, Hist. Veg. xi, 162.—Darby, Bot. S. States, 510.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 422.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 41.—Wood, Cl. Book, 644; Bot. & Fl. 306.—A. De Candolle, Prodr. xvi², 59.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 72.—Koch, Dendrologie, ii², 67.—Young, Bot. Texas, 503.—Vasey, Cat. Forest Trees, 26.

? Q. lævis, Walter, Fl. Caroliniana, 234.

TURKEY OAK. SCRUB OAK. FORKED-LEAF BLACK JACK. BLACK JACK.

North Carolina, south near the coast to cape Malabar and Pease creek, Florida, and along the coast of Alabama and Mississippi.

A small tree, 7 to 15 meters in height, with a trunk 0.45 to 0.60 meter in diameter; very common in the south Atlantic and east Gulf states upon barren sandy hills and ridges of the maritime pine belt; rare in Mississippi.

Wood heavy, hard, strong, close-grained, compact; layers of annual growth marked by several rows of large open ducts and containing many much smaller ducts arranged in short lines parallel to the broad, conspicuous medullary rays; color, light brown tinged with red, the sap-wood somewhat lighter; specific gravity, 0.7294; ash, 0.87; largely used for fuel.

279.—Quercus palustris, Du Roi,

Harbk. ii, 268, t. 5, f. 4.—Wangenheim, Amer. 76, t. 5, f. 10.—Michaux, Hist. Chênes Am. No. 19, t. 33, 34; Fl. Bor.-Am. ii, 200.—Willdenow, Spec. iv, 446; Enum. 976; Berl. Baumz. 343.—Persoon, Syn. ii, 569.—Desfontaines, Hist. Arb. ii, 511.—Poiret, Suppl. ii, 222.—Michaux f. Hist. Arb. Am. ii, 123, t. 25; N. American Sylva, i, 83, t. 27.—Aiton, Hort. Kew. 2 ed. v, 292.—Smith in Rees' Cycl. xxx, No. 6.—Pursh, Fl. Am. Sept. ii, 631.—Barton, Prodr. Fl. Philadelph. 91; Compend. Fl. Philadelph. ii, 170.—Eaton, Manual, 108; 6 ed. 293.—Nuttall, Genera, ii, 214.—Nouveau Duhamel, vii, 172.—Hayne, Dend. Fl. 158.—Sprengel, Syst. iii, 863.—Torrey, Compend. Fl. N. States, 358; Fl. N. York, ii, 190, t. 107.—Beck, Bot, 329.—Loudon, Arboretum, iii, 1887, f. 1758-1761 & t.—Eaton & Wright, Bot. 384.—Spach, Hist. Veg. xi, 166.—Darlington, Fl. Cestrica, 3 ed. 269.—Cooper in Smithsonian Rep. 1858, 255.—Brendel in Trans. Illinois Ag. Soc. iii, 631.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 644; Bot. & Fl. 306.—A. De Candolle, Prodr. xvi², 60.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 23, 72, f. 4.—Gray, Manual N. States, 5 ed. 454.—Liebmann, Chênes Am. Trop. t. A.—Koch, Dendrologie, ii², 71.—Emerson, Trees Massachusetts, 2 ed. i, 167 & t.—Vasey, Cat. Forest Trees, 27.—W. E. Stone in Bull. Torrey Bot. Club, ix, 57.—Ridgway in Proc. U. S. Nat. Mus. 1882, 83.—Burgess in Coulter's Bot. Gazette, vii, 95.—Chapman, Fl. S. States, Suppl. 649.

Q. rubra, var. *dissecta*, Lamarck, Dict. i, 120.

Q. rubra ramosissima, Marshall, Arbustum, 122.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, 398.

PIN OAK. SWAMP SPANISH OAK. WATER OAK.

Valley of the Connecticut river, Massachusetts (Amherst, *Stone*), to central New York, south to Delaware and the District of Columbia; southern Wisconsin to eastern Kansas, southern Arkansas, and southeastern Tennessee.

A tree 24 to 30 or, exceptionally, 36 meters (*Ridgway*) in height, with a trunk 0.90 to 1.50 meter in diameter; low, rich soil, generally along the borders of streams and swamps; most common and reaching its greatest development west of the Alleghany mountains.

Wood heavy, hard, very strong, coarse-grained, inclined to check badly in drying; layers of annual growth marked by several rows of large open ducts; medullary rays broad, numerous, conspicuous; color, light brown, the sap-wood rather darker; specific gravity, 0.6938; ash, 0.81; somewhat used for shingles, clapboards, construction, and in cooperage.

280.—Quercus aquatica, Walter,

Fl. Caroliniana, 234.—Aiton, Hort. Kew. iii, 357; 2 ed. v, 290.—Abbot, Insects Georgia, ii, t. 59, 79.—Michaux, Hist. Chênes Am. No. 11, t. 19, 20, 21; Fl. Bor.-Am. ii, 198.—Muhlenberg & Willdenow in Neue Schriften Gesell. Nat. Fr. Berlin, iii, 399.—Persoon, Syn. ii, 569.—Desfontaines, Hist. Arb. ii, 509.—Poiret, Suppl. ii, 220.—Michaux f. Hist. Arb. Am. ii, 89, t. 17; N. American Sylva, 3 ed. i, 65, t. 19.—Smith in Rees' Cycl. xxx, No. 52.—Pursh, Fl. Am. Sept. ii, 628.—Barton, Compend. Fl. Philadelph. ii, 168.—Nouveau Duhamel, vii, 167.—Elliott, Sk. ii, 599.—Sprengel, Syst. iii, 862.—Torrey, Compend. Fl. N. States, 357.—Audubon, Birds, t. 24.—Beck, Bot. 328.—Eaton, Manual, 6 ed. 292.—London, Arboretum, iii, 1892, f. 1767.—Eaton & Wright, Bot. 384.—Spach, Hist. Veg. xi, 161.—Darby, Bot. S. States, 510.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 421.—Curtis in Rep. Geological Surv. N. Carolina, 37.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 643; Bot. & Fl. 305.—A. De Candolle, Prodr. xvi², 67.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 72.—Gray, Manual N. States, 5 ed. 452; Hall's Pl. Texas, 21.—Liebmann, Chênes Am. Trop. t. D.—Young, Bot. Texas, 503.—Vasey, Cat. Forest Trees, 26.

Q. nigra aquatica, Lamarck, Dict. i, 721.

Q. nigra trifida, Marshall, Arbustum, 121.

? Q. uliginosa, Wangenheim, Amer. 80, t. 6, f. 18.

Q. hemisphærica, Willdenow, Spec. iv, 443.—Poiret, Suppl. ii, 628.—Pursh, Fl. Am. Sept. ii, 628.—Smith in Rees' Cycl. xxx, No. 56, 628.—Nuttall, Genera, ii, 214.—Eaton, Manual, 6 ed. 295.—Eaton & Wright, Bot. 385.—Michaux f. N. American Sylva, 3 ed. 187.

Q. nana, Willdenow, Spec. 448.—Elliott, Sk. ii, 599.

Q. aquatica, vars. *cuneata, elongata, indivisa, attenuata*, Aiton, Hort. Kew. 2 ed. v, 290.

Q. hemisphærica, var. *nana*, Nuttall, Genera, ii, 214.

Q. aquatica, var. *hybrida*, Chapman, Fl. S. States, 421.

Q. nigra, Koch, Dendrologie, ii², 61, in part.

WATER OAK. DUCK OAK. POSSUM OAK. PUNK OAK.

Sussex county, Delaware, south through the coast and middle districts to cape Malabar and Tampa bay, Florida, through the Gulf states to the valley of the Colorado river, Texas, and through Arkansas to the valley of the Black river, southeastern Missouri (Poplar Bluffs, *Letterman*), middle Kentucky and Tennessee.

A tree 15 to 24 meters in height, with a trunk 0.60 to 1.20 meter in diameter; generally along streams and bottoms in heavy, undrained soil, or, more rarely, upon uplands; very common and reaching its greatest development along the large streams in the maritime pine belt of the eastern Gulf states.

Wood heavy, hard, strong, coarse-grained, compact; layers of annual growth marked by several rows of large open ducts; medullary rays thin, conspicuous; color, rather light brown, the sap-wood lighter; specific gravity, 0.7244; ash, 0.51; probably not used except as fuel.

281.—Quercus laurifolia, Michaux,

Hist. Chênes Am. No. 10, t. 17; Fl. Bor.-Am. ii, 197.—Willdenow, Spec. iv, 427.—Persoon, Syn. ii, 567.—Smith in Rees' Cycl. xxx, No. 14.—Aiton, Hort. Kew. 2 ed. v, 288.—Pursh, Fl. Am. Sept. ii, 627.—Nuttall, Genera, ii, 214.—Nouveau Duhamel, vii, 153.—Elliott, Sk. ii, 597.—Sprengel, Syst. iii, 857.—Eaton, Manual, 6 ed. 294.—Loudon, Arboretum, iii, 1897, f. 1775, 1776.—Eaton & Wright, Bot. 385.—Darby, Bot. S. States, 510.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 36.—Liebmann, Chênes Am. Trop. t. D.—Wood, Cl. Book, 643.—Vasey, Cat. Forest Trees, 26.—Engelmann in Trans. St. Louis Acad. iii, 385, 395.

Q. laurifolia hybrida, Michaux, Hist. Chênes Am. No. 10, t. 18.

Q. laurifolia, var. *obtusa*, Willdenow, Spec. iv, 428.—Aiton, Hort. Kew. 2 ed. v, 288.—Wood, Cl. Book, 343.

Q. laurifolia, var. *acuta*, Willdenow, Spec. iv, 428.—Aiton, Hort. Kew. 2 ed. v, 288.

Q. obtusa, Pursh, Fl. Am. Sept. ii, 627.

Q. Phellos, var. *laurifolia*, Chapman, Fl. S. States, 420.—Wood, Bot. & Fl. 305.—Young, Bot. Texas, 502.

Q. aquatica, var. *laurifolia*, A. De Candolle, Prodr. xvi², 68.

LAUREL OAK.

North Carolina, south near the coast to Mosquito inlet and cape Romano, Florida, and along the Gulf coast to the shores of Mobile bay.

A large tree, 18 to 24 meters in height, with a trunk 0.90 to 1.20 meter in diameter; most common and reaching its greatest development on the rich hummocks of the Florida coast.

Wood heavy, very strong and hard, coarse-grained, inclined to check in drying; layers of annual growth marked by several rows of rather small open ducts; medullary rays broad, conspicuous; color, dark brown tinged with red, the sap-wood lighter; specific gravity, 0.7673; ash 0.82.

282.—Quercus heterophylla, Michaux f.

Hist. Arb. Am. ii, 87, t. 16; N. American Sylva, 3 ed. i, 64, t. 18.—Pursh, Fl. Am. Sept. ii, 627.—Barton, Compend. Fl. Philadelph. ii, 167.—Nuttall, Genera, ii, 214; Sylva, i, 15; 2 ed. i, 24.—Green in Universal Herbal, ii, 442.—Torrey, Compend. Fl. N. States, 357.—Sweet, Cat. 2 ed. 466.—Beck, Bot. 328.—Eaton, Manual, 6 ed. 292.—Loudon, Arboretum, iii, 1894.—Eaton & Wright, Bot. 383.—Gale in Proc. Nat. Inst. 1855, 70, f. 1.—Wood, Cl. Book, 645.—Buckley in Proc. Philadelphia Acad. 1862, 361; 1862, 100.—Gray, Hall's Pl. Texas, 21.—Liebmann, Chênes Am. Trop. t. B.—Meehan in Proc. Philadelphia Acad. 1875, 437, 465; Coulter's Bot. Gazette, vii, 10.—Leidy in Proc. Philadelphia Acad. 1875, 415.—Engelmann in Trans. St. Louis Acad. iii, 385, 391.—Martindale, Notes on the Bartram Oak, 3; Coulter's Bot. Gazette, vi, 303.—Ward in Bull. U. S. Nat. Mus. No. 22, 114.

Q. aquatica, var. *heterophylla*, Aiton, Hort. Kew. 2 ed. v, 290.—A. De Candolle, Prodr. xvi², 68.

Q. nigra, var. Cooper in Smithsonian Rep. 1858, 255.

Q. Phellos × *tinctoria*, Gray, Manual N. States, 4 ed. 406.

Q. Phellos, var. Gray, Manual N. States, 5 ed. 453.

Q. Phellos × *coccinea*, Engelmann in Trans. St. Louis Acad. iii, 541.

BARTRAM'S OAK.

New Jersey, Salem and Cumberland counties, "restricted to a line or belt bordering extreme tidal points of streams entering the Delaware river where the alluvial terminates and the upland commences," (*Commons*); Delaware, near Townsend station and Wilmington; North Carolina (*M. A. Curtis* in herb. *Canby*); eastern Texas (*E. Hall*); this perhaps *Q. Durandii*.

A small tree, 12 to 15 meters in height, with a trunk 0.45 to 0.60 meter in diameter; rare and very local.

Wood heavy, hard, very strong, close-grained, compact; layers of annual growth marked by several rows of small open ducts; medullary rays numerous, conspicuous; color, light brown tinged with red, the sap-wood somewhat darker; specific gravity, 0.6834; ash, 0.17.

283.—Quercus cinerea, Michaux,

Hist. Chênes Am. No. 8, t. 14; Fl. Bor.-Am. ii, 197.—Willdenow, Spec. iv, 425.—Persoon, Syn. ii, 567.—Poiret, Suppl. ii, 212.—Michaux f. Hist. Arb. Am. ii, 82, t. 14; N. American Sylva, 3 ed. i, 61, t. 16.—Aiton, Hort. Kew, 2 ed. v, 288.—Pursh, Fl. Am. Sept. ii, 626.—Smith in Rees' Cycl. xxx, No. 6.—Nuttall, Genera, ii, 214.—Nouveau Duhamel, vii, 151.—Elliott, Sk. ii, 594.—Sprengel, Syst. iii, 857.—Eaton, Manual, 6 ed. 294.—Eaton & Wright, Bot. 6 ed. 294.—Engelmann & Gray in Jour. Boston Soc. Nat. Hist. v, 262.—Scheele in Rœmer, Texas, 446.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 421.—Curtis in Rep. Geological Surv. N. Carolina, 37.—Wood, Cl. Book, 643; Bot. & Fl. 305.—A. De Candolle, Prodr. xvi², 73.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 73.—Gray, Manual N. States, 5 ed. 452; Hall's Pl. Texas, 21.—Young, Bot. Texas, 502.—Koch, Dendrologie, ii², 58.—Vasey, Cat. Forest Trees, 26.—Engelmann in Trans. St. Louis Acad. iii, 385, 395.

Q. Prinus, β. Linnæus, Spec. 1 ed. 995.

Q. humilis, Walter, Fl. Caroliniana, 234.

Q. Phellos, var. *cinerea*, Aiton, Hort. Kew. iii, 354.—Loudon, Arboretum, iii, 1895, f. 1773.—Spach, Hist. Veg. xi, 161.

UPLAND WILLOW OAK. BLUE JACK. SAND JACK.

North Carolina, south near the coast to cape Malabar and Pease creek, Florida, west along the Gulf coast to the valley of the Brazos river, Texas, extending north through eastern Texas to about latitude 33°.

A tree 9 to 15 meters in height, with a trunk rarely exceeding 0.20 meter in diameter; sandy barrens and dry upland ridges.

Wood heavy, hard, strong, close grained, compact; layers of annual growth marked by several rows of not large open ducts; medullary rays distant, thin, conspicuous; color, light brown tinged with red, the sap-wood darker; specific gravity, 0.6420; ash, 1.21.

284.—Quercus hypoleuca, Engelmann,

Trans. St. Louis Acad. iii, 384; Wheeler's Rep. vi, 251.—Vasey, Cat. Forest Trees, 26.—Rusby in Bull. Torrey Bot. Club, ix, 78.

Q. cofertifolia, Torrey, Bot. Mex. Boundary Survey, 207 [not HBK.].—Cooper in Smithsonian Rep. 1858, 261.

Limpia mountains, Texas (*Havard*), valleys of the high mountain ranges of southwestern New Mexico, Santa Rita mountains, Arizona, above 6,000 feet elevation; southward into Sonora.

A small evergreen tree of great beauty, 9 to 15 meters in height, with a trunk sometimes 0.75 meter in diameter; dry, gravelly slopes and summits, the large specimens hollow and defective.

Wood heavy, very strong and hard, close-grained, compact; layers of annual growth marked by few small open ducts; medullary rays broad, conspicuous; color, dark brown, the sap-wood much lighter; specific gravity, 0.8009; ash, 1.34.

285.—Quercus imbricaria, Michaux,

Hist. Chênes Am. No. 9, t. 15, 16; Fl. Bor.-Am. ii, 197.—Willdenow, Spec. iv, 428; Enum. Suppl. 64; Berl. Baumz. 338.—Persoon, Syn. ii, 567.—Poiret, Suppl. ii, 214.—Michaux f. Hist. Arb. Am. ii, 78, t. 13; N. American Sylva, 3 ed. i, 60, t. 15.—Aiton, Hort. Kew. 2 ed. v, 288.—Smith in Rees' Cycl. xxx, No. 15.—Pursh, Fl. Am. Sept. ii. 627.—Nuttall, Genera, ii, 214.—Barton, Compend. Fl. Philadelph. ii, 167.—Nouveau Duhamel, vii, 153.—Hayne, Dend. Fl. 155.—Elliott, Sk. ii, 598.—Sprengel, Syst. iii, 857.—Torrey, Compend. Fl. N. States, 357.—Beck, Bot. 328.—Eaton, Manual, 6 ed. 292.—Loudon, Arboretum, iii, 1898, f. 1777.—Eaton & Wright, Bot. 383.—Darby, Bot. S. States, 510.—Torrey & Gray in Pacific R. R. Rep. ii, 130.—Cooper in Smithsonian Rep. 1858, 255.—Brendel in Trans. Illinois Ag. Soc. iii, 623, t. 6.—Chapman, Fl. S. States, 420.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 36.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 643; Bot. & Fl. 305.—A. De Candolle, Prodr. xvi^2, 63.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1860, 73.—Gray, Manual N. States, 5 ed. 452.—Young, Bot. Texas, 502.—Liebmann, Chênes Am. Trop. t. D, t. xxii, f. 5.—Koch, Dendrologie, ii^2, 60.—Vasey, Cat. Forest Trees, 26.—Broadhead in Coulter's Bot. Gazette, iii, 60.—Ridgway in Proc. U. S. Nat. Mus. 1882, 80.

Q. Phellos, var. *imbricaria*, Spach, Hist. Veg. xi, 160.

SHINGLE OAK. LAUREL OAK.

Allentown, Lehigh county, Pennsylvania (*Porter*), west through southern Michigan, southern Wisconsin, and southeastern Iowa to southeastern Nebraska and northeastern Kansas, south to northern Georgia and Alabama, middle Tennessee, and northern Arkansas.

A tree 24 to 30 meters in height, with a trunk 0.60 to 0.90 meter in diameter; rich woodlands.

Wood heavy, hard, rather coarse-grained, checking badly in drying; layers of annual growth marked by many rows of large open ducts; medullary rays broad, conspicuous; color, light brown tinged with red, the sap-wood much lighter; specific gravity, 0.7529; ash, 0.43; occasionally used for clapboards, shingles, etc.

286.—Quercus Phellos, Linnæus,

Spec. 1 ed. 994.—Lamarck, Dict. i, 722.—Wangenheim, Amer. 76, t. 5, f. 11.—Walter, Fl. Caroliniana, 234.—Aiton, Hort. Kew. iii, 354; 2 ed. v, 287.—Abbot, Insects Georgia, ii, t. 52, 91.—Michaux, Fl. Bor.-Am. ii, 197.—Willdenow, Spec. iv, 423; Enum. 974; Berl. Baumz. 337.—Smith in Rees' Cycl. xxx, No. 7.—Persoon, Syn. ii, 567.—Desfontaines, Hist. Arb. ii, 507.—Michaux f. Hist. Arb. Am. ii, 75, t. 12; N. American Sylva, 3 ed. i, 58, t. 14.—Pursh, Fl. Am. Sept. ii, 625.—Barton, Prodr. Fl. Philadelph. 91; Compend. Fl. Philadelph. ii, 167.—Nuttall, Genera, ii, 214; Sylva, i, 15; 2 ed. i, 17.—Nouveau Duhamel, vii, 150.—Hayne, Dend. Fl. 155.—Elliott, Sk. ii, 593.—Sprengel, Syst. iii, 857.—Torrey, Compend. Fl. N. States, 357; Fl. N. York, ii, 187.—Beck, Bot. 328.—Eaton, Manual, 6 ed. 383.—Loudon, Arboretum, iii, 1894, f. 1774 & t.—Eaton & Wright, Bot. 383.—Spach, Hist. Veg. xi, 160.—Penn. Cycl. xix, 216.—Darby, Bot. S. States, 509.—Cooper in Smithsonian Rep. 1858, 255.—Chapman, Fl. S. States, 420.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 36.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 643; Bot. & Fl. 305.—A. De Candolle, Prodr. xvi^2, 63.—Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1-6, 1866, 73.—Gray, Manual N. States, 5 ed. 452; Hall's Pl. Texas, 21.—Young, Bot. Texas, 502.—Koch, Dendrologie, ii^2, 59.—Vasey, Cat. Forest Trees, 26.—Gartenflora, xxix, 221 & f.—Ridgway in Proc. U. S. Nat. Mus. 83.

Q. Phellos angustifolia, Marshall, Arbustum, 124.

Q. Phellos latifolia, Marshall, Arbustum, 124.—Loddiges, Cat. ed. 1836.—Loudon, Arboretum, iii, 1895 & t.

Q. Phellos, var. *viridis*, Aiton, Hort. Kew. iii, 354.

Q. Phellos, var. *humilis*, Pursh, Fl. Am. Sept. ii, 625.

WILLOW OAK. PEACH OAK.

Tottenville, Staten island, New York, south near the coast to northeastern Florida, through the Gulf states to the valley of the Sabine river, Texas, and through Arkansas to southeastern Missouri, Tennessee, and southern Kentucky.

A tree 18 to 24 meters in height, with a trunk sometimes 0.90 meter in diameter; bottom lands or rich sandy uplands.

Wood heavy, strong, not hard, rather close-grained, compact; layers of annual growth marked by several rows of small open ducts; medullary rays few, distant; color, light brown tinged with red, the sap-wood lighter red; specific gravity 0.7472; ash, 0.50; somewhat used for fellies of wheels, clapboards, in construction, etc.

287.—Quercus densiflora, Hooker & Arnott,

Bot. Beechey, 391.—Hooker, Icon. iv, t. 380.—Bentham, Pl. Hartweg. 337.—Nuttall, Sylva, i, 11, t. 5; 2 ed. i, 21, t. 5.—Torrey in Pacific R. R. Rep. iv, 138.—Bot. Wilkes Exped. 458.—Newberry in Pacific R. R. Rep. vi, 31, 89, f. 8.—A. De Candolle, Prodr. xvi², 82.—Bolander in Proc. California Acad. iii, 231.—Vasey, Cat. Forest Trees, 25.—Engelmann in Trans. St. Louis Acad. iii, 389; Bot. California, ii, 99.

Q. echinacea, Torrey in Pacific R. R. Rep. iv, 137, t. 14.

Pasania densiflora, Örsted in Saerskitt. Aftryk. af. Nat. For. Viden. Meddelt. Nos. 1–6, 1866, 73.

Q. echinoides, R. Brown Campst. in Ann. & Mag. Nat. Hist. April, 1871, 2.

TANBARK OAK. CHESTNUT OAK. PEACH OAK.

Valley of the Umpqua river, Oregon, south through the Coast ranges to the Santa Lucia mountains, California.

A tree 18 to 24 meters in height, with a trunk 0.60 to 0.90 meter in diameter; rich valleys and banks of streams; most common and reaching its greatest development in the redwood forests of the California coast.

Wood heavy, hard, strong, very close-grained, compact, containing broad bands of small open ducts parallel to the thin, dark, conspicuous medullary rays; color, bright reddish-brown, the thick sap-wood darker brown; specific gravity, 0.6827; ash, 1.49; largely used as fuel.

The bark, rich in tannin, very largely used and preferred to that of any other tree of the Pacific forests for tanning.

NOTE.—The following shrubby species of *Quercus* do not properly find a place in this catalogue:

Quercus undulata, Torrey in Ann. Lyc. N. York, ii, 248, t. 4.
Interior Pacific region from Colorado southward.

Quercus Breweri, Engelmann in Bot. California, ii, 96.
Q. lobata, var. *fruticosa*, Engelmann in Trans. St. Louis Acad. iii, 388.
Western slopes of the high Sierra Nevadas, California.

Quercus Georgiana, M. A. Curtis in Chapman's Fl. S. States.
Stone Mountain, Georgia.

Quercus myrtifolia, Willdenow, Sp. iv, 424.
Q. Phellos, var. *arenaria*, Chapman, Fl. S. States, 420.
Q. aquatica, var. *myrtifolia*, A. De Candolle, Prodr. xvi, 68.
South Atlantic and Gulf coast.

Quercus ilicifolia, Wangenheim, Amer. 79, t. 6, f. 17.
Q. Banisteri, Michaux, Hist. Chênes Am. t. 27.
North Atlantic region.

Quercus pumila, Walter, Fl. Caroliana, 234.
Q. Phellos pumila, Michaux, Hist. Chênes Am. t. 15, f. 1.
Q. cinerea, var. *pumila*, Chapman, Fl. S. States, 421.—A. De Candolle, Prodr. 16, 74.
Q. cinerea, var. *sericea*, Engelmann in Trans. St. Louis Acad. iii, 384.
Q. sericea, Willdenow, Spec. 424.
Q. Phellos, var. *sericea*, Aiton, Hort. Kew. iii, 354.
Pine barrens, South Carolina.

Quercus dumosa, Nuttall, Sylva, i, 7.
Q. berberidifolia, Liebmann in Dansk. Vidensk. Selsk. Forhandl. 1854, 172, in part.
Q. dumosa, var. *bullata*, Engelmann in Bot. California, 206.
Q. acutidens, Torrey, Bot. Mex. Boundary Survey, 207, t. 51.
Coast ranges of southern California.

Numerous hybrid or supposed hybrid oaks, variously described by American botanists, are not properly considered here.

288.—Castanopsis chrysophylla, A. De Candolle;

Seemann's Jour. Bot. i, 182; Prodr. xvi², 109.—Watson in King's Rep. v, 322; Bot. California, ii, 100.—Gray in Proc. Am. Acad. vii, 401.—Torrey, Bot. Wilkes Exped. 463.—Vasey, Cat. Forest Trees, 27.—Hall in Coulter's Bot. Gazette, ii, 91.

Castanea chrysophylla, Douglas in Hooker's London Jour. Bot. ii, 496, t. 16.—Bentham, Pl. Hartweg. 337.—Hooker, Fl. Bor.-Am. ii, 159.—Nuttall, Sylva, i, 21; 2 ed. i, 37.—Bot. Mag. t. 4953.—Torrey in Pacific R. R. Rep. iv, 137; Bot. Mex. Boundary Survey, 205.—Morren in Belg. Hort. vii, 248, t. 240.—Newberry in Pacific R. R. Rep. vi, 26, 89, f. 4.—Fl. des Serres, xii, 3, t. 1184.—Cooper in Smithsonian Rep. 1858, 261.—Kellogg in Proc. California Acad. ii, 280.—Bolander in Proc. California Acad. iii, 231.—Engelmann in Wheeler's Rep. vi, 375.—Shingles in London Gard. Chronicle, 1882, 716.

Castanea chrysophylla, var. *minor*, Bentham, Pl. Hartweg. 337.

Castanea sempervirens, Kellogg in Proc. California Acad. i, 71.

C. chrysophylla, var. *minor*, A. De Candolle, Prodr. xvi², 110.

C. chrysophylla, var. *pumila*, Vasey, Cat. Forest Trees, 27.

CHINQUAPIN.

Cascade mountains, Oregon, below 4,000 feet elevation, south along the western slopes of the Sierra Nevadas, and through the California Coast ranges to the San Bernardino and San Jacinto mountains.

A tree 15 to 24 meters in height, with a trunk 0.30 to 0.90 meter in diameter, or at high elevations and toward its southern limits reduced to a low shrub; most common and reaching its greatest development in the Coast Range valleys of northern California; at its southern limits rarely below 10,000 feet elevation.

Wood light, soft, not strong, close-grained, compact; layers of annual growth marked by a single row of rather large open ducts; medullary rays numerous, obscure; color, light brown tinged with red, the sap-wood lighter; specific gravity, 0.5574; ash, 0.35; in southern Oregon occasionally used in the manufacture of plows and other agricultural implements.

289.—Castanea pumila, Miller,

Dict. No. 2.—Lamarck, Dict. i, 708.—Michaux, Fl. Bor.-Am. ii, 193.—Willdenow, Spec. iv, 461; Enum. 980; Berl. Baumz. 78.—Smith in Rees' Cycl. xiv, No. 2.—Nouveau Duhamel, iii, 79.—Persoon, Syn. ii, 572.—Desfontaines, Hist. Arb. ii, 500.—Michaux f. Hist. Arb. Am. ii, 166, t. 7; N. American Sylva, 3 ed. iii, 16, t. 105.—Aiton, Hort. Kew. 2 ed. v, 298.—Pursh, Fl. Am. Sept. ii, 624.—Rafinesque, Fl. Ludoviciana, 159; New Fl. & Bot. i, 83.—Nuttall, Genera, ii, 217; Am. Phil. Soc. 2 ser. v, 168.—Hayne, Dend. Fl. 165.—James in Long's Exped. ii, 287.—Elliott, Sk. ii, 615.—Torrey, Compend. Fl. N. States, 355; Fl. N. York, ii, 196.—Audubon, Birds, t. 85.—Beck, Bot. 332.—Eaton, Manual, 6 ed. 84.—Penn. Cycl. vi, 350.—Loudon, Arboretum, iii, 2002, f. 1927, 1928.—Eaton & Wright, Bot. 184.—Spach, Hist. Veg. xi, 192.—Darlington, Fl. Cestrica, 3 ed. 270.—Darby, Bot. S. States, 512.—Cooper in Smithsonian Rep. 1858, 256.—Chapman, Fl. S. States, 424.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 47.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 646; Bot. & Fl. 307.—Porcher, Resources S. Forests, 237.—A. De Candolle, Prodr. xvi², 115.—Gray, Manual N. States, 5 ed. 455.—Young, Bot. Texas, 508.—Koch, Dendrologie, ii², 24.—Vasey, Cat. Forest Trees, 27.—Butler in Coulter's Bot. Gazette, iii, 17.

Fagus pumila, Linnæus, Spec. 1 ed. 998.—Du Roi, Harbk. i, 175.—Wangenheim, Amer. 57, t. 19, f. 44.—Walter, Fl. Caroliniana, 233.—Aiton, Hort. Kew. iii, 361.—Abbot, Insects Georgia, ii, t. 57.

Fagus Castanea pumila, Marshall, Arbustum, 47.

Fagus pumila, var. *præcox*, Walter, Fl. Caroliniana, 233.

C. nana, Muhlenberg, Cat. 86.—Elliott, Sk. ii, 615.—Rafinesque, New Fl. & Bot. i, 83.—Darby, Bot. S. States, 512.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 47.—Lesquereux in Owen's 2d Rep. Arkansas, 388.

C. alnifolia, Nuttall, Genera, ii, 217; Sylva, i, 19, t. 6; 2 ed. i, 36, t. 6.

C. vesca, Lesquereux in Owen's 2d Rep. Arkansas, 388 [not Gærtner].

CHINQUAPIN.

Lancaster county, Pennsylvania, and the valley of the lower Wabash river, Indiana, south and southwest to northern Florida and the valley of the Neches river, Texas.

A tree sometimes 15 meters in height, with a trunk 0.30 to 1.05 meter in diameter, or often, especially in the Atlantic states, reduced to a low shrub; rich hillsides and borders of swamps; most common and reaching its greatest development in southern Arkansas.

Wood light, hard, strong, coarse-grained, durable in contact with the ground, liable to check in drying; layers of annual growth marked by many rows of large open ducts; medullary rays numerous, obscure; color, dark brown, the sap-wood hardly distinguishable; specific gravity, 0.5887; ash, 0.12; used for posts, rails, railway ties, etc.

The small nuts sweet and edible.

290.—Castanea vulgaris, var. Americana, A. De Candolle,

Prodr. xvi², 114.—Schneck in Coulter's Bot. Gazette, vi, 159.—Bell in Geological Rep. Canada, 1879–'80, 53ᶜ.—Ridgway in Proc. U. S. Nat. Mus. 1882, 84.

Fagus Castanea dentata, Marshall, Arbustum, 46.

Fagus Castanea, Wangenheim, Amer. 47 [not Linnæus].—Walter, Fl. Caroliniana, 233.—Aiton, Hort. Kew. iii, 361, in part.—Lamarck, Ill. iii, 366, t. 782, in part.

C. vesca, var. *Americana*, Michaux, Fl. Bor.-Am. ii, 193.—Persoon, Syn. ii, 572.—Barton, Prodr. Fl. Philadelph. 90.—Pursh, Fl. Am. Sept. ii, 624.—Eaton, Manual, 109; 6 ed. 84.—Nuttall, Genera, ii, 217.—Elliott, Sk. ii, 614.—Torrey, Compend. Fl. N. States, 355; Fl. N. York, ii, 195, t. 111.—Loudon, Arboretum, iii, 1984.—Eaton & Wright, Bot. 184.—Emerson, Trees Massachusetts, 164, 2 ed. i, 187 & t.—Porcher, Resources S. Forests, 238. Vasey, Cat. Forest Trees, 27.—Rudkin in Bull. Torrey Bot. Club, vii, 81.

C. Americana, Rafinesque, New Fl. & Bot. i, 82.—Willdenow, Enum. Suppl. 64.—Nuttall, Sylva, i, 24; 2 ed. i, 38.—Spach, Hist. Veg. xi, 191.—Cooper in Smithsonian Rep. 1858, 256.—Koch, Dendrologie, ii², 23.—Martindale in Proc. Philadelphia Acad. 1880, 2.

C. vesca, Willdenow, Spec. iv, 460, in part.—Desfontaines, Hist. Arb. ii, 500, in part.—Michaux f. Hist. Arb. Am. ii, 151, t. 6; N. American Sylva, 3 ed. iii, 11, t. 104 [not Gærtner].—Hayne, Dend. Fl. 165, in part.—Sprengel, Syst. iii, 856, in part.—Beck, Bot. 332.—Penn. Cycl. vi, 350.—Bigelow, Fl. Boston. 3 ed. 224.—Darlington, Fl. Cestrica, 3 ed. 270.—Darby, Bot. S. States, 511.—Chapman, Fl. S. States, 424.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 46.—Wood, Cl. Book, 646; Bot. & Fl. 306.—Gray, Manual N. States, 5 ed. 455.

CHESTNUT.

Southern Maine to the valley of the Winooski river, Vermont, southern Ontario and southern Michigan, south through the northern states to Delaware and southern Indiana, and along the Alleghany mountains to northern Alabama, extending west to middle Kentucky and Tennessee.

A large tree, 24 to 30 meters in height, with a trunk 1.80 to 4 meters in diameter; rich woods and hillsides; very common and reaching its greatest development on the western slopes of the southern Alleghany mountains.

Wood light, soft, not strong, coarse-grained, liable to check and warp in drying, easily split, very durable in contact with the soil; layers of annual growth marked by many rows of large open ducts; medullary rays numerous, obscure; color, brown, the sap-wood lighter; specific gravity, 0.4504; ash, 0.18; largely used in cabinet-making, for railway ties, posts, fencing, etc.

The fruit, although smaller, superior in sweetness and flavor to that of the European chestnut.

An infusion or fluid extract of the dried leaves is successfully employed in the treatment of whooping-cough and other pectoral affections (*U. S. Dispensatory*, 14 ed. 245.—*Nat. Dispensatory*, 2 ed. 364).

291.—Fagus ferruginea, Aiton,

Hort. Kew. iii, 362; 2 ed. v, 298.—Abbot, Insects Georgia, ii, t. 75.—Willdenow, Spec. iv, 460; Enum. 980; Berl. Baumz. 140.—Persoon, Syn, ii, 571.—Desfontaines, Hist. Arb. ii, 496.—Michaux f. Hist. Arb. Am. ii, 174, t. 9; N. American Sylva, 3 ed. iii, 21, t. 106.—Smith in Rees' Cycl. xiv, No. 4.—Pursh, Fl. Am. Sept. ii, 624.—Barton, Prodr. Fl. Philadelph. 90; Compend. Fl. Philadelph. ii, 174.—Eaton, Manual, 108; 6 ed. 145.—Sprengel, Syst. iii, 856.—Torrey, Compend. Fl. N. States, 354; Fl. N. York, ii, 194, t. 110.—Beck. Bot. 333.—Eaton, Manual, 6 ed. 145.—Loudon, Arboretum, iii, 1980, f. 1917.—Hooker, Fl. Bor.-Am. ii, 159.—Eaton & Wright, Bot. 244.—Bigelow, Fl. Boston. 3 ed. 374.—Darlington, Fl. Cestrica, 3 ed. 271.—Cooper in Smithsonian Rep. 1858, 256.—Chapman, Fl. S. States, 425.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 47.—Wood, Bot. & Fl. 307.—A. De Candolle, Prodr. xvi², 118.—Gray, Manual N. States, 5 ed. 455.—Koch, Dendrologie, ii², 19.—Vasey, Cat. Forest Trees, 27.—Broadhead in Coulter's Bot. Gazette, iii, 60.—Sears in Bull. Essex Inst. xiii, 179.—Bell in Geological Rep. Canada, 1879–'80, 52ᶜ.—Ridgway in Proc. U. S. Nat. Mus. 1882, 85.

F. sylvatica atropunicea, Marshall, Arbustum, 46.

F. Americana latifolia, Wangenheim, Amer. 80, t. 29, f. 55.—Loudon, Arboretum, iii, 1980, f. 1916.

F. sylvatica, Walter, Fl. Caroliniana, 233 [not Linnæus].—Pursh, Fl. Am. Sept. ii, 624.—Beck, Bot. 333.—Darlington, Fl. Cestrica, 2 ed. 538.—Darby, Bot. S. States, 512.

F. sylvestris, Michaux, Fl. Bor. Am. ii, 194.—Michaux f. Hist. Arb. Am. ii, 170, t. 8; N. American Sylva, 3 ed. iii, 18, t. 107.—Hooker, Fl. Bor.-Am. ii, 159.—Lesquereux in Owen's 2d Rep. Arkansas, 388.

F. alba, Rafinesque, Fl. Ludoviciana, 131.

F. sylvatica, var. *Americana*, Nuttall, Genera, ii, 216.—Barton, Compend. Fl. Philadelph. ii, 174.—Elliott, Sk. ii, 613.—Eaton, Manual, 6 ed. 145.—Loudon, Arboretum, iii, 1953.—Eaton & Wright, Bot. 244.—Emerson, Trees Massachusetts, 153; 2 ed. i, 180 & t.—Wood, Cl. Book, 647.—Porcher, Resources S. Forests, 235.

F. Americana, Sweet, Hort. Brit.—Spach, Hist. Veg. xi, 201.

F. ferruginea, var. *Caroliniana*, Loudon, Arboretum, iii, 1980, f. 1915.

BEECH.

Nova Scotia and the valley of the Restegouche river to the northern shores of lake Huron and northern Wisconsin, south to the Chattahoochee region of western Florida and the valley of the Trinity river, Texas, west to eastern Illinois, southeastern Missouri, and Madison county, Arkansas (*Letterman*).

A large tree, 24 to 30 or, exceptionally, 34 meters (*Ridgway*) in height, with a trunk 0.90 to 1.20 meter in diameter; rich woods, or at the south sometimes in bottom lands or the dryer portions of swamps, reaching its greatest development upon the "bluff" formations of the lower Mississippi basin; very common.

Wood very hard, strong, tough, very close grained, not durable in contact with the soil, inclined to check in drying, difficult to season, susceptible of a beautiful polish; medullary rays broad, very conspicuous; color, varying greatly with soil and situation, dark red, or often lighter, the sap-wood nearly white; specific gravity, 0.6883; ash, 0.51; largely used in the manufacture of chairs, shoe-lasts, plane-stocks, handles, etc., and for fuel.

292.—Ostrya Virginica, Willdenow,

Spec. iv, 469; Enum. 982; Berl. Baumz. 260.—Persoon, Syn. ii, 573.—Aiton, Hort. Kew. 2 ed. v, 302.—Pursh, Fl. Am. Sept. ii, 623.—Eaton, Manual, 109; 6 ed. 244.—Nuttall, Genera, ii, 219.—Hayne, Dend. Fl. 169.—Elliott, Sk. ii, 618.—Sprengel, Syst. iii, 856.—Torrey, Compend. Fl. N. States, 356; Nicollet's Rep. 160; Fl. N. York, ii, 185, t. 102.—Audubon, Birds, t. 40.—Loudon, Arboretum, iii, 2015, f. 1940.—Hooker, Fl. Bor.-Am. ii, 160.—Eaton & Wright, Bot. 336.—Bigelow, Fl. Boston. 3 ed. 383.—Spach in Ann. Sci. Nat. 2 ser. xvi, 246; Hist. Veg. xi, 218.—Emerson, Trees Massachusetts, 177; 2 ed. i, 201 & t.—Parry in Owen's Rep. 618.—Darlington, Fl. Cestrica, 3 ed. 274.—Darby, Bot. S. States, 509.—Cooper in Smithsonian Rep. 256.—Chapman, Fl. S. States, 426.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 75.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 647; Bot. & Fl. 307.—Porcher, Resources S. Forests, 233.—A. De Candolle, Prodr. xvi^2, 125.—Gray, Manual N. States, 5 ed. 456.—Young, Bot. Texas, 510.—Vasey, Cat. Forest Trees, 27.—Sargent in Am. Nat. xi, 683.—Sears in Bull. Essex Inst. xiii, 179.—Ridgway in Proc. U. S. Nat. Mus. 85.

Carpinus Ostrya, Linnæus, Spec. 1 ed. 998, in part.—Du Roi, Harbk. i, 130.—Wangenheim, Amer. 48.—Marshall, Arbustum, 25.—Mœnch, Meth. 694.—Abbot, Insects Georgia, ii, t. 76.—Nouveau Duhamel, ii, 200.—Michaux f. Hist. Arb. Am. iii, 53, t. 7; N. American Sylva, 3 ed. iii, 27, t. 109.

Carpinus Virginiana, Miller, Dict. 7 ed. No. 4.—Lamarck, Dict. i, 708; Wangenheim, Amer. 49.—Nouveau Duhamel, ii, 201.—Desfontaines, Hist. Arb. ii, 493.—Smith in Rees' Cycl. vii, No. 5.

Carpinus triflora, Mœnch, Meth. 394.

Carpinus Ostrya, var. *Americana*, Michaux, Fl. Bor.-Am. ii, 202.

O. Virginica, var. *glandulosa*, Spach in Ann. Sci. Nat. 2 ser. xvi, 246; Hist. Veg. xi, 218.

O. Virginica, var. *eglandulosa*, Spach. in Ann. Sci. Nat. 2 ser. xvi, 246; Hist. Veg. xi, 218.

O. Virginiana, Koch, Dendrologie, ii^2, 6.

HOP HORNBEAM. IRON WOOD. LEVER WOOD.

Bay of Chaleur, through the valleys of the Saint Lawrence and the lower Ottawa rivers, along the northern shore of lake Huron to northern Minnesota, south through the northern states and along the Alleghany mountains to the Chattahoochee region of western Florida, and through eastern Iowa, southeastern Missouri, and Arkansas to eastern Kansas, the Indian territory, and eastern Texas.

A small tree, 9 to 15 meters in height, with a trunk 0.30 to 0.60 meter in diameter; generally on dry, gravelly hillsides and knolls, reaching its greatest development in southern Arkansas; common.

Wood heavy, very strong and hard, tough, very close-grained, compact, susceptible of a beautiful polish, very durable in contact with the soil; medullary rays numerous, obscure; color, light brown tinged with red, or, like the sap-wood, often nearly white; specific gravity, 0.8284; ash, 0.50; used for posts, levers, handles of tools, etc.

293.—Carpinus Caroliniana, Walter,

Fl. Caroliniana, 238.—A. De Candolle, Prodr. xvi^2, 126.—Koch, Dendrologie, ii^2, 4.—Sears in Bull. Essex Inst. xviii, 180.—Ridgway in Proc. U. S. Nat. Mus. 1882, 85.

C. Americana, Lamarck, Dict. iv, 708; Suppl. ii, 202.—Michaux, Fl. Bor.-Am. ii, 201.—Willdenow, Spec. iv, 468; Enum. Suppl. 64; Berl. Baumz. 75.—Persoon, Syn. ii, 573.—Michaux f. Hist. Arb. Am. iii, 57, t. 8; N. American Sylva, 3 ed. iii, 26, t. 108.—Pursh, Fl. Am. Sept. ii, 623.—Aiton, Hort. Kew. 2 ed. v, 301.—Eaton, Manual, 109; 6 ed. 82.—Barton, Prodr. Fl. Philadelph. 91; Compend. Fl. Philadelph. ii, 176.—Nuttall, Genera, ii, 218.—Hayne, Dend. Fl. 168.—Elliott, Sk. ii, 618.—Watson, Dend. Brit. ii, t. 157.—Sprengel, Syst. iii, 854.—Guimpel, Otto & Hayne, Abb. Holz. 107, t. 84.—Torrey, Compend. Fl. N. States, 356; Fl. N. York, ii, 185, t. 103.—Penn. Cycl. iv, 315.—London, Arboretum, iii, 2013, f. 1936.—Hooker, Fl. Bor.-Am. ii, 160.—Eaton & Wright, Bot. 182.—Bigelow, Fl. Boston. 3 ed. 383.—Spach in Ann. Sci. Nat. 2 ser. xvi, 252; Hist. Veg. xi, 224.—Emerson, Trees Massachusetts, 174; 2 ed. i, 198 & t.—Parry in Owen's Rep. 618.—Darlington, Fl. Cestrica, 3 ed. 273.—Darby, Bot. S. States, 508.—Cooper in Smithsonian Rep. 1858, 256.—Chapman, Fl. S. States, 425.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 75.—Lesquereux in Owen's 2d Rep. Arkansas, 388.—Wood, Cl. Book, 648; Bot. & Fl. 307.—Gray, Manual N. States, 5 ed. 457; Hall's Pl. Texas, 21.—Young, Bot. Texas, 509.—Vasey, Cat. Forest Trees, 27.—Broadhead in Coulter's Bot. Gazette, iii, 60.—Bell in Geological Rep. Canada, 1879–'80, 52^c.

C. Betulus Virginiana, Marshall, Arbustum, 25.

HORNBEAM. BLUE BEECH. WATER BEECH. IRON WOOD.

Nova Scotia, southern New Brunswick, northern shores of Georgian bay, southern peninsula of Michigan to northern Minnesota (lake Pokegama, *Garrison*), south to cape Malabar and Tampa bay, Florida, and the valley of the Trinity river, Texas, west to central Iowa, eastern Kansas, and the valley of the Poteau river, Indian territory.

A small tree, 9 to 15 meters in height, with a trunk sometimes 0.60 to 0.90 meter in diameter, or at the north much smaller and often reduced to a low shrub; borders of streams and swamps, in moist soil; most common and reaching its greatest development along the western slopes of the southern Alleghany mountains and in southern Arkansas and eastern Texas.

Wood heavy, very strong and hard, close-grained, inclined to check in drying; medullary rays numerous, broad; color, light brown, the thick sap-wood nearly white; specific gravity, 0.7286; ash, 0.83; sometimes used for levers, handles of tools, etc.

BETULACEÆ.

294.—Betula alba, var. populifolia, Spach,

Ann. Sci. Nat. 2 ser. xv, 187; Hist. Veg. xi, 233.—Endlicher, Genera, Suppl. iv^2, 19.—Regel in Mem. Soc. Nat. Moscow, xix, 76, t. 4, f. 19-28; Gray, Manual N. States, 5 ed. 459.—Vasey, Cat. Forest Trees, 28.—Macoun in Geological Rep. Canada, 1879-'80, 55^c.

B. lenta, Du Roi, Harbk. i, 92 [not Linnæus].—Wangenheim, Amer. 45, t. 29, f. 38.

B. populifolia, Marshall, Arbustum, 19.—Aiton, Hort. Kew. iii, 336; 2 ed. v, 299.—Willdenow, Berl. Baumz. 1 ed. 37, t. 2, f. 5; Spec. iv, 463.—Persoon, Syn. ii, 572.—Desfontaines, Hist. Arb. ii, 476.—Nouveau Duhamel, iii, 204.—Poiret, Suppl. i, 687.—Michaux f. Hist. Arb. Am. ii, 139, t. 2; N. American Sylva, 3 ed. ii, 78, t. 71.—Pursh, Fl. Am. Sept. ii, 620.—Smith in Rees' Cycl. iv, No. 8.—Barton, Prodr. Fl. Philadelph. 92; Compend. Fl. Philadelph. ii, 175.—Eaton, Manual, 109; 6 ed. 53.—Nuttall, Genera, ii, 218; Sylva, i, 25; 2 ed. i, 42.—Hayne, Dend. Fl. 166.—Sprengel, Syst. iii, 854.—Watson, Dend. Brit. ii, 151.—Torrey, Compend. Fl. N. States, 355; Fl. N. York, ii, 199, t. 112.—Loudon, Arboretum, iii, 1707, f. 1560.—Hooker, Fl. Bor.-Am. ii, 155.—Eaton & Wright, Bot. 156.—Bigelow, Fl. Boston. 3 ed. 381.—Emerson, Trees Massachusetts, 213; 2 ed. i, 243 & t.—Gray, Manual N. States, 1 ed. 421.—Cooper in Smithsonian Rep. 1858, 256.—Wood, Cl. Book, 649; Bot. & Fl. 308.—Koch, Dendrologie, ii, 646.

B. acuminata, Ehrhart, Beitr. vi, 98.—Mœnch, Meth. 693.

B. alba, subspecies *populifolia*, Regel in Bull. Soc. Nat. Moscow, xxxviii^1, 399; De Candolle, Prodr. xvi^2, 164.

WHITE BIRCH. OLD-FIELD BIRCH. GRAY BIRCH.

New Brunswick and the valley of the lower Saint Lawrence river to the southern shores of lake Ontario, south, generally near the coast, to New Castle county, Delaware.

A small, short-lived tree of rapid growth, 6 to 9 meters in height, with a trunk 0.30 to 0.45 meter in diameter; dry, gravelly, barren soil or borders of swamps, now generally springing up upon abandoned or burned land in eastern New England.

Wood light, soft, not strong, close-grained, liable to check in drying, not durable; medullary rays numerous, obscure; color, light brown, the sap-wood nearly white; specific gravity, 0.5760; ash, 0.29; largely used in the manufacture of spools, shoe-pegs, wood pulp, etc., for hoop-poles and fuel.

The bark and leaves, as well as those of *B. papyrifera* and *B. lenta*, are popularly esteemed as a remedy for various chronic diseases of the skin, bladder, etc., and for rheumatic and gouty complaints; the empyreumatic oil of birch obtained from the inner bark by distillation is used externally and internally for the same purposes (*U. S. Dispensatory*, 14 ed. 1592.—*Nat. Dispensatory*, 2 ed. 287); the bark occasionally used domestically in the manufacture of ink.

295.—Betula papyrifera, Marshall,

Arbustum, 19.—Michaux, Fl. Bor.-Am. ii, 180.

B. papyracea, Aiton, Hort. Kew. iii, 337; 2 ed. v, 300.—Willdenow, Spec. iv, 464; Enum. 981; Berl. Baumz. 58, t. 2, f. 1.—Nouveau Duhamel, iii, 205.—Persoon, Syn. ii, 572.—Desfontaines, Hist. Arb. ii, 477.—Poiret, Suppl. i, 688.—Michaux f. Hist. Arb. Am. ii, 133, t. 1; N. American Sylva, 3 ed. ii, 70, t. 69.—Smith in Rees' Cycl. iv, No. 9.—Pursh, Fl. Am. Sept. ii, 621.—B. S. Barton, Bot. Appx. 34, t. 27, f. 1.—Eaton, Manual, 109; 6 ed. 53.—Barton, Compend. Fl. Philadelph. ii, 175.—Nuttall, Genera, ii, 218; Sylva, i, 25; 2 ed. i, 42.—Hayne, Dend. Fl. 167.—Watson, Dend. Brit. ii, t. 152.—Sprengel, Syst. iii, 854.—Torrey, Compend. Fl. N. States, 355; Fl. N. York, ii, 199.—Audubon, Birds, t. 88.—Loudon, Arboretum, iii, 1708, f. 1561 & t.—Hooker, Fl. Bor.-Am. ii, 155.—Eaton & Wright, Bot. 156.—Bigelow, Fl. Boston. 3 ed. 381.—Penn. Cycl. ii, 349.—Emerson, Trees Massachusetts, 210; 2 ed. i, 239 & t.—Parry in Owen's Rep. 618.—Richardson, Arctic Exped. 437.—Cooper in Smithsonian Rep. 1858, 256.—Hooker f. in Trans. Linnæan Soc. xxiii^2, 300, 339.—Wood, Cl. Book, 649; Bot. & Fl. 308.—Gray, Manual N. States, 5 ed. 459.—Koch, Dendrologie, ii, 645.—Vasey, Cat. Forest Trees, 28.—Macoun in Geological Rep. Canada, 1875-'76, 210.—Sears in Bull. Essex Inst. xiii, 180.—Bell in Geological Rep. Canada, 1879-'80, 45^c.

B. nigra, Loiseleur in Nouveau Duhamel, ii, t. 51 [not Linnæus].

B. grandis, Schrader in Ind. Hort. Goett. 1833, 2.

B. rubra, Loddiges, Cat. ed. 1836.

B. Canadensis, Loddiges, Cat. ed. 1836.

B. alba, var. *papyrifera*, Spach. in Ann. Sci. Nat. 2ser. xv, 188; Hist. Veg. xi, 234.—Endlicher, Genera, Suppl. iv^2, 19.—Regel in Mem. Soc. Nat. Moscow, xix, 81, t. 5, f. 5–16.

B. cordifolia, Regel in Mem. Soc. Nat. Moscow, xix, 86, t. 12, f. 29–36.

B. alba, subspecies *papyrifera*, Regel in Bull. Soc. Nat. Moscow, xxxviii^4, 401; De Candolle, Prodr. xvi^2, 166.

B. alba, subspecies *papyrifera*, var. *cordifolia*, Regel in Bull. Soc. Nat. Moscow, xxxviii^4, 401; De Candolle, Prodr. xvi^2, 166.

B. alba, subspecies *papyrifera*, var. *communis*, Regel in Bull. Soc. Nat. Moscow, xxxviii^4, 401; De Candolle, Prodr. xvi^2, 166.

B. alba, subspecies *commutata*, Regel in Bull. Soc. Nat. Moscow, xxxviii^4, 401; De Candolle, Prodr. xvi^2, 166.

B. occidentalis, Lyall in Jour. Linnæan Soc. vii, 134 [not Hooker].

B. alba, var. *populifolia*, Winchell in Ludlow's Rep. Black Hills, 67 [not Spach].

CANOE BIRCH. WHITE BIRCH. PAPER BIRCH.

Northern Newfoundland and Labrador to the southern shores of Hudson bay and northwest to the Great Bear lake and the valley of the Yukon river, Alaska, south, in the Atlantic region to Wading river, Long island, the mountains of northern Pennsylvania, Clear lake, Montcalm county, Michigan, northeastern Illinois and Saint Cloud, Minnesota; in the Pacific region south to the Black hills of Dakota (*R. Douglas*), the Mullen trail of the Bitter Root mountains and Flathead lake, Montana, the neighborhood of Fort Colville, Washington territory (*Watson*), and the valley of the lower Fraser river, British Columbia (*Engelmann & Sargent*).

A tree 18 to 24 meters in height, with a trunk 0.60 to 0.90 meter in diameter; rich woodlands and banks of streams; very common in the northern Atlantic region and reaching a higher latitude than any deciduous tree of the American forest.

Wood light, strong, hard, tough, very close-grained, compact; medullary rays numerous, obscure; color, brown tinged with red, the sap-wood nearly white; specific gravity, 0.5955; ash, 0.25; largely used in the manufacture of spools, shoe-lasts and pegs, in turnery, for fuel, wood-pulp, etc.

The very tough, durable bark easily separated into thin layers, impervious to water, is largely used in the manufacture of canoes, tents, etc.

296.—Betula occidentalis, Hooker,

Fl. Bor.-Am. ii, 155.—Spach in Ann. Sci. Nat. 2 ser. xv, 197.—Nuttall, Sylva, i, 22, t. 7; 2 ed. i, 40, t. 7.—Endlicher, Genera, Suppl. iv^2, 20.—Torrey in Fremont's Rep. 97; Bot. Wilkes Exped. 466.—Newberry in Pacific R. R. Rep. vi, 89.—Cooper in Smithsonian Rep. 1858, 261; Am. Nat. iii, 408.—Regel in Mem. Soc. Nat. Moscow, xix, 131, t. 15, f. 35.—Porter in Hayden's Rep. 1871, 493.—Watson in King's Rep. v, 323, t. 35; Pl. Wheeler, 17; Bot. California, ii, 79.—Porter & Hayden, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 127.—Rothrock in Pl. Wheeler. 50; Wheeler's Rep. vi, 239.—Vasey, Cat. Forest Trees, 28.—Macoun in Geological Rep. Canada, 1875–'76, 210.—G. M. Dawson in Canadian Nat. new ser. ix, 331.

B. alba, subspecies *occidentalis typica*, Regel in Bull. Soc. Nat. Moscow, xxxviii^4, 400; De Candolle, Prodr. xvi^2, 165.

BLACK BIRCH.

British Columbia, south to the Mount Shasta region (Strawberry vale) and the eastern cañons of the Sierra Nevadas above Owen's valley (*Lemmon*), California, and through the interior ranges and the Rocky mountains to Utah and northern New Mexico.

A small tree, 8 to 12 meters in height, with a trunk sometimes 0.30 to 0.45 meter in diameter; mountain cañons and along streams, in moist soil, often throwing up several stems from the ground and forming dense thickets.

Wood soft, strong, brittle, close-grained, compact; medullary rays numerous, obscure; color, light brown, the sap-wood lighter; specific gravity, 0.6030; ash, 0.30; somewhat used for fencing, fuel, etc.

297.—Betula lutea, Michaux f.

Hist. Arb. Am. ii, 152, t. 5; N. American Sylva, 3 ed. ii, 82, t. 73.—Spach in Ann. Sci. Nat. 2 ser. xv, 191; Hist. Veg. xi, 243.—Endlicher, Genera, Suppl. iv², 20.—Wood, Bot. & Fl. 308.—Gray, Manual N. States, 5 ed. 459.—Koch, Dendrologie, ii, 640.—Vasey, Cat. Forest Trees, 28.—Sears in Bull. Essex Inst. xiii, 180.

B. excelsa, Pursh, Fl. Am. Sept. ii, 621 [not Aiton].—Nuttall, Genera, ii, 218.—Sprengel, Syst. iii, 854.—Torrey, Compend. Fl. N. States, 355; Fl. N. York, ii, 200.—Eaton, Manual, 6 ed. 53.—Loudon, Arboretum, iii, 1711, f. 1564, 1565 & t.—Hooker, Fl. Bor.-Am. ii, 156.—Eaton & Wright, Bot. 156.—Bigelow, Fl. Boston. 3 ed. 382.—Lindley in Penn. Cycl. ii, 349.—Gray, Manual N. States, 1 ed. 422.—Emerson, Trees Massachusetts, 206; 2 ed. i, 235 & t.—Richardson, Arctic Exped. 438.—Cooper in Smithsonian Rep. 1858, 256.—Chapman, Fl. S. States, 428.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 74.—Wood, Cl. Book, 648.—Bell in Geological Rep. Canada, 1879-'80, 50c.

B. lenta, Regel in Mem. Soc. Nat. Moscow, xix, 125, in part; Bull. Soc. Nat. Moscow, xxxviii⁴, 417, in part; De Candolle, Prodr. xvi², 179, in part.

YELLOW BIRCH. GRAY BIRCH.

Newfoundland, northern shores of the gulf of Saint Lawrence to Abittibi lake and the western shores of lake Superior and Rainy lake, south through the northern states to Delaware and southern Minnesota, and along the Alleghany mountains to the high peaks of North Carolina and Tennessee.

One of the largest and most valuable deciduous trees of the northern New England and Canadian forests, often 21 to 29 meters in height, with a trunk 0.90 to 1.20 meter in diameter; rich woodlands; common.

Wood heavy, very strong and hard, very close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, obscure; color, light brown tinged with red, the heavier sap-wood nearly white; specific gravity, 0.6553; ash, 0.31; largely used for fuel, in the manufacture of furniture, button and tassel molds, pill and match boxes, and for the hubs of wheels.

298.—Betula nigra, Linnæus,

Spec. 1 ed. 982.—Marshall, Arbustum, 18.—Walter, Fl. Caroliniana, 231.—Aiton, Hort. Kew. iii, 336; 2 ed. v, 299.—Gærtner, Fruct. ii, 54, t. 90, f. 1.—Willdenow, Spec. iv, 464; Enum. 981; Berl. Baumz. 56.—Nouveau Duhamel, iii, 203, t. 51.—Persoon, Syn. ii, 572.—Desfontaines, Hist. Arb. ii, 477.—Smith in Rees' Cycl. iv, No. 2.—Pursh, Fl. Am. Sept. ii, 621.—Nuttall, Genera, ii, 218.—Hayne, Dend. Fl. 166.—Lamarck, Ill. iii, 350, t. 760, f. 2.—Elliott, Sk. ii, 616.—Watson, Dend. Brit. ii, t. 153.—Sprengel, Syst. ii, 854.—Torrey, Compend. Fl. N. States, 355; Fl. N. York, ii, 201.—Beck, Bot. 325.—Loudon, Arboretum, iii, 1710, f. 1562, 1563 & t.—Penn. Cycl. ii, 149.—Emerson, Trees Massachusetts 208; 2 ed. i, 237.—Darlington, Fl. Cestrica, 3 ed. 275.—Darby, Bot. S. States, 508.—Cooper in Smithsonian Rep. 1858, 256.—Chapman, Fl. S. States, 428.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 73.—Regel in Mem. Soc. Nat. Moscow, xix, 118, t. 12, f. 1–12; Bull. Soc. Nat. Moscow, xxxviii⁴, 412; De Candolle, Prodr. xvi², 175.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 649; Bot. & Fl. 308.—Porcher, Resources S. Forests, 266.—Gray, Manual N. States, 5 ed. 459; Hall's Pl. Texas, 21.—Koch, Dendrologie, ii, 644.—Young, Bot. Texas, 512.—Vasey, Cat. Forest Trees, 28.—Burbank in Proc. Boston Soc. Nat. Hist. xviii, 214.—Broadhead in Coulter's Bot. Gazette, iii, 60.—Ridgway in Proc. U. S. Nat. Mus. 1882, 85.

B. lanulosa, Michaux, Fl. Bor.-Am. ii, 181.—Nouveau Duhamel, iii, 206.

B. rubra, Michaux f. Hist. Arb. Am. ii, 142, t. 3; N. American Sylva, 3 ed. ii, 80, t. 72.—Loddiges, Bot. Cab. t. 1248.—Eaton, Manual, 6 ed. 53.—Eaton & Wright, Bot. 156.—Spach in Ann. Sci. Nat. 2 ser. xv, 185; Hist. Veg. xi, 230.—Endlicher, Genera, Suppl. iv², 19.

B. angulata, Loddiges, Cat. ed. 1836.

RED BIRCH. RIVER BIRCH.

Banks of the Merrimac and Spicket rivers, Middlesex and Essex counties, Massachusetts, Wading river, Long island, south through the coast and middle districts to the Chattahoochee region of western Florida, west to western Iowa, northwestern Missouri, eastern Kansas, the Indian territory, and the valley of the Trinity river, Texas.

A tree 18 to 24 meters in height, with a trunk rarely exceeding 0.75 meter in diameter; banks of streams and ponds; very common and reaching its greatest development in the south Atlantic states and in the basin of the lower Mississippi river.

Wood light, rather hard, strong, close-grained, compact; medullary rays numerous, obscure; color, brown, the sap-wood much lighter; specific gravity, 0.5762; ash, 0.35; used in the manufacture of furniture, woodenware, wooden shoes, ox-yokes, etc.

299.—Betula lenta, Linnæus,

Spec. 1 ed. 983.—Lamarck, Dict. i, 453.—Marshall, Arbustum, 19.—Aiton, Hort. Kew. iii, 337; 2 ed. v, 300.—Willdenow, Spec. iv, 464; Enum. 981; Berl. Baumz. 59.—Persoon, Syn. ii, 572.—Desfontaines, Hist. Arb. ii, 477.—Nouveau Duhamel, iii, 205.—Michaux f. Hist. Arb. Am. ii, 147, t. 4; N. American Sylva, 3 ed. ii, 85, t. 74.—Smith in Rees' Cycl. iv, No. 3.—Pursh, Fl. Am. Sept. ii, 621.—Eaton, Manual, 109; 6 ed. 53.—Barton, Compend. Fl. Philadelph. ii, 175.—Nuttall, Genera, ii, 218.—Hayne, Dend. Fl. 167.—Elliott, Sk. ii, 617.—Watson, Dend. Brit. ii, 144.—Sprengel, Syst. ii, 854.—Torrey, Compend. Fl. N. States, 356; Fl. N. York, ii, 200.—Guimpel, Otto & Hayne, Abb. Holz. 105, t. 83.—Loudon, Arboretum, iii, 1713, f. 1566.—Hooker, Fl. Bor.-Am. ii, 156.—Eaton & Wright, Bot. 156.—Bigelow, Fl. Boston. 3 ed. 381.—Lindley in Penn. Cycl. ii, 349.—Spach in Ann. Sci. Nat. 2 ser. xv, 190; Hist. Veg. xi, 241.—Emerson, Trees Massachusetts, 203; 2 ed. i, 232 & t.—Richardson, Arctic Exped. 438.—Endlicher, Genera, Suppl. iv^2, 20.—Darlington, Fl. Cestrica, 3 ed. 275.—Darby, Bot. S. States, 508.—Cooper in Smithsonian Rep. 1858, 256.—Chapman, Fl. S. States, 428.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 74.—Regel in Mem. Soc. Nat. Moscow, xxxviii^4, 125, in part; Bull. Soc. Nat. Moscow, xxxviii, 417, in part; De Candolle, Prodr. xvi^2, 179, in part.—Wood, Cl. Book, 648; Bot. & Fl. 308.—Porcher, Resources S. Forests, 265.—Gray, Manual N. States, 5 ed. 458.—Koch, Dendrologie, ii, 639.—Vasey, Cat. Forest Trees, 28.—Sears in Bull. Essex Inst. xiii, 180.—Bell in Geological Rep. Canada, 1879-'80, 55^c.—Ridgway in Proc. U. S. Nat. Mus. 1882, 85.

B. nigra, Du Roi, Harbk. i, 93.—Wangenheim, Amer. 35, t. 15, f. 34.

B. excelsa, Aiton, Hort. Kew. iii, 337; 2 ed. v, 299 [not Pursh].—Willdenow, Spec. iv, 464.—Berl. Baumz. 41, t. 2, f. 2.—Nouveau Duhamel, iii, 203, t. 52.—Persoon, Syn. ii, 572.—Desfontaines, Hist. Arb. ii, 477.—Poiret, Suppl. i, 687.—Smith in Rees' Cycl. iv, No. 10.—Hayne, Dend. Fl. i, 7.—Spach in Ann. Sci. Nat. 2 ser. xv, 188; Hist. Veg. xi, 243.—Endlicher, Genera, iv^2, 20.

B. carpinifolia, Ehrhart, Beitr. vi, 99.—Willdenow, Enum. 981; Berl. Baumz. 49.

CHERRY BIRCH. BLACK BIRCH. SWEET BIRCH. MAHOGANY BIRCH.

Newfoundland and the valley of the Saguenay river, west through Ontario to the Manitou islands of lake Huron, south to northern Delaware and southern Indiana, and along the Alleghany mountains to the Chattahoochee region of northern Florida, extending west to middle Kentucky and Tennessee.

A tree 18 to 24 meters in height, with a trunk 0.90 to 1.50 meter in diameter; rich woodlands; very common in all northern forests.

Wood heavy, very strong and hard, close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, obscure; color, dark brown tinged with red, the sap-wood light brown or yellow; specific gravity, 0.7617; ash, 0.26; now largely used in the manufacture of furniture and for fuel; in Nova Scotia and New Brunswick largely in ship-building.

"Birch beer" is obtained by fermenting the saccharine sap of this and perhaps some other species of the genus

300.—Alnus maritima, Muhlenberg,

Mss.—Nuttall, Sylva, i, 34, t. 10^2; 2 ed. i, 50, t. 10^2.—Gray, Manual N. States, 5 ed. 461; Hall's Pl. Texas, 21.—Canby in Coulter's Bot. Gazette, vi, 1881.

Betula-Alnus maritima, Marshall, Arbustum, 20.

A. oblongata, Regel in Mem. Soc. Nat. Moscow, xix, 172, t. vi, f. 3-9 [not Willdenow].

A. maritima typica, Regel in Bull. Soc. Nat. Moscow, xxxviii^4, 427; De Candolle, Prodr. xvi^2, 186.

SEASIDE ALDER.

Southern Delaware and eastern Maryland, near the coast; valley of the Red river, Indian territory, in about longitude 96° 30′ W. (*E. Hall*); Manchuria and Japan (*A. maritima, Japonica* and *arguta, Regel in De Candolle, Prodr.* xvi^2, 186).

A small tree, 6 to 7 meters in height, with a trunk 0.10 to 0.15 meter in diameter; borders of streams and swamps.

Wood light, soft, close-grained, checking badly in drying; medullary rays broad, conspicuous; color, light bright brown, the sap-wood hardly distinguishable, somewhat lighter; specific gravity, 0.4996; ash, 0.39.

301.—Alnus rubra, Bongard,

Mem. Acad. St. Petersburg, 6 ser. ii, 162.—Hooker, Fl. Bor.-Am. ii, 158.—Spach in Ann. Sci. Nat. 2 ser. xv, 205.—Endlicher, Genera, Suppl. iv², 21.—Lyall in Jour. Linnæan Soc. vii, 134.—Regel in Bull. Soc. Nat. Moscow, xxxviii⁴, 429; De Candolle, Prodr. xvi², 186.—Torrey, Bot. Wilkes Exped. 467.—Watson, Bot. California, ii, 80.—G. M. Dawson in Canadian Nat. new ser. ix, 331.

?A. glutinosa, Pursh, Fl. Am. Sept. ii, 622 [not Willdenow].

A. Oregana, Nuttall, Sylva, i, 28, t. 9; 2 ed. i, 44, t. 9.—Newberry in Pacific R. R. Rep. vi, 25, 89.—Cooper in Smithsonian Rep. 1858, 261; Pacific R. R. Rep. xii², 28, 68.—Vasey, Cat. Forest Trees, 28.—Hall in Coulter's Bot. Gazette, ii, 91.

A. incana, var. *rubra*, Regel in Mem. Soc. Nat. Moscow, xix, 157, t. 17, f. 3-4.

ALDER.

Sitka, south through the islands and Coast ranges of British Columbia, Washington territory, Oregon, and California to Santa Barbara, extending east through the Blue mountains to northern Montana.

A large tree, 24 to 30 meters in height, with a trunk 0.90 to 1.20 meter in diameter, or in British Columbia and the Blue mountains often reduced to a low shrub; river bottom lands and borders of streams; most common and reaching its greatest development along the large streams of western Washington territory and Oregon.

Wood light, soft, not strong, brittle, very close-grained, compact, easily worked, satiny, susceptible of a beautiful polish; medullary rays distant, broad; color, light brown tinged with red, the sap-wood nearly white; specific gravity, 0.4813; ash, 0.42; largely used in Oregon in the manufacture of furniture.

302.—Alnus rhombifolia, Nuttall,

Sylva, i, 33; 2 ed. i, 49.—Torrey, Bot. Wilkes Exped. 467.—Vasey, Cat. Forest Trees, 28.—Watson, Bot. California, ii, 80.

A. glutinosa, var. *serrulata*, Regel in Mem. Soc. Nat. Moscow, xix, 164, in part.

A. serrulata, var. *rugosa*, Regel in Bull. Soc. Nat. Moscow, xxxviii⁴, 432, in part; De Candolle, Prodr. xvi², 188, in part.

ALDER.

Valley of the lower Fraser river, British Columbia, south through the Coast ranges to southern California, extending east along the ranges of Washington territory to Clear creek, Idaho (*Watson*), and the valley of the Flathead river, Montana (*Canby & Sargent*).

A small tree, 9 to 15 meters in height, with a trunk sometimes 0.60 to 0.90 meter in diameter, or toward its northern and eastern limits reduced to a shrub; borders of streams; the common alder of the California valleys.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, obscure; color, light brown, the sap-wood lighter, often nearly white; specific gravity, 0.4127; ash, 0.31.

303.—Alnus oblongifolia, Torrey,

Bot. Mex. Boundary Survey, 204.—Cooper in Smithsonian Rep. 1858, 266.—Watson in Pl. Wheeler, 17; Bot. California, ii, 80.—Rothrock in Wheeler's Rep. vi, 239.—Rusby in Bull. Torrey Bot. Club, ix, 79.

A. serrulata, var. *oblongifolia*, Regel in Bull. Soc. Nat. Moscow, xxxviii⁴, 443; De Candolle, Prodr. xvi², 188.

ALDER.

San Bernardino and Cayumaca mountains, California, through the ranges of southern Arizona and southern New Mexico to the valley of the Rio Grande; southward into Mexico.

A tree 15 to 21 meters in height, with a trunk 0.90 to 1.20 meter in diameter; borders of streams in deep mountain cañons.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, very obscure; color, light brown tinged with yellow, the sap-wood nearly white; specific gravity, 0.3981; ash, 0.42.

304.—Alnus serrulata, Willdenow,

Spec. iv, 336; Enum. 965; Berl. Baumz. 2 ed. 21.—Nouveau Duhamel, ii, 216.—Persoon, Syn. ii, 550.—Desfontaines, Hist. Arb. ii, 488.—Aiton, Hort. Kew. 2 ed. v, 259.—Michaux f. Hist. Arb. Am. iii, 320, t. 4, f. 1; N. American Sylva, 3 ed. ii, 87, t. 75, f. 1.—Pursh, Fl. Am. Sept. ii, 623.—Barton, Prodr. Fl. Philadelph. 89; Compend. Fl. Philadelph. ii, 158.—Eaton, Manual, 105; 6 ed. 12.—Nuttall, Genera, ii, 206.—Hayne, Dend. Fl. 122.—Elliott, Sk. ii, 567.—Torrey, Compend. Fl. N. States, 350; Fl. N. York, ii, 202, t. 115.—Beck, Bot. 326.—Darlington, Fl. Cestrica, 3 ed. 276.—Loudon, Arboretum, iii, 1688, f. 1544.—Eaton & Wright, Bot. 120.—Bigelow, Fl. Boston. 3 ed. 220.—Spach in Ann. Sci. Nat. 2 ser. xv, 206; Hist. Veg. xi, 251.—Emerson, Trees Massachusetts, 218; 2 ed. i, 248 & t.—Endlicher, Genera, Suppl. iv², 21.—Darby, Bot. S. States, 508.—Chapman, Fl. S. States, 429.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 102.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 650; Bot. & Fl. 308.—Porcher, Resources S. Forests, 266.—Gray, Manual N. States, 5 ed. 461.—Young, Bot. Texas, 513.—Broadhead in Coulter's Bot. Gazette, iii, 60.

Betula rugosa, Du Roi, Harbk. i, 176.—Wangenheim, Amer. 86, t. 29, f. 60.—Ehrhart, Beitr. iii, 21.

?Betula-Alnus glauca, Marshall, Arbustum, 20.

Betula serrulata, Aiton, Hort. Kew. iii, 338.—Willdenow, Berl. Baumz. 1 ed. 45.—Abbot, Insects Georgia, ii, 183, t. 92.—Michaux, Fl. Bor.-Am. ii, 181.

A. serrulata, var. *vulgaris*, Spach in Ann. Sci. Nat. 2 ser. xv, 206.

A. serrulata, var. *macrophylla*, Spach in Ann. Sci. Nat. 2 ser. xv, 206.

A. serrulata, var. *oblongata*, Spach, Hist. Veg. xi, 251.

A. serrulata, var. *latifolia*, Spach, Hist. Veg. xi, 251.

A. rubra, Tuckerman in Am. Jour. Sci. 1 ser. xlv, 32.

A. hybrida, Reichenbach, Icon. Fl. Germ. xii, t. 630, f. 1292.

A. glutinosa, var. *serrulata*, Regel in Mem. Soc. Nat. Moscow, xix, 164, t. 11, f. 6, 8, in part.

A. glutinosa, var. *rugosa*, Regel in Mem. Soc. Nat. Moscow, xix, 165, t. 11, f. 9, 10.

A. serrulata genuina and *obtusifolia*, Regel in Bull. Soc. Nat. Moscow, xxxviii⁴, 432; De Candolle, Prodr. xvi², 188.

A. serrulata, var. *rugosa*, Regel in Bull. Soc. Nat. Moscow. xxxviii⁴, 432, in part; De Candolle, Prodr. xvi², 188, in part.

A. rugosa, Koch, Dendrologie, ii, 635.

A. oblongata, *undulata*, *rugosa*, *Canadensis*, and *Americana*, Hort.

BLACK ALDER. SMOOTH ALDER.

Essex county, Massachusetts, west to southern Missouri, south to northern Florida and the valley of the Trinity river, Texas.

A small tree, 6 to 12 meters in height, with a trunk 0.10 to 0.15 meter in diameter, or more often a tall, branching shrub forming dense thickets; borders of streams and swamps, probably reaching its greatest development in southern Arkansas.

Wood light, soft, close-grained, compact; medullary rays numerous, conspicuous; color, light brown, the sapwood lighter; specific gravity, 0.4666; ash, 0.38.

A decoction of the bark and leaves, as well as those of *A. incana*, is a popular remedy against impurity of the blood and in the treatment of diarrhœa and hæmaturia, etc. (*Nat. Dispensatory*, 2 ed. 135).

305.—Alnus incana, Willdenow,

Spec. iv, 335; Enum. 965; Berl. Baumz. 2 ed. 20.—Persoon, Syn. ii, 550.—Aiton, Hort. Kew. 2 ed. v, 259.—Hayne, Dend. Fl. 152.—Eaton, Manual, 6 ed. 12.—Loudon, Arboretum, iii, 1687, f. 1543.—Hooker, Fl. Bor.-Am. ii, 157.—Eaton & Wright, Bot. 120.—Spach in Ann. Sci. Nat. 2 ser. xv, 206; Hist. Veg. xi, 252.—Nuttall, Sylva, i, 30; 2 ed. i, 46.—Tuckerman in Am. Jour. Sci. 1 ser. xlv, 32.—Torrey, Fl. N. York, ii, 202.—Emerson, Trees Massachusetts, 220; 2 ed. i, 251 & t.—Endlicher, Genera, Suppl. iv², 21.—Parry in Owen's Rep. 618.—Cooper in Smithsonian Rep. 1858, 256.—Hooker f. in Trans. Linnæan Soc. xxiii², 301.—Wood, Cl. Book, 649; Bot. & Fl. 308.—Regel in Bull. Soc. Nat. Moscow, xxxviii⁴, 433; De Candolle, Prodr. xvi², 188.—Gray, Manual N. States, 5 ed. 461.—Koch, Dendrologie, ii, 636.—Vasey, Cat. Forest Trees, 28.—Macoun in Geological Rep. Canada, 1875-'76, 210.—Bell in Geological Rep. Canada, 1879-'80, 55ᶜ.

Betula-Alnus, var. *β. incana*, Linnæus, Spec. 1 ed. 983.—Du Roi, Harbk. i, 109.

Betula incana, Linnæus, Suppl. 417.—Aiton, Hort. Kew. iii, 339.—Willdenow, Berl. Baumz. 1 ed. 45.—Smith in Rees' Cycl. iv, No. 7.

? Betula-Alnus rubra, Marshall, Arbustum, 20.

A. glauca, Michaux f. Hist. Arb. Am. iii, 322, t. 4, f. 2; N. American Sylva, 3 ed. 89, t. 75, f. 2.—Bigelow, Fl. Boston. 3 ed. 367.

A. incana, var. *glauca*, Gray, Manual N. States, 1 ed. 423; 3 ed. 461.

A. incana, *Americana*, and *genuina*, Regel in Mem. Soc. Nat. Moscow, xix, 155.

SPECKLED ALDER. HOARY ALDER. BLACK ALDER.

Newfoundland to the eastern base of the Rocky mountains, south to northern New England, Wisconsin, Minnesota, and eastern Nebraska; in Europe.

A small tree, 6 to 7 meters in height, with a trunk 0.10 to 0.15 meter in diameter, or more often a tall, branching shrub; borders of streams and swamps.

A form with leaves green and glabrous on both sides or slightly pubescent, extending through the mountain ranges of the Pacific region from the Saskatchewan and British Columbia to New Mexico and the southern Sierra Nevadas of California, is—

var. virescens, Watson, Bot. California, ii, 81.

A. incana, var. *glauca*, Regel in Mem. Soc. Nat. Moscow, xix, 154, in part; Bull. Soc. Nat. Moscow, xxxviii[1] 433, in part; De Candolle, Prodr. xvi[2], 189, in part.—Watson in King's Rep. v, 326 [not Aiton]; Pl. Wheeler, 17.—Rothrock, Pl. Wheeler, 50; Wheeler's Rep. vi, 239.—Macoun in Geological Rep. Canada, 1875-'76, 210.

A. serrulata, var. *rugosa*, Regel in Bull. Soc. Nat. Moscow, xxxviii[1], 432, in part; De Candolle, Prodr. xvi[2], 188, in part.

Wood light, soft, close-grained, checking in drying; medullary rays numerous, broad; color, light brown, the sap-wood nearly white; specific gravity, 0.4607; ash, 0.42; preferred and largely used in northern New England in the final baking of bricks, and occasionally, as well as that of *A. serrulata*, in the manufacture of gunpowder.

SALICACEÆ.

306.—Salix nigra, Marshall,

Arbustum, 139.—Muhlenberg in Neue Schriften Gesell. Nat. Fr. Berlin, iv, 237, t. 4, f. 5 (Ann. Bot. ii, 65, t. 5, f. 5).—Willdenow, Spec. iv, 657; Enum. 1003; Berl. Baumz. 2 ed. 426.—Persoon, Syn. ii, 599.—Michaux f. Hist. Arb. Am. iii, 324, t. 5, f. 1; N. American Sylva, 3 ed. iii, 64, t. 125, f. 1.—Pursh, Fl. Am. Sept. ii, 614.—Poiret, Suppl. iv, 61.—Eaton, Manual, 118; 6 ed. 320.—Nuttall, Genera, ii, 231; Sylva, i, 79; 2 ed. i, 94.—Hayne, Dend. Fl. 180.—Elliott, Sk, ii, 670.—Sprengel, Syst. i, 100.—Torrey, Compend. Fl. N. States, 370; Fl. N. York, ii, 209.—Forbes, Sal. Woburn. 280.—W. Koch, Comment. 17.—Beck, Bot. 320.—Trautvetter in Mem. Acad. St. Petersburg, iii, 614.—Loudon, Arboretum, iii, 1529, 1604, f. 8.—Hooker, Fl. Bor.-Am. ii, 148.—Barratt, Sal. Am. No. 19.—Eaton & Wright, Bot. 408.—Dietrich, Syn. v, 419.—Seringe, Fl. Jard. ii, 35.—Emerson Trees Massachusetts, 271; 2 ed. i, 307 & t.—Darlington, Fl. Cestrica, 3 ed. 279.—Andersson in Ofr. af. Vet. Akad. Forh. 1858, 114 (Proc. Am. Acad. iv, 53); Kongl. Sven. Akad. Handl. vi, 19, f. 15; De Candolle, Prodr. xvi[2], 200.—Darby, Bot. S. States, 506.—Cooper in Smithsonian Rep. 1858, 256.—Walpers, Ann. v, 744.—Chapman, Fl. S. States, 430.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 75.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 654; Bot. & Fl. 310.—Porcher, Resources S. Forests, 334.—Engelmann in Trans. Am. Phil. Soc. new ser. xii, 209.—Gray, Manual N. States, 5 ed. 460; Hall's Pl. Texas, 21.—Koch, Dendrologie, ii, 513.—Young, Bot. Texas, 514.—Macoun in Geological Rep. Canada, 1875-'76, 210.—Vasey, Cat. Forest Trees, 28.—Bebb in Bot. California, ii, 83.—Sears in Bull. Essex Inst. xiii, 181.—Ridgway in Proc. U. S. Nat. Mus. 1882, 86.—Hemsley, Bot. Am.-Cent. iii, 180

S. pentandra, Walter, Fl. Caroliniana, 243.

S. Caroliniana, Michaux, Fl. Bor.-Am. ii, 226.—Lamarck, Dict. vi, 662.—Poiret, Suppl. v, 62.

S. Houstoniana, Pursh, Fl. Am. Sept. ii, 614.—Poiret, Suppl. v, 68.—Sprengel, Syst. i, 107.—Elliott, Sk. ii, 670.—Trautvetter in Mem. Acad. St. Petersburg, iii, 615.—Forbes, Sal. Woburn. 21, t. 21.—Eaton & Wright, Bot. 409.

S. falcata, Pursh, Fl. Am. Sept. ii, 614 [not HBK.].—Poiret, Suppl. v, 70.—Sprengel, Syst. i, 107.—Forbes, Sal. Woburn. 279.—Eaton, Manual, 6 ed. 320.—Hooker, Fl. Bor.-Am. ii, 149.—Barratt, Sal. Am. No. 21.—Dietrich, Syn. v, 420.

? *S. ambigua*, Pursh, Fl. Am. Sept. ii, 617.—Forbes, Sal. Woburn. 282.—Eaton, Manual, 6 ed. 321.—Eaton & Wright, Bot. 409.

S. ligustrina, Michaux f. Hist. Arb. Am. iii, 326, t. 5, f. 2; N. American Sylva, 3 ed. iii, 65, t. 125, f. 2.—Poiret, Suppl. v, 61.

S. Purshiana, Sprengel, Syst. iii, 608.—Beck, Bot. 320.—Darlington, Fl. Cestrica, 2 ed. 560.

S. flavo-virens, Hornemann in Cat. Hort. Hafn. Suppl. ii, 11.

? *S. cordata*, var. *falcata*, Torrey, Compend. Fl. N. States, 370.

S. nigra, var. *falcata*, Torrey, Fl. N. York, ii, 209.—Carey in Gray, Manual N. States, 1 ed. 429.—Darlington, Fl. Cestrica, 3 ed. 280.

BLACK WILLOW.

Southern New Brunswick and the northern shores of lakes Huron and Superior southward through the Atlantic region to bay Biscayne and the Caloosa river, Florida, and the valley of the Guadalupe river, Texas; Pacific region, valleys of the Sacramento river, California, and the Colorado river, Arizona.

A small tree, sometimes 15 to 18 meters in height, with a trunk rarely 0.60 meter in diameter, or in southern Florida reduced to a low shrub; usually along the banks of streams; most common in the basin of the Mississippi river and reaching its greatest development in the rich bottom lands of the Colorado and other rivers of eastern Texas; varying greatly in the size and shape of the leaves (vars. *angustifolia*, *longifolia*, *latifolia*, etc., *Andersson in Kongl. Sven. Akad. Handl.* vi, 20), length and habit of the aments, etc.

The best marked forms are—

var. **marginata**, Andersson in Kongl. Sven. Akad. Handl. vi, 22; De Candolle, Prodr. xvi², 201.

S. marginata, Wimmer in Schedul. Herb. Vindab.

var. **longipes**, Andersson in Kongl. Sven. Akad. Handl. vi, 22; De Candolle, Prodr. xvi², 201.

S. longipes, Shuttleworth in herb. Hooker.—Andersson in Ofv. af. Vet. Akad. Forh. 1858, 114 (Proc. Am. Acad. iv, 53).—Walpers, Ann. v, 744.

Forms of var. *longipes* more or less pubescent have been characterized by *Andersson in Kongl. Sven. Akad. Handl.* vi, 22; *De Candolle, Prodr.* xvi², 201, as subvars. *venulosa* and *gongylocarpa* [*Shuttleworth*], (*S. longipes*, var. *pubescens*, *Andersson in Proc. Am. Acad.* iv, 53; *S. subvillosa*, *Elliott in herb. Schweinitz ex. Nuttall, Sylva*, i, 79; 2 ed. i, 94, *vide Gray in Proc. Am. Acad.* iv, 53, note).

var. **Wrightii**, Andersson in Kongl. Sven. Akad. Handl. vi, 22; De Candolle, Prodr. xvi², 201.—Hemsley, Bot. Am.-Cent. iii, 180.

S. Wrightii, Andersson in Ofv. af. Vet. Akad. Forh. 1858, 115 (Proc. Am. Acad. iv, 55 —Walpers, Ann. v, 745.—Torrey in Bot. Mex. Boundary Survey, 204.

var. **Wardii**, Bebb in Bull. U. S. Nat. Mus. No. 22, 114.

Wood light, soft, weak, close-grained, checking badly in drying; medullary rays obscure; color, brown, the sap-wood nearly white; specific gravity, 0.4456; ash, 0.70.

The tonic and astringent bark used domestically as a popular febrifuge, and containing, in common with that of all the species of the genus, salicylic acid, a powerful anti-pyritic now successfully used in the treatment of acute cases of gout, rheumatism, typhoid fever, etc. (*Am. Jour. Pharm.* 1875, 303.—*U. S. Dispensatory*, 14 ed. 796, 1748.—*Nat. Dispensatory*, 2 ed. 1248).

NOTE.—The closely allied *Salix occidentalis*, Bosc, of the West Indies is not perhaps specifically distinct from *S. nigra*, with which some of the forms of var. *longipes* from southern Florida seem to connect it.

307.—Salix amygdaloides, Andersson,

Ofv. af. Vet. Akad. Forh. 1858, 114 (Proc. Am. Acad. iv, 53).—Walpers, Ann. v, 744.—Bebb in Wheeler's Rep. vi, 240.

? S. melanopsis, Nuttall, Sylva, i, 78, t. 21; 2 ed. i, 93, t. 21.

S. nigra, var. *amygdaloides*, Andersson in Kongl. Sven. Akad. Handl. vi, 21; De Candolle, Prodr. xvi², 201.—Rothrock, Pl. Wheeler, 50.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 128.

WILLOW.

Shores of the great lakes (Wayne county, New York, *Hankenson;* Painesville, Ohio, *Beardslee*), westward to the valley of the Saskatchewan, and southward through the Rocky Mountain region to southern New Mexico; banks of the lower Columbia river, Oregon (*Howells*).

A small tree, rarely 9 to 12 meters in height, with a trunk 0.15 to 0.30 meter in diameter; along streams.

Wood light, soft, not strong, close-grained, checking in drying; the heart-wood light brown, sap-wood nearly white; specific gravity, 0.4509; ash, 0.92.

308.—Salix lævigata, Bebb,

Am. Nat. viii, 202; Bot. California, ii, 83.

WILLOW.

California, Sierra county (*Lemmon*) and the valley of the Sacramento river to the southern boundary of the state.

A tree sometimes 15 meters in height, with a trunk 0.30 to 0.60 meter in diameter; borders of streams and bottom lands.

A form with narrower falcate leaves (Yreka, *E. L. Greene*) is—

var. **angustifolia**, Bebb in Bot. California, ii, 84.—Rothrock in Wheeler's Rep. vi, 374.

A form with short, densely-flowered aments is—

var. **congesta**, Bebb in Bot. California, ii, 84.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, very thin; color, light brown tinged with red; specific gravity, 0.4872; ash, 0.58.

309.—Salix lasiandra, Bentham,

Pl. Hartweg. 336.—Torrey in Pacific R. R. Rep. iv, 138.—Newberry in Pacific R. R. Rep. vi, 89.—Bebb in Bot. California, ii, 84.

S. Hoffmanniana, Hooker & Arnott, Bot. Beechey, 159.

S. speciosa, Nuttall, Sylva, i, 58, t. 17; 2 ed. i, 74, t. 17 [not Hooker & Arnott].—Newberry in Pacific R. R. Rep. vi, 89.—Cooper in Pacific R. R. Rep. xii², 29.

S. lucida, var. *angustifolia*, forma *lasiandra*, Andersson in Ofv. af. Vet. Akad. Forh. 1858, 115 (Proc. Am. Acad. iv, 54).

S. arguta, var. *lasiandra*, Andersson in Kongl. Sven. Akad. Handl. vi, 33; De Candolle, Prodr. xvi², 206.

WILLOW.

British Columbia, shores of lake Kamloop (*Macoun*), southward to the valley of the Sacramento river, California; Rocky mountains, Utah, and through Colorado to New Mexico (var. *Fendleriana*).

A tree 12 to 18 meters in height, with a trunk sometimes 0.60 meter in diameter; banks of streams; very common; varying in the shape of the leaves and character of the aments.

The best marked forms are—

var. **lancifolia**, Bebb in Bot. California, ii, 84.

S. lancifolia, Andersson in Kongl. Sven. Akad. Handl. vi, 34, f. 23.—Gray in Proc. Am. Acad. vii, 402.—Hall in Coulter's Bot. Gazette, ii, 91.

S. lucida, var. *macrophylla*, Andersson in De Candolle, Prodr. xvi², 205.

The common form of British Columbia and western Washington territory and Oregon.

var. **Fendleriana**, Bebb in Bot. California, ii, 84.

S. pentandra, var. *caudata*, Nuttall, Sylva, i, 61, t. 18; 2 ed. i, 77, t. 18.

S. Fendleriana, Andersson in Ofv. af. Vet. Akad. Forh. 1858, 115 (Proc. Am. Acad. iv, 54).—Walpers, Ann. v, 745.

S. arguta, Andersson in Kongl. Sven. Akad. Handl. vi, 32; De Candolle, Prodr. xvi², 205, in part.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, very obscure; color, light brown, the sap-wood lighter or often nearly white; specific gravity, 0.4756; ash, 0.60. Var. *lancifolia*, specific gravity, 0.4547; ash, 0.79. Var. *Fendleriana*, the heart-wood brown, sap-wood light brown; specific gravity, 0.4598; ash, 0.56.

310.—Salix longifolia, Muhlenberg,

Neue Schriften Gesell. Nat. Fr. Berlin, iv, 238, t. 6, f. 6 (Ann. Bot. ii, 66, t. 5, f. 6).—Willdenow, Spec. iv, 670.—Persoon, Syn. ii, 600.—Pursh, Fl. Am. Sept. ii, 613.—Nuttall, Genera, ii, 231.—Torrey in Ann. Lyc. N. York, ii, 248; Fl. N. York, ii, 209; Nicollet's Rep. 160; Fremont's Rep. 97; Emory's Rep. 412; Sitgreaves' Rep. 172; Bot. Mex. Boundary Survey, 204.—Barratt, Sal. Am. No. 23.—Beck, Bot. 320.—Eaton, Manual, 6 ed. 319.—Eaton & Wright, Bot. 408.—Hooker, Fl. Bor.-Am. ii, 149.—Dietrich, Syn. v, 420.—Parry in Owen's Rep. 618.—Richardson, Arctic Exped. 439, 440.—Cooper in Smithsonian Rep. 1858, 261.—Andersson in Ofv. af. Vet. Akad. Forh. 1858, 116 (Proc. Am. Acad. iv, 56); Kongl. Sven. Akad. Handl. vi, 54, f. 35; De Candolle, Prodr. xvi², 214.—Walpers, Ann. v, 745.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 653; Bot. & Fl. 310.—Engelmann in Proc. Am. Phil. Soc. new ser. xii, 209.—Gray, Manual N. States, 5 ed. 465.—Watson in King's Rep. v, 324; Wheeler's Rep. 1872, 493.—Gray in Proc. Am. Acad. vii, 402.—Macoun in Geological Rep. Canada, 1875-'76, 210.—Vasey, Cat. Forest Trees, 29.—Hall in Coulter's Bot. Gazette, ii, 91.—Bebb in Wheeler's Rep. vi, 240; Bot. California, ii, 84.—Ward in Bull. U. S. Nat. Mus. No. 22, 116.

S. fluviatalis, Nuttall, Sylva, i, 73; 2 ed. i, 89.

? S. rubra, Richardson, Arctic Exped. Appx. 37.

S. longifolia, var. *pedicellata*, Andersson in Kongl. Sven. Akad. Handl. vi, 55, f. 35; De Candolle, Prodr. xvi², 214.—Macoun in Geological Rep. Canada, 1875-'76, 210.

SAND-BAR WILLOW.

Valley of the Connecticut river (Sunderland, Massachusetts, *N. G. Jesup*) and of the Potomac river at Washington (*Ward*); west and northwest through the region of the great lakes to the valley of the Mackenzie river, in latitude 66° N. (*Richardson*), through the Mississippi basin, Texas, the Rocky Mountain region, and the Pacific Coast states.

A small tree, 6 to 9 meters in height, with a trunk rarely exceeding 0.30 meter in diameter; borders of streams and river sand-bars, in low, wet sandy soil, often forming low, dense clumps; rare east of the Alleghany mountains; very common throughout the Mississippi River basin, and reaching its greatest development in the valleys of Oregon and northern California.

Well-marked forms, varying from the type in the form of the leaves, aments, and nature of pubescens, etc., are—

var. exigua, Bebb in Bot. California, ii, 85.

S. exigua, Nuttall, Sylva, i, 75; 2 ed. i, 90.

S. longifolia, var. *angustissima*, Andersson in Ofv. af. Vet. Akad. Forh. 1858, 116 (Proc. Am. Acad. iv, 56).

Western Texas to California and Oregon.

var. argyrophylla, Andersson in Kongl. Sven. Akad. Handl. vi, 55; De Candolle, Prodr. xvi², 214.—Watson in King's Rep. v, 324.—Porter in Hayden's Rep. 1872, 493.—Rothrock, Pl. Wheeler, 50.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 128.—Macoun in Geological Rep. Canada, 1875-'76, 210.—Bebb in Bot. California, ii, 85.

S. argophylla, Nuttall, Sylva, i, 71, t. 20; 2 ed. i, 87, t. 20.

? S. brachycarpa, Nuttall, Sylva, i, 69; 2 ed. i, 85.

S. longifolia, var. *opaca*, Andersson in Kongl. Sven. Akad. Handl. vi, 55.

S. longifolia, var. *argyrophylla angustissima*, Andersson in Kongl. Sven. Akad. Handl. vi, 55; De Candolle, Prodr. xvi², 214.

S. longifolia, var. *argyrophylla opaca*, Andersson in De Candolle, Prodr. xvi², 214.

Western Texas to Oregon.

Wood light, soft, very close-grained, compact; medullary rays numerous, very obscure; color, brown tinged with red, the sap-wood brown; specific gravity, 0.4930; ash, 0.48. Var. *exigua*, heavier, the heart- and sap-wood darker colored; specific gravity, 0.5342; ash, 1.06.

311.—Salix sessilifolia, Nuttall,

Sylva, i, 68; 2 ed. i, 84.—Andersson in Ofv. af. Vet. Akad. Forh. 1858, 116 (Proc. Am. Acad. iv, 56); Kongl. Sven. Akad. Handl. vi, 55, f. 36; De Candolle, Prodr. xvi², 214.—Walpers, Ann. v, 746.—Bebb in Bot. California, ii, 85.

S. sessilifolia, var. *villosa*, Andersson in De Candolle, Prodr. xvi², 215.

Puget sound southward to northern California, near the coast.

A small tree, 9 to 12 meters in height, with a trunk rarely exceeding 0.30 to 0.45 meter in diameter; borders of streams, in low, wet ground.

A form with narrower entire leaves, of the Sacramento valley and the California Coast ranges, is—

var. **Hindsiana**, Andersson in Ofv. af. Vet. Akad. Forh. 1858, 117 (Proc. Am. Acad. iv, 56).—Bebb in Bot. California, ii, 85.

S. Hindsiana, Bentham, Pl. Hartweg. 335.—Newberry in Pacific R. R. Rep. vi, 89.—Torrey in Pacific R. R. Rep. iv, 138.—Andersson in Kongl. Sven. Akad. Handl. vi, 56, f. 37; De Candolle, Prodr. xvi², 215.—Walpers, Ann. v, 746.

S. Hindsiana, var. *tenuifolia*, Andersson in Kongl. Sven. Akad. Handl. vi, 56; De Candolle, Prodr. xvi², 215.

Wood light, soft, close-grained, compact; medullary rays thin; color, light red, the sap-wood nearly white; specific gravity, 0.4397; ash, 0.50.

312.—Salix discolor, Muhlenberg,

Neue Schriften Gesell. Nat. Fr. Berlin, iv, 234, t. 5, f. 1 (Ann. Bot. ii, 62, t. 5, f. 1).—Willdenow, Spec. iv, 665.—Persoon, Syn. ii, 599.—Pursh, Fl. Am. Sept. ii, 613.—Poiret, Suppl. v, 56.—Nuttall, Genera, ii, 231.—Elliott, Sk. ii, 669.—Torrey, Compend. Fl. N. States, 369; Fl. N. York, ii, 206.—Sprengel, Syst. i, 104.—Forbes, Sal. Woburn. 279.—Eaton, Manual, 6 ed. 319.—Smith in Rees' Cycl. No. 25.—Darlington, Fl. Cestrica, 3 ed. 257.—Eaton & Wright, Bot. 408.—Loudon, Arboretum, iii, 1530, f. 1317, 1630, f. 147.—Bigelow, Fl. Boston. 3 ed. 392.—*Hooker, Fl. Bor.-Am. ii, 147.—Barratt, Sal. Am. No. 3.—Emerson, Trees Massachusetts, 258; 2 ed. i, 296 & t.*—Dietrich, Syn. v, 419.—Richardson, Arctic Exped. 312.—Darby, Bot. S. States, 506.—Andersson in Ofv. af. Vet. Akad. Forh. 1858, 114 (Proc. Am. Acad. iv, 63); Kongl. Sven. Akad. Handl. vi, 83, f. 49; De Candolle, Prodr. xvi², 225.—Walpers, Ann. v, 750.—Chapman, Fl. S. States, 430.—Gray, Manual N. States, 5 ed. 462.—Koch, Dendrologie, ii, 570.—Macoun in Geological Rep. Canada, 1874-'75, 210.—Ridgway in Proc. U. S. Nat. Mus. 1882, 86.

S. sensitiva, Barratt, Sal. Am. No. 8.

GLAUCOUS WILLOW.

Labrador, west to the valleys of the Peace and Athabasca rivers, southward through the Atlantic region to Delaware and southern Missouri.

A small tree, rarely exceeding 6 meters in height, with a trunk sometimes 0.30 meter in diameter, or more often a tall, straggling shrub 3 to 6 meters in height; along streams and borders of swamps in low, wet soil; varying greatly in the form of leaves, aments, and nature of pubescence.

The best marked forms are—

var. **eriocephala**, Andersson in Kongl. Sven. Akad. Handl. vi, 85; De Candolle, Prodr, xvi², 225.—Gray, Manual N. States, 5 ed. 463.

S. eriocephala, Michaux, Fl. Bor.-Am. ii, 225.—Lamarck, Dict. vi, 661.—Bigelow, Fl. Boston. 3 ed. 391.—Eaton, Manual, 6 ed. 321.—Eaton & Wright, Bot. 409.—Emerson, Trees Massachusetts, 1 ed. 259; 2 ed. i, 196 & t.—Carey in Gray's Manual N. States, 1 ed. 426.—Andersson in Ofv. af. Vet. Akad. Forh. 1858, 117 (Proc. Am. Acad. iv, 57).—Walpers, Ann. v, 746.

S. crassa, Barratt, Sal. Am. No. 7.

var. **prinoides**, Andersson in Kongl. Sven. Akad. Handl. vi, 86; De Candolle, Prodr. xvi², 225.—Emerson, Trees Massachusetts, 2 ed. i, 297.

S. prinoides, Pursh, Fl. Am. Sept. ii, 613.—Nuttall, Genera, ii, 231.—Sprengel, Syst. i, 102.—Poiret, Suppl. iv, 67.—Torrey, Compend. Fl. N. States, 366.—Smith in Rees' Cycl. No. 26.—Forbes, Sal. Woburn. 79, t. 40.—Eaton, Manual, 6 ed. 319.—Beck, Bot. 319.—Eaton & Wright, Bot. 407.—W. Koch, Comment. 46.—Loudon, Arboretum, iii, 1530, f. 1317, 1612, f. 40.—Hooker, Fl. Bor.-Am. ii, 150.—Emerson, Trees Massachusetts, 1, ed. 259.—Dietrich, Syn. v, 419.

Wood light, soft, close-grained, compact, containing many evenly-distributed, small, open ducts; medullary rays and layers of annual growth not obscure; color, brown streaked with orange, the sap-wood light brown; specific gravity, 0.4261; ash, 0.43.

313.—Salix flavescens, Nuttall,

Sylva, i, 65; 2 ed. i, 81.—Bebb in Bot. California, ii, 86, in part.

Rocky mountains of Idaho and Montana southward to the Mogollon range, New Mexico (*E. L. Greene*); on the Cascade mountains, Oregon, and the Sierra Nevada, California.

A small tree, sometimes 6 to 9 meters in height, with a trunk rarely 0.30 meter in diameter; borders of streams, reaching its greatest development in the southern Rocky Mountain region.

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, obscure; color, brown tinged with red, the sap-wood nearly white; specific gravity, 0.4969; ash, 0.61.

Var. Scouleriana, Bebb;

Coulter's Bot. Gazette, vii, 129.

S. brachystachys, Bentham, Pl. Hartweg. 336.—Andersson in Ofv. af. Vet. Akad. Forh. 1858, 121 (Proc. Am. Acad. iv, 61); Kongl. Sven. Akad. Handl. vi, 82, f. 48; De Candolle, Prodr. xvi², 224.

S. Scouleriana, Barratt in Hooker, Fl. Bor.-Am. ii, 145, in part.—Cooper in Pacific R. R. Rep. xii², 29.

S. brachystachys, var. *Scouleriana*, Andersson in De Candolle, Prodr. xvi², 224.

S. flavescens, Bebb in Bot. California, ii, 86, in part.

BLACK WILLOW.

Kadiak island, Alaska (*Kellogg*), southward through British Columbia, western Washington territory, and Oregon to Santa Barbara, California.

A small tree, 8 to 9 meters in height, with a trunk rarely 0.60 meter in diameter; uplands, near springs or streams, or often in quite dry soil; common and reaching its greatest development near the shores of Puget sound.

Wood light, hard, strong, tough, close-grained, compact; medullary rays numerous, very obscure; color, light red, the sap-wood brown; specific gravity, 0.5412; ash, 0.39.

314.—Salix Hookeriana, Barratt;

Hooker, Fl. Bor.-Am. ii, 145, t. 180.—Nuttall, Sylva, i, 64; 2 ed. i, 80.—Andersson in Ofv. af. Vet. Akad. Forh. 1858, 119 (Proc. Am. Acad. iv, 59); De Candolle, Prodr. xvi², 274.—Walpers, Ann. v, 747.—Macoun in Geological Rep. Canada, 1875–'76, 210.

Grand rapids of the Saskatchewan (*Douglas*); coast of Washington territory and Oregon.

A small tree, 8 to 9 meters in height, with a trunk rarely 0.30 meter in diameter, or more often a low, straggling shrub with many prostrate stems; on the coast generally along the edge of sea-beaches, or in low, rather moist, sandy soil.

Wood light, soft, close-grained, compact, containing many minute open ducts; medullary rays thin, very obscure; color, light brown tinged with red, the sap-wood nearly white; specific gravity, 0.5350; ash, 0.32.

315.—Salix cordata, var. vestita, Andersson,

Kongl. Sven. Akad. Handl. vi, 159; De Candolle, Prodr. xvi², 252.

DIAMOND WILLOW.

Valley of the Missouri river and its tributaries, Fort Osage, Missouri (*Prince Neuwied*), Iowa, Nebraska, and westward to about the one hundred and tenth degree of longitude.

A small tree, rarely 8 meters in height, with a trunk 0.15 to 0.20 meter in diameter, or more often a straggling shrub not exceeding 1.80 to 3 meters in height; low bottom lands, in wet, sandy soil.

Wood light, soft, close-grained, compact, the annual layers of growth clearly defined; medullary rays very obscure; color, brown or often tinged red, the sap-wood nearly white; specific gravity, 0.6069; ash, 0.59; heavier than that of other species examined, and largely used for fence posts, being said to equal, when thoroughly seasoned, red cedar in durability in contact with the soil.

NOTE.—The typical *Salix cordata*, Muhlenberg, of wide distribution through the Atlantic region, rarely, if ever, attains arborescent size or habit.

316.—Salix lasiolepis, Bentham,

Pl. Hartweg. 335.—Cooper in Smithsonian Rep. 1858, 261.—Andersson in Ofv. af. Vet. Akad. Forh. 1858, 118 (Proc. Am. Acad. iv, 58); De Candolle, Prodr. xvi², 264.—Walpers, Ann. v, 747.—Vasey, Cat. Forest Trees, 29.—Bebb in Bot. California, ii, 86.

S. lasiolepis, var. *Bigelovii*, Bebb in Bot. California, ii, 86 (a vernal state, *teste* Bebb *in lit.*).

S. Bigelovii, Torrey in Pacific R. R. Rep. iv, 139.—Andersson in Ofv. af. Vet. Akad. Forh. 1858, 118 (Proc. Am. Acad. iv, 58); Kongl. Sven. Akad. Handl. vi, 163, f. 94; De Candolle, Prodr. xvi², 255.—Walpers, Ann. v, 747.

S. Bigelovii, var. *fuscior*, Andersson in Kongl. Sven. Akad. Handl. vi, 163; De Candolle, Prodr. xvi², 255.

S. ———, ? Watson in King's Rep. v, 325.

S. lasiolepis, var. *fallax*, Bebb in Bot. California, ii, 86.

WILLOW.

California, valley of the Klamath river, southward through the western portions of the state, reaching in the Sierra Nevadas an elevation of 3,500 to 4,000 feet above the sea.

A small tree, sometimes 12 to 18 meters in height, with a trunk 0.45 to 0.50 meter in diameter, or northward and at high elevations reduced to a low shrub; leaves varying greatly in shape and breadth (vars. *angustifolia* and *latifolia*, *Andersson in De Candolle Prodr.* xvi², 255), or toward its southern limit often persistent until spring (*S. Hartwegi*, *Bentham in Pl. Hartweg*, 52; *S. humilis*, var. *Hartwegi*, *Andersson*, *l. c.* 236).

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, thin; color, light brown, the sap-wood nearly white; specific gravity, 0.5587; ash, 0.98; somewhat used as fuel, especially in the southern part of the state.

317.—Salix Sitchensis, Sanson;

Bongard in Mem. Acad. St. Petersburg, 6 ser. ii, 162.—Ledebour, Fl. Rossica, iii, 609.—Richardson, Arctic Exped. 439.—Andersson in Ofv. af. Vet. Akad. Forh. 1858, 126 (Proc. Am. Acad. iv, 66); Kongl. Sven. Akad. Handl. vi, 106, f. 59; De Candolle, Prodr. xvi², 233.—Walpers, Ann. v, 752.—Gray in Proc. Am. Acad. vii, 402.—Hall in Coulter's Bot. Gazette, ii, 93.—Bebb in Bot. California, ii, 87; Coulter's Bot. Gazette, vii, 25.

S. cuneata, Nuttall, Sylva, i, 66; 2 ed. i, 82.

SILKY WILLOW.

Alaska, southward near the coast to Santa Barbara, California.

A low, much-branched tree, rarely exceeding 8 meters in height, with a trunk 0.30 to 0.45 meter in diameter, or more often a straggling shrub; low, wet soil, borders of streams and ponds.

A form with narrow oblanceolate leaves is—

var. angustifolia, Bebb in Bot. California, ii, 87.

S. chlorophylla, var. *pellita*, Andersson in Kongl. Sven. Akad. Handl. 139, f. 72; De Candolle, Prodr. xvi², 244.

Wood light, soft, close-grained, compact; medullary rays numerous, thin; color, light red, the sap-wood nearly white; specific gravity, 0.5072; ash, 0.59.

318.—Populus tremuloides, Michaux,

Fl. Bor.-Am. ii, 243.—Nouveau Duhamel, ii, 184, t. 53.—Persoon, Syn. ii, 623.—Desfontaines, Hist. Arb. ii, 465.—Michaux f. Hist. Arb.-Am. iii, 285, t. 8, f. 1; N. American Sylva, 3 ed. ii, 175, t. 99, f. 1.—Poiret, *Suppl. iv, 377.—Willdenow, Enum. Suppl. 67.*—Torrey, Ann. Lyc. N. York, ii, 249; Compend. Fl. N. States, 375; Fremont's Rep. 97; Fl. N. York, ii, 214; Sitgreaves' Rep. 172; Ives' Rep. 27; Bot. Wilkes Exped, 468.—Beck, Bot. 323.—Darlington, Fl. Cestrica, 3 ed. 281.—Eaton, Manual, 117; 6 ed. 277.—Lindley, Fl. Med. 320.—Hooker, Fl. Bor.-Am. ii, 154.—Eaton & Wright, Bot. 370.—Bigelow, Fl. Boston. 3 ed. 397.—Spach in Ann. Sci. Nat. 2 ser. xv, 30; Hist. Veg. x, 384.—Nuttall, Sylva, i, 55; 2 ed. i, 70.—Seringe, Fl. des Jard. ii, 56.—Parry in Owen's Rep. 618.—Newberry in Pacific R. R. Rep. vi, 25, 89.—Cooper in Smithsonian Rep. 1858, 257; Pacific R. R. Rep. xii², 29, 68; Am. Nat. iii, 409.—Hooker f. in Trans. Linnæan Soc. xxiii², 301.—Wood, Cl. Book, 655; Bot. & Fl. 311.—Engelmann in Trans. Am. Phil. Soc. new ser. xii, 209.—*Gray, Manual N. States, 5 ed. 466.—Wesmael in De Candolle, Prodr. xvi², 325.—London Gard. Chronicle, 1871,* 683.—Watson in King's Rep. v, 327; Pl. Wheeler, 17; Am. Jour. Sci. 3 ser. xv, 135; Bot. California, ii, 91.—Porter in Hayden's Rep. 1871, 494.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 128.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 121.—Vasey, Cat. Forest Trees, 29.—Hall in Coulter's Bot. Gazette, ii, 91.—Macoun in Geological Rep. Canada, 1875-'76, 210.—Rothrock in Wheeler's Rep. vi, 51.—Beal in Am. Nat. xv, 32, f. 1.—Trelease in Coulter's Bot. Gazette, vi, 284, f. 6.—Sears in Bull. Essex Inst. xiii, 183.—G. M. Dawson in Canadian Nat. new ser. ix, 231.—Ridgway in Proc. U. S. Nat. Mus. 1882, 87.

P. trepida, Willdenow, Spec. iv, 803.—Aiton, Hort. Kew. 2 ed. 395.—Pursh. Fl. Am. Sept. ii, 638.—Eaton, Manual, 117.—Nuttall, Genera, ii, 239.—Sprengel, Syst. ii, 244.—Loudon, Arboretum, iii, 1649, f. 1510.

P. tremuliformis, Emerson, Trees Massachusetts, 243; 2 ed. i, 279 & t.

P. Athenicnsis, Hort.—Koch, Dendrologie, ii, 486 (excl. syn.).

ASPEN. QUAKING ASP.

Northern Newfoundland and Labrador to the southern shores of Hudson bay, northwest to the Great Bear lake, the mouth of the Mackenzie river, and the valley of the Yukon river, Alaska; south in the Atlantic region to the mountains of Pennsylvania, the valley of the lower Wabash river, and northern Kentucky; in the Pacific region south to the valley of the Sacramento river, California, and along the Rocky mountains and interior ranges to southern New Mexico, Arizona, and central Nevada.

A small tree, 15 to 18 meters in height, with a trunk rarely exceeding 0.60 meter in diameter; very common through British America and spreading over enormous areas bared by fire of the coniferous forest; in the Pacific region very common upon moist mountain slopes and bottoms at an elevation of 6,000 to 10,000 feet; the most widely-distributed North American tree.

Wood light, soft, not strong, close-grained, compact, not durable, containing, as does that of the whole genus, numerous minute, scattered, open ducts; medullary rays very thin, hardly distinguishable; color, light brown, the thick sap-wood nearly white; specific gravity, 0.4032; ash, 0.55; largely manufactured into wood-pulp, a substitute for rags in the manufacture of paper; in the Pacific region sometimes used for fuel, flooring, in turnery, etc.

A bitter principle in the bark causes its occasional use as a tonic in the treatment of intermittent fevers and cases of debility (*U. S. Dispensatory*, 14 ed. 1763).

319.—Populus grandidentata, Michaux,

Fl. Bor.-Am. ii, 243.—Persoon, Syn. ii, 624.—Desfontaines, Hist. Arb. ii, 466.—Michaux f. Hist. Arb. Am. iii, 287, t. 8, f. 2; N. American Sylva, 3 ed. ii, 176, t. 99, f. 2.—Pursh, Fl. Am. Sept. ii, 619.—Poiret, Suppl. iv, 377.—Barton, Compend. Fl. Philadelph. ii, 197.—Nuttall, Genera, ii, 239.—Hayne, Dend. Fl. 200.—Willdenow, Enum. Suppl. 67.—Elliott, Sk. ii, 710.—Sprengel, Syst. ii, 244.—Torrey, Compend. Fl. N. States, 375; Fl. N. York, ii, 214.—Beck, Bot. 323.—Eaton, Manual, 6 ed. 277.—Hooker, Fl. Bor.-Am. ii, 154.—Eaton & Wright, Bot. 370.—Loudon, Arboretum, iii, 1650, f. 1511.—Bigelow, Fl. Boston. 3 ed. 397.—Spach in Ann. Sci. Nat. xv, 2 ser. 33; Hist. Veg. x, 384.—Emerson, Trees Massachusetts, 242; 2 ed. i, 278 & t.—Seringe in Fl. des Jard. ii, 56.—Parry in Owen's Rep. 618.—Darlington, Fl. Cestrica, 3 ed. 281.—Darby, Bot. S. States, 507.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 431.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 73.—Wood, Cl. Book, 656; Bot. & Fl. 311.—Gray, Manual N. States, 5 ed. 466.—Koch, Dendrologie, ii, 487.—Wesmæl in De Candolle, Prodr. xvi², 327.—Vasey, Cat. Forest Trees, 29.—Watson in Am. Jour. Sci. 3 ser. xv, 135.—Beal in Am. Nat. xv, 34, f. 2.—Sears in Bull. Essex Inst. xiii, 182.—Trelease in Coulter's Bot. Gazette, vi, 285.—Bell in Geological Rep. Canada, 1879-'80, 56ᵉ.

P. grandidentata, var. *pendula*, Torrey, Compend. Fl. N. States, 375.—Nuttall, Genera, ii, 239.

POPLAR.

Nova Scotia, New Brunswick, and west through Ontario to northern Minnesota, south through the northern states and along the Alleghany mountains to North Carolina, extending west to middle Kentucky and Tennessee.

A tree 21 to 24 meters in height, with a trunk 0.50 to 0.75 meter in diameter; rich woods and borders of streams and swamps.

Wood light, soft, not strong, close-grained, compact; medullary rays thin, obscure; color, light brown, the sap-wood nearly white; specific gravity, 0.4632; ash, 0.45; largely manufactured into wood-pulp and occasionally used in turnery, for woodenware, etc.

320.—Populus heterophylla, Linnæus,

Spec. 1 ed. 1034.—Marshall, Arbustum, 107.—Wangenheim, Amer. 85.—Walter, Fl. Caroliniana, 248.—Aiton, Hort. Kew. iii, 407; 2 ed. v, 397.—Nouveau Duhamel, ii, 181, t. 51.—Michaux, Fl. Bor.-Am. ii, 244.—Willdenow, Spec. iv, 806; Enum. 1017; Berl. Baumz. 293.—Desfontaines, Hist. Arb. ii, 466—Pursh, Fl. Am. Sept. ii, 619.—Nuttall, Genera, ii, 239.—Hayne, Dend. Fl. 203.—Elliott, Sk. ii, 712.—Sprengel, Syst. ii, 244.—Torrey, Compend. Fl. N. States, 375; Fl. N. York, ii, 215.—Beck, Bot. 323.—Eaton, Manual, 6 ed. 278.—Darlington, Fl. Cestrica, 3 ed. 281.—Loudon, Arboretum, iii, 1672, f. 1534.—Eaton & Wright, Bot. 371.—Spach in Ann. Sci. Nat. 2 ser. xv, 30; Hist. Veg. x, 386.—Seringe in Fl. des Jard. ii, 61.—Darby, Bot. S. States, 507.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 431.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 73.—Wood, Cl. Book, 656; Bot. & Fl. 311.—Gray, Manual N. States, 5 ed. 467.—Koch, Dendrologie, ii, 488.—Wesmæl in De Candolle, Prodr. xvi², 326.—Vasey, Cat. Forest Trees, 29.—Watson in Am. Jour. Sci. 3 ser. xv, 135.—Trelease in Coulter's Bot. Gazette, vi, 285.—Ridgway in Proc. U. S. Nat. Mus. 1881, 86.

P. cordifolia, Burgsdorf, Anleit. Erz. Holzart. 3 ed. 152.

P. argentea, Michaux f. Hist. Arb. Am. iii, 390, t. 9; N. American Sylva, 3 ed. ii, 170, t. 97.

P. heterophylla, var. *argentea*, Wesmæl in De Candolle, Prodr. xvi², 376.

RIVER COTTONWOOD. SWAMP COTTONWOOD.

Guilford, Connecticut (*W. R. Dudley*), Northport, Long island, south, generally near the coast, to southern Georgia, through the Gulf states to western Louisiana, and through Arkansas to central Tennessee and Kentucky, southern Illinois and Indiana.

A tree 24 to 27 meters in height, with a trunk 0.60 to 0.75 meter in diameter; borders of river swamps; most common and reaching its greatest development in the basin of the lower Ohio river; rare and local.

Wood light, soft, not strong, close-grained, compact; medullary rays thin, very obscure; color, dull brown, the thick sap-wood lighter brown; specific gravity, 0.4089; ash, 0.81.

321.—Populus balsamifera, Linnæus,

Spec. 1 ed. 1034.—Du Roi, Harbk. 82.—Marshall, Arbustum, 107.—Wangenheim, Amer. 85, t. 28, f. 59.—Aiton, Hort. Kew. iii, 406; 2 ed. v, 397.—Mœnch, Meth. 338.—B. S. Barton, Coll. i, 16.—Nouveau Duhamel, ii, 179, t. 50.—Michaux, Fl. Bor.-Am. ii, 244.—Willdenow, Spec. iv, 805; Enum. 1017; Berl. Baumz. 290.—Persoon, Syn. ii, 624.—Desfontaines, Hist. Arb. ii, 466.—Michaux f. Hist. Arb. Am. iii, 306, t. 13, f. 1; N. American Sylva, 3 ed. ii, 172, t. 98, f. 1.—Pursh, Fl. Am. Sept. ii, 618.—Eaton, Manual, 117; 6 ed. 278.—Nuttall, Genera, ii, 239; Sylva, i, 55; 2 ed. i, 70.—Hayne, Dend. Fl. 202.—Sprengel, Syst. ii, 244.—Beck, Bot. 322.—Lindley, Fl. Med. 320.—Loudon, Arboretum, iii, 1637, f. 1535, 1536 & t.—Hooker, Fl. Bor.-Am. ii, 153.—Eaton & Wright, Bot. 370.—Hooker & Arnott, Bot. Beechey, 159.—Spach in Ann. Sci. Nat. 2 ser. xv, 33; Hist. Veg. x, 393.—Lindley, Bot. Reg. xxix, Misc. 20.—Seringe in Fl. des Jard. ii, 65.—Torrey, Fl. N. York, ii, 216; Bot. Wilkes Exped. 469.—Cooper in Smithsonian Rep. 1858, 257; Am. Nat. iii, 408.—Hooker f. in Trans. Linnæan Soc. xxiii², 301.—Wood, Cl. Book, 656; Bot. & Fl. 311.—Gray, Manual N. States, 5 ed. 467.—Koch, Dendrologie, ii, 495.—Vasey, Cat. Forest Trees, 29.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Watson in Am. Jour. Sci. xv, 135.—Beal in Am. Nat. xv, 34, f. 4.—Trelease in Coulter's Bot. Gazette, vi, 285.—Sears in Bull. Essex Inst. xiii, 181.—Bell in Geological Rep. Canada, 1879-'80, 45c.

P. Tacamahaca, Miller, Dict.

P. viminea, Bon Jard. 1845, 565.

P. balsamifera, var. *genuina*, Wesmæl in De Candolle, Prodr. xvi², 329.

BALSAM. TACAMAHAC. BALM OF GILEAD.

Straits of Belle Isle to Richmond gulf and cape Churchill, Hudson bay, northwest to the shores of the Great Bear lake and the valley of the Yukon river, Alaska, south to northern New England, central Michigan and Minnesota, the Rocky mountains and interior ranges of Montana and Idaho, Washington territory, and British Columbia.

A large tree, 18 to 24 meters in height, with a trunk 1.50 to 2.10 meters in diameter; very common on all islands and shores of the northern rivers; in British Columbia generally confounded with the allied *P. trichocarpa*, the range of the two species here still uncertain.

Wood very light, soft, not strong, close-grained, compact; medullary rays numerous, very obscure; color, brown, the thick sap-wood nearly white; specific gravity, 0.3635; ash, 0.66.

The buds, as well as those of several other species, covered with a resinous exudation, and occasionally used medicinally as a substitute for turpentine and other balms.

Var. candicans, Gray,

Manual N. States, 2 ed. 419; 5 ed. 467.—Cooper in Smithsonian Rep. 1858, 257.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 129.—Watson in Am. Jour. Sci. 3 ser. xv, 135.—Bull. Torrey Bot. Club, vii, 57.—Trelease in Coulter's Bot. Gazette, vi, 285.

P. balsamifera lanceolata, Marshall, Arbustum, 108.

P. candicans, Aiton, Hort. Kew. iii, 406; 2 ed. v, 397.—Nouveau Duhamel, ii, 179.—Willdenow, Spec. iv, 806; Enum. 1017; Berl. Baumz. 291.—Persoon, Syn. ii, 624.—Michaux f. Hist. Arb. Am. iii, 308, t. 13, f. 2; N. American Sylva, 3 ed. ii, 173, t. 98, f. 2.—Pursh, Fl. Am. Sept. ii, 618.—Barton, Prodr. Fl. Philadelph. 96.—Poiret, Suppl. iv, 378.—Nuttall, Genera, ii, 239.—Hayne, Dend. Fl. 202.—Sprengel, Syst. ii, 244.—Torrey, Compend. Fl. N. States, 375; Fl. N. York, ii, 217.—Audubon, Birds, t. 59.—Beck, Bot, 332.—Eaton, Manual, 6 ed. 278.—Loudon, Arboretum, ii, 1676, f. 1537.—Hooker, Fl. Bor.-Am. ii, 154.—Eaton & Wright, Bot. 370.—Bigelow, Fl. Boston. 3 ed. 398.—Spach in Ann. Sci. Nat. 2 ser. xv, 33; Hist. Veg. x, 392.—Lindley, Bot. Reg. xxix, Misc. 22.—Emerson, Trees Massachusetts, 245; 2 ed. i, 281.—Seringe in Fl. des Jard. ii, 63.—Gray, Manual N. States, 1 ed. 431.—Wood, Cl. Book, 656; Bot. & Fl. 311.—Wesmæl in De Candolle, Prodr. xvi², 330.

P. Canadensis, Mœnch, Weiss. 81 [not Michaux f.].

P. latifolia, Mœnch, Meth. 338.

P. Ontariensis, Hort.—Loddiges, Cat. 1836.

P. macrophylla, Lindley in Loudon, Encyc. Pl. 840.

P. acladesca and *P. heterophylla*, Hort. (ex. Koch, Wachen. 1865, 238).

A large tree, rare or unknown in a wild state; very common in cultivation.

The wood heavier than that of the species; specific gravity, 0.4161; ash, 0.46.

322.—Populus angustifolia, James,

Long's Exped. i, 497.—Torrey in Ann. Lyc. N. York, ii, 249; Fremont's Rep. 97; Sitgreaves' Rep. 172; Ives' Rep. 27; Bot. Wilkes Exped. 469.—Nuttall, Sylva, i, 52, t. 16; 2 ed. i, 68, t. 16.—Cooper in Smithsonian Rep. 1858, 261; Am. Nat. iii, 408.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 121.—Vasey, Cat. Forest Trees, 29.—Watson in Am. Jour. Sci. 3 ser. xv, 136; Bot. California, ii, 91.

P. Canadensis, var. *angustifolia*, Wesmæl in De Candolle, Prodr. xvi², 329.

P. balsamifera, var. *angustifolia*, Watson in King's Rep. v, 327; Pl. Wheeler, 17.—Porter in Hayden's Rep. 1871, 494.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 128.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Rusby in Bull. Torrey Bot. Club, ix, 106.

BLACK COTTONWOOD.

Black hills of Dakota (*R. Douglas*), Swimming Horse creek, and the Snowy Mountain region, Montana, Red Rock creek, southwestern Montana (*Watson*), east Humboldt and Shoshone mountains, Nevada, Rocky mountains of Colorado, and the ranges of southwestern New Mexico and eastern Arizona.

A small tree, 15 to 18 meters in height, with a trunk rarely exceeding 0.60 meter in diameter; borders of streams, between 6,000 and 10,000 feet elevation.

Wood light, soft, weak, close-grained, compact; medullary rays numerous, obscure; color, brown, the sap-wood nearly white; specific gravity, 0.3912; ash, 0.79.

323.—Populus trichocarpa, Torrey & Gray;

Hooker, Icon. v, 878.—Walpers, Ann. v, 767.—Cooper in Smithsonian Rep. 1858, 266.—Wesmæl in De Candolle, Prodr. xvi², 330.—Watson in King's Rep. v, 328; Am. Jour. Sci. 3 ser. xv, 136; Bot. California, ii, 91.—Torrey, Bot. Wilkes Exped. 469.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Trelease in Coulter's Bot. Gazette, vi, 285, f. 5.—G. M. Dawson in Canadian Nat. new ser. ix, 331.

P. balsamifera, var. Hooker, Fl. Bor.-Am. ii, 154.

P. angustifolia, Newberry in Pacific R. R. Rep. vi, 89 [not James].—Cooper in Pacific R. R. Rep. xii², 29, 68.

P. balsamifera, Lyall in Jour. Linnæan Soc. vii, 134 [not Linnæus].—Hall in Coulter's Bot. Gazette, ii, 91.

P. trichocarpa, var. *cupulata*, Watson in Am. Jour. Sci. 3 ser. xv, 136; Bot. California, ii, 91.

P. balsamifera, var. ? *Californica*, Watson in Am. Jour. Sci. 3 ser. xv, 136.

BLACK COTTONWOOD. BALSAM COTTONWOOD.

Valley of the Fraser river, British Columbia, and probably much farther north, east to the eastern base of the Bitter Root mountains, Montana (*Watson*), south through Washington territory, western Oregon and California to the southern borders of the state.

A large tree, 24 to 60 meters in height, with a trunk 1.20 to 2.10 meters in diameter; banks of streams and bottom lands below 6,000 feet elevation; very common and reaching its greatest development in the valleys of the lower Columbia river and the streams flowing into Puget sound, here the largest deciduous tree of the forest.

Wood very light, soft, not strong, rather close-grained, compact; medullary rays thin, hardly distinguishable; color, light dull brown, the sap-wood lighter, nearly white; specific gravity, 0.3814; ash, 1.27; in Oregon and Washington territory largely manufactured into staves of sugar barrels, woodenware, etc.

324.—Populus monilifera, Aiton,

Hort. Kew. iii, 406; 2 ed. v, 396.—Abbot, Insects Georgia, ii, 71.—Nouveau Duhamel, ii, 186.—Willdenow, Spec. iv, 805; Enum. 1017; Berl. Baumz. 292.—Persoon, Syn. ii, 623.—Desfontaines, Hist. Arb. ii, 465.—Michaux f. Hist. Arb. Am. iii, 295, t. 10, f. 2; N. American Sylva, 3 ed. ii, 168, t. 96, f. 2.—Pursh, Fl. Am. Sept. ii, 618.—Nuttall, Genera, ii, 239; Trans. Am. Phil. Soc. 2 ser. v, 167.—Hayne, Dend. Fl. 202.—Sprengel, Syst. ii, 244.—Watson, Dend. Brit. ii, t. 102.—Beck, Bot. 323.—Eaton, Manual, 6 ed. 278.—Loudon, Arboretum, iii, 1657, f. 1517 & t.—Eaton & Wright, Bot. 371.—Spach in Ann. Sci. Nat. 2 ser. xv, 32; Hist. Veg. x, 389.—Torrey in Fremont's Rep. 97; Fl. N. York, ii, 215; Pacific R. R. Rep. v, 365.—Emerson, Trees Massachusetts, 249; 2 ed. i, 287.—Seringe in Fl. des Jard. ii, 63.—Cooper in Smithsonian Rep. 1858, 257.—Gray in Pacific R. R. Rep. xii², 47; Manual N. States, 5 ed. 467.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 72.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 655.—Engelmann in Trans. Am. Phil. Soc. xii, 209.—Watson in King's Rep. v, 327; Am. Jour. Sci. 3 ser. xv, 136.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 121.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Trelease in Coulter's Bot. Gazette, vi, 285, f. 3, 4.—Ward in Bull. U. S. Nat. Mus. No. 22, 116.—Beal in Am. Nat. xv, 34, f. 3.—Bell in Geological Rep. Canada, 1879-'80, 56ᵉ.—Ridgway in Proc. U. S. Nat. Mus. 1882, 87.—Chapman, Fl. S. States, Suppl. 649.

? *P. deltoide*, Marshall, Arbustum, 106.

P. angulata, Aiton, Hort. Kew. iii, 406; 2 ed. v, 396.—Nouveau Duhamel, ii, 186.—Desfontaines, Hist. Arb. ii, 466.—Willdenow, Spec. iv, 805; Enum. 1017; Berl. Baumz. 294.—Michaux f. Hist. Arb. Am. iii, 302, t. 12; N. American Sylva, 3 ed. ii, 161, t. 94.—Pursh, Fl. Ann. Sept. ii, 619.—Eaton, Manual, 117; 6 ed. 277.—Nuttall, Genera, ii, 239.—James in Long's Exped. ii, 164.—Torrey in Ann. Lyc. N. York, ii, 249.—Elliott, Sk. ii, 711.—Sprengel, Syst. ii, 244.—Loudon, Arboretum, iii, 1670, 1533 & t.—Eaton & Wright, Bot. 370.—Spach in Ann. Sci. Nat. 2 ser. xv, 321; Hist. Veg. x, 391.—Seringe in Fl. des Jard. ii, 64.—Scheele in Rœmer, Texas, 446.—Darby, Bot. S. States, 507.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 431.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 655; Bot. & Fl. 311.—Gray, Manual N. States, 5 ed. 467.—Wesmæl in De Candolle, Prodr. xvi², 328.—Koch, Dendrologie, ii, 494.—Young, Bot. Texas, 514.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 129.—Vasey, Cat. Forest Trees, 29.—Sears in Bull. Essex Inst. xiii, 182.

P. lævigata, Aiton, Hort. Kew. iii, 406; 2 ed. v, 395.—Willdenow, Spec. iv, 803.—Pursh, Fl. Am. Sept. ii, 619.—Poiret, Suppl. iv, 378.—Nuttall, Genera, ii, 239; Sylva, i, 54; 2 ed. i, 70.—Sprengel, Syst. ii, 244.—Beck, Bot. 323.—Eaton, Manual, 6 ed. 278.—Loddiges, Cat. ed. 1836.—Eaton & Wright, Bot. 370.—Emerson, Trees Massachusetts, 246; 2 ed. i, 283.

P. glandulosa, Mœnch, Meth. 339.

P. angulosa, Michaux, Fl. Bor.-Am. ii, 243.

P. Canadensis, Michaux f. Hist. Arb. Am. iii, 302, t. 12; N. American Sylva, 3 ed. ii, 164, t. 95.—Spach in Ann. Sci. Nat. 2 ser. xv, 32; Hist. Veg. x, 390.—Seringe in Fl. des Jard. ii, 65.—Fescali, Forst. Pfl. 122, t. 8, f. 10–14.—Wood, Bot. & Fl. 311.—Wesmæl in De Candolle, Prodr. xvi², 329.—Koch, Dendrologie, ii, 491.

P. Virginiana, Du Mont, Cours. Bot. Cult. vi, 400.

P. Marylandica, Bosc in Nouv. Dict. xi, 409.—Poiret, Suppl. iv, 378.—Sprengel, Syst. ii, 244.

P. macrophylla, Loddiges, Cat. ed. 1836.

P. Lindleyana, *P. neglecta*, and *P. lævigata*, Hort.

COTTONWOOD. NECKLACE POPLAR. CAROLINA POPLAR. BIG COTTONWOOD.

Shores of lake Champlain, Vermont, south through western New England to the Chattahoochee region of western Florida, west along the northern shores of lake Ontario to the eastern base of the ranges of the Rocky mountains of Montana, Colorado, and New Mexico.

A large tree, 24 to 51 meters in height, with a trunk 1.20 to 2.40 meters in diameter; low, moist soil; the common cottonwood of Texas and the western plains, bordering all streams flowing east from the Rocky mountains.

Wood very light, soft, not strong, close-grained, compact, liable to warp in drying, difficult to season; medullary rays numerous, obscure; color, dark brown, the thick sap-wood nearly white; specific gravity, 0.3889; ash, 0.96; largely used in the manufacture of paper-pulp, for light packing-cases, fence boards, and fuel.

325.—Populus Fremontii, Watson,

Proc. Am. Acad, x, 350; Am. Jour. Sci. 3 ser. xv, 136; Bot. California, ii, 92.

P. monilifera, Newberry in Pacific R. R. Rep. vi, 327 [not Aiton].—Watson in King's Rep. v, 327; Pl. Wheeler, 17.—Torrey, Bot. Wilkes Exped. 469.

COTTONWOOD.

California, valley of the upper Sacramento river, south to San Bernardino county (Colton, *Parry*), and eastward in Nevada and Utah.

A large tree, 24 to 30 meters in height, with a trunk 1.20 to 1.80 meter in diameter; borders of streams; the common cottonwood of the valleys of central California.

Wood light, soft, not strong, close-grained, compact, liable to warp in drying, difficult to season; medullary rays thin, very obscure; color, light brown, the sap-wood nearly white; specific gravity, 0.4914; ash, 0.77.

Var. Wislizeni, Watson,

Am. Jour. Sci. 3 ser. xv, 137; Bot. California, ii, 92; Proc. Am. Acad. xviii, 157.—Rusby in Bull. Torrey Bot. Club, ix, 79.

P. monilifera, Torrey in Sitgreaves' Rep. 172; Bot. Mex. Boundary Survey, 204; Ives' Rep. 27 [not Aiton].—Bigelow in Pacific R. R. Rep. iv, 21.

COTTONWOOD. WHITE COTTONWOOD.

San Diego county, California, through Arizona and New Mexico to western Texas and southern Colorado.

A large tree, 24 to 30 meters in height, with a trunk 1.20 to 1.80 meter in diameter; borders of streams; the prevalent cottonwood of the arid southwestern region, there largely planted as a shade tree and for fuel.

Wood light, soft, not strong, compact; specific gravity, 0.4621; ash, 1.13; furnishing the ordinary domestic fuel of the region.

CONIFERÆ.

326.—Libocedrus decurrens, Torrey,

Smithsonian Contrib., vi, 7, t. 3; Pacific R. R. Rep. iv, 140; Bot. Mex. Boundary Survey, 211; Bot. Wilkes Exped. t. 16.—Bentham, Pl. Hartweg. 338.—Lindley in London Gard. Chronicle, 1853, 695.—Newberry in Pacific R. R. Rep. vi, 63.—Cooper in Smithsonian Rep. 1858, 262.—Walpers, Ann. v, 795.—Bolander in Proc. California Acad. iii, 228.—Parlatore in De Candolle, Prodr. xvi², 456.—R. Brown Campst. in Trans. Edinburgh Bot. Soc. ix, 373.—Hoopes, Evergreens, 309, f. 40.—Watson in King's Rep. v, 335; Bot. California, ii, 116.—A. Murray in London Garden, ii, 542.—Gordon, Pinetum, 2 ed. 402.—Veitch, Manual Conif. 267.

Thuya Craigana, Murray in Rep. Oregon Exped. 2, t. 5.

Thuya gigantea, Carrière in Rev. Hort. 1854, 224, f. 12–14, in part; Fl. des Serres, ix, 199, f. 3–5, in part; Trait. Conif. 106, in part; 2 ed. 112, in part.—Gordon, Pinetum, 321, in part; Suppl. 102, in part.—Henkel & Hochstetter, Nadelhölz. 280, in part.

Heyderia decurrens, Koch, Dendrologie, ii², 179.

WHITE CEDAR. BASTARD CEDAR. POST CEDAR. INCENSE CEDAR.

North fork of the Santian river, Oregon, south along the western slopes of the Cascade and Sierra Nevada mountains between 3,000 and 8,500 feet elevation, and through the California Coast ranges to the San Bernardino and Cayumaca mountains.

A large tree, 30 to 45 meters in height, with a trunk 1.20 to 2.10 meters in diameter; slopes and valleys; common.

Wood light, soft, not strong, brittle, close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, dark colored, conspicuous; medullary rays numerous, obscure; the thin sap-wood nearly white; specific gravity, 0.4017; ash, 0.08; largely used for fencing and in the construction of water-flumes, and for interior finish, furniture, laths, shingles, etc.; often injured by a species of dry rot (*Dædalia vorax*, *Harkness in Pacific Rural Press*, Jan. 25, 1879, f. 1, 2), rendering it unfit for lumber.

327.—Thuya occidentalis, Linnæus,

Spec. 1 ed. 1002.—Kalm, Travels, English ed. iii, 170.—Marshall, Arbustum, 152.—Wangenheim, Amer. 7, t. 2, f. 3.—Walter, Fl. Caroliniana, 238.—Aiton, Hort. Kew. iii, 371; 2 ed. v, 321.—Gærtner, Fruct. ii, 62, t. 91, f. 2.—Michaux, Fl. Bor.-Am. ii, 209.—Willdenow, Spec. iv, 508; Enum. 990; Berl. Baumz. 504.—Nouveau Duhamel, iii, 12, t. 4.—Poiret in Lamarck, Dict. vii, 369; Ill. iii, 369.—Schkuhr, Handb. iii, 287, t. 309.—Persoon, Syn. ii, 580.—Desfontaines, Hist. Arb. ii, 575.—Titford, Hort. Bot. Am. 98.—Michaux f. Hist. Arb. Am. iii, 29, t. 3; N. American Sylva, 3 ed. iii, 177, t. 156.—Pursh, Fl. Am. Sept. ii, 647.—Barton, Prodr. Fl. Philadelph. 93.—Eaton, Manual, 111; 6 ed. 364.—Nuttall, Genera, ii, 224.—Hayne, Dend. Fl. 177.—Elliott, Sk. ii, 641.—Watson, Dend. Brit. ii, 150.—Sprengel, Syst. iii, 888.—Richard, Conif. 43, t. 71, f. 1.—Torrey, Compend. Fl. N. States, 361; Fl. N. York, ii, 234.—Rafinesque, Med. Bot. ii, 268.—Beck, Bot. 338.—Loudon, Arboretum, iv, 2454, f. 2312–2314 & t.—Forbes, Pinetum Woburn. 193.—Hooker, Fl. Bor.-Am. ii, 165.—Eaton & Wright, Bot. 451.—Bigelow, Fl. Boston. 3 ed. 388.—Spach, Hist. Veg. xi, 339.—Penn. Cycl. xxiv, 409.—Reid in London Gard. Chronicle, 1844, 276.—Emerson, Trees Massachusetts, 96; 2 ed. i, 112.—Endlicher, Syn. Conif. 51.—Lindley & Gordon in Jour. Hort. Soc. London, v, 206.—Parry in Owen's Rep. 618.—Darlington, Fl. Cestrica, 3 ed. 294.—Knight, Syn. Conif. 16.—Carrière in Rev. Hort. 1854, 224, f. 15; Trait. Conif. 103; 2 ed. 109.—Darby, Bot. S. States, 516.—Cooper in Smithsonian Rep. 1858, 257.—Gordon, Pinetum, 323; 2 ed. 403.—Chapman, Fl. S. States, 436.—Wood, Cl. Book, 662; Bot. & Fl. 315.—Porcher, Resources S. Forests, 507.—Henkel & Hochstetter, Nadelhölz. 278.—Nelson, Pinaceæ, 68.—R. Brown Campst. in Trans. Edinburgh Bot. Soc. ix, 363.—Gray, Manual N. States, 5 ed. 472.—Hoopes, Evergreens, 317.—Parlatore in De Candolle, Prodr. xvi², 458.—Schnizlein, Icon. t. 76, f. 2.—Koch, Dendrologie, ii², 173.—Vasey, Cat. Forest Trees, 36.—Macoun in Geological Rep. Canada, 1875–'76, 211.—Sears in Bull. Essex Inst. xiii, 183.—Veitch, Manual Conif. 261.—Bell in Geological Rep. Canada, 1879–'80, 47c.

T. odorata, Marshall, Arbustum, 152.

T. obtusa, Mœnch, Meth. 691.

Cupressus Arbor-vitæ, Targione-Tozzetti, Obs. Bot. ii, 51.

T. Wareana and *T. Sibirica*, Hort.

WHITE CEDAR. ARBOR-VITÆ.

New Brunswick to Anticosti island, through the valley of the Saint Lawrence river to the southern shores of James' bay and southeast to the eastern extremity of lake Winnipeg, south through the northern states to central New York, northern Pennsylvania, central Michigan, northern Illinois, central Minnesota, and along the Alleghany mountains to the high peaks of North Carolina.

A tree 12 to 18 meters in height, with a trunk sometimes 1.20 to 1.50 meter in diameter; cold, wet swamps and along the rocky banks of streams; very common at the north, spreading over great areas of swamp; extensively cultivated as a hedge and ornamental plant, and producing innumerable seminal varieties of more or less horticultural value.

Wood very light, soft, not strong, brittle, rather coarse-grained, compact, very durable in contact with the soil; the bands of small summer cells very thin, dark colored; medullary rays numerous, indistinct; color, light brown, turning darker with exposure, the thin sap-wood nearly white; specific gravity, 0.3164; ash, 0.37; largely used for posts, fencing, railway ties, and shingles.

The distilled oil and a tincture of the leaves of *Thuya* have been found useful in the treatment of pulmonary and uterine complaints (*U. S. Dispensatory*, 14 ed. 1775.—*Nat. Dispensatory*, 2 ed. 1428).

328.—Thuya gigantea, Nuttall,

Jour. Philadelphia Acad. vii, 52; Sylva, iii, 102, t. iii; 2 ed. ii, 162, t. 111.—Loddiges, Cat. ed. 1836.—Loudon, Arboretum, iv, 2458.—Hooker, Fl. Bor.-Am. ii, 165.—Spach, Hist. Veg. xi, 342.—Endlicher, Syn. Conif. 52.—Lindley & Gordon in Jour. Hort. Soc. London, v, 206.—Newberry in Pacific R. R. Rep. vi, 56, f. 22.—Carrière, Trait. Conif. 102; 2 ed. 112, in part.—Cooper in Smithsonian Rep. 1858, 262; Am. Nat. iii, 413.—Gordon, Pinetum, 321, in part; Suppl. 102; 2 ed. 181.—Torrey, Bot. Mex. Boundary Survey, 211.—Lyall in Jour. Linnæan Soc. vii, 133, 144.—Henkel & Hochstetter, Nadelhölz. 280, in part.—Nelson, Pinaceæ, 67.—Rothrock in Smithsonian Rep. 1867, 434.—Parlatore in De Candolle, Prodr. xvi², 457.—R. Brown Campst. in Trans. Edinburgh Bot. Soc. ix, 367.—Hoopes, Evergreens, 315.—London Gard. Chronicle, 1871, 683.—Gray in Proc. Am. Acad. vii, 402.—Fowler in London Gard. Chronicle, 1872, 1527.—Koch, Dendrologie, ii², 176.—Vasey, Cat. Forest Trees, 36.—E. Hall in Coulter's Bot. Gazette, ii, 91.—Watson, Bot. California, ii, 115.—G. M. Dawson in Canadian Nat. new ser. ix, 324.—T. Howell in Coulter's Bot. Gazette, vi, 267.—Veitch, Manual Conif. 256.

T. plicata, Don, Hort. Cantab. 6 ed. 249.—Lambert, Pinus, 1 ed. ii, 19; 2 ed. 114, in part.—Nuttall, Sylva, iii, 103; 2 ed. ii, 164.—Spach, Hist. Veg. xi, 342.—Endlicher, Syn. Conif. 51 (excl. syn. *Wareana* & *odorata*).—Lindley & Gordon in Jour. Hort. Soc. London, v, 205.—Knight, Syn. Conif. 16.—Carrière, Trait. Conif. 102 (excl. syn. *Wareana* & *odorata*); 2 ed. 106 (excl. syn. *Wareana*).—Cooper in Smithsonian Rep. 1858, 262; Pacific R. R. Rep. xii², 27.—Henkel & Hochstetter, Nadelhölz. 277 (excl. syn. *odorata*).—Nelson, Pinaceæ, 68.—Gordon, Pinetum, 2 ed. 406.—A. De Candolle, Prodr. xvi², 457, in part.—Vasey, Cat. Forest Trees, 36.—Veitch, Manual Conif. 263.

T. Menziesii, Douglas, Mss.—Carrière, Trait. Conif. 106; 2 ed. 107.—Gordon, Pinetum, 323.—Nelson, Pinaceæ, 67.—Henkel & Hochstetter, Nadelhölz. 281.

T. Lobbii, Hort.

T. occidentalis, var. *plicata*, Hort.—Hoopes, Evergreens, 321.

RED CEDAR. CANOE CEDAR.

Alaska, south along the Coast ranges and islands of British Columbia, through western Washington territory and Oregon and the Coast ranges of northern California to Mendocino county, extending east along the mountains of Washington territory to the Cœur d'Alêne, Bitter Root, and Salmon River mountains of Idaho and the western slopes of the Rocky mountains of northern Montana (*Canby & Sargent*).

A large tree, 30 to 45 meters in height, with a trunk 0.90 to 3.60 meters in diameter; low, rich woods and swamps, less commonly on dry ridges and slopes below 5,200 feet elevation; common and reaching its greatest development in western Washington territory and Oregon; the large specimens generally hollow.

Wood very light, soft, not strong, brittle, rather coarse-grained, compact, easily worked, very durable in contact with the soil; bands of small summer cells thin, dark colored, distinct; medullary rays numerous, obscure; color, dull brown tinged with red, the thin sap-wood nearly white; specific gravity, 0.3796; ash, 0.17; largely used for interior finish, fencing, shingles, in cabinet-making and cooperage, and exclusively by the Indians of the northwest coast in the manufacture of their canoes.

329.—Chamæcyparis sphæroidea, Spach,

Hist. Veg. xi, 331.—Endlicher, Syn. Conif. 61.—Lindley & Gordon in Jour. Hort. Soc. London, v, 209.—Knight, Syn. Conif. 20.—Carrière, Trait. Conif. 133; 2 ed. 122.—Gordon, Pinetum, 49; 2 ed. 71.—Henkel & Hochstetter, Nadelhölz. 248.—Nelson, Pinaceæ, 69.—Parlatore in De Candolle, Prodr. xvi², 464.—Ridgway in Proc. U. S. Nat. Mus. 1882, 87.

Cupressus thyoides, Linnæus, Spec. 1 ed. 1003.—Kalm, Travels, English ed. ii, 174.—Du Roi, Harbk. ii, 198.—Marshall, Arbustum, 39.—Wangenheim, Amer. 8, t. 2, f. 4.—Aiton, Hort. Kew. iii, 372; 2 ed. v, 323.—Bartram, Travels, 2 ed. 409.—Michaux, Fl. Bor.-Am. ii, 208.—Willdenow, Spec. iv, 512; Enum. 991; Berl. Baumz. 111.—Nouveau Duhamel, iii, 6.—Persoon, Syn. ii, 580.—Desfontaines, Hist. Arb. ii, 567.—Schkuhr, Handb. iii, 286, t. 310.—Michaux f. Hist. Arb. Am. iii, 20, t. 2; N. American Sylva, 3 ed. iii, 162, t. 152.—Pursh, Fl. Am. Sept. ii, 646.—Eaton, Manual, 111; 6 ed. 115.—Nuttall, Genera, ii, 224.—Hayne, Dend. Fl. 178.—Elliott, Sk. ii, 644.—Watson, Dend. Brit. ii, 156.—Torrey, Compend. Fl. N. States, 361; Fl. N. York, ii, 233.—Beck, Bot. 338.—Loudon, Arboretum, iv, 2475, f. 2327.—Forbes, Pinetum Woburn. 183, t. 61.—Hooker, Fl. Bor.-Am. ii, 165.—Eaton & Wright, Bot. 215.—Bigelow, Fl. Boston. 3 ed. 387.—Emerson, Trees Massachusetts, 98; 2 ed. i, 114.—Richardson, Arctic Exped. 442.—Darby, Bot. S. States, 516.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 435.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 28.—Wood, Cl. Book, 663; Bot. & Fl. 315.—Porcher, Resources S. Forests, 509.—Gray, Manual N. States, 5 ed. 473.—Hoopes, Evergreens, 346.—Koch, Dendrologie, ii², 162.—Vasey, Cat. Forest Trees, 36.—Veitch, Manual Conif. 238.

Thuya sphæroidea, Sprengel, Syst. iii, 889.

Thuya sphæroidalis, Richard, Conif. 45, t. 8, f. 2.

WHITE CEDAR.

Southern Maine, south near the coast to northern Florida, and along the Gulf coast to the valley of the Pearl river, Mississippi.

A tree 24 to 27 meters in height, with a trunk 0.60 to 1.20 meter in diameter; in deep, cold swamps; rare in the Gulf states, west of the bay of Mobile.

Wood very light and soft, not strong, close-grained, compact, easily worked, very durable in contact with the soil; bands of small summer cells thin, dark colored, conspicuous; medullary rays numerous, obscure; color, light brown tinged with red, growing darker with exposure, the sap-wood lighter; specific gravity, 0.3322; ash, 0.33; largely used in boat-building, for woodenware, cooperage, shingles, interior finish, telegraph and fence posts, railway ties, etc.

Along the Atlantic coast from New Jersey southward lumber is manufactured from buried trunks of this species dug from peat swamps.

330.—Chamæcyparis Nutkaensis, Spach,

Hist. Veg. xi, 333.—Nuttall, Sylva, iii, 105; 2 ed. ii, 165.—Endlicher, Syn. Conif. 62.—Ledebour, Fl. Rossica, iii, 680.—Lindley & Gordon in Jour. Hort. Soc. London, v, 209.—Carrière, Trait. Conif. 134; 2 ed. 127.—Walpers, Ann. v, 796.—Henkel & Hochstetter, Nadelhölz, 250.—Parlatore in De Candolle, Prodr. xvi², 465.—Hall in Coulter's Bot. Gazette, ii, 91.—G. M. Dawson in Canadian Nat. 2 ser. ix, 329.

Cupressus Nootkatensis, Lambert, Pinus, 1 ed. ii, 18; 2 ed. ii, No. 60.—Loudon, Arboretum, iv, 2480.

Cupressus Nutkaensis, Hooker, Fl. Bor.-Am. ii, 165.—Newberry in Pacific R. R. Rep. vi, 63, f. 28.—Gordon, Pinetum, 66; 2 ed. 94.—Cooper in Smithsonian Rep. 1858, 263.—Nelson, Pinaceæ, 74.—Hoopes, Evergreens, 345.—Lawson, Pinetum Brit. ii, 199, t. 34, f. 1-12.—Koch, Dendrologie, ii², 165.—Vasey, Cat. Forest Trees, 36.—Macoun in Geological Rep. Canada, 1876-'77, 211.—Veitch, Manual Conif. 235.

Thuya excelsa, Bongard in Mem. Acad. St. Petersburg, 6 ser. ii, 164.

Cupressus Americana, Trautvetter, Imag. Pl. Fl. Rossica, 12, t. 7.

C. Nutkaensis, var. *glauca*, Walpers, Ann. v, 769.

Thuyopsis borealis, Hort.—Carrière, Trait. Conif. 1 ed. 113.

Thuyopsis cupressoides, Carrière, Man. des Pl. iv, 324.

C. excelsa, Fischer in herb. Sitka.

Thuyopsis Tchugatskoy and *T. Tchugatskoyæ*, Hort.

YELLOW CYPRESS. SITKA CYPRESS.

Sitka, south along the islands and Coast ranges of British Columbia and the Cascade mountains of Washington territory and Oregon to the valley of the Santian river, Oregon ("Lucky Camp mountain", *Cusick*).

A large tree of great economic value, 30 to 38 meters in height, with a trunk 1.20 to 1.80 meter in diameter, or toward its southern limits and at high elevations much smaller; common along the coast at the sea-level to about latitude 49° 30′ N., then less common and only at higher elevations; south of British Columbia hardly below 5,000 feet elevation and very rare and local; the most valuable timber tree of Alaska.

Wood light, hard, not strong, brittle, very close-grained, compact, very durable in contact with the soil, easily worked, satiny, susceptible of a beautiful polish, possessing an agreeable, resinous odor; bands of small summer cells thin, not conspicuous; medullary rays thin, numerous, hardly distinguishable; color, bright, light clear yellow, the thin sap-wood nearly white; specific gravity, 0.4782; ash, 0.34; somewhat used in boat- and ship-building, for furniture, interior finish, etc., probably unsurpassed in beauty as a cabinet wood by that of any North American tree.

331.—Chamæcypàris Lawsoniana, Parlatore,

Stud. Organ. Conif. 23, 29, t. 3, f. 22-25; De Candolle, Prodr. xvi², 464.—Gordon, Pinetum, 2 ed. 85.—Watson, Bot. California, ii, 155.—Sargent in London Gard. Chronicle, 1881, 8.

Cupressus Lawsoniana, Murray in Edinburgh New Phil. Jour. new ser. i, 292, t. 9.—Bot. Mag. t. 5581.—Nelson, Pinaceæ, 72.—Cooper in Smithsonian Rep. 1858, 263.—Lawson, Pinetum Brit. ii, 191, t. 31, f. 1-13.—Hoopes, Evergreens 342, f. 53.—Henkel & Hochstetter, Nadelhölz. 246.—Fowler in London Gard. Chronicle, 1872, 285.—London Garden, vii 508 & t.—Vasey, Cat. Forest Trees, 36.—Veitch, Manual Conif. 231.—Eichler in Monatsb. Acad. Berl. 1881, f. 29, 30.

Cupressus fragrans, Kellogg in Proc. California Acad. i, 103.

? Cupressus attenuata, Gordon, Pinetum, 1 ed. 57; 2 ed. 79.

C. Boursierii, Carrière, Trait. Conif. 2 ed. 125 [not Decaisne].

C. Nutkanus, Torrey, Bot. Wilkes Exped. t. 16.

PORT ORFORD CEDAR. OREGON CEDAR. WHITE CEDAR. LAWSON'S CYPRESS. GINGER PINE.

Oregon, Coos bay, south to the valley of the Rogue river, not extending more than thirty miles from the coast; California, valley of the upper Sacramento river (shores of Castle and Soda lakes, Shasta county).

A large tree of the first economic value, 45 to 61 meters in height, with a trunk 1.80 to 4 meters in diameter; rich woods, in low, moist soil, interspersed with the yellow fir and hemlock; most common and reaching its greatest development along the Oregon coast; local; in California very rare and local.

Wood light, hard, strong, very close-grained, compact, easily worked, very durable in contact with the ground, abounding in odoriferous resin, satiny, susceptible of a beautiful polish; layers of small summer cells thin, not conspicuous; medullary rays numerous, very obscure; color, light yellow or almost white, the thin sap-wood hardly distinguishable; specific gravity, 0.4621; ash, 0.10; largely manufactured into lumber and used for interior finish, flooring, railway ties, fence posts, matches, and in ship- and boat-building; the resin strongly diuretic and a powerful insecticide.

332.—Cupressus macrocarpa, Hartweg,

Jour. Hort. Soc. London, ii, 187.—Bentham, Pl. Hartweg. 337.—Gordon in Jour. Hort. Soc. London, iv, 296 & t.; Pinetum, 65; 2 ed. 91.—Lindley & Gordon in Jour. Hort. Soc. London, v, 206.—Knight, Syn. Conif. 20.—Torrey, Bot. Mex. Boundary Survey, 211.—Cooper in Smithsonian Rep. 1858, 263; Proc. California Acad. iii, 290.—Carrière, Trait. Conif. 1 ed. 124, in part.—Bolander in Proc. California Acad. iii, 228.—Henkel & Hochstetter, Nadelhölz. 239.—Nelson, Pinaceæ, 73.—Hoopes, Evergreens, 353.—Parlatore in De Candolle, Prodr. xvi², 473.—Fowler in London Gard. Chronicle, 1872, 285.—Koch, Dendrologie, ii², 148.—Vasey, Cat. Forest Trees, 36.—Watson, Bot. California, ii, 113.—Veitch, Manual Conif. 234.—Lawson Pinetum Brit. ii, 195, t. 32.

C. Lambertiana, Carrière in Rev. Hort. 1855, 232; Trait. Conif. 124; 2 ed. 166.

C. Hartwegii, Carrière in Rev. Hort. 1855, 232; Trait. Conif. 2 ed. 168.

? C. macrocarpa, var. *fastigiata*, Knight, Conif. 20.—Parlatore in De Candolle, Prodr. xvi², 473.—Veitch, Manual Conif. 234.

? C. Hartwegii, var. *fastigiata*, Carrière, Trait. Conif. 2 ed. 169.

MONTEREY CYPRESS.

California, Monterey (Cypress point, Pescadero ranch, and Carmelo point).

A tree 15 to 21 meters in height, with a trunk 1.20 to 1.80 meter in diameter; on granite rocks immediately upon the sea-coast; very local.

Wood heavy, hard, strong, rather brittle, very close-grained, compact, easily worked, very durable in contact with the soil, satiny, susceptible of a beautiful polish, odorous; bands of small summer cells thin, dark colored, conspicuous; medullary rays numerous, hardly distinguishable; color, clear bright brown streaked with red and yellow, the thin sap-wood light yellow; specific gravity, 0.6261; ash, 0.57; very beautiful and of undoubted value as a cabinet wood.

333.—Cupressus Goveniana, Gordon,

Jour. Hort. Soc. London, iv, 296 & f.; Pinetum, 60; 2 ed. 83.—Bentham, Pl. Hartweg. 337.—Lindley & Gordon in Jour. Hort. Soc. London, v, 206.—Carrière, Trait. Conif. 125; 2 ed. 170.—Torrey, Mex. Boundary Survey, 211.—Cooper in Smithsonian Rep. 1858, 266.—Henkel & Hochstetter, Nadelhölz. 240.—Hoopes, Evergreens, 252.—Parlatore in De Candolle, Prodr. xvi², 472.—Fowler in London Gard. Chronicle, 1872, 285.—Watson, Bot. California. ii, 114.—Veitch, Manual Conif. 230.

? C. Californica, Carrière, Trait. Conif. 127; 2 ed. 164.

C. Californica gracilis, Nelson, Pinaceæ, 70, in part

? C. cornuta, Carrière in Rev. Hort. 1866, 251 & f.

? Juniperus aromatica, Hort.

Humboldt county, California, south along the coast and through the Coast ranges into Lower California.

A small tree, sometimes 12 to 15 meters in height, with a trunk 0.60 to 0.90 meter in diameter; borders of streams and mountain slopes, in rather rich soil, or often a low shrub, fruiting when 0.30 to 1 meter in height, and occupying extensive tracts of sandy barrens 1 to 5 miles inland from the coast, or thin, rocky soil (*Pringle*); widely but not generally distributed.

Wood light, soft, not strong, brittle, close-grained, compact; bands of small summer cells broad, dark colored, conspicuous; medullary rays thin, obscure; color, light brown, the thick sap-wood nearly white; specific gravity, 0.4689; ash, 0.45.

334.—Cupressus Macnabiana, Murray,

Edinburgh, New Phil. Jour. new ser. i, 293, t. 10.—Gordon, Pinetum, 64; 2 ed. 90.—Carrière, Trait. Conif. 2 ed. 165.—Hoopes, Evergreens, 353.—Parlatore in De Candolle, Prodr. xvi², 473.—Koch, Dendrologie, ii², 150.—Vasey, Cat. Forest Trees, 36.—Watson, Bot. California, ii, 114.—Veitch, Manual Conif. 233.

C. glandulosa, Hooker, (ex. Henkel & Hochstetter, Nadelhölz. 241).

C. Californica gracilis, Nelson, Pinaceæ, 70, in part.

California, mountains south of Clear lake, Lake county (*Torrey, Bolander, Pringle, Miller*).

A small tree, sometimes 9 meters in height, with a trunk 0.30 to 0.45 meter in diameter, or more often a tall shrub branching from the ground; very rare and local; not rediscovered in the original station reported by Jeffrey, the Mount Shasta region.

Wood not collected.

335.—Cupressus Guadalupensis, Watson,

Proc. Am. Acad. xiv, 300; Bot. California, ii, 114.

C. macrocarpa, ? Watson in Proc. Am. Acad. xi, 119 [not Hartweg].

C. Arizonica, E. L. Greene in Bull. Torrey Bot. Club, ix, 64.—Rusby in Bull. Torrey Bot. Club, ix, 79.—Watson in Proc. Am. Acad. xviii, 157.

San Francisco mountains of New Mexico and eastern Arizona (*Greene, Rusby*), Santa Catalina and Santa Rita mountains, Arizona (*Pringle, Lemmon*); on the Sierra Madre, near Saltillo, and Gaudalupe island, Mexico (*Palmer*).

A tree 18 to 21 meters in height, with a trunk 0.60 to 0.90 meter in diameter; rocky cañons and ridges; on the New Mexico and Arizona mountains, forming extensive forests between 5,000 and 8,000 feet elevation, generally on northern slopes; local.

Wood light, soft, very close-grained, compact, easily worked, susceptible of a good polish; bands of small summer cells, broad, conspicuous; medullary rays numerous, very obscure; color, gray, often faintly streaked with yellow, the thick sap-wood light yellow; specific gravity, 0.4843; ash, 0.44.

336.—Juniperus Californica, Carrière,

Rev. Hort, iii, 353 & f.; Trait. Conif. 58; 2 ed. 41.—Gordon, Pinetum, 121.—Vasey, Cat. Forest Trees, 37.—Engelmann in Trans. St. Louis Acad. iii, 588; Wheeler's Rep. vi, 375.—Palmer in Am. Nat. xii, 593.—Watson, Bot. California, ii, 113.

J. tetragona, var. *osteosperma*, Torrey in Pacific R. R. Rep. iv, 141; Bot. Mex. Boundary Survey, 210; Ives' Rep. 28.

J. tetragona, Cooper in Smithsonian Rep. 1858, 263 [not Schlechtendal].

J. Cerrosianus, Kellogg in Proc. California Acad. ii, 37.

J. occidentalis, Gordon, Pinetum, Suppl. 38; Pinetum, 2 ed. 162, in part.—Henkel & Hochstetter, Nadelhölz. 245, in part.—Hoopes, Evergreens, 299, in part.—Parlatore in De Candolle, Prodr. xvi², 489, in part.

J. Californica, var. *osteosperma*, Engelmann; Watson in Proc. Am. Acad. xi, 119.

JUNIPER.

California, San Francisco bay, south through the Coast ranges to Lower California.

A small tree, rarely 6 to 9 meters in height, with a trunk 0.30 to 0.60 meter in diameter, or more often a tall shrub, sending up many stems from the ground; sandy barrens and dry, rocky soil.

Wood light, soft, very close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, dark colored, not conspicuous; medullary rays numerous, very obscure; color, light brown slightly tinged with red, the sap-wood nearly white; specific gravity, 0.6282; ash, 0.75; in southern California largely used for fencing and fuel.

Var. Utahensis, Engelmann,

Trans. St. Louis Acad. iii, 588; Wheeler's Rep. vi, 264.—Vasey, Cat. Forest Trees, 37.—Sargent in Am. Jour. Sci. 3 ser. xvii, 418.—Palmer in Am. Nat. xii, 594.—Watson, Bot. California, ii, 113.

J. occidentalis, Watson in King's Rep. v, 336, in part; Pl. Wheeler, 18 [not Hooker].

J. occidentalis, var. *Utahensis*, Veitch, Manual Conif. 289.

JUNIPER.

Western base of the Wahsatch mountains, Utah, to eastern California, south through the Great Basin to southeastern California (*Pringle*) and the San Francisco mountains, eastern Arizona (*Greene*).

A small, contorted tree, 6 to 9 meters in height, with a trunk 0.60 to 0.90 meter in diameter, or more often a tall, much-branched shrub; very common through the elevated valleys and along the lower slopes of all the ranges of central and southern Utah and Nevada, and the most generally-distributed arborescent species of the region.

Wood light, soft, close-grained, compact, very durable in contact with the soil; color, light brown, the thick sap-wood nearly white; specific gravity, 0.5522; ash, 0.49; the common fuel and fencing material of the region.

337.—Juniperus pachyphlœa, Torrey,

Pacific R. R. Rep. iv, 142; Bot. Mex. Boundary Survey, 210; Ives' Rep. 28.—Cooper in Smithsonian Rep. 1858, 263.—Henkel & Hochstetter, Nadelhölz. 247.—Carrière, Trait. Conif. 2 ed. 56.—Parlatore in De Candolle, Prodr. xvi², 490.—Gordon, Pinetum, 2 ed. 164.—Engelmann in Trans. St. Louis Acad. iii, 589; Wheeler's Rep. vi, 264.—Palmer in Am. Nat. xii, 593.—Veitch, Manual Conif. 289.—Rusby in Bull. Torrey Bot. Club, ix, 79.—Hemsley, Bot. Am.-Cent. iii, 184.

J. plochyderma, Torrey in Sitgreaves' Rep. 173, t. 16.

J. Sabina pachyphlœa, Antoine, Kupress. 39.

JUNIPER.

Eagle and Limpia mountains (*Havard*), west along the ranges of western Texas, southern New Mexico and Arizona south of latitude 34°; southward into Mexico.

A tree 9 to 15 meters in height, with a trunk 0.60 to 1.20 meter in diameter; dry, stony slopes and ridges, generally between 2,000 and 3,000 feet elevation; the prevailing and largest juniper of the mountains of western Texas.

Wood light, soft, not strong, brittle, very close-grained, compact, susceptible of a fine polish; bands of small summer cells very thin, dark colored, not conspicuous; medullary rays numerous, obscure; color, clear light red, often streaked with yellow, the thin sap-wood nearly white; specific gravity, 0.5829; ash, 0.11.

338.—Juniperus occidentalis, Hooker,

Fl. Bor.-Am. ii, 166.—Endlicher, Syn. Conif. 26.—Lindley & Gordon in Jour. Hort. Soc. London, v, 202.—Carrière, Conif. 42, in part; 2 ed. 40, in part.—Torrey in Pacific R. R. Rep. iv, 142.—Cooper in Smithsonian Rep. 1858, 263.—Gordon, Pinetum, 117 (excl. syn.); Suppl. 38 (excl. syn.); 2 ed. 162 (excl. syn.).—Henkel & Hochstetter, Nadelhölz. 345, in part.—Nelson, Pinaceæ, 142.—Hoopes, Evergreens, 299 (excl. syn. *Californica*).—Parlatore in De Candolle, Prodr. xvi², 489, in part.—Vasey, Cat. Forest Trees, 37.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Palmer in Am. Nat. xii, 594.—Watson, Bot. California, ii, 113.—Veitch, Manual Conif. 289.

J. excelsa, Pursh, Fl. Am. Sept. ii, 647.—Nuttall, Genera, ii, 245.

J. Andina, Nuttall, Sylva, iii, 95, t. 110; 2 ed. ii, 157, t. 110.—Carrière, Trait. Conif. 2 ed. 55.

Chamæcyparis Boursierii, Decaisne in Bull. Soc. Bot. France, i, 70.

J. Hermanni, Koch, Dendrologie, ii², 141 [not Sprengel].

J. occidentalis, var. *pleiosperma*, Engelmann in Trans. St. Louis Acad. ii, 590.

J. pyriformis, Hort.

JUNIPER.

Blue mountains and high prairies of eastern Washington territory and Oregon, Cascade mountains of Oregon, valley of the Klamath river, California, and south along the high ridges of the Sierra Nevada, between 7,000 and 10,000 feet elevation, to the San Bernardino mountains (*Parish Bros.*).

A tree 9 to 15 meters in height, with a trunk 1.20 to 2.10 meters in diameter, or often a low, much-branched shrub; dry, rocky ridges and prairies, reaching its greatest development in the California sierras.

Wood light, soft, very close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, not conspicuous; medullary rays numerous, very obscure; color, light red or brown, the sap-wood nearly white; specific gravity, 0.5765; ash, 0.12; largely used for fencing and fuel.

Var. monosperma, Engelmann,

Trans. St. Louis Acad. iii, 590; Wheeler's Rep. vi, 263.—Veitch, Manual Conif. 289.—Rusby in Bull. Torrey Bot. Club, ix, 79.

JUNIPER.

Eastern base of Pike's peak, Colorado, to the mountains of western Texas, and through New Mexico and southern Arizona to southern California.

A small, stunted tree, 6 to 9 meters in height, with a trunk sometimes 0.60 meter in diameter, or often branching from the ground with many stout, contorted stems; dry, gravelly slopes between 3,500 and 7,000 feet elevation.

Wood heavier than that of the type, the layers of annual growth often eccentric; specific gravity, 0.7119; ash, 0.78; largely used for fuel and fencing.

Var. conjugens, Engelmann,

Trans. St. Louis Acad. iii, 590.—Veitch, Manual Conif. 289.—Watson in Proc. Am. Acad. xviii, 158.

JUNIPER.

Western Texas, valley of the Colorado river (Austin), west and north.

A tree 11 to 15 meters in height, with a trunk sometimes 0.30 meter in diameter, covering with extensive forests the limestone hills of western Texas; its range not yet satisfactorily determined.

Wood light, hard, not strong, very close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, dark colored, conspicuous; medullary rays numerous, very obscure; color, brown, often streaked with red, the thin sap-wood nearly white; specific gravity, 0.6907; ash, 0.46; largely used for fencing, fuel, telegraph poles, railway ties, etc.

339.—Juniperus Virginiana, Linnæus,

Spec. 1 ed. 1039.—Kalm, Travels, English ed. ii, 180.—Marshall, Arbustum, 70.—Wangenheim, Amer. 9, t. 2, f. 5.—Walter, Fl. Caroliniana, 248.—Aiton, Hort. Kew. iii, 414; 2 ed. v, 414.—Lamarck, Dict. iv, 627.—Willdenow, Spec. iv, 853; Enum. 1025; Berl. Baumz. 198.—Persoon, Syn. ii, 632.—Desfontaines, Hist. Arb. ii, 539.—Michaux f. Hist. Arb. Am. iii, 42, t. 5; N. American Sylva, 3 ed. 173, t. 155.—Pursh, Fl. Am. Sept. 647.—Nouveau Duhamel, vi, 49, t. 16.—Barton, Prodr. Fl. Philadelph. 96; Compend. Fl. Philadelph. ii, 200.—Eaton, Manual, 118; 2 ed. 194.—Nuttall, Genera, ii, 245; Sylva, iii, 97; 2 ed. ii, 159.—Bigelow, Med. Bot. iii, 49, t. 45; Fl. Boston. 3 ed. 398.—Hayne, Dend. Fl. 205.—Elliott, Sk. ii, 717.—Torrey in Nicollet's Rep. 167; Compend. Fl. N. States, 377; Fl. N. York, ii, 235; Marcy's Rep. 284; Pacific R. R. Rep. iv, 142; Bot. Mex. Boundary Survey, 211; Ives' Rep. 28.—Sprengel, Syst. iii, 908.—Richard, Conif. 37, t. 6, f. 2.—Audubon, Birds, t. 43.—Rafinesque, Med. Bot. ii, 13.—Beck, Bot. 337.—Lindley, Fl. Med. 556.—Loudon, Arboretum, iv, 2495, f. 2357.—Forbes, Pinetum Woburn. 199.—Penn. Cycl. xiii, 147.—Eaton & Wright, Bot. 288.—Emerson, Trees Massachusetts, 102; 2 ed. i, 118.—Endlicher, Syn. Conif. 27, in part.—Scheele in Roemer, Texas, Appx. 447.—Lindley & Gordon in Jour. Hort. Soc. London, v, 202.—Parry in Owen's Rep. 618.—Darlington, Fl. Cestrica, 3 ed. 295.—Knight, Syn. Conif. 12.—Darby, Bot. S. States, 515.—Durand in Jour. Philadelphia Acad. 1855, 101.—Torrey & Gray in Pacific R. R. Rep. ii, 130, 175.—Carrière, Trait. Conif. 43; 2 ed. 44.—Bigelow in Pacific R. R. Rep. 20.—Gordon, Pinetum, 112; 2 ed. 154.—Cooper in Smithsonian Rep. 1858, 257; Am. Nat. iii, 413.—Chapman, Fl. S. States, 435.—Gray in Pacific R. R. Rep. xii², 48; Manual N. States, 5 ed. 474; Hall's Pl. Texas, 21.—Hooker f. in Trans. Linnæan Soc. xxiii², 302.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 71.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 663; Bot. & Fl. 314.—Porcher, Resources S. Forests, 510.—Engelmann in Trans. Am. Phil. Soc. new ser. xii, 209; Trans. St. Louis Acad. iii, 591; Wheeler's Rep. vi, 263.—Lyall in Jour. Linnæan Soc. vii, 144.—Henkel & Hochstetter, Nadelhölz. 335.—Nelson, Pinaceæ, 153.—Hoopes, Evergreens, 291.—Parlatore in De Candolle, Prodr. xvi², 488.—Young, Bot. Texas, 517.—Koch, Dendrologie, ii², 138.—Watson in King's Rep. v, 335.—Rothrock in Pl. Wheeler, 28, 50; Wheeler's Rep. vi, 10.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 132.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 122.—Vasey, Cat. Forest Trees, 37.—Guibourt, Hist. Drogues, 7 ed. ii, 242.—Broadhead in Coulter's Bot. Gazette, iii, 60.—G. M. Dawson in Canadian Nat. new ser. ix, 329.—Scars in Bull. Essex Inst. xiii, 183.—Veitch, Manual Conif. 282.—Bell in Geological Rep. Canada, 1879–'80, 52c.—Ridgway in Proc. U. S. Nat. Mus. 1882, 87.—Hemsley, Bot. Am.-Cent. iii, 184.

J. Caroliniana, Marshall, Arbustum, 71.—Du Roi, Harbk. 2 ed. 497.

J. arborescens, Mœnch, Meth. 699.

J. Barbadensis, Michaux, Fl. Bor.-Am. ii, 246 [not Linnæus].—Pursh, Fl. Am. Sept. ii, 647.—Nuttall, Genera, ii, 245; Sylva, iii, 96; 2 ed. ii, 158.

J. Virginiana, var. *Caroliniana*, Willdenow, Berl. Baumz. 198.—Hayne, Dend. Fl. 205.—Loudon, Arboretum, iv, 2495.

J. Virginiana, var. *Hermanni*, Persoon, Syn. ii, 632.

J. Hermanni, Sprengel, Syst. iii, 908.

J. fœtida, var. *Virginiana*, Spach in Ann. Sci. Nat. 2 ser. xvi, 298; Hist. Veg. xi, 318.

J. Virginiana vulgaris, Endlicher, Syn. Conif. 28.

J. Sabina, var. *Virginiana*, Antoine, Kupress. t. 83, 84.

RED CEDAR. SAVIN.

Southern New Brunswick to the northern shores of Georgian bay, northern Michigan, Wisconsin and Minnesota, south to cape Malabar and Tampa bay, Florida, and the valley of the Colorado river, Texas, west to eastern Nebraska, Kansas, and the Indian territory to about the one hundredth parallel of west longitude; in the Pacific region, Rocky mountains of Colorado to Vancouver's island, British Columbia; not extending to western Texas, California, or Oregon; in Utah, Nevada, and Arizona rare and local.

The most widely distributed of North American Coniferæ, a tree 24 to 30 meters in height, with a trunk 0.60 to 1.35 meter in diameter, or toward its northern and western limits much smaller, often reduced to a low shrub; dry, gravelly ridges, and limestone hills, or in the Gulf states, especially near the coast, in deep swamps; in northern Montana, borders of streams and lakes; common; and reaching its greatest development in the valley of the Red river, Texas.

Wood light, soft, not strong, brittle, very close- and straight-grained, compact, easily worked, very durable in contact with the soil; odorous; bands of small summer cells rather broad, conspicuous; medullary rays numerous, very obscure; color, dull red, the thin sap-wood nearly white; specific gravity, 0.4926; ash, 0.13; largely used for posts, sills, railway ties, interior finish, cabinet-making, and almost exclusively for lead-pencils.

A decoction of the leaves is occasionally used as a substitute for savine cerete, and an infusion of the berries as a diuretic (*U. S. Dispensatory*, 14 ed. 529.—*Nat. Dispensatory*, 2 ed. 795).

340.—Taxodium distichum, Richard,

Ann. Mus. xvi, 298; Conif. 52, t. 10.—Nouveau Duhamel, iii, 8.—Robin, Voyages, iii, 525.—Lambert, Pinus, 2 ed. 25 & t.—Torrey, Compend. Fl. N. States, 361; Bot. Mex. Boundary Survey, 210.—Brongniart in Ann. Sci. Nat. 1 ser. xxx, 182.—Loudon, Arboretum, iv, 2481, f. 2335-2339.—Forbes, Pinetum Woburn. 177, t. 60.—Endlicher, Syn. Conif. 68, in part.—Engelmann & Gray in Jour. Boston Soc. Nat. Hist. v, 234.—Scheele in Rœmer, Texas, Appx. 447.—Lindley & Gordon in Jour. Hort. Soc. London, v, 269.—Knight, Syn. Conif. 20.—Darlington, Fl. Cestrica, 3 ed. 295.—Carrière, Trait. Conif. 143; 2 ed. 180; Rev. Hort. viii, 62 & f.—Morren in Belg. Hort. vi, 74 & t.—Gordon, Pinetum, 305; 2 ed. 382.—London Gard. Chronicle, 1857, 549.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 435.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 29.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 663; Bot. & Fl. 315.—Henkel & Hochstetter, Nadelhölz. 258.—Gray, Manual N. States, 5 ed. 473.—Hoopes, Evergreens, 364, f. 58.—Parlatore in De Candolle, Prodr. xvi^2, 440.—Lawson, Pinetum Brit. ii, 305, f. 1-9.—Fowler in London Gard. Chronicle, 1872, 1526.—Young, Bot. Texas, 518.—Koch, Dendrologie, ii^2, 195.—Bertrand in Bull. Soc. Bot. France, xviii, 127.—Vasey, Cat. Forest Trees, 36.—Broadhead in Coulter's Bot. Gazette, iii, 60.—Veitch, Manual Conif. 214.—Ridgway in Proc. U. S. Nat. Mus. 87.—Watson in Proc. Am. Acad. xviii, 158.

Cupressus disticha, Linnæus, Spec. 1 ed. 1003.—Du Roi, Harbk. i, 201.—Marshall, Arbustum, 39.—Lamarck, Dict. ii, 244.—Wangenheim, Amer. 43.—Walter, Fl. Caroliniana, 238.—Aiton, Hort. Kew. iii, 372; 2 ed. v, 323.—Bartram, Travels, 2 ed. 88.—Michaux, Fl. Bor.-Am. ii, 208.—Desfontaines, Hist. Arb. ii, 567.—Willdenow, Spec. iv, 512; Enum. 991; Berl. Baumz. 111.—Schkuhr, Handb. iii, 288.—Michaux f. Hist. Arb. Am. iii, 4, t. 1; N. American Sylva, 3 ed. iii, 154, t. 151.—Pursh, Fl. Am. Sept. ii, 645.—Barton, Prodr. Fl. Philadelph. 93.—Rafinesque, Fl. Ludoviciana, 151.—Nuttall, Genera, ii, 224.—Hayne, Dend. Fl. 178.—James in Long's Exped. ii, 317, 318.—Elliott, Sk. ii, 642.—Beck, Bot. 238.—Eaton, Manual, 6 ed. 116.—Eaton & Wright, Bot. 215.—De Chambray, Trait. Arb. Res. Conif. 349.—*Dickson & Brown* in Am. Jour. Sci. 2 ser. v, 15.—Porcher, Resources S. Forests, 508.

Cupressus disticha, var. *patens* and var. *nutans*, Aiton, Hort. Kew. 2 ed. v, 323.

Cupressus disticha, var. *imbricaria*, Nuttall, Genera, ii, 224; Trans. Am. Phil. Soc. 2 ser. v, 163.—Croom in Am. Jour. Sci. 1 ser. xxviii, 166.

Schubertia disticha, Mirbel in Mem. Mus. xiii, 75.—Sprengel, Syst. iii, 890.—Spach, Hist. Veg. xi, 349.

T. microphyllum, Brongniart in Ann. Sci. Nat. 1 ser. xxx, 182.—Endlicher, Syn. Conif. 68.—Lindley & Gordon in Jour. Hort. Soc. London, v, 207.—Carrière, Trait. Conif. 148.

T. adscendens, Brongniart in Ann. Sci. Nat. 1 ser. xxx, 182.—Endlicher, Syn. Conif. 69.—Lindley & Gordon in Jour. Hort. Soc. London, v, 207.—Carrière, Trait. Conif. 148.

T. distichum, var. *patens* and var. *nutans*, Endlicher, Syn. Conif. 68.—Loudon, Arboretum, iv, 2481.

T. distichum fastigiatum, Knight, Syn. Conif. 21.—Carrière, Trait. Conif. 145; 2 ed. 181.—Gordon, Pinetum, 307; 2 ed. 383.—Henkel & Hochstetter, Nadelhölz. 260.—Hoopes, Evergreens, 367.

T. distichum, var. *microphyllum*, Henkel & Hochstetter, Nadelhölz. 261.—Parlatore in De Candolle, Prodr. xvi^2, 441 (*T. Sinense pendulum*, Forbes, Pinetum Woburn. 180.—*Glyptostrobus pendulus*, Endlicher, Conif. 71.—Bot. Mag. t. 5603.—Carrière, trait. Conif. 152.—*T. Sinense*, Gordon, Pinetum, 309.—*Cupressus Sinense*, Hort.).

Cupressinnata disticha, Nelson, Pinaceæ, 61.

BALD CYPRESS. BLACK CYPRESS. RED CYPRESS. WHITE CYPRESS. DECIDUOUS CYPRESS.

Sussex county, Delaware, south near the coast to Mosquito inlet and cape Romano, Florida, west through the Gulf states near the coast to the valley of the Nueces river, Texas, and through Arkansas to western Tennessee, western and northern Kentucky, southeastern Missouri, and southern Illinois and Indiana.

A large tree of great economic value, 24 to 46 meters in height, with a trunk 1.80 to 4 meters in diameter; deep, submerged swamps, river-bottom lands, and pine-barren ponds; common and forming extensive forests in the south Atlantic and Gulf states.

Wood light, soft, close, straight-grained, not strong, compact, easily worked, very durable in contact with the soil; bands of small summer cells broad, resinous, conspicuous; medullary rays numerous, very obscure; color, light or dark brown, the sap-wood nearly white; specific gravity, 0.4543; ash, 0.42; largely manufactured into lumber and used for construction, cooperage, railway ties, posts, fencing, etc., often injured, especially west of the Mississippi river, by a species of *Dædalia*, not yet determined, rendering it unfit for lumber.

Two varieties of cypress, black and white, are recognized by lumbermen, the wood of the former heavier than water when green, rather harder and considered more durable than the other; the unseasoned wood of the latter lighter than water and rather lighter colored than black cypress.

341.—Sequoia gigantea, Decaisne,

Bull. Bot. Soc. France, i, 70; Rev. Hort. 1855, 9, t. 10, f. 1.—Gray in Proc. Am. Acad. iii, 94; Am. Jour. Sci. 2 ser. xvii. 440; xviii, 150, 286.—Torrey in Pacific R. R. Rep. iv, 140.—Kellogg in Proc. California Acad. i, 42.—Blake in Pacific R. R. Rep. v, 257, t. 13.—Carrière, Trait. Conif. 166.—Newberry in Pacific R. R. Rep. vi, 90.—Cooper in Smithsonian Rep. 1858, 263.—Wood, Bot. & Fl. 315.—Bloomer in Proc. California Acad. iii, 397.—Hoopes, Evergreens, 239, f. 29.—Parlatore in De Candolle Prodr. xvi^2, 437.—Koch, Dendrologie, ii^2, 194.—Bertrand in Ann. Sci. Nat. 5 ser. xx, 114.—Vasey, Cat. Forest Trees, 36.—Muir in Proc. Am. Assoc. xxv, 242.—Watson, Bot. California, ii, 117.

Wellingtonia gigantea, Lindley in London Gard. Chronicle, 1853, 819, 823; Bot. Mag. t. 4777, 4778.—C. Lemaire in Ill. Hort. 1854, 14 & t.—Naudin in Rev. Hort. 1854, 116.—Fl. des Serres, ix, 93 & t. 903 & t.—Flor. Cabinet, 1854, 121 & t.—Bigelow in Pacific R. R. Rep. iv, 22.—Gordon, Pinetum, 330; Suppl. 106; 2 ed. 415.—Murray in Edinburgh New Phil. Jour. new ser, xi, 205, t. 3–9 (Trans. Bot. Soc. Edinburgh, vi, 330, t. 6, f. 8, 9).—Henkel & Hochstetter, Nadelhölz. 222.—Carrière, Trait. Conif. 2 ed. 217.—Veitch, Manual Conif. 415.

Wellingtonia Californica, Winslow in California Farmer, September, 1854.—Hooker, Jour. Bot. & Kew Misc. vii, 26.

Taxodium Washingtonianum, Winslow in California Farmer, September, 1854.

Taxodium giganteum, Kellogg & Behr in Proc. California Acad. i, 51.

S. Wellingtonia, Seemann in Bonplandia, ii, 238; iii, 27; vi, 343; Ann. & Mag. Nat. Hist. 3 ser. March, 1859, 161.—Lawson, Pinetum Brit. iii, 299, t. 37, 51, 53, f. 1–37.

Gigantabies Wellingtonia, Nelson, Pinaceæ, 79.

BIG TREE.

California, western slopes of the Sierra Nevadas from Placer county (Calaveras Grove) south to Deer creek on the southern borders of Tulare county.

The largest tree of the American forest, 76 to 119 meters in height, with a trunk 6 to 11 meters in diameter; valleys and moist swales or hollows between 4,000 and 6,000 feet elevation, growing in small, isolated groves, except toward its southern limits, here mixed with the sugar pine and red and white firs, covering large tracts, often several hundred acres in extent.

Wood very light, soft, weak, brittle, rather coarse-grained, compact, remarkably durable in contact with the soil; bands of small summer cells thin, dark colored, conspicuous; medullary rays numerous, thin; color, bright clear red, turning much darker with exposure, the thin sap-wood white; specific gravity, 0.2882; ash, 0.50; in Fresno county formerly somewhat manufactured into lumber and locally used for fencing, shingles, construction, etc.

342.—Sequoia sempervirens, Endlicher,

Syn. Conif. 198.—Decaisne in Rev. Hort. 1855, 9, t. 11, f. 2.—Carrière, Trait. Conif. 164; 2 ed. 210.—Bigelow in Pacific R. R. Rep. iv, 23.—Newberry in Pacific R. R. Rep. vi, 57, 90, f. 23.—Torrey in Pacific R. R. Rep. iv, 140; Bot. Mex. Boundary Survey, 210; Ives' Rep. 28.—Gordon, Pinetum, 303; Suppl. 97; 2 ed. 379.—Cooper in Smithsonian Rep. 1858, 263.—Murray in Edinburgh New Phil. Jour. new ser. xi, 221 (Trans. Bot. Soc. Edinburgh, vi, 346).—Seemann in Ann. & Mag. Nat. Hist. 3 ser. March, 1859, 165.—Wood, Bot. & Fl. 315.—Bolander in Proc. California Acad. iii, 231.—Hoopes, Evergreens, 244.—Parlatore in De Candolle Prodr. xvi^2, 436.—Koch, Dendrologie, ii^2, 193.—Vasey, Cat. Forest Trees, 36.—Stearns in Am. Nat. x, 110.—Watson, Bot. California, ii, 116.—Veitch, Manual Conif. 212.—Lawson, Pinetum Brit. iii, t. 52 & figs.

Taxodium sempervirens, Lambert, Pinus, 114; 2 ed. ii, 107, t. 52.—Loudon, Arboretum, iv, 2487, f. 2340, 2341.—Hooker, Fl. Bor.-Am. ii, 164; Icon. iv, t. 379.—Hooker & Arnott, Bot. Beechey, 1841.—Fremont, Geographical Mem. California, 36, 37.—Henkel & Hochstetter, Nadelhölz. 262.

Taxodii species, Douglas in Companion Bot. Mag. ii, 150.

Sequoia gigantea, Endlicher, Syn. Conif. 190, in part.—Bentham, Pl. Hartweg. 338.

Abies religiosa, Hooker & Arnott, Bot. Beechey, 160.

Schubertia sempervirens, Spach, Hist. Veg. xi, 353.

S. religiosa, Presl, Epimel. Bot. 357.—Walpers, Ann. iii, 448.

Gigantabies taxifolia, Nelson, Pinaceæ, 78.

REDWOOD.

California, from the northern boundary of the state, south through the Coast ranges to "Veers creek" near the southern border of Monterey county.

A large tree of great economic value, 61 to 92 meters in height, with a trunk 2.40 to 7 meters in diameter, sending up from the stump when cut many vigorous shoots; sides of cañons and gulches in low, wet situations, borders of streams, etc., not appearing on dry hillsides; generally confined to the western slopes of the Coast ranges, and nowhere extending far from the coast; most generally multiplied and reaching its greatest average density north of cape Mendocino.

Wood light, soft, not strong, very brittle, rather coarse-grained, compact, susceptible of a good polish, easily split and worked, very durable in contact with the soil; bands of small summer cells thin, dark colored, conspicuous; medullary rays numerous, very obscure; color, clear light red, the thin sap-wood nearly white; specific gravity, 0.4208; ash, 0.14; largely sawed into lumber; the prevailing and most valuable building material of the Pacific coast, and in California almost exclusively used for shingles, fence posts, telegraph poles, railway ties, wine-butts, tanning- and water-tanks, coffins, etc.; forms with curled or contorted grain are highly ornamental.

343.—Taxus brevifolia, Nuttall,

Sylva, iii, 86, t. 108; 2 ed. ii, 149, t. 108 (*T. occidentalis* on plate).—Torrey in Pacific R. R. Rep. iv, 140.—Newberry in Pacific R. R. Rep. vi, 60, 90, f. 26.—Cooper in Smithsonian Rep. 1858, 263; Pacific R. R. Rep. xii², 26, 69; Am. Nat. iii, 414.—Wood, Bot. & Fl. 316.—Bolander in Proc. California Acad. iii, 229.—Carrière, Trait. Conif. 2 ed. 742.—Hoopes, Evergreens, 383.—Parlatore in De Candolle, Prodr. xvi², 501.—Gray in Proc. Am. Acad. vii, 402.—Koch, Dendrologie, ii², 95.—Gordon, Pinetum, 2 ed. 392.—Vasey, Cat. Forest Trees, 35.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Hall in Coulter's Bot. Gazette, ii, 91.—Watson, Bot. California, ii, 110.—G. M. Dawson in Canadian Nat. new ser. ix, 329.—Veitch, Manual Conif. 305.

T. baccata, var. *Canadensis*, Bentham, Pl. Hartweg. 338.

T. baccata, Hooker, Fl. Bor.-Am. ii, 167, in part.

T. Boursierii, Carrière in Rev. Hort. 1854, 228 & t.; Trait. Conif. 523; 2 ed. 739.

T. Lindleyana, Murray in Edinburgh New Phil. Jour. new ser. i, 294; Trans. Bot. Soc. Edinburgh, vi, 1860.—Lawson, Cat. 1855, 15.—Gordon, Pinetum, 316; Suppl. 99.—Henkel & Hochstetter, Nadelhölz. 360.—Nelson, Pinaceæ, 174.

T. Canadensis, Bigelow in Pacific R. R. Rep. iv, 25 [not Willdenow].

YEW.

Queen Charlotte islands and the valley of the Skeena river, south through the Coast ranges of British Columbia, through western and the mountain ranges of eastern Washington territory and Oregon to the western slopes of the Rocky mountains of northern Montana (*Canby & Sargent*), through the California Coast ranges to the bay of Monterey and along the western slopes of the Sierra Nevadas to about latitude 37° N.

A tree 18 to 24 meters in height, with a trunk 0.60 to 0.90 meter in diameter, or toward its eastern limits in Idaho and Montana much smaller, often reduced to a low shrub; rare; low, rich woods and borders of streams, reaching its greatest development in western Oregon, Washington territory, and British Columbia.

Wood heavy, hard, strong, brittle, very close-grained, compact, susceptible of a beautiful polish, very durable in contact with the soil; bands of small summer cells thin, dark colored, conspicuous; medullary rays thin, numerous, very obscure; color, light bright red, the thin sap-wood light yellow; specific gravity, 0.6391; ash, 0.22; used for fence posts and by the Indians of the northwest coast for paddles, spear handles, bows, fish-hooks, etc.

344.—Taxus Floridana, Nuttall,

Sylva, iii, 92; 2 ed. ii, 155.—Croom in Am. Jour. Sci. 1 ser. xxvi, 334.—Chapman, Fl. S. States, 436.—Carrière, Trait. Conif. 2 ed. 741.—Hoopes, Evergreens, 384.—Vasey. Cat. Forest Trees, 36.

T. montana, Nuttall, Sylva, iii, 92; 2 ed. ii, 155.

YEW.

Western Florida, banks of the Apalachicola river from Bristol to Aspalaga, Gadsden county, and Watson's Landing? (*Curtiss*).

A small tree, 3 to 6 meters in height, with a trunk 0.15 to 0.25 meter in diameter; rare and very local.

Wood heavy, hard, very close-grained, compact; bands of small summer cells very thin, dark colored, not conspicuous; medullary rays numerous, obscure; color, dark brown tinged with red, the thin sap-wood nearly white; specific gravity, 0.6340; ash, 0.21.

345.—Torreya taxifolia, Arnott,

Ann. Nat. Hist. i, 134; Hooker, Icon. iii, t. 232, 233.—Eaton & Wright, Bot. 454.—Nuttall, Sylva, iii, 91, t. 109; 2 ed. ii, 153, t. 109.—Spach, Hist. Veg. xi, 298.—Endlicher, Syn. Conif. 241.—Lindley & Gordon in Jour. Hort. Soc. London, v, 226.—Darby, Bot. S. States, 516.—Carrière, Trait. Conif. 514; 2 ed. 726.—Gordon, Pinetum, 329; 2 ed. 412.—Cooper in Smithsonian Rep. 1858, 259.—Chapman, Fl. S. States, 436.—Wood, Cl. Book, 664; Bot. & Fl. 316.—Hoopes, Evergreens, 387, f. 62.—Parlatore in De Candolle, Prodr. xvi^2, 505.—Koch, Dendrologie, ii^2, 100.—Vasey, Cat. Forest Trees, 35.—Veitch, Manual Conif. 311.

Caryotaxus taxifolia, Henkel & Hochstetter, Nadelhölz. 367.

Fœtataxus montana, Nelson, Pinaceæ, 167.

STINKING CEDAR. SAVIN.

Western Florida, eastern bank of the Apalachicola river from Chattahoochee to the neighborhood of Bristol, Gadsden county; doubtfully reported from the shores of a small lake west of Ocheesee and at Wakulla Springs, Wakulla county (*Curtiss*).

A tree 12 to 18 meters in height, with a trunk 0.60 to 0.90 meter in diameter, sending up when cut many vigorous shoots from the stem and roots; borders of swamps on calcareous soil; very rare and local.

Wood light, rather hard, strong, brittle, very close-grained, compact, susceptible of a beautiful polish, very durable in contact with the soil; bands of small summer cells very thin, not conspicuous; medullary rays numerous, obscure; color, clear bright yellow, the thin sap-wood much lighter; specific gravity, 0.5145; ash, 0.73; largely used locally for fence posts, etc.

346.—Torreya Californica, Torrey,

N. York Jour. Pharm. iii, 49; Pacific R. R. Rep. iv, 140.—Bigelow in Pacific R. R. Rep. iv, 24.—Kellogg in Proc. California Acad. i, 35.—Newberry in Pacific R. R. Rep. vi, 61, 90, f. 27.—Cooper in Smithsonian Rep. 1858, 263.—Bolander in Proc. California Acad. iii, 229.—Hoopes, Evergreens, 385.—Parlatore in De Candolle, Prodr. xvi^2, 506.—Koch, Dendrologie, ii^2, 101.—Gordon, Pinetum, 2 ed. 410.—Vasey, Cat. Forest Trees, 35.—Watson, Bot. California, ii, 110.

T. Myristica, Hooker f. in Bot. Mag. t. 4780.—Van Houtte in Fl. des Serres, ix, 175 & t.—Carrière, Conif. 315; 2 ed. 727.—Gordon, Pinetum, 1 ed. 327.—Murray in Edinburgh New Phil. Jour. new ser. x, 7, t. 3.—Veitch, Manual Conif. 311.

Caryotaxus Myristica, Henkel & Hochstetter, Nadelhölz. 368.

Fœtataxus Myristica, Nelson, Pinaceæ, 168.

CALIFORNIA NUTMEG. STINKING CEDAR.

California, Mendocino county, and along the western slope of the Sierra Nevadas to Tulare county, between 3,000 and 5,000 feet elevation.

A tree 15 to 22 meters in height, with a trunk 0.30 to 0.90 meter in diameter, sending up from the stump when cut many vigorous shoots; borders of streams, in moist soil; rare.

Wood light, soft, not strong, very close-grained, compact, susceptible of a fine polish, very durable in contact with the soil; bands of small summer cells broad, not conspicuous; medullary rays numerous, obscure; color, clear light yellow, the thin sap-wood nearly white; specific gravity, 0.4760; ash, 1.34.

347.—Pinus Strobus, Linnæus,

Spec. 1 ed. 1001; Du Roi, Harbk. ii, 57.—Wangenheim, Amer. i, t. 1, f. 1.—Aiton, Hort. Kew. iii, 369; 2 ed. v, 318.—Swartz, Obs. 363.—Mœnch, Meth. 364.—Michaux, Fl. Bor.-Am. ii, 205.—*Poiret in* Lamarck, Dict. v, 341; Ill. iii, 369, t. 786, f. 2.—Lambert, Pinus, 1 ed. t. 22; 2 ed. i, 27, t. 35; 3 ed. i, 51, t. 32.—Willdenow, Spec. iv, 501; Enum. 989; Berl Baumz. 213.—Persoon, Syn. ii, 579.—Desfontaines, Hist. Arb. ii, 612.—Michaux f. Hist. Arb. Am. i, 104, t. 10; N. American Sylva, 3 ed. iii, 126, t. 145.—Nouveau Duhamel, v, 249, t. 76.—Smith in Rees' Cycl. xxviii, No. 17.—Pursh, Fl. Am. Sept. ii, 644.—Eaton, Manual, 110; 6 ed. 265.—Nuttall, Genera, ii, 223; Sylva, iii, 118; 2 ed. ii, 176 (excl. syn. var. *monticola*).—Hayne, Dend. Fl. 175.—Elliott. Sk. ii, 638.—Sprengel, Syst. ii, 887.—Torrey, Compend. Fl. N. States, 360; Fl. N. York, ii, 229.—Richard, Conif. 60, t. 12, f. 2.—Audubon, Birds, t. 39.—Beck, Bot. 339.—Loudon, Arboretum, iv, 2280, f. 2193–2196.—Forbes, Pinetum Woburn. 83.—Hooker, Fl. Bor.-Am. ii, 161.—Eaton & Wright. Bot. 359.—Bigelow, Fl. Boston. 3 ed. 385.—Antoine, Conif. 43, t. 20, f. 3.—Lindley in Penn. Cycl. xvii, 173.—Link in Linnæa, xv, 514.—Spach, Hist. Veg. xi, 394.—De Chambray, Trait. Arb. Res. Conif. 202, t. 4, 5, f. 8.—Emerson, Trees Massachusetts, 60; 2 ed. i, 73 & t.—Endlicher, Syn. Conif. 147.—Gihoul, Arb. Resin. 35, t. 5.—Knight, Syn. Conif. 34.—Lindley & Gordon in Jour. Hort. Soc. London. v, 215.—Carrière, Trait. Conif. 302; 2 ed. 398.—Buckley in Am. Jour. Sci. 2 ser. xiii, 398.—Darlington, Fl. Cestrica, 3 ed. 290.—Darby, Bot. S. States, 515.—Gordon, Pinetum, 239; 2 ed. 322.—Cooper in Smithsonian Rep. 1858, 257.—Fescali, Forst. Pfl. 56, t. 11, f. 7–13.—Chapman, Fl. S. States, 434.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 25.—Wood, Cl. Book, 660; Bot. & Fl. 312.—Porcher, Resources S. Forests, 505.—Henkel & Hochstetter, Nadelhölz. 92.—Nelson, Pinaceæ, 130.—Hoopes, Evergreens, 136, f. 19.—Gray, Manual N. States, 5 ed. 470.—Parlatore in De Candolle, Prodr. xvi², 405.—Schnizlein, Icon. t. 77, f. 10.—Koch, Dendrologie, ii², 319.—Vasey, Cat. Forest Trees, 32.—Macoun in Geological Rep. Canada, 1875–'76, 211.—Sears in Bull. Essex Inst. xiii, 187.—Veitch, Manual Conif. 183.—Bell in Geological Rep. Canada, 1879–'80, 49c.

P. Strobus, var. *alba*, var. *brevifolia*, var. *compressa*, Loudon, Arboretum, iv, 2280.—Lindley & Gordon *in Jour.* Hort. Soc. London, v, 215.

P. Strobus, var. *nivea*, Hort.

WHITE PINE. WEYMOUTH PINE.

Newfoundland, northern shores of the gulf of Saint Lawrence to lake Nipigon and the valley of the Winnipeg river, south through the northern states to Pennsylvania, the southern shores of lake Michigan, "Starving rock," near La Salle, Illinois, near Davenport, Iowa (*Parry*), and along the Alleghany mountains to northern Georgia.

A large tree of the first economic value, 24 to 52 meters in height, with a trunk 1.20 to 3.50 meters in diameter; sandy loam upon drift formations, forming extensive forests, or in the region of the great lakes often in small bodies scattered through the hard-wood forests, here reaching its greatest development; north of latitude 47° N. and south of Pennsylvania, central Michigan, and Minnesota much smaller, less common and valuable.

Wood light, soft, not strong, very close, straight-grained, compact, easily worked, susceptible of a beautiful polish; bands of small summer cells thin, not conspicuous, resin passages small, not numerous nor conspicuous; medullary rays numerous, thin; color, light brown, often slightly tinged with red, the sap-wood nearly white; specific gravity, 0.3854; ash, 0.19; more largely manufactured into lumber, shingles, laths, etc., than that of any other North American tree; the common and most valuable building material of the northern states; largely used in cabinet-making, for interior finish, and in the manufacture of matches, woodenware, and for many domestic purposes.

Coniferin, a glucoside principle, has been discovered in the cambium layer of this and several other species of *Coniferæ* (*Jour. für Prakt. Chem.* xcvii, 243.—*Am. Jour. Pharm.* 1867, 261.—*U. S. Dispensatory*, 14 ed. 901).

348.—Pinus monticola, Douglas;

Lambert, Pinus, 1 ed. iii, 27, t. 35.—Loudon, Arboretum, iv, 2291, f. 2208, 2209.—Forbes, Pinetum Woburn. 81, t. 31.—Antoine, Conif. 40, t. 18, f. 3.—Hooker & Arnott, Bot. Beechey, 394.—Endlicher, Syn. Conif. 148.—Lindley & Gordon in Jour. Hort. Soc. London, v, 215.—Carrière, Trait. Conif. 305; 2 ed. 401.—Gordon, Pinetum, 233; 2 ed. 314.—Cooper in Smithsonian Rep. 1858, 262; Pacific R. R. Rep. xii², 27; Am. Nat. iii, 410.—Lyall in Jour. Linnæan Soc. vii, 141.—Henkel & Hochstetter, Nadelhölz. 94.—Nelson, Pinaceæ, 120.—Hoopes, Evergreens, 135.—Bolander in Proc. California Acad. iii, 318.—Parlatore in De Candolle, Prodr. xvi², 405.—Gray in Proc. Am. Acad. vii, 402.—Fowler in London Gard. Chronicle, 1872, 1071.—Koch, Dendrologie, ii², 322.—Vasey, Cat. Forest Trees, 32.—Macoun in Geological Rep. Canada, 1875–'76, 211.—Hall in Coulter's Bot. Gazette, ii, 91.—Engelmann in Bot. California, ii, 123.—G. M. Dawson in Canadian Nat. new ser. ix, 328.—Veitch, Manual Conif. 181, f. 41.—Lawson, Pinetum Brit. i, 69, f. 1–6.

P. Strobus, var. *monticola*, Nuttall, Sylva, iii, 118; 2 ed. ii, 176.

P. Grozelieri, Carrière in Rev. Hort. 1869, 126.

P. porphyrocarpa, Lawson, Pinetum Brit. i, 83, f. 1–8.

WHITE PINE.

Vancuover's island, Coast and Gold ranges of southern British Columbia, through the Cœur d'Alêne and Bitter Root mountains of Idaho to the valley of the Flathead river, northern Montana (*Canby & Sargent*), south along the Cascade mountains of Washington territory and Oregon and the California sierras to Calaveras county.

A large tree, 30 to 46 meters in height, with a trunk 0.90 to 1.50 meter in diameter; most common and reaching its greatest development in the Pend d'Oreille and Clark's Fork regions of Idaho, here a valuable and important timber tree; in British Columbia generally below 3,000 feet, and in California between 7,000 and 10,000 feet elevation; not common.

Wood very light, soft, not strong, close, straight-grained, compact; bands of small summer cells thin, resinous, not conspicuous, resin passages numerous, not large, conspicuous; medullary rays numerous, obscure; color, light brown or red, the sap-wood nearly white; specific gravity, 0.3908; ash, 0.23; inferior in quality, although resembling that of the eastern white pine (*P. Strobus*); in Idaho and Montana somewhat manufactured into lumber.

349.—Pinus Lambertiana, Douglas,

Companion Bot. Mag. ii, 92, 106, 107, 130, 152; Trans. Linnæan Soc. xv, 500.—Lambert, Pinus, 1 ed. iii, 157, t. 68, 69.—Loudon, Arboretum, iv, 2288, f. 2203.—Forbes, Pinetum Woburn. 77, t. 30.—Hooker, Fl. Bor.-Am. ii, 161.—Antoine, Conif. 41, t. 19.—Lindley in Penn. Cycl. xvii, 173.—Hooker & Arnott, Bot. Beechey, 394.—Spach, Hist. Veg. xi, 397.—Nuttall, Sylva, iii, 122, t. 114; 2 ed. ii, 180, t. 114.—De Chambray, Trait. Arb. Res. Conif. 346.—Endlicher, Syn. Conif. 150.—Lindley & Gordon in Jour. Hort. Soc. London, v, 215.—Carrière, Trait. Conif. 307; 2 ed. 403.—Bigelow in Pacific R. R. Rep. iv, 21.—Torrey in Pacific R. R. Rep. iv, 141; Bot. Mex. Boundary Survey, 210; Ives' Rep. 28.—Newberry in Pacific R. R. Rep. vi, 42, 90, f. 14.—Gordon, Pinetum, 228; 2 ed. 307.—Cooper in Smithsonian Rep. 1858, 262.—Murray in Trans. Bot. Soc. Edinburgh, vi, 369.—Lawson, Pinetum Brit. i, 47, t. 7, f. 1–7.—Bolander in Proc. California Acad. iii, 226, 317.—Henkel & Hochstetter, Nadelhölz. 95.—Nelson, Pinaceæ, 115.—Hoopes, Evergreens, 134.—Parlatore in De Candolle, Prodr. xvi², 402.—Fowler in London Gard. Chronicle, 1872, 1071.—Koch, Dendrologie, ii², 323.—Vasey, Cat. Forest Trees, 32.—Veitch, Manual Conif. 179.

SUGAR PINE.

Oregon, Cascade and Coast ranges, from the head of the Mackenzie river and the valley of the Rogue river south along the western flank of the California sierras, through the Coast ranges to the Santa Lucia mountains, and in the San Bernardino and Cuyamaca mountains.

A large tree, 46 to 92 meters in height, with a trunk 3 to 7 meters in diameter; most common and reaching its greatest development upon the sierras of central and northern California between 4,000 and 8,000 feet elevation; in the Oregon Coast ranges descending to 1,000 feet above the sea-level.

Wood very light, soft, coarse, straight-grained, compact, satiny, easily worked; bands of small summer cells thin, resinous, conspicuous, resin passages numerous, very large and conspicuous; medullary rays numerous, obscure; color, light brown, the sap-wood nearly white; specific gravity, 0.3684; ash, 0.22; now largely manufactured into lumber and used for interior finish, door-blinds, sashes, etc., and for cooperage and woodenware; less valuable and less easily worked than that of the eastern white pine (*Pinus Strobus*); its quality injured by the larger and more numerous resin passages.

A saccharine exudation from the stumps of cut or partially-burned trees sometimes used as a substitute for sugar.

350.—Pinus flexilis, James,

Long's Exped. ii, 27, 34.—Torrey in Ann. Lyc. N. York, ii, 249; Pacific R. R. Rep. iv, 141.—Eaton, Manual, 6 ed. 265.—Eaton & Wright, Bot. 359.—Nuttall, Sylva, iii, 107, t. 112; 2 ed. ii, 167, t. 107.—Lindley & Gordon in Jour. Hort. Soc. London, v, 220.—Carrière in Fl. des Serres, ix, 200; Rev. Hort. 1854, 228; Trait. Conif. 310; 2 ed. 392.—Bigelow in Pacific R. R. Rep. iv, 6, 20.—Gordon, Pinetum, 224; 2 ed. 302.—Cooper in Smithsonian Rep. 1858, 262.—Parry in Trans. St. Louis Acad. ii, 121.—Engelmann in Am. Jour. Sci. 2 ser. xxxiv, 331; Trans. St. Louis Acad. ii, 208; Wheeler's Rep. vi, 257; Bot. California, ii, 124.—Henkel & Hochstetter, Nadelhölz. 126.—Nelson, Pinaceæ, 112.—Bolander in Proc. California Acad. iii, 318.—Hoopes, Evergreens, 131, f. 18.—Parlatore in De Candolle, Prodr. xvi², 403.—Porter in Hayden's Rep. 1871, 494.—Watson in King's Rep. v, xxviii, 332; Pl. Wheeler, 17.—Rothrock, Pl. Wheeler, 27, 50; Wheeler's Rep. vi, 9.—Porter & Coulter, Fl. Colorado; Hayden, Surv. Misc. Pub. No. 4, 130.—Murray in London Gard. Chronicle, 1875, 106.—Vasey, Cat. Forest Trees, 32.—Sargent in Am. Jour. Sci. 3 ser. xvii, 420—Lawson, Pinetum Brit. i, 35, f. 1.

P. Lambertiana, var. Hooker, Fl. Bor.-Am. ii, 161.

P. Lambertiana, var. *brevifolia*, Endlicher, Syn. Conif. 150.—Lindley & Gordon in Jour. Hort. Soc. London, v, 215.—Carrière, Trait. Conif. 2 ed. 404.

P. flexilis, var. *serrulata*, Engelmann in Wheeler's Rep. vi, 258.

P. flexilis, var. *macrocarpa*, Engelmann in Wheeler's Rep. vi, 258.

WHITE PINE.

Eastern slopes of the Rocky mountains, Montana, and probably much farther north, south to New Mexico, on the Guadalupe and Limpia mountains, western Texas (*Havard*), on the high mountain ranges of Utah, Nevada, and northern Arizona, Inyo mountains and mount Silliman, California.

A tree 15 to 18 meters in height, with a trunk 0.60 to 1.20 meter in diameter; dry, gravelly slopes and ridges between 4,000 and 10,000 feet elevation; common along the eastern slopes of the Rocky mountains of northern Montana, forming open, scattered forests, here low, round-topped, and the prevailing forest tree; in central Nevada the most valuable lumber tree of the region.

Wood light, soft, close-grained, compact; bands of small summer cells narrow, not conspicuous, resin passages numerous, large; medullary rays numerous, conspicuous; color, light clear yellow, turning red with exposure, the sap-wood nearly white; specific gravity, 0.4358; ash, 0.28; in northern Montana, Nevada, and Utah sometimes sawed into inferior lumber and used in construction and for various domestic purposes.

351.—Pinus albicaulis, Engelmann,

Trans. St. Louis Acad. ii, 209; Coulter's Bot. Gazette, vii, 4.—Gray in Proc. Am. Acad. vii, 402.—Vasey, Cat. Forest Trees, 32.—Hall in Coulter's Bot. Gazette, ii, 91.—Lawson, Pinetum Brit. i, 1, f. 1–4.

P. flexilis, Murray, Rep. Oregon Exped. i, t. 2, f. 1 [not James].—Lyall in Jour. Linnæan Soc. vii, 142.—Parlatore in De Candolle, Prodr. xvi², 403, in part.

P. cembroides, Newberry in Pacific R. R. Rep. vi, 44, 90, f. 15 [not Zuccarini].

P. Shasta, Carrière, Trait. Conif. 2 ed. 390.

P. flexilis, var. *albicaulis*, Engelmann in Bot. California, ii, 124.—G. M. Dawson in Canadian Nat. new. ser. ix, 328.

Coast ranges of British Columbia, from the valley of the Lltasyouco river (*G. M. Dawson*) south along the Cascade and Blue mountains of Washington territory and Oregon, extending east along the high ranges of northern Washington territory to the eastern slope of the Rocky mountains of northern Montana (Old Marias pass, *Canby & Sargent*); California, Scott's mountains, mount Shasta, and on the high peaks of the Sierra Nevadas to mount San Bernardino.

A small alpine tree, 6 to 12 meters in height, with a trunk rarely 0.60 meter in diameter, or at its highest elevation reduced to a low, prostrate shrub; dry, gravelly ridges at the extreme limit of tree growth, reaching in the San Bernardino mountains an elevation of 10,500 feet.

Wood light, soft, not strong, brittle, close-grained, compact; bands of small summer cells thin, not conspicuous, resin passages numerous, not large; medullary rays numerous, obscure; color, light brown, the sap-wood nearly white; specific gravity, 0.4165; ash, 0.27.

352.—Pinus reflexa, Engelmann,

Coulter's Bot. Gazette, vii, 4.—Rusby in Bull. Torrey Bot. Club, ix, 80.

P. flexilis, var. *reflexa*, Engelmann in Wheeler's Rep. vi, 258.

WHITE PINE.

High mountains of southwestern New Mexico (*Greene, Rusby*) to the Santa Rita mountains (*Rothrock, Engelmann & Sargent*) and Santa Catalina mountains (*Lemmon, Pringle*), Arizona.

A tree 24 to 30 meters in height, with a trunk sometimes exceeding 0.60 meter in diameter; rocky ridges and slopes of almost inaccessible cañons between 6,000 to 8,000 feet elevation.

Wood light, hard, not strong, close-grained, compact; bands of small summer cells thin, resinous, not conspicuous, resin passages large, not numerous; medullary rays numerous, obscure; color, light red, the sap-wood nearly white; specific gravity, 0.4877; ash, 0.26.

353.—Pinus Parryana, Engelmann,

Am. Jour. Sci. 2 ser. xxiv, 332, note; Bot. California, ii, 124.—Parlatore in De Candolle, Prodr. xvi², 402.—Vasey, Cat. Forest Trees, 30.

P. Llaveana, Torrey, Bot. Mex. Boundary Survey, 208, t. 55 [not Schiede & Deppe].—Cooper in Smithsonian Rep. 1858, 262.—Bolander in Proc. California Acad. iii, 318.

PIÑON. NUT PINE.

California, Larkin's station, 20 miles southeast of Campo, San Diego county (*Vasey*), and southward into Lower California.

A small tree, 6 to 9 meters in height, with a trunk 0.30 to 0.45 meter in diameter; very rare within the limits of the United States; south of the boundary forming extensive open forests upon the high *mesas* and slopes of Lower California (*Pringle*).

Wood light, soft, close-grained, compact; bands of small summer cells thin, not conspicuous, resin passages very numerous, large, conspicuous; medullary rays numerous, obscure; color, light brown or yellow, the sap-wood much lighter, nearly white; specific gravity, 0.5675; ash, 0.54.

The large seeds edible.

354.—Pinus cembroides, Zuccarini,

Flora, ii, 93.—Endlicher, Syn. Conif. 182.—Fl. des Serres, iv, 3446, t. 97.—Nelson, Pinaceæ, 107.—Parlatore in De Candolle, Prodr. xvi², 397.—Engelmann in Trans. St. Louis Acad. iv, 176.—Watson in Proc. Am. Acad. xviii, 158.

P. Llaveana, Schiede & Deppe in Linnæa, xii, 488.—Forbes, Pinetum Woburn. 49, t. 17.—Antoine, Conif. 36, t. 16, f. 1.—Spach, Hist. Veg. xi, 401.—Lindley & Gordon in Jour. Hort. Soc. London, v, 216.—Carrière, Trait. Conif. 405; 2 ed. 461.—Gordon, Pinetum, 199; 2 ed. 274 (excl. syn. *edulis*).—Henkel & Hochstetter, Nadelhölz. 64 (excl. syn. *edulis*).—Hoopes, Evergreens, 143.

P. osteosperma, Engelmann in Wislizenus' Rep. No. 3.—Lindley & Gordon in Jour. Hort. Soc. London, v, 216.—Carrière in Fl. des Serres, ix, 200; Rev. Hort. 1854, 227.

NUT PINE.

Santa Catalina mountains, Arizona (*Pringle*); through northern Mexico.

A small tree, in Arizona 6 to 7 meters in height, with a trunk hardly exceeding 0.30 meter in diameter; dry ridges and slopes at 3,500 feet elevation.

Wood light, soft, very close-grained, compact; bands of small summer cells thin, not conspicuous, resin passages few, small; medullary rays numerous, obscure; color, light clear yellow, the sap-wood nearly white; specific gravity, 0.6512; ash, 0.90.

The seeds edible.

355.—Pinus edulis, Engelmann,

Wislizenus' Rep. No. 4; Wheeler's Rep. vi, 260.—Lindley & Gordon in Jour. Hort. Soc. London, v. 216.—Carrière, Fl. des Serres, ix, 201; Rev. Hort. 1854, 227; Trait. Conif. 408.—Torrey in Sitgreaves' Rep. 173, t. 20; Pacific R. R. Rep. iv, 140; Ives' Rep. 28.—Bigelow in Pacific R. R. Rep. iv, 3, 19.—Cooper in Smithsonian Rep. 1858, 261.—Hoopes, Evergreens, 142.—Parlatore in De Candolle, Prodr. xvi², 398.—Watson in Pl. Wheeler, 17.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 130.—Vasey, Cat. Forest Trees, 30.—Rothrock in Wheeler's Rep. vi, 9.—Rusby in Bull. Torrey Bot. Club, ix, 106.—Veitch, Manual Conif. 172.

P. cembroides, Gordon in Jour. Hort. Soc. London, v, 236 & f.; Pinetum, 192; 2 ed. 265 [not Zuccarini].—Fl. des Serres, iv, 324b, 325b, t. 331, f. 97.—Lindley & Gordon in Jour. Hort. Soc. London, v, 216.—Carrière, Trait. Conif. 404; 2 ed. 460.

P. futilis, Roezl in herb. *fide* Gordon, Pinetum, Suppl. 76; 2 ed. 265.

PIÑON. NUT PINE.

Eastern base of Pike's peak, Colorado, south through New Mexico to the mountains of western Texas.

A small tree, 6 to 9 meters in height, with a trunk 0.30 to 0.90 meter in diameter; dry *mesas* and slopes, generally on lime or sandstone, reaching in Colorado an elevation of 9,000 feet.

Wood light, soft, not strong, brittle, close-grained, compact, durable in contact with the soil; bands of small summer cells thin, not conspicuous, resin passages few, small; medullary rays numerous, obscure; color, light brown, the sap-wood nearly white; specific gravity, 0.6388; ash, 0.62; largely used for fuel, charcoal, fencing, etc., and in western Texas occasionally manufactured into inferior lumber.

The large edible nuts supply the Indians with a valuable article of food.

356.—Pinus monophylla, Torrey & Fremont,

Fremont's Rep. 319, t. 4.—Cooper in Smithsonian Rep. 1858, 261.—Bolander in Proc. California Acad. iii, 318.—Hoopes, Evergreens, 142.—Parlatore in De Candolle, Prodr. xvi², 378.—Lawson, Pinetum Brit. i, 65, t. 9, f. 1–12 (*P. Fremontiana* on plate).—Watson in King's Rep. v, 330; Pl. Wheeler, 17.—Koch, Dendrologie, ii², 271.—Bertrand in Bull. Soc. Bot. France, xviii, 81, t. 5, f. 81.—Rothrock in Pl. Wheeler, 28, 50.—Vasey, Cat. Forest Trees, 30.—Palmer in Am. Nat. xii, 594.—Engelmann in Wheeler's Rep, vi, 259, 374; Trans. St. Louis Acad. iv, 178; Bot. California, ii, 124.—Sargent in Am. Jour. Sci. 3 ser. xvii, 419.—Masters in London Gard. Chronicle, 1883, p. 48, f. 8.

P. Fremontiana, Endlicher, Syn. Conif. 1831, in part.—Gordon in Jour. Hort. Soc. London, iv, 293 & f.; Pinetum, 194; 2 ed. 235.—Knight, Syn. Conif. 28.—Lindley & Gordon in Jour. Hort. Soc. London, v, 216.—Carrière, Trait. Conif. 194; 2 ed. 462.—Henkel & Hochstetter, Nadelhölz. 62.

PIÑON. NUT PINE.

Near Utah lake, Utah, to the eastern foot-hills of the California sierras, south along the mountain ranges of the Great Basin to the San Francisco mountains of eastern Arizona.

A small, bushy tree, 4 to 6 meters in height, with a trunk sometimes 1 meter in diameter; dry, gravelly slopes and *mesas* between 3,000 and 6,000 feet elevation.

Wood light, soft, weak, brittle, close-grained, compact; bands of small summer cells thin, not conspicuous, resin passages few, not large; medullary rays numerous, obscure; color, yellow or light brown, the sap-wood nearly white; specific gravity, 0.5658; ash, 0.68; largely used for fuel and charcoal.

The large edible seeds furnish the principal food of the Indians of the Great Basin.

357.—Pinus Balfouriana, Murray,

Rep. Oregon Exped. i, t. 3, f. 1.—Gordon, Pinetum, 217; 2 ed. 293.—Henkel & Hochstetter, Nadelhölz. 109.—Bolander in Proc. California Acad. iii, 318.—Carrière, Trait. Conif. 2 ed. 425.—Nelson, Pinaceæ, 104.—Hoopes, Evergreens, 149.—Fowler in London Gard. Chronicle, 1872, 973.—Vasey, Cat. Forest Trees, 32.—Engelmann in Trans. St. Louis Acad. iv, 179; Bot. California, ii, 125.—Veitch, Manual Conif. 175.—Lawson, Pinetum Brit. i, 11, f. 1–5.

California, Scott's mountain, Siskiyou county (*Jeffrey*, *Lemmon*), mount Whitney, and about the headwaters of King and Kern rivers.

A small tree, 15 to 19 meters in height, with a trunk 0.60 to 0.90 meter in diameter; dry, gravelly slopes and ridges, forming upon Scott's mountain a broad belt of open forest growth between 5,000 and 8,000 feet elevation.

Wood light, soft, weak, brittle, very close-grained, compact, satiny, susceptible of a good polish; bands of small summer cells very narrow, dark colored, resin passages few, not conspicuous; medullary rays numerous obscure; specific gravity, 0.5434; ash, 0.41.

Var. aristata, Engelmann,

Wheeler's Rep. vi, 375.—Bot. California, ii, 125.—Veitch, Manual Conif. 175.

P. aristata, Engelmann in Am. Jour. Sci. 2 ser. xxxiv, 331; Trans. St. Louis Acad. ii, 205, t. 5, 6; iv, 179; Bot. California, ii, 125.—Parry in Trans. St. Louis Acad. ii, 123.—Wood, Bot. & Fl. 313.—Regel, Gartenflora, 1863, iii, 91.—Henkel & Hochstetter, Nadelhölz. 417.—Nelson, Pinaceæ, 103.—Carrière, Trait. Conif. 2 ed. 424.—Parlatore in De Candolle, Prodr. xvi², 400.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 130.—Murray in London Gard. Chronicle, 1875, 106.—Gordon, Pinetum, 2 ed. 291.—Vasey, Cat. Forest Trees, 32.—Brandegee in Coulter's Bot. Gazette, 32.—Lawson, Pinetum Brit. i, 5, f. 1.

P. Balfouriana, Watson in King's Rep. v, 331; Pl. Wheeler, 17 [not Murray].—Rothrock in Pl. Wheeler, 28, 50.—Sargent. in Am. Jour. Sci. 3 ser. xvii, 419.

FOXTAIL PINE. HICKORY PINE.

Mountains of southeastern California, Nevada, northern Arizona, and southern Utah to Colorado, above 7,500 feet, or in Colorado reaching 12,000 feet elevation.

A tree 15 to 30 meters in height, with a trunk 0.60 to 2.40 meters in diameter; dry, gravelly ridges; not common.

Wood light, soft, not strong, very close-grained, compact; bands of small summer cells thin, dark colored, not conspicuous, resin passages few, not prominent; medullary rays numerous, obscure; color, red, the thin sap-wood nearly white; specific gravity, 0.5572; ash, 0.30; in central Nevada largely used for the timbering of mines, and now nearly exterminated.

358.—Pinus resinosa, Aiton,

Hort. Kew. iii, 337; 2 ed. v, 316.—Lambert, Pinus, 1 ed. t. 14; 2 ed. i, 20, t. 14; 3 ed. i, 17, t. 13.—Willdenow, Spec. iv, 496; Enum. 988; Berl. Baumz. 267.—Poiret in Lamarck, Dict. v, 339.—Persoon, Syn. ii, 578.—Desfontaines, Hist. Arb. ii, 612.—Smith in Rees' Cycl. xxviii, No. 3.—Pursh, Fl. Am. Sept. ii, 642.—Eaton, Manual, 110; 6 ed. 264.—Nuttall, Genera, ii, 223.—Hayne, Dend. Fl. 173.—Sprengel, Syst. ii, 886.—Torrey, Compend. Fl. N. States, 360; Fl. N. York, ii, 227.—Beck, Bot. 339.—Loudon, Arboretum, iv, 2210, f. 2094–2097.—Forbes, Pinetum Woburn. 19, t. 6.—Hooker, Fl. Bor.-Am. ii, 161, in part.—Eaton & Wright, Bot. 358.—Bigelow, Fl. Boston. 3 ed. 334.—Lindley in Penn. Cycl. xvii, 170.—Antoine, Conif. 7, t. 4, f. 1.—Link in Linnæa, xv, 501.—Endlicher, Syn. Conif. 178.—Knight, Syn. Conif, 27.—Lindley & Gordon in Jour. Hort. Soc. London, v, 219.—Parry in Owen's Rep. 618.—Carrière, Trait. Conif. 401.—Gordon, Pinetum, 183 (excl. syn. *Loiseleuriana*); 2 ed. 256.—Richardson Arctic Exped. 441.—Cooper in Smithsonian Rep. 1858, 257.—Wood, Cl. Book, 661; Bot. & Fl. 313.—Henkel & Hochstetter, Nadelhölz. 45 (excl. syn. *Loiseleuriana*).—Hoopes, Evergreens, 102.—Gray, Manual N. States, 5 ed. 470.—Parlatore in De Candolle, Prodr. xvi², 388.—Koch, Dendrologie, ii², 286.—Vasey, Cat. Forest Trees, 30.—Macoun in Geological Rep. Canada, 1875–'76, 211.—Engelmann in Trans. St. Louis Acad. iv, 179.—Sears in Bull. Essex Inst. xiii, 185.—Bell in Geological Rep. Canada, 1879–'80, 50c.—Veitch, Manual Conif. 159.

P. rubra, Michaux f. Hist. Arb. Am. i, 46, t. 1; N. American Sylva, 3 ed. iii, 91, t. 134 [not Lambert].—De Chambray, Trait. Arb. Res. 344.—Gihoul, Arb. Resin. 27.—Carrière, Trait. Conif. 2 ed. 496.

P. Laricio, var. *resinosa*, Spach, Hist. Veg. 385.

RED PINE. NORWAY PINE.

Newfoundland, northern shores of the gulf of Saint Lawrence and lake Nipigon to the valley of the Winnipeg river, south through the northern states to Chestnut Hill, Middlesex county, Massachusetts, the mountains o northern Pennsylvania, Isabella county, Michigan, and central Minnesota.

A large tree, 24 to 46 meters in height, with a trunk 0.60 to 1.37 meter in diameter; light sandy loam or dry rocky ridges, forming scattered groves rarely exceeding a few hundred acres in extent; common and reaching its greatest development through northern Wisconsin and Minnesota; rare in the eastern States, except in the extreme northern portions of New England.

Wood light, not strong, hard, rather coarse-grained, compact; bands of small summer cells broad, dark colored, very resinous, resin passages few, small, not conspicuous; medullary rays numerous, thin; color, light red, the sap-wood yellow or often almost white; specific gravity, 0.4854; ash, 0.27; largely manufactured into lumber and used for all purposes of construction, flooring, piles, etc.

359.—Pinus Torreyana, Parry,

Bot. Mex. Boundary Survey, 210, t. 58, 59; Proc. San Diego Nat. Hist. Soc. Nov. 1883.—Carrière, Trait. Conif. 326; 2 ed. 423.—Gordon, Pinetum, 241.—Cooper in Smithsonian Rep. 1860, 442.—Henkel & Hochstetter, Nadelhölz. 117.—Bolander in Proc California Acad. iii, 318.—Hoopes, Evergreens, 150.—Vasey, Cat. Forest Trees, 31.—Palmer in Am. Nat. xii, 594.—Engelmann in Trans. St. Louis Acad. iv, 181; Bot. California, ii, 125.—Veitch, Manual Conif. 173.

P. lophosperma, Lindley in London Gard. Chronicle, 1860, 46.—Gordon, Pinetum, Suppl. 69; 2 ed. 310.—Henkel & Hochstetter, Nadelhölz. 112.—Nelson, Pinaceæ, 117.—Parlatore in De Candolle, Prodr. xvi², 391.

California, mouth of the Soledad river, San Diego county; doubtfully reported from one of the islands of Santa Barbara and from Lower California.

A low, short-lived, gnarled, crooked tree, 6 to 8 meters in height, with a trunk 0.23 to 0.33 meter in diameter crests of sandy bluffs immediately upon the sea-coast; very local and fast disappearing.

Wood light, soft, not strong, brittle, rather close-grained, compact; bands of small summer cells broad resinous, conspicuous, resin passages small, few; medullary rays numerous, obscure; color, light red, the sap-wood yellow or nearly white; specific gravity, 0.4879; ash, 0.35; locally used for fuel.

360.—Pinus Arizonica, Engelmann,

Wheeler's Rep. vi, 260; Trans. St. Louis Acad. iv, 181; Coulter's Bot. Gazette, vii, 4.

YELLOW PINE.

Santa Rita mountains (*Rothrock, Engelmann & Sargent*), Santa Catalina mountains (*Lemmon, Pringle*), and probably upon other ranges of southern Arizona.

A tree 24 to 30 meters in height, with a trunk 0.60 to 0.90 meter in diameter; high rocky ridges between 6,000 and 8,000 feet elevation; the prevailing forest tree over large areas near the summits of the Santa Catalina mountains (*Lemmon*).

Wood light, soft, not strong, rather brittle, close-grained, compact; bands of small summer cells broad, very resinous, conspicuous, resin passages numerous, large; medullary rays thin, obscure; color, light red or often yellow, the sap-wood lighter yellow or white; specific gravity, 0.5038; ash, 0.20; sometimes sawed into inferior lumber.

361.—Pinus ponderosa, Douglas,

Companion Bot. Mag. ii, 111.—Loudon, Arboretum, iv, 2243, f. 2132-2136.—Forbes, Pinetum Woburn. 44, t. 15.—Antoine, Conif. 28, t. 8 f. 1.—Lindley in Penn. Cycl. xvii, 172.—Link in Linnæa, xv, 306.—Nuttall, Sylva, iii, 114; 2 ed. ii, 173.—Spach, Hist. Veg. xi, 389.—Endlicher, Syn. Conif. 163.—Knight, Syn. Conif. 30.—Lindley & Gordon in Jour. Hort. Soc. London, v, 217.—Carrière, Trait. Conif 340; 2 ed. 445.—Gordon, Pinetum, 205; Suppl. 67; 2 ed. 281.—Newberry in Pacific R. R. Rep. vi, 36, 90, t. 4, f. 12.—Cooper in Smithsonian Rep. 1858, 261; Pacific R. R. Rep. xii², 27, 68; Am. Nat. iii, 409.—Torrey, Bot. Mex. Boundary Survey, 209; Ives' Rep 28.—Engelmann in Am. Jour. Sci. 2 ser. xxxiv, 332; Proc. Am. Phil. Soc. 2 ser. xii, 209; Wheeler's Rep. vi, 261; Trans. St. Louis Acad. iv, 181; Bot. California, ii, 125.—Lyall in Jour. Linnæan Soc. vii, 142.—Bolander in Proc. California Acad. iii, 226, 317.—Henkel & Hochstetter, Nadelhölz. 71.—Nelson, Pinaceæ, 125.—Hoopes, Evergreens, 117.—Parlatore in De Candolle, Prodr. xvi², 393 (excl. syn. *Sinclairii*).—Watson in King's Rep. v, 331; Pl. Wheeler, 17.—Gray in Proc. Am. Acad. vii, 402.—Fowler in London Gard Chronicle, 1872, 1326.—Koch, Dendrologie, ii², 310.—Rothrock in Pl. Wheeler, 28, 50; Wheeler's Rep. vi, 9.—Porter & Coulter, Fl Colorado; Hayden's Surv. Misc. Pub. No. 4, 129.—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 121.—Vasey, Cat. Forest Trees, 30.—Hall in Coulter's Bot. Gazette, ii, 91.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Brandegee in Coulter's Bot. Gazette, iii, 32.—G. M. Dawson in Canadian Nat. new ser. ix, 326.—Rusby in Bull. Torrey Bot. Club, ix, 106.

P. Benthamiana, Hartweg in Jour. Hort. Soc. London, ii, 189; iii, 223.—Gordon in Jour. Hort. Soc. London, iv, 212 & t.; (Fl. des Serres, vi, 85 & *f.*); Pinetum, 188; 2 ed. 261 (excl. syn. *Sinclairii*).—Knight, Syn. Conif. 30.—Lindley & Gordon in Jour. Hort. Soc. London, v, 216.—Carrière, Trait. Conif, 350; 2 ed. 452.—Murray in Edinburgh New Phil. Jour. new ser. i, 287, t. 8.—Henkel & Hochstetter, Nadelhölz. 84.—Nelson, Pinaceæ, 104.—Fowler in London Gard. Chronicle, 1872, 973.

P. resinosa, Torrey in Ann. Lyc. N. York, ii, 249 [not Aiton].—Douglas, Companion Bot. Mag. ii, 126.—Hooker, Fl. Bor.-Am. ii, 161, in part.—Winchell in Ludlow's Rep. Black Hills, 68.

P. brachyptera, Engelmann in Wislizenus' Rep. No. 4.—Lindley & Gordon in Jour. Hort. Soc. London, v, 216.—Carrière in Fl. des Serres, ix, 201; Rev. Hort. 1854, 227; Trait. Conif. 356; 2 ed. 454.—Bigelow in Pacific R. R. Rep. iv 18.—Gordon, Pinetum, 190; 2 ed. 263.—Henkel & Hochstetter, Nadelhölz. 85.—Nelson, Pinaceæ, 454.

P. Beardsleyi, Murray in Edinburgh New Phil. Jour. new ser. i, 286, t. 6.—Carrière, Trait. Conif. 359.

P. Craigana, Murray in Edinburgh New Phil. Jour. new ser. i, 288, t. 7.

P. macrophylla, ? Torrey in Sitgreaves' Rep. 173 [not Engelmann].

P. Engelmanni, Torrey in Pacific R. R. Rep. iv, 141 [not Carrière].

P. Parryana, Gordon, Pinetum, 202; 2 ed. 277 [not Engelmann].—Henkel & Hochstetter, Nadelhölz. 88.—Carrière, Trait. Conif. 2 ed. 446.

P. ponderosa, var. *Benthamiana*, Vasey, Cat. Forest Trees, 30.

P. ponderosa, var. *scopulorum*, Engelmann in Bot. California, ii, 126.

YELLOW PINE. BULL PINE.

Interior of British Columbia, south of latitude 51°, south and east along the mountain ranges of the Pacific region to Mexico, the Black hills of Dakota, Colorado, and western Texas; not detected in central or southern Nevada.

A large tree, 61 to 91 meters in height, with a trunk 3.60 to 4.57 meters in diameter, or throughout the Rocky Mountain region much smaller, rarely exceeding 30 meters in height (var. *scopulorum*); dry, rocky ridges and prairies, or in northern California rarely in cold, wet swamps, reaching its greatest development along the western slope of the sierras of northern and central California; in western Washington territory and Oregon rare and local; after *Pseudotsuga Douglasii* the most generally distributed and valuable timber tree of the Pacific forests, furnishing the principal lumber of eastern Washington territory and Oregon, western Montana, Idaho, the Black hills of Dakota, western Texas, New Mexico, and Arizona.

Wood, varying greatly in quality and value, heavy, hard, strong, brittle, not coarse-grained nor durable, compact; bands of small summer cells broad or narrow, very resinous, conspicuous, resin passages few, small; medullary rays numerous, obscure; color, light red, the very thick sap-wood almost white; specific gravity, 0.4715; ash, 0.35; largely manufactured into lumber, and used for railway ties, fuel, etc.

NOTE.—A form with purple cones and long glaucous foliage, approaching *P. Jeffreyi* in habit, is the prevailing tree of the valley of Flathead lake, Montana (*Canby & Sargent*).

362.—Pinus Jeffreyi, Murray,

Rep. Oregon Exped. 2, t. 1; Edinburgh New Phil. Jour. new ser. xi, 224, t. 8, 9 (Trans. Bot. Soc. Edinburgh, vi, 350 & t.); Carrière, Trait. Conif. 388; 2 ed. 439.—Gordon, Pinetum, 198; 2 ed. 272.—Henkel & Hochstetter, Nadelhölz. 87.—Nelson, Pinaceæ, 115.—Hoopes, Evergreens, 115.—Parlatore in De Candolle, Prodr. xvi², 393.—Lawson, Pinetum Brit. i, 45, t. 6, f. 1-4.—Koch, Dendrologie, ii², 314.—Engelmann in Coulter's Bot. Gazette, vii, 4.—Veitch, Manual Conif. 165.

P. deflexa, Torrey in Bot. Mex. Boundary Survey, 209, t. 56, in part.—Cooper in Smithsonian Rep. 1860, 442.—Henkel & Hochstetter, Nadelhölz, 416.—Carrière, Trait. Conif. 2 ed. 455.—Bolander in Proc. California Acad. iii, 318.—Parlatore in De Candolle, Prodr. xvi², 431.—Fowler in London Gard. Chronicle, 1872, 1070.—Murray in London Gard. Chronicle, 1875, 106.—Gordon, Pinetum, 2 ed. 289.

P. ponderosa, var. *Jeffreyi*, Vasey, Cat. Forest Trees, 31.—Engelmann in Trans. St. Louis Acad. iv, 181; Bot. California, ii, 126.

BULL PINE. BLACK PINE.

California, Scott's mountain, Siskiyou county, south along the Sierra Nevada to the San Bernardino and San Jacinto mountains.

A large tree, 30 to 31 meters in height, with a trunk 1.20 to 4 meters in diameter; dry, gravelly slopes between 6,000 and 8,000 feet elevation; most common and reaching its greatest development on the eastern slope of the Sierra Nevadas, here generally replacing the allied *P. ponderosa*, from which it may be distinguished by its more deeply-cleft bark, glaucous branchlets and leaves, much larger cones, and by the strong, pungent odor of oil of orange of the freshly-cut branchlets.

Wood light, strong, hard, rather coarse-grained, compact; bands of small summer cells not broad, very resinous, conspicuous, resin passages few, not large; medullary rays numerous, obscure; color, light red, the sap-wood pale yellow or nearly white; specific gravity, 0.5206; ash, 0.26; largely manufactured into coarse lumber.

Abietine, a volatile carbo-hydrogen possessing powerful anæsthetic properties, is probably obtained by distilling the resinous exudation of this species, and not of *P. Sabiniana* (*Watt's Dict. Chemistry, 2d Suppl.* 1.—*Am. Jour. Pharm.* 1872, 97.—*U. S. Dispensatory*, 14 ed. 900).

363.—Pinus Chihuahuana, Engelmann,

Wislizenus' Rep. No. 26; Wheeler's Rep. vi, 262; Trans. St. Louis Acad. iv, 181; Coulter's Bot. Gazette, vii, 4.—Lindley & Gordon in Jour. Hort. Soc. London, v, 220.—Carrière in Fl. des Serres, ix, 200; Rev. Hort. 1854, 227; Trait. Conif. 357; 2 ed. 455.—Gordon, Pinetum, 193; 2 ed. 266.—Torrey, Bot. Mex. Boundary Survey, 209.—Cooper in Smithsonian Rep. 1860, 442.—Henkel & Hochstetter, Nadelhölz. 86.—Hoopes, Evergreens, 143.—Parlatore in De Candolle, Prodr. xvi², 397. —Vasey, Cat. Forest Trees, 32.

Santa Rita mountains, Arizona (*Rothrock, Engelmann & Sargent*), San Francisco mountains of southwestern New Mexico and Arizona (*Greene*); in Chihuahua.

A small tree, 18 to 24 meters in height, with a trunk 0.45 to 0.60 meter in diameter; dry, rocky ridges and slopes between 5,000 and 7,000 feet elevation; not common.

Wood light, soft, strong, brittle, close-grained, compact; bands of small summer cells not broad, resinous, conspicuous, resin passages few, rather large, conspicuous; medullary rays numerous, thin; color, clear light orange, the thick sap-wood lighter; specific gravity, 0.5457; ash, 0.39.

364.—Pinus contorta, Douglas;

Loudon, Arboretum, iv, 2292, f. 2210, 2211.—Nuttall, Sylva, iii, 117; 2 ed. ii, 176.—Endlicher, Syn. Conif. 168.—Carrière, Trait. Conif. 164; 2 ed. 474.—Torrey in Pacific R. R. Rep. iv, 141.—Gordon, Pinetum, 165; 2 ed. 232.—Cooper in Smithsonian Rep. 1858, 261.—Lyall in Jour. Linnæan Soc. vii, 133, 141, in part.—Henkel & Hochstetter, Nadelhölz. 24.—Rothrock in Smithsonian Rep. 1867, 433.—Hoopes, Evergreens, 81, in part.—Parlatore in De Candolle, Prodr, xvi², 381, in part.—Watson in King's Rep. v, 330.—Fowler in London Gard. Chronicle, 1872, 1070.—Gray in Proc. Am. Acad. vii, 402.—Koch, Dendrologie, ii², 301.—Vasey, Cat. Forest Trees, 29.—Hall in Coulter's Bot. Gazette, ii, 91.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Engelmann in Trans. St. Louis Acad, iv, 182; Bot. California, ii, 126; London Gard. Chronicle, 1883, 351.—G. M. Dawson in Canadian Nat. 2 ser. ix, 327, in part.—Veitch, Manual Conif. 145.—Masters in London Gard. Chronicle, 1883, 45, f. 5.

P. inops, Bongard in Mem. Acad. St. Petersburg, 6 ser. ii, 163 [not Aiton].—Hooker, Fl. Bor.-Am. ii, 161, in part.—Ledebour, Fl. Rossica, iii, 676 [not Aiton].

P. Boursieri, Carrière in Rev. Hort. 1854, 233 & f.; Fl. des Serres, ix, 200 & f.; Trait. Conif. 398; 2 ed. 475.

P. Banksiana, Lindley & Gordon in Jour. Hort. Soc. London, v, 218, in part.

P. muricata, Bolander in Proc. California Acad. iii, 227, 317 [not Don].

P. Bolanderi, Parlatore in De Candolle, Prodr. xvi², 379.

SCRUB PINE.

Alaska, south along the coast to Mendocino county, California, extending inland to the western slopes of the Coast ranges.

A small, stunted tree, 6 to 9 meters in height, with a trunk 0.30 to 0 50 meter in diameter; sandy dunes and exposed rocky points.

Wood light, hard, strong, brittle, coarse-grained; bands of small summer cells very broad, resinous, conspicuous, resin passages numerous, not large; medullary rays numerous, obscure; color, light brown tinged with red, the thick sap-wood nearly white; specific gravity, 0.5815; ash, 0.19.

365.—Pinus Murrayana, Balfour,

Rep. Oregon Exped. 2, t. 3, f. 2.—Murray in Edinburgh New Phil. Jour. new ser. xi, 226 (Trans. Bot. Soc. Edinburgh, vi, 351).

P. inops, Bentham, Pl. Hartweg. 337 [not Aiton].

P. contorta, Newberry in Pacific R. R. Rep. vi, 34, 90, t. 5, f. 11 [not Douglas].—Engelmann in Am. Jour. Sci. 2. ser. xxiv, 332.—Lyall in Jour. Linnæan Soc. vii, 141, in part.—Cooper in Am. Nat. iii, 409.—Parlatore in De Candolle, Prodr. xvi², 381, in part.—Porter in Hayden's Rep. 1871, 494.—Gray in Proc. Am. Acad. vii, 402.—Rothrock in Pl. Wheeler, 27, 50.—Parry in Am. Nat. vii, 179.

P. contorta, var. *latifolia*, Engelmann in King's Rep. v, 331; Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 129; Wheeler's Rep. vi, 262.—Brandegee in Coulter's Bot. Gazette, iii, 32.—G. M. Dawson in Canadian Nat. new ser. ix, 328.

P. contorta, var. *Bolanderi*, Vasey, Cat. Forest Trees, 29.

TAMARACK. BLACK PINE. LODGE-POLE PINE. SPRUCE PINE.

Valley of the Yukon river, Alaska (Fort Selkirk, *Dall*), south through the interior of British Columbia, along the mountain ranges of Washington territory and Oregon and the Sierra Nevadas of California to mount San Jacinto; on the high plateau east of the Rocky mountains in about latitude 56°, and south through the mountains of Idaho, Montana, Wyoming, Colorado, and Utah to New Mexico and northern Arizona.

A tree 18 to 24 meters in height, with a trunk 0.60 to 1.20 meter in diameter; reaching its greatest development in the California Sierras; in the interior regions in dry, gravelly soil, here the prevailing tree, covering immense areas, and generally replacing other species destroyed by fire; western Washington territory and southward only along the borders of moist alpine meadows between 6,000 and 9,000 feet elevation; generally confounded with the closely-allied *P. contorta* of the coast, from which it may be distinguished by its longer, broader leaves, very thin, scaly bark, thin sap-wood, and less resinous and finer-grained wood, resembling that of the white pines; the distribution of the two species in northern British Columbia and Alaska still undetermined.

Wood light, soft, not strong, close, straight-grained, easily worked, compact, not durable; bands of small summer cells narrow, not conspicuous, resin passages few, not large; medullary rays numerous, obscure; color, light yellow or nearly white, the thin sap-wood lighter; specific gravity, 0.4096; ash, 0.32; occasionally manufactured into lumber, and used for fuel, railway ties, etc.

366.—Pinus Sabiniana, Douglas,

Companion Bot. Mag. ii, 150.—Lambert, Pinus, 1 ed. iii, 137, t. 58.—Loudon, Arboretum, iv, 2246, f. 2138-2143.—Forbes, Pinetum Woburn. 63, t. 23, 24.—Hooker, Fl. Bor.-Am. ii, 162.—Lindley in Penn. Cycl. xvii, 172.—Antoine, Conif. 30, t. 11.—Hooker & Arnott, Bot. Beechey, 393.—Link in Linnæa, xv, 509.—Nuttall, Sylva, iii, 110, t. 113; 2 ed. ii, 169, t. 113.—Spach, Hist. Veg. xi, 390.—De Chambray, Trait. Arb. Res. 347.—Endlicher, Syn. Conif. 159.—Knight, Syn. Conif. 30.—Lindley & Gordon in Jour. Hort. Soc. London, v, 216.—Fl. des Serres, ix, 275, t. 964.—Carrière, Trait. Conif. 334; 2 ed. 435.—Torrey & Gray in Pacific R. R. Rep. ii, 130.—Bigelow in Pacific R. R. Rep, iv, 25.—Torrey in Pacific R. R. Rep. iv, 141; Bot. Mex. Boundary Survey, 210; t. 57; Ives' Rep. 28.—Newberry in Pacific R. R. Rep. vi, 39, 90, f. 13.—Gordon, Pinetum, 208; 2 ed. 284.—Cooper in Smithsonian Rep. 1858, 261.—Walpers, Ann. v, 799.—Bolander in Proc. California Acad. iii, 226, 318.—Henkel & Hochstetter, Nadelhölz. 75.—Lawson, Pinetum Brit. i, 85, t. 11, t. 1-3.—Nelson, Pinaceæ, 129.—Hoopes, Evergreens, 121.—Parlatore in De Candolle, Prodr. xvi², 391.—Fowler in *London Gard. Chronicle, 1872, 1326.—Koch, Dendrologie*, ii², 312.—*Vasey, Cat. Forest Trees*, 31.—Engelmann in Wheeler's Rep. vi, 375; Trans. St. Louis Acad. iv, 182; Bot. California, ii, 127.—Veitch, Manual Conif. 169.

DIGGER PINE. BULL PINE.

California, Portuguese Flat, Shasta county, south along the foot-hills of the Coast ranges and the western slope of the Sierra Nevadas below 4,000 feet elevation.

A large tree, 24 to 30 meters in height, with a trunk 0.60 to 1.20 meter in diameter; very common through all the foot-hills region.

Wood light, soft, not strong, brittle, very coarse-grained, compact, not durable; bands of small summer cells broad, very resinous, conspicuous, resin passages few, large, prominent; medullary rays numerous, obscure; color, light brown or red, the thick sap-wood yellow or nearly white; specific gravity, 0.4840; ash, 0.40; largely used for fuel.

The large edible nuts furnish the Indians an important article of food.

367.—Pinus Coulteri, D. Don,

Trans. Linnæan Soc. xvii, 440.—Loudon, Arboretum, iv, 2250, f. 2144-2146.—Forbes, Pinetum Woburn. 67, t. 25, 26.—Antoine, Conif. 31, t. 12, 13.—Penn. Cycl. xvii, 172.—Link in Linnæa, xv, 510.—Hooker & Arnott, Bot. Beechey, 393.—Nuttall, Sylva, iii, 112; 2 ed. ii, 171.—Endlicher, Syn. Conif. 160.—Carrière in Fl. des Serres, ix, 275 & t.; Trait. Conif. 334; 2 ed. 435.—Cooper in Smithsonian Rep. 1858, 261.—Torrey in Ives' Rep. 28.—Henkel & Hochstetter, Nadelhölz. 76.—Bolander in Proc. California Acad. iii, 318.—Parlatore in De Candolle, Prodr. xvi, 392.—Vasey, Cat. Forest Trees, 31.—Gordon, Pinetum, 2 ed. 266.—Engelmann in Trans. St. Louis Acad. iv, 182; Bot. California, ii, 127.—Lawson, Pinetum Brit. i, 23, f. 1-5.

P. macrocarpa, Lindley in Bot. Reg. xxvi, Misc. 61.—Knight, Syn. Conif. 30.—Lindley & Gordon in Jour. Hort. Soc. London, v, 216.—Gordon, Pinetum, 201.—Nelson, Pinaceæ, 117.—Hoopes, Evergreens, 115.—Veitch, Manual Conif. 166.

P. Sabiniana Coulteri, Loudon, Encycl. Pl. 985, f. 1839-1841.

P. Sabiniana macrocarpa, Hort.

California, Monte Diablo, south through the Coast ranges to the Cuyamaca mountains, and probably in Lower California.

A tree 24 to 46 meters in height, with a trunk 0.90 to 1.80 meter in diameter; dry ridges and slopes between 3,000 and 6,000 feet elevation; most common and reaching its greatest development in the San Jacinto mountains.

Wood light, soft, not strong, brittle, coarse-grained; bands of small summer cells broad, very resinous, conspicuous, resin passages few, large; medullary rays numerous, prominent; color, light red, the thick sap-wood nearly white; specific gravity, 0.4133; ash, 0.37.

368.—Pinus insignis, Douglas;

Loudon, Arboretum, iv, 2243, f. 2132-2137.—Forbes, Pinetum Woburn. 51, t. 18.—Lindley in Penn. Cycl. xvii, 171.—Antoine, Conif. 27, t. 8, f. 1.—Hooker & Arnott, Bot. Beechey, 393.—Spach, Hist. Veg. xi, 389.—Nuttall, Sylva, iii, 115; 2 ed. ii, 174.—Bentham, Bot. Sulphur, 55.—Endlicher, Syn. Conif. 163.—Knight, Syn. Conif. 30.—Lindley & Gordon in Jour. Hort. Soc. London, v, 217.—Carrière, Trait. Conif. 339; 2 ed. 440.—Bigelow in Pacific R. R. Rep. iv, 25.—Torrey in Pacific R. R. Rep. iv, 141; Bot. Mex. Boundary Survey, 209, t. 55; Ives' Rep. 28.—Newberry in Pacific R. R. Rep. vi, 90.—Gordon, Pinetum, 197; 2 ed. 270.—Cooper in Smithsonian Rep. 1858, 261.—Murray in Edinburgh New Phil. Jour. new ser. xi, 222 (Trans. Bot. Soc. Edinburgh, vi, 347).—Henkel & Hochstetter, Nadelhölz. 69.—Bolander in Proc. California Acad. iii, 262, t. 317.—Nelson, Pinaceæ, 114.—Hoopes, Evergreens, 143.—Parlatore in De Candolle, Prodr. xvi², 395.—Lawson, Pinetum Brit. i, 37 t. 1, 5, f. 1-14.—Fowler in London Gard. Chronicle, 1872, 1070.—Vasey, Cat. Forest Trees, 31.—Engelmann in Trans. St. Louis Acad. iv, 182; Bot. California, ii, 128.—Veitch, Manual Conif. 163, f. 39.

?P. Californica, Loiseleur in Nouveau Duhamel, v, 243.—Loudon, Arboretum, iv, 2268.—Endlicher, Syn. Conif. 162.—Hooker & Arnott, Bot. Beechey, 393.—Nuttall, Sylva, iii, 117; 2 ed. ii, 175.—Carrière, Trait. Conif. 1 ed. 253.

P. adunca, Bosc in Poiret, Suppl. iv, 418.

P. Sinclairii, Hooker & Arnott, Bot. Beechey, 392, 393, t. 93, in part.—Nuttall, Sylva, iii, 141; 2 ed. ii, 198.—Carrière, Trait. Conif. 2 ed. ii, 198.

P. radiata, D. Don in Trans. Linnæan Soc. xvii, 442; Lambert, Pinus, 1 ed. iii, 133, t. 86.—Loudon, Arboretum, iv, 2270, f. 2182.—Antoine, Conif. 33, t. 14, f. 3.—Hooker & Arnott, Bot. Beechey, 392, 393, in part.—Nuttall, Sylva, iii, 116; 2 ed. ii, 175.—Endlicher, Syn. Conif. 161.—Hartweg in Jour. Hort. Soc. London, iii, 226.—Gordon in Jour. Hort. Soc. London, iv, 214 & f. (Fl. des Serres, vi, 434 & t.); Pinetum, 206; 2 ed. 282.—Knight, Syn. Conif. 37.—Lindley & Gordon in Jour. Hort. Soc. London, v, 216.—Carrière, Trait. Conif. 1 ed. 337.—Nelson, Pinaceæ, 127.—Hoopes, Evergreens, 118.—Koch, Dendrologie, ii², 307.—Vasey, Cat. Forest Trees, 31.

P. tuberculata, D. Don in Trans. Linnæan Soc. xvii, 441 [not Gordon].—Lambert, Pinus, 1 ed. iii, 131, t. 85.—Loudon, Arboretum, iv, 2270, f. 2181.—Antoine, Conif. 33, t. 14, f. 2.—Hooker & Arnott, Bot. Beechey, 394.—Endlicher, syn. Conif. 162.—Carrière, Trait. Conif. 338; 2 ed. 441, in part.—Nelson, Pinaceæ, 137.—Hoopes, Evergreens, 123 (excl. syn. *Californica*).—Parlatore in De Candolle, Prodr. xvi², 394, in part.

P. rigida,? Hooker & Arnott, Bot. Beechey, 160 [not Miller].

P. insignis macrocarpa, Hartweg in Jour. Hort. Soc. London, iii, 226.—Carrière, Trait. Conif. 440.

MONTEREY PINE.

California, Pescadero to Monterey and San Simeon bay.

A tree 24 to 30 meters in height, with a trunk 0.60 to 0.90 meter in diameter; sandy soil, in immediate proximity to the sea-coast; rare and local; now widely cultivated on the Pacific coast for shelter and ornament. A form of Guadalupe island, off the coast of Lower California, with leaves in pairs, is var. *binata* (*Engelmann in Proc. Am. Acad.* xi, 119; *Bot. California*, ii, 128).

Wood light, soft, not strong, brittle, close-grained, compact; bands of small summer cells not broad, resinous, conspicuous; color, light brown, the very thick sap-wood nearly white; specific gravity, 0.4574; ash, 0.30; locally somewhat used for fuel.

369.—Pinus tuberculata, Gordon,

Jour. Hort. Soc. London, iv, 218 & f. (Fl. des Serres, v, 517c & f.); Pinetum, 211; 2 ed. 288 [not Don].—Rep. Oregon Exped. 2, t. 2, f. 2.—Henkel & Hochstetter, Nadelhölz. 78, in part.—Bolander in Proc. California Acad. iii, 262, 317.—Lawson, Pinetum Brit. i, 93, t. 13, f. 1-9.—Carrière, Trait. Conif. 2 ed. 441, in part.—Parlatore in De Candolle, Prodr. xvi², 394 (excl. bib.).—Koch, Dendrologie, ii², 309.—Vasey, Cat. Forest Trees, 31.—Engelmann in Trans. St. Louis Acad. iv, 183; Bot. California, ii, 128.—Veitch, Manual Conif. 170.

P. Californica, Hartweg in Jour. Hort. Soc. London, ii, 189 [not Loiseleur].

KNOB-CONE PINE.

Valley of the Mackenzie river, Oregon, south along the western slope of the Cascade and Sierra Nevada mountains, and in the California Coast ranges from the Santa Cruz to the San Jacinto mountains.

A tree 18 to 22 meters in height, with a trunk 0.60 to 0.90 meter in diameter, or, rarely, reduced to a low shrub, fruiting when not more than 1 meter in height; dry, gravelly ridges and slopes from 2,500 (San Bernardino mountains) to 5,500 (mount Shasta) feet elevation; not common.

Wood light, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells very broad, not conspicuous, resin passages numerous, large, prominent; medullary rays numerous, thin; color, light brown, the thick sap-wood nearly white or slightly tinged with red; specific gravity, 0.3499; ash, 0.33.

370.—Pinus Tæda, Linnæus,

Spec. 1 ed. 1000, in part.—Du Roi, Harbk. ii, 63.—Wangenheim, Amer. 41.—Aiton, Hort. Kew. iii, 368; 2 ed. v, 317.—Mœnch, Meth. 365.—*Michaux, Fl. Bor.-Am. ii, 205.—Lambert, Pinus, 1 ed. i, 23, t. 16, 17; 2 ed. i, 26, t. 17, 18; 3 ed. i, 30, t. 15.—Willdenow, Spec. iv, 498;* Berl. Baumz. 269.—Persoon, Syn. ii, 578.—Desfontaines, Hist. Arb. ii, 612.—Michaux f. Hist. Arb. Am. i, 98, t. 9; N. American Sylva, 3 ed. iii, 123, t. 143.—Nouveau Duhamel, v, 245, t. 75, f. 2.—Smith in Rees' Cycl. xxviii, No. 13.—Pursh, Fl. Am. Sept. ii, 644.—Nuttall, Genera, ii, 223.—Hayne, Dend. Fl. 175.—Elliott, Sk. ii, 636.—Sprengel, Syst. ii, 887.—Eaton, Manual, 6 ed. 265.—Lawson, Ag. Manual, 351; Pinetum Brit. i, 89, t. 12.—Loudon, Arboretum, iv, 2237, f. 2118–2122.—Forbes, Pinetum Woburn. 43, t. 14.—Antoine, Conif. 25, t. 7, f. 1.—Eaton & Wright, Bot. 359.—Link in Linnæa, xv, 503.—Spach, Hist. Veg. xi, 391.—Griffith, Med. Bot. 609.—Gihoul, Arb. Resin, 32.—Endlicher, Syn. Conif. 164.—Scheele in Rœmer, Texas, Appx. 447.—Knight, Syn. Conif. 30.—Lindley & Gordon in Jour. Hort. Soc. London, v, 217.—Carrière, Trait. Conif. 344; 2 ed. 448.—Darby, Bot. S. States, 515.—Gordon, Pinetum, 210; 2 ed. 286.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 433.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 22.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 660; Bot. & Fl. 313.—Porcher, Resources S. Forests, 506.—Henkel & Hochstetter, Nadelhölz. 65.—Nelson, Pinaceæ, 136.—Gray, Manual N. States, 5 ed. 469; Hall's Pl. Texas, 21.—Hoopes, Evergreens, 122.—Parlatore in De Candolle, Prodr. xvi^2, 393.—Young, Bot. Texas, 516.—Koch, Dendrologie, ii^2, 304.—Vasey, Cat. Forest Trees, 31.—Bentley & Trimen, Med. Pl. iv, 259, t. 259.—Engelmann in Trans. St. Louis Acad. iv, 183.—Veitch, Manual Conif. 172.

P. Tæda, var. *tenuifolia*, Aiton, Hort. Kew. iii, 368.

LOBLOLLY PINE. OLD-FIELD PINE. ROSEMARY PINE.

Southern Delaware, south to cape Malabar and Tampa bay, Florida, generally near the coast, through the Gulf states to the valley of the Colorado river, Texas, and north through southern Arkansas to the valley of the Arkansas river.

A tree 24 to 46 meters in height, with a trunk 0.90 to 1.50 meter in diameter; low, wet clay or dry sandy soil; springing up on all abandoned lands from Virginia southward, and now often replacing in the southern pine belt the original forests of *Pinus palustris;* in eastern North Carolina rarely on low, rich swamp ridges, here known as rosemary pine and attaining its greatest development and value.

Wood light, not strong, brittle, very coarse-grained, not durable; bands of small summer cells broad, very resinous, conspicuous, resin passages few, not prominent; medullary rays numerous, obscure; color, light brown, the very thick sap-wood orange, or often nearly white; wood of the rosemary pine close-grained, less resinous, lighter, with much thinner sap; specific gravity, 0.5441; ash, 0.26; largely used for fuel and manufactured into lumber of inferior quality.

Turpentine is occasionally manufactured from this species (*U. S. Dispensatory*, 14 ed. 901.—*Flückiger & Hanbury, Pharmacographia*, 545).

371.—Pinus rigida, Miller,

Dict. 7 ed. No. 10.—Du Roi, Harbk. ii, 60.—Marshall, Arbustum, 101.—Wangenheim, Amer. 41.—Lambert, Pinus, 1 ed. i, 25, t. 18, 19; 2 ed. i, 28; t. 18, 19; 3 ed. i, 32, t. 16, 17.—Willdenow, Spec. iv, 498; Enum. 988; Berl. Baumz. 268.—Persoon, Syn. ii, 578.—Desfontaines, Hist. Arb. ii, 612.—Michaux f. Hist. Arb. Am. i, 89, t. 8; N. American Sylva, 3 ed. iii, 118, t. 144.—Nouveau Duhamel, v, 244, t. 74.—Aiton, Hort. Kew. 2 ed. v, 317.—Smith in Rees' Cycl. xxviii, No. 14.—Pursh, Fl. Am. Sept. ii, 643.—Poiret, Suppl. iv, 417.—Eaton, Manual, 110; 6 ed. 265.—Barton, Compend. Fl. Philadelph. ii, 183.—Nuttall, Genera, ii, 223.—Hayne, Dend. Fl. 175.—Elliott, Sk. ii, 635.—Sprengel, Syst. ii, 887.—Torrey, Compend. Fl. N. States, 360; Fl. N. York, ii, 227.—Beck, Bot. 339.—Loudon, Arboretum, iv, 2239, f. 2123–2126.—Forbes, Pinetum Woburn. 41, t. 13.—Eaton & Wright, Bot, 358.—Antoine, Conif. 26, t. 7, f. 2.—Bigelow, Fl. Boston. 3 ed. 385.—Lindley in Penn. Cycl. xvii, 172.—Link in Linnæa, xv, 503.—Antoine, Conif. 26, t. 7, f. 2.—Bigelow, Fl. Boston. 3 ed. 385.—Lindley in Penn. Cycl. xvii, 172.—Link in Linnæa, xv, 503.—Spach, Hist. Veg. xi, 388.—Griffith, Med. Bot. 604.—Gihoul, Arb. Resin, 31.—Endlicher, Syn. Conif. 164.—Knight, Syn. Conif. 30.—Lindley & Gordon in Jour. Hort. Soc. London, v, 217.—Carrière, Trait. Conif. 342; 2 ed. 447.—Darlington, Fl. Cestrica, 3 ed. 290.—Darby, Bot. S. States, 514.—Gordon, Pinetum, 207; 2 ed. 283.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 433.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 21.—Wood, Cl. Book, 660; Bot. & Fl. 313.—Henkel & Hochstetter, Nadelhölz, 67.—Nelson, Pinaceæ, 128.—Gray, Manual N. States, 5 ed. 469.—Hoopes, Evergreens, 119.—Parlatore in De Candolle, Prodr. xvi^2, 394.—Koch, Dendrologie, ii^2, 307.—Vasey, Cat. Forest Trees, 31.—Engelmann in Trans. St. Louis Acad. iv, 183.—Sears in Bull. Essex Inst. xiii, 186.—Veitch, Manual Conif. 169.

P. Tæda, var. *rigida*, Aiton, Hort. Kew. iii, 368.

P. Tæda, var. a. Poiret in Lamarck, Dict. v, 340.

P. Fraseri, Loddiges, Cat. ed. 1836, 50 [not Pursh].

P. Loddigesii, Loudon, Arboretum, iv, 2269.

PITCH PINE.

Valley of the Saint John's river, New Brunswick, to the northern shores of lake Ontario, south through the Atlantic states to northern Georgia, extending to the western slope of the Alleghany mountains in West Virginia and Kentucky (Pineville, Bell county, *De Friese*).

A tree 12 to 24 meters in height, with a trunk 0.60 to 0.90 meter in diameter; dry, sandy, barren soil, or less commonly in deep, cold swamps; very common.

Wood light, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells broad, very resinous, conspicuous, resin passages numerous, not large; medullary rays numerous, obscure; color, light brown or red, the thick sap-wood yellow or often nearly white; specific gravity, 0.5151; ash, 0.23; largely used for fuel, charcoal, and occasionally manufactured into coarse lumber.

NOTE.—Upon the island of Nantucket, Massachusetts, this species is now greatly injured by the attacks of the destructive caterpillar of the pine moth (*Retina frustrana*, Scudder in *Pub. Massachusetts Ag. Soc.* 1883 & t).

372.—Pinus serotina, Michaux,

Fl. Bor.-Am. ii, 205.—Willdenow, Spec. iv, 499.—Persoon, Syn. ii, 578.—Michaux f. Hist. Arb. Am. i, 86, t. 7; N. American Sylva, 3 ed. iii, 117, t. 142.—Nouveau Duhamel, v, 246, t. 75, f. 1.—Pursh, Fl. Am. Sept. ii, 643.—Poiret, Suppl. iv, 417.—Nuttall, Genera, ii, 223.—Lambert, Pinus, 1 ed. iii, 35, t. 18.—Elliott, Sk. ii, 634.—Sprengel, Syst. ii, 887.—Torrey, Compend. Fl. N. States, 360.—Beck, Bot. 339.—Eaton, Manual, 6 ed. 265.—Loudon, Arboretum, iv, 2242, f. 2127-2131.—Forbes, Pinetum Woburn. 47, t. 16.—Eaton & Wright, Bot. 359.—Antoine, Conif. 27, t. 8, f. 2.—Lindley in Penn. Cycl. xvii, 172.—Link in Linnæa, xv, 504.—Spach, Hist. Veg. xi, 389.—Gihoul, Arb. Resin. 32.—Endlicher, Syn. Conif. 163.—Knight, Syn. Conif. 30.—Lindley & Gordon in Jour. Hort. Soc. London, v, 217.—Carrière, Trait. Conif. 341; 2 ed. 449.—Darby, Bot. S. States, 514.—Gordon, Pinetum, 209; 2 ed. 285.—Chapman, Fl. S. States, 433.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 21.—Henkel & Hochstetter, Nadelhölz. 70.—Nelson, Pinaceæ, 129.—Parlatore in De Candolle, Prodr. xvi², 394.—Koch, Dendrologie, ii², 305.—Vasey, Cat. Forest Trees, 31.

P. Tæda, var. *alopecuroidea*, Aiton, Hort. Kew. 2 ed. v, 317.—Loudon, Arboretum, iv, 2237.

P. rigida, var. *serotina*, Loudon, Encycl. Pl. 979, f. 1824-1827.—Cooper in Smithsonian Rep. 1858, 257.—Hoopes, Evergreens, 120.—Engelmann in Trans. St. Louis Acad. iv, 183.

POND PINE.

North Carolina, south near the coast to the head of the Saint John's river, Florida.

A tree 12 to 24 meters in height, with a trunk 0.60 to 0.90 meter in diameter; inundated borders of streams and ponds in low, peaty soil; not common.

Wood heavy, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells broad, forming fully one-half the annual growth, very resinous, dark colored, conspicuous, resin passages few, large; medullary rays numerous, obscure; color, dark orange, the thick sap-wood pale yellow; specific gravity 0.7942; ash, 0.17.

373.—Pinus inops, Aiton,

Hort. Kew. iii, 367; 2 ed. v, 316.—Michaux, Fl. Bor.-Am. ii, 204.—Lambert, Pinus, 1 ed. i, 18, t. 13; 2 ed. i, 21, t. 14; 3 ed. i, 25, t. 12.—Willdenow, Spec. iv, 496; Enum. 988; Berl. Baumz. 266.—Persoon, Syn. ii, 578.—Michaux f. Hist. Arb. Am. i, 58, t. 4; N. American Sylva, 3 ed. iii, 103, t. 139.—Nouveau Duhamel, v, 236, t. 69, f. 1.—Pursh, Fl. Am. Sept. ii, 641.—Smith in Rees' Cycl. xxviii, No. 10.—Barton, Prodr. Fl. Philadelph. 93.—Compend. Fl. Philadelph. ii, 183.—Nuttall, Genera, ii, 223.—Hayne, Dend. Fl. 173.—Elliott, Sk. ii, 633.—Sprengel, Syst. ii, 886.—Torrey, Compend. Fl. N. States, 359.—Audubon, Birds, t. 97.—Beck, Bot. 338.—Eaton, Manual, 6 ed. 265.—Bon Jard. 1837, 976.—Loudon, Arboretum, iv, 2192, f. 2068-2071.—Forbes, Pinetum Woburn. 15, t. 4.—Hooker, Fl. Bor.-Am. ii, 161, in part.—Eaton & Wright, Bot. 358.—Antoine, Conif. 17, t. 5, f. 3.—Lindley in Penn. Cycl. xvii, 171.—Link in Linnæa, xv, 500.—Spach, Hist. Veg. xi, 386.—Endlicher, Syn. Conif. 167.—Knight, Syn. Conif. 26.—Lindley & Gordon in Jour. Hort. Soc. London, v, 217.—Carrière, Trait. Conif. 361; 2 ed. 471.—Darlington, Fl. Cestrica, 3 ed. 290.—Darby, Bot. S. States, 514.—Gordon, Pinetum, 167; 2 ed. 238.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 433.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 20.—Wood, Cl. Book, 661; Bot. & Fl. 313.—Henkel & Hochstetter, Nadelhölz. 22.—Nelson, Pinaceæ, 113.—Gray, Manual N. States, 5 ed. 470.—Hoopes, Evergreens, 84.—Parlatore in De Candolle, Prodr. xvi², 380 (excl. syn. *variabilis*).—Vasey, Cat. Forest Trees, 30.—Veitch, Manual Conif. 158.

P. Virginiana, Miller, Gard. Dict. 7 ed. No. 9.—Du Roi, Obs. Bot. 43; Harbk. 2 ed. ii, 35.—Marshall, Arbustum, 102.—Wangenheim, Amer. 74.—Koch, Dendrologie, ii², 299.

P. Tæda, var. *Virginiana*, Poiret in Lamarck, Dict. v, 340.

JERSEY PINE. SCRUB PINE.

Middle Island, Long island, Tottenville, and Clifton, Staten island, New York, south, generally near the coast, to the valley of the Savannah river (Aiken, South Carolina), and through eastern and middle Kentucky to "the knobs" of southeastern Indiana.

A tree 24 to 36 meters in height, with a trunk 0.60 to 0.90 meter in diameter, or in the Atlantic states generally much smaller; sandy, generally barren soil, reaching its greatest development west of the Alleghany mountains.

Wood light, soft, not strong, brittle, very close-grained, compact, durable; bands of small summer cells broad, very resinous, conspicuous, resin passages few, not prominent; medullary rays numerous, thin; color, light orange, the thick sap-wood nearly white; specific gravity, 0.5309; ash, 0.30; largely used for fuel, and in Kentucky and Indiana preferred for and largely manufactured into water-pipes and pump-logs.

374.—Pinus clausa, Vasey,

Cat. Forest Trees, 30.

P. inops, var. *clausa*, Engelmann in Trans. St. Louis Acad. iv, 183.—Chapman, Fl. S. States, Suppl. 650.

SAND PINE. SCRUB PINE. SPRUCE PINE.

Florida, shores of Pensacola bay, south, generally within 30 miles of the coast, to Pease creek, and occupying a narrow ridge along the east coast south of Saint Augustine.

A tree 21 to 24 meters in height, with a trunk 0.60 to 0.75 meter in diameter, or on the west coast rarely 6 to 9 meters in height; barren, sandy dunes and ridges; most common and reaching its greatest development about the head of Halifax bay.

Wood light, soft, not strong, brittle; bands of small summer cells broad, very resinous, conspicuous, resin passages numerous, prominent; medullary rays numerous, thin; color, light orange or yellow, the thick sap-wood nearly white; specific gravity, 0.5576; ash, 0.31; occasionally used for the masts of small vessels.

375.—Pinus pungens, Michaux f.

Hist. Arb. Am. i, 61, t. 5; N. American Sylva, 3 ed. iii, 105, t. 140.—Nouveau Duhamel, v. 236, t. 67, f. 4.—Aiton, Hort. Kew. 2 ed. v, 314.—Pursh, Fl. Am. Sept. ii, 643.—Poiret, Suppl. iv, 417.—Elliott, Sk. ii, 635.—Sprengel, Syst. ii, 886.—Eaton, Manual, 6 ed. 265.—Lambert, Pinus, 1 ed. iii, 34, t. 17.—Loudon, Arboretum, iv, 2197, f. 2077-2080.—Forbes, Pinetum Woburn. 17, t. 5.—Eaton & Wright, Bot. 359.—Antoine, Conif. 18, t. 5, f. 4.—Lindley in Penn. Cycl. xvii, 171.—Nuttall, Sylva, iii, 125; 2 ed. ii, 184.—Spach, Hist. Veg. xi, 287.—Endlicher, Syn. Conif. 166.—Knight, Syn. Conif. 27.—Lindley & Gordon in Jour. Hort. Soc. London, v, 217.—Carrière, Trait. Conif. 359; 2 ed. 470.—Darby, Bot. S. States, 515.—Gordon, Pinetum, 181; 2 ed. 254.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 432.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 20.—Wood, Cl. Book, 660; Bot. & Fl. 313.—Henkel & Hochstetter, Nadelhölz, 21.—Nelson, Pinaceæ, 127.—Gray, Manual N. States, 5 ed. 469.—Hoopes, Evergreens, 98.—Parlatore in De Candolle, Prodr. xvi², 379.—Koch, Dendrologie ii², 304.—Vasey, Cat. Forest Trees, 30.—Meehan in Rep. Penn. Fruit Growers' Soc. 1877 & t.—Engelmann in Trans. St. Louis. Acad. iv, 183.—Veitch, Manual Conif. 158.

TABLE-MOUNTAIN PINE. HICKORY PINE.

Alleghany mountains, Pennsylvania to Tennessee.

A tree 9 to 18 meters in height, with a trunk 0.60 to 1.05 meter in diameter; most common and reaching its greatest develop ment upon the high mountains of East Tennessee, here often the prevailing species and forming extensive forests.

Wood light, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells broad, resinous, conspicuous, resin passages numerous, large; medullary rays numerous, prominent; color, light brown, the thick sap-wood nearly white; specific gravity, 0.4935; ash, 0.27; in Pennsylvania largely manufactured into charcoal.

376.—Pinus muricata, D. Don,

Trans. Linnæan Soc. xvii, 441.—Lambert, Pinus, 1 ed. iii, t. 84.—Loudon, Arboretum, iv, 2269, f. 2180.—Hooker & Arnott, Bot. Beechey, 393.—Antoine, Conif. 32, t. 14, f. 1.—Nuttall, Sylva, iii, 113; 2 ed. ii, 172.—Endlicher, Syn. Conif. 161.—Knight, Syn. Conif. 26.—Gordon in Jour. Hort. Soc. London, iv, 216 & f. (Fl. des Serres, v, 517[b] & f.); Pinetum, 173; 2 ed. 246 (excl. syn. *Murrayana*).—Lindley & Gordon in Jour. Hort. Soc. London, v, 217.—Carrière, Trait. Conif. 359; 2 ed. 470.—Torrey, Bot. Mex. Boundary Survey, 209, t. 54 (*P. Edgariana* on plate).—Cooper in Smithsonian Rep. 1858, 261.—Henkel & Hochstetter, Nadelhölz. 60.—Nelson, Pinaceæ, 121.—Hoopes, Evergreens, 92.—Parlatore in De Candolle, Prodr. xvi², 379.—Fowler in London Gard. Chronicle, 1872, 1164.—Koch, Dendrologie, ii², 302.—Vasey, Cat. Forest Trees, 30.—Engelmann in Trans. St. Louis Acad. iv, 183; Bot. California, ii, 128.—Veitch, Manual Conif. 151.—London Gard. Chronicle, 1884, 49, f. 7-9.

P. inops, var. Bentham, Pl. Hartweg. 337.

P. Edgariana, Hartweg in Jour. Hort. Soc. London, iii, 217, 226.

P. contorta, Bolander in Proc. California Acad. iii, 227, 317 [not Douglas].

OBISPO PINE. BISHOP'S PINE.

California, Mendocino county south through the Coast ranges to San Luis Obispo county.

A tree 24 to 36 meters in height, with a trunk 0.30 to 0.90 meter in diameter, or more often not exceeding 15 meters in height; cold peat bogs or barren, sandy gravel; always exposed to the winds and fogs of the ocean, and not found above 2,000 feet elevation, reaching its greatest development in Mendocino county; rare and local.

Wood light, very strong and hard, rather coarse-grained, compact; bands of small summer cells broad, resinous, resin passages few, not prominent; medullary rays numerous, thin; color, light brown, the thick sap-wood nearly white; specific gravity, 0.4942; ash, 0.26.

377.—Pinus mitis, Michaux,

Fl. Bor.-Am. ii, 204.—Michaux f. Hist. Arb. Am. i, 52, t. 3; N. American Sylva, 3 ed. iii, 96, t. 137.—Barton, Prodr. Fl. Philadelph. 93.—Poiret, Suppl. iv, 417.—Loudon, Arboretum, iv, 2195, f. 2072-2076.—Antoine, Conif. 16, t. 5, f. 1.—Lindley in Penn. Cycl. xvii, 171.—Spach, Hist. Veg. xi, 386.—Torrey, Fl. N. York, ii, 229.—Endlicher, Syn. Conif. 167.—Knight, Syn. Conif. 26.—Lindley & Gordon in Jour. Hort. Soc. London, v, 217.—Carrière, Trait. Conif. 361; 2 ed. 472.—Gordon, Pinetum, 170; 2 ed. 243 (excl. syn. *Roylei*).—Cooper in Smithsonian Rep. 1858, 275.—Chapman, Fl. S. States, 433.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 19.—Lesquereux in Owen's 2d Rep. Arkansas, 389.—Wood, Cl. Book, 660; Bot. & Fl. 313.—Henkel & Hochstetter, Nadelhölz. 23.—Gray, Manual N. States, 5 ed. 470.—Hoopes, Evergreens, 88.—Parlatore in De Candolle, Prodr. xvi^2, 380.—Young, Bot. Texas, 516.—Koch, Dendrologie, ii^2, 300.—Vasey, Cat. Forest Trees, 30.—Broadhead in Coulter's Bot. Gazette, iii, 60.—Engelmann in Trans. St. Louis Acad. iv, 184.—Ridgway in Proc. U. S. Nat. Mus. 88.

P. echinata, Miller, Dict. 7 ed. No. 12.—Marshall, Arbustum, 180?—Wangenheim, Amer. 74.

P. Virginiana, var. *echinata*, Du Roi, Harbk. ii, 38.

P. Tæda, var. *variabilis*, Aiton, Hort. Kew. iii, 368.

P. variabilis, Lambert, Pinus, 1 ed. i, 22, t. 15; 2 ed. i, 25, t. 16; 3 ed. i, 29, t. 14.—Willdenow, Spec. iv, 498.—Persoon, Syn. ii, 578.—Nouveau Duhamel, v, 235, t. 69, f. 2.—Aiton, Hort. Kew. 2 ed. v, 316.—Pursh, Fl. Am. Sept. ii, 643.—Smith in Rees' Cycl. xxviii, No. 12.—Barton, Compend. Fl. Philadelph. ii, 183.—Nuttall, Genera, ii, 223.—Elliott, Sk. ii, 633.—Sprengel, Syst. ii, 886.—Torrey, Compend. Fl. N. States, 360.—Beck, Bot. 339.—Eaton, Manual, 6 ed. 265.—Forbes, Pinetum Woburn. 35, t. 11.—Eaton & Wright, Bot. 358.—Antoine, Conif. 15, t. 5, f. 2.—Link in Linnæa, xv, 502.—Endlicher, Syn. Conif. 168 (excl. syn.).—Darby, Bot. S. States, 514.

P. rigida, Porcher, Resources S. States, 504 [not Miller].

YELLOW PINE. SHORT-LEAVED PINE. SPRUCE PINE. BULL PINE.

Staten island, New York, south to the Chattahoochee region of western Florida, through the Gulf states to Tennessee and eastern Texas, and through Arkansas to the Indian territory, southeastern Kansas, southern Missouri, and in Union county, Illinois.

A tree 24 to 30 meters in height, with a trunk 0.60 to 1.35 meter in diameter; light sandy soil or, less commonly, along the low borders of swamps; forming west of the Mississippi river, mixed with oaks and other deciduous trees, extensive forests; the only species of northern Arkansas, Kansas, and Missouri, reaching its greatest development in western Louisiana, southern Arkansas, and eastern Texas.

Wood, varying greatly in quality and amount of sap, heavy, hard, strong, generally coarse-grained, compact; bands of small summer cells broad, often occupying half the width of the annual growth; very resinous, resin passages numerous, large; medullary rays numerous, conspicuous; color, orange, the sap-wood nearly white; specific gravity, 0.6104; ash, 0.29; largely manufactured into lumber, especially in the states west of the Mississippi river, and among yellow pines only inferior in value to that of *P. palustris*.

378.—Pinus glabra, Walter,

Fl. Caroliniana, 237.—Poiret in Lamarck, Dict. v, 342.—Ravenel in Proc. Elliott Soc. i, 52.—Chapman, Fl. S. States, 433.—Porcher, Resources S. Forests, 506.—Hoopes, Evergreens, 82.—Vasey, Cat. Forest Trees, 30.—Engelmann in Trans. St. Louis Acad. iv, 184.

?*P. mitis*, var. *paupera*, Wood, Cl. Book, 660.

CEDAR PINE. SPRUCE PINE. WHITE PINE.

South Carolina, south to the Chattahoochee region of western Florida, generally near the coast, and through the Gulf states south of latitude 32° 30′ to the valley of the Pearl river, Louisiana.

A tree 24 to 30 meters in height, with a trunk 0.60 to 1.20 meter in diameter; rich bottom lands and hummocks in dense forests of hard-wood trees, reaching its greatest development in Alabama and Mississippi; not common and local.

Wood light, soft, not strong, brittle, very coarse-grained, not durable; bands of small summer cells broad, not resinous, resin passages few, not large; medullary rays numerous, obscure; color, *light brown, the sap-wood* nearly white; specific gravity, 0.3931; ash, 0.45.

379.—Pinus Banksiana, Lambert,

Pinus, 1 ed. i, 7, t. 3; 2 ed. i, 7, t, 3; 3 ed. i, 9, t. 3.—Persoon, Syn. ii, 578.—Desfontaines, Hist. Arb. ii, 611.—Nouveau Duhamel, v, 234, t. 67, f. 3.—Aiton, Hort. Kew. 2 ed. v, 315.—Pursh, Fl. Am. Sept. ii, 642.—Smith in Rees' Cycl. xxviii, No. 4.—Nuttall, Genera, ii, 223; Sylva, iii, 124; 2 ed. ii, 182.—Sprengel, Syst. ii, 886.—Torrey, Compend. Fl. N. States, 360.—Beck, Bot. 339.—Eaton, Manual, 6 ed. 265.—Loudon, Arboretum, iv, 2190, f. 2064–2067.—Forbes, Pinetum Woburn. 13, t. 3.—Hooker, Fl. Bor.-Am. ii, 161.—Eaton & Wright, Bot. 358.—Antoine, Conif. 8, t. 4, f. 2.—Lindley in Penn. Cycl. xvii, 171.—Link in Linnæa, xv, 491.—Spach, Hist. Veg. xi, 379.—Endlicher, Syn. Conif. 177.—Knight, Syn. Conif. 26.—Lindley & Gordon in Jour. Hort. Soc. London, v, 218 (excl. syn. *contorta*).—Parry in Owen's Rep. 618.—Carrière, Trait. Conif. 381; 2 ed. 485.—Gordon, Pinetum, 163; 2 ed. 230.—Richardson, Arctic Exped. 441.—Cooper in Smithsonian Rep. 1858, 257.—Hooker f. in Trans. Linnæan Soc. xxiii², 301.—Wood, Cl. Book, 661.—Henkel & Hochstetter, Nadelhölz. 44.—Nelson, *Pinaceæ*, 104.—Gray, Manual N. States, 5 ed. 470.—Hoopes, Evergreens, 78.—Vasey, Cat. Forest Trees, 29.—Macoun in Geological Rep. Canada, 1875–'76, 211.—Engelmann in Trans. St. Louis Acad. iv, 184.—Sears in Bull. Essex Inst. xiii, 186.—Bell in Geological Rep. Canada, 1879–'80, 46c.—Veitch, Manual Conif. 158.

P. sylvestris, var. *divaricata*, Aiton, Hort. Kew. iii, 366.

P. Hudsonica, Poiret in Lamarck, Dict. v, 339.—Parlatore in De Candolle, Prodr. xvi², 380.—Wood, Bot. & Fl. 313.—Koch, Dendrologie, ii², 298.

P. rupestris, Michaux f. Hist. Arb. Am. i, 49, t. 2; N. American Sylva, 3 ed. iii, 95, t. 136.

GRAY PINE. SCRUB PINE. PRINCE'S PINE.

Bay of Chaleur, New Brunswick, to the southern shores of Hudson bay, northwest to the Great Bear lake, the valley of the Mackenzie river, and the eastern slope of the Rocky mountains between the fifty-second and sixty-fifth degrees of north latitude; south to northern Maine, Ferrisburg, Vermont (*R. E. Robinson*), the southern shore of lake Michigan, and central Minnesota.

A small tree, 9 to 22 meters in height, with a trunk rarely exceeding 0.75 meter in diameter; barren, sandy soil or, less commonly, in rich loam; most common north of the boundary of the United States, and reaching its greatest development in the region north of lake Superior, here often forming considerable forests; toward its extreme western limits associated and often confounded with the closely allied *P. contorta* and *P. Murrayana* of the Pacific region.

Wood light, soft, not strong, rather close-grained, compact; bands of small summer cells not broad, very resinous, conspicuous, resin passages few, not large; medullary rays numerous, obscure; color, clear light brown or, rarely, orange, the thick sap-wood almost white; specific gravity, 0.4761; ash, 0.23; largely used for fuel, railway ties, etc.

380.—Pinus palustris, Miller,

Dict. 7 ed. No. 14.—Marshall, Arbustum, 100.—Wangenheim, Amer. 73.—Walter, Fl. Caroliniana, 237.—Aiton, Hort. Kew. iii, 368; 2 ed. v, 317.—Abbot, Insects Georgia, i, t. 42.—Du Roi, Harbk. 2 ed. ii, 66.—Michaux, Fl. Bor.-Am. ii, 204.—Lambert, Pinus, 1 ed. i, 27, t. 20; 2 ed. i, 30, t. 21; 3 ed. i, 41, t. 24, 25.—Willdenow, Spec. iv, 499.—Poiret in Lamarck, Dict. v, 341.—Persoon, Syn. ii, 578.—Desfontaines, Hist. Arb. ii, 612.—Pursh, Fl. Am. Sept. ii, 644.—Smith in Rees' Cycl. xxviii, No. 15.—Nuttall, Genera, ii, 223; Sylva, iii, 126; 2 ed. ii, 185.—Hayne, Dend. Fl. 174.—Elliott, Sk. ii, 637.—Sprengel, Syst. ii, 887.—Eaton, Manual, 6 ed. 266.—Forbes, Pinetum Woburn. 59, t. 22.—Eaton & Wright, Bot. 359.—Antoine, Conif. 23, t. 6, f. 2.—Link in Linnæa, xv, 206.—Griffith, Med. Bot. 604.—Darby, Bot. S. States, 515.—Cooper in Smithsonian Rep. 1858, 257.—Wood, Cl. Book, 660.—Porcher, Resources S. Forests, 495.—Michaux f. N. American Sylva, 3 ed. iii, 106, t. 141 (the plate as *P. australis*).

P. australis, Michaux f. Hist. Arb. Am. i, 64, t. 6.—Nouveau Duhamel, v, 246, t. 75, f. 3.—Loudon, Arboretum, iv, 2255, f. 2156–2160.—Lindley in Penn. Cycl. xvii, 171.—Spach, Hist. Veg. xi, 392.—Endlicher, Syn. Conif. 165.—Carson, Med. Bot. ii, 43, t. 87.—Gihoul, Arb. Resin. 33.—Knight, Syn. Conif. 30.—Lindley & Gordon in Jour. Hort. Soc. London, v, 217.—Carrière, Trait. Conif. 345; 2 ed. 450.—Gordon, Pinetum, 187; Suppl. 63; 2 ed. 260.—Chapman, Fl. S. States, 434.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 24.—Wood, Bot. & Fl. 313.—Henkel & Hochstetter, Nadelhölz. 65.—Nelson, *Pinaceæ*, 103.—Hoopes, Evergreens, 109.—Parlatore in De Candolle, Prodr. xvi², 392.—Young, Bot. Texas, 517.—Vasey, Cat. Forest Trees, 31.—Bentley & Trimen, Med. Pl. iv, 258, t. 258.—Engelmann in Trans. St. Louis Acad. iv, 185.—Veitch, Manual Conif. 172.

LONG-LEAVED PINE. SOUTHERN PINE. GEORGIA PINE. YELLOW PINE. HARD PINE.

Southeastern Virginia, south to cape Canaveral and Tampa bay, Florida, and through the Gulf states to the valley of the Red river, Louisiana, and the Trinity river, Texas, rarely extending beyond 150 miles from the coast.

A tree of the first economic value, 18 to 29 meters in height, with a trunk 0.60 to 1.20 meter in diameter; dry, sandy loam of the maritime plain, generally of Tertiary formation, and forming, outside of the river bottoms, extensive forests almost to the exclusion of other species, or toward its extreme interior range, especially in the Gulf states, occupying rolling hills, here mixed with oaks and various deciduous trees; rarely along the borders of swamps in low, wet soil.

Wood heavy, exceedingly hard, very strong, tough, coarse-grained, compact, durable; bands of small summer cells broad, occupying fully half the width of the annual growth, very resinous, dark colored, resin passages few, not conspicuous; medullary rays numerous, conspicuous; color, light red or orange, the thin sap-wood nearly white; specific gravity, 0.6999; ash, 0.25; largely manufactured into lumber and used in construction of all sorts, for ship-building, fencing, railway ties, etc.

The turpentine, tar, pitch, rosin, and spirits of turpentine manufactured in the United States are almost exclusively produced by this species (*U. S. Dispensatory*, 14 ed. 709, 899.—*Nat. Dispensatory*, 2 ed. 1417.—*Flückiger & Hanbury, Pharmacographia*, 545).

381.—Pinus Cubensis, Grisebach,

Mem. Am. Acad. viii, 530; Cat. Pl. Cuba, 217.—Parlatore in De Candolle, Prodr. xvi², 396.

P. Tæda, var. *heterophylla*, Elliott, Sk. ii, 636.

P. Elliottii, Engelmann; Vasey, Cat. Forest Trees, 30; Trans. St. Louis Acad. iv, 186, t. 1, 2, 3.—Chapman, Fl. S. States, Suppl. 650.

P. Cubensis, var. *terthrocarpa*, Wright.—Grisebach, Cat. Pl. Cuba, 217.

SLASH PINE. SWAMP PINE. BASTARD PINE. MEADOW PINE.

South Carolina (Bluffton, *Mellichamp*), south near the coast to the southern keys of Florida, west along the Gulf coast to the valley of the Pearl river, Louisiana, not extending beyond 50 or 60 miles inland; in the West Indies.

A tree 24 to 30 meters in height, with a trunk 0.60 to 0.90 meter in diameter; light sandy soil along the dunes and marshes of the coast, or wet clay borders of ponds, abandoned fields, etc., and now rapidly taking possession of ground from which the forests of *P. palustris* have been removed; the only species of Florida south of cape Canaveral and bay Biscayne.

Wood heavy, exceedingly hard, very strong, tough, coarse-grained, compact, durable; bands of small summer cells very broad, occupying fully half the width of the annual growth, very resinous, conspicuous, resin passages few, not large; medullary rays numerous, rather prominent; color, rich dark orange, the sap-wood lighter, often nearly white; specific gravity, 0.7504; ash, 0.26; hardly inferior in value to that of *P. palustris*, although rarely manufactured into lumber.

Turpentine is occasionally manufactured in southern Florida from this species.

NOTE.—Specimens collected upon the southern keys of Florida by A. H. Curtiss connect the forms of South Carolina, Georgia, and northern Florida with the West Indian tree.

382.—Picea nigra, Link,

Linnæa, xv, 520.—Carrière, Trait. Conif. 241; 2 ed. 323.—Hooker f. in Trans. Linnæan Soc. xxiii², 301.—Brunet, Hist. Picea, 10 & t. f. B.—Peck in Trans. Albany Inst. viii, 283.—Engelmann in London Gard. Chronicle, 1879, 334.—Sears in Bull. Essex Inst. xiii, 185.

Abies Mariana, Miller, Dict.—Wangenheim, Amer. 75.

Pinus Mariana, Du Roi, Obs. Bot. 38; Harbk. ii, 107.—Ehrhart, Beitr. iii, 24.

Pinus Abies Canadensis, Marshall, Arbustum, 103.

Pinus Americana rubra, Wangenheim, Amer. 75.

Pinus nigra, Aiton, Hort. Kew. iii, 370; 2 ed. v, 319.—Lambert, Pinus, 1 ed. i, 41, t. 27; 2 ed. i, 45, t. 27; 3 ed. i, 64, t. 37.—Willdenow, Spec. iv, 506; Enum. 990; Berl. Baumz. 278.—Persoon, Syn. ii, 579.—Pursh. Fl. Am. Sept. ii, 640.—Smith in Rees' Cycl. xxviii, No. 20.—Barton, Compend. Fl. Philadelph. ii, 182.—Nuttall, Genera, ii, 223.—Hayne, Dend. Fl. 177.—Elliott, Sk. ii, 640.—Sprengel, Syst. ii, 885.—Torrey, Compend. Fl. N. States, 359; Fl. N. York, ii, 230.—Beck, Bot. 340.—Eaton, Manual, 6 ed. 264.—Hooker, Fl. Bor.-Am. ii, 163.—Eaton & Wright, Bot. 358.—Bigelow, Fl. Boston. 3 ed. 386.—Antoine, Conif. 88, t. 34, f. 3.—Endlicher, Syn. Conif. 115.—Darby, Bot. S. States, 515.—Porcher, Resources S. Forests, 505.—Parlatore in De Candolle, Prodr. xvi², 413.

Pinus Americana, Gærtner, Fruct. ii, 60, t. 91, f. 1.

Pinus rubra, Lambert, Pinus, 1 ed. i, 48, t. 28; 2 ed. i, 47, t. 30; 3 ed. i, 66, t. 38 [not Michaux f.].—Persoon, Syn. ii, 579.—Aiton, Hort. Kew. 2 ed. v, 319.—Pursh, Fl. Am. Sept. ii, 640.—Smith in Rees' Cycl. xxviii, No. 23.—Nuttall, Genera. ii, 223.—Sprengel, Syst. ii, 885.—Torrey, Compend. Fl. N. States, 359.—*Beck, Bot. 340.—Eaton, Manual, 6 ed. 264.—Hooker, Fl.* Bor.-Am. ii, 164.—Eaton & Wright, Bot. 358.—Antoine, Conif. 87, t. 34, f. 2.—Endlicher, Syn. Conif. 113.—Gihoul, Arb. Resin. 44.—Parlatore in De Candolle, Prodr. xvi², 413.

Abies denticulata, Michaux, Fl. Bor.-Am. ii, 206.—Poiret in Lamarck, Dict. vi, 520.

Abies nigra, Poiret in Lamarck, Dict. vi, 520.—Desfontaines, Hist. Arb. ii, 580.—Michaux f. Hist. Arb. Am. i, 124, t. 11; N. American Sylva, 3 ed. iii, 139, t. 147.—*Nouveau Duhamel, v, 292, t. 81, f. 1.—Lindley in Penn. Cycl. i, 32.*—Loudon, Arboretum, iv, 2312, f. 2225–2227.—Spach, Hist. Veg. xi, 410, in part.—Emerson, Trees Massachusetts, 81; 2 ed. ii, 96.—Griffith, Med. Bot. 606.—Knight, Syn. Conif. 36.—Lindley & Gordon in Jour. Hort. Soc. London, v, 211.—Parry in Owen's Rep. 618.—Gordon, Pinetum, 11; 2 ed. 17.—Richardson, Arctic Exped. 442.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 434.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 27.—Wood, Cl. Book, 662; Bot. & Fl. 313.—Porcher, Resources S. Forests, 507.—Henkel & Hochstetter, Nadelhölz. 191.—Nelson, Pinaceæ, 50.—Gray, Manual N. States, 5 ed. 471.—Hoopes, Evergreens, 169.—Vasey, Cat. Forest Trees, 33.—Guibourt, Hist. Drogues, 7 ed. ii, 247.—Macoun in *Geological Rep. Canada, 1875–'76, 211.—Bell in Geological Rep. Canada, 1879–'80, 44ᶜ.—Veitch,* Manual Conif. 74.

Abies rubra, Poiret in Lamarck, Dict. vi, 520.—Desfontaines, Hist. Arb. ii, 580.—Loudon, Arboretum, iv, 2316, f. 2228.—Forbes, Pinetum Woburn. 101, t. 35.—Knight, Syn. Conif. 37.—Lindley & Gordon in Jour. Hort. Soc. London, v, 211.—Gordon, Pinetum, 11; 2 ed. 17.—Henkel & Hochstetter, Nadelhölz. 189.—Nelson, Pinaceæ, 51.

P. rubra, Link in Linnæa, xv, 521.—Carrière, *Trait. Conif. 240; 2 ed.* 322.

Abies nigra, var. *rubra*, Michaux f. Hist. Arb. Am. i, 123; N. American Sylva, 3 ed. iii, 141.—Spach, Hist. Veg. xi, 411.—Hoopes, Evergreens, 170.

? *Abies rubra*, var. *arctica*, Lindley & Gordon in Jour. Hort. Soc. London, v, 211.

Abies alba, Chapman, Fl. S. States, 435 [not Poiret].

Abies Americana, Koch, Dendrologie, ii², 241.

P. nigra, var. *rubra*, Engelmann in London Gard. Chronicle, 1879, 334.

Abies arctica, Hort.

Abies Marylandica, Hort.

BLACK SPRUCE.

Newfoundland, northern Labrador to Ungava bay, Nastapokee sound, cape Churchill, Hudson bay, and northwest to the mouth of the Mackenzie river and the eastern slope of the Rocky mountains; south through the northern states to Pennsylvania, central Michigan, Wisconsin, and Minnesota, and along the Alleghany mountains to the high peaks of North Carolina.

A tree 15 to 21 meters in height, with a trunk 0.60 to 0.90 meter in diameter; light, dry, rocky soil, forming, especially north of the fiftieth degree of latitude, extensive forests on the water-sheds of the principal streams or in cold, wet swamps; then small, stunted, and of little value (*P. rubra*).

Wood light, soft, not strong, close, straight-grained, compact, satiny; bands of small summer cells thin, resinous, resin passages few, minute; medullary rays few, conspicuous; color, light red or often nearly white, the sap-wood lighter; specific gravity, 0.4584; ash, 0.27; largely manufactured into lumber, used in construction, for ship-building, piles, posts, railway ties, etc.

Essence of spruce, prepared by boiling the young branches of this species, is used in the manufacture of spruce beer, a popular beverage (*U. S. Dispensatory*, 14 ed. 901).

383.—Picea alba, Link,

Linnæa, xv, 519.—Carrière, Trait. Conif. 238; 2 ed. 319.—Fl. des Serres, xxi, 157, t. 2251.—Brunet, Hist. Picea, 4 & t. f. A.—Engelmann in London Gard. Chronicle, 1879, 334.—Sears in Bull. Essex Inst. xiii, 184.

Abies Canadensis, Miller, Dict. No. 1.

Pinus Canadensis, Du Roi, Obs. Bot. 38; Harbk. ii, 124 [not Linnæus].—Wangenheim, Amer. 5, t. 1, f. 2.

P. laxa, Ehrhart, Beitr. iii, 24.

P. glauca, Mœnch, Weiss. 73.

Pinus alba, Aiton, Hort. Kew. iii, 371; 2 ed. v, 318.—Lambert, Pinus, 1 ed. i, 39 t. 26; 2 ed. i, 43, t. 28; 3 ed. i, 61, t. 35.—Willdenow, Spec. iv, 507; Enum. 990; Berl. Baumz. 280.—Persoon, Syn. ii, 579.—Pursh, Fl. Am. Sept. ii, 641.—Smith in Rees' Cycl. xxviii, No. 21.—Eaton, Manual, 6 ed. 264.—Nuttall, Genera, ii, 223.—Hayne, Dend. Fl. 177.—Elliott, Sk. ii, 640.—Sprengel, Syst. ii, 885.—Torrey, Compend. Fl. N. States, 359; Fl. N. York, ii, 231.—Meyer, Pl. Labrador, 30.—Beck, Bot. 340.—Hooker, Fl. Bor.-Am. ii, 163.—Eaton & Wright, Bot. 358.—Bigelow, Fl. Boston. 3 ed. 386.—Antoine, Conif. 86, t. 34, f. 1.—Endlicher, Syn. Conif. 112.—Darby, Bot. S. States, 515.—Tuinbouw Flora, 1855, 1, t. 14, 15.—Walpers, Ann. v, 799.—Parlatore in De Candolle, Prodr. xvi², 414.

Pinus tetragona, Mœnch, Meth. 364.

Abies alba, Poiret in Lamarck, Dict. vi, 521.—Michaux, Fl. Bor.-Am. ii, 207.—Desfontaines, Hist. Arb. ii, 580.—Michaux f. Hist. Arb. Am. i, 133, t. 12; N. American Sylva, 3 ed. iii, 144, t. 148.—Nouveau Duhamel, v, 291, t. 81, f. 2.—Loudon, Arboretum, iv, 2310, f. 2224.—Forbes, Pinetum Woburn. 95, t. 33.—Nuttall, Sylva, iii, 129; 2 ed. ii, 189.—Spach, Hist. Veg. xi, 412.—Emerson, Trees Massachusetts, 84; 2 ed. i, 99.—Gihoul, Arb. Resin. 43.—Knight, Syn. Conif. 36.—Lindley & Gordon in Jour. Hort. Soc. London, v, 211.—Parry in Owen's Rep. 618.—Gordon, Pinetum, 2; 2 ed. 3.—Richardson, Arctic Exped. 442.—Cooper in Smithsonian Rep. 1858, 257.—Hooker f. in Trans. Linnæan Soc. xxiii², 301.—Engelmann in Am. Jour. Sci. 2 ser. xxxiv, 330.—Wood, Cl. Book, 661; Bot. & Fl. 313.—Porcher, Resources S. Forests, 507.—Henkel & Hochstetter, Nadelhölz. 188.—Nelson, Pinaceæ, 47.—Gray, Manual N. States, 5 ed. 471.—Murray in Seemann, Jour. Bot. v, 253, t. 69, f. 2-7.—Hoopes, Evergreens, 157, f. 20.—Vasey, Cat. Forest Trees, 32.—Guibourt, Hist. Drogues, 7 ed. ii, 247.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Bell in Geological Rep. Canada, 1879-'80, 44c.

Abies rubra, var. *cærulea*, Loudon, Arboretum, iv, 2316.—Lindley & Gordon in Jour. Hort. Soc. London, v, 211.

Abies cærulea, Forbes, Pinetum Woburn. 99.

P. cærulea, Link in Linnæa, xv, 522.

Pinus rubra, var. *violacea*, Endlicher, Syn. Conif. 114.

P. nigra, var. *glauca*, Carrière, Trait. Conif. 1 ed. 242.

Abies arctica, Murray in Seemann, Jour. Bot. v, 253, t. 69, f. 1, 8-13.

Abies laxa, Koch, Dendrologie, ii², 243.

Abies alba, var. *cærulea*, Carrière, Trait. Conif. 2 ed. 320.

Abies alba, var. *arctica*, Parlatore in De Candolle, Prodr. xvi², 414.

WHITE SPRUCE.

Newfoundland, northern shore of Labrador to Ungava bay, cape Churchill, and northwestward to the mouth of the Mackenzie river and the valley of the Yukon river, Alaska; south to the coast of Maine, northeastern Vermont (West Burke and Elmwood, *Pringle*), northern Michigan, Minnesota to Moose lake and the White Earth Indian reservation, the Black hills of Dakota (*R. Douglas*), along the Rocky mountains of northern Montana to the valley of the Blackfoot river (*Canby & Sargent*), Sitka, and British Columbia.

A tree 15 to 50 meters in height, with a trunk 0.60 to 0.90 meter in diameter; low, rather wet soil, borders of ponds and swamps; most common north of the boundary of the United States, and reaching its greatest development along the streams and lakes of the Flathead region of northern Montana at an elevation of 2,500 to 3,500 feet; the most important timber tree of the American subarctic forests north of the sixtieth degree of latitude, here more generally multiplied and of larger size than the allied *P. nigra*, with which it is associated; its distribution southward in British Columbia not yet satisfactorily determined.

Wood light, soft, not strong, close, straight-grained, compact, satiny; bands of small summer cells thin, not conspicuous, resin passages few, minute; medullary rays numerous, prominent; color, light yellow, the sap-wood hardly distinguishable; specific gravity, 0.4051; ash, 0.32; largely manufactured into lumber, although not distinguished in commerce from that of the black spruce (*P. nigra*).

384.—Picea Engelmanni, Engelmann,

Trans. St. Louis Acad. ii, 212; Wheeler's Rep. vi, 256; London Gard. Chronicle, 1879, 334; 1882, 145.—Carrière, Trait. Conif. 2 ed. 348.—G. M. Dawson in Canadian Nat. new ser. ix, 325.—Rusby in Bull. Torrey Bot. Club, ix, 80.

Abies alba, ? Torrey in Fremont's Rep. 97.

Abies nigra, Engelmann in Am. Jour. Sci. 2 ser. xxxiii, 330 [not Poiret].

Abies Engelmanni, Parry in Trans. St. Louis Acad. ii, 122; London Gard. Chronicle, 1863, 1035; Am. Nat. viii, 179; Proc. Davenport Acad. i, 149.—Regel, Gartenflora, 1864, 244.—Henkel & Hochstetter, Nadelhölz. 418.—Hoopes, Evergreens, 177, f. 22.—Watson in King's Rep. v, 332; Pl. Wheeler, 17.—Porter in Hayden's Rep. 1871, 494.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 130.—Vasey, Cat. Forest Trees, 33.—Koch, Dendrologie, ii², 242.—Hall in Coulter's Bot. Gazette, ii, 91.—Sargent in London Gard. Chronicle, 1877, 631.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Brandegee in Coulter's Bot. Gazette, iii, 32.—Bell in Geological Rep. Canada, 1879-'80, 56c.—Veitch, Manual Conif. 68.

Pinus Engelmanni, Engelmann in Proc. Am. Phil. Soc. new ser. xii, 209.

Pinus commutata, Parlatore in De Candolle, Prodr. xvi², 417.—Gordon, Pinetum, 2 ed. 5.

WHITE SPRUCE.

Peace River plateau, in latitude 55° 46′ N. (*G. M. Dawson*), through the interior of British Columbia and along the Cascade mountains of Washington territory and Oregon to the valley of the Mackenzie river; along the principal ranges of the Rocky and Wahsatch mountains to the San Francisco mountains, Sierra Blanco, and mount Graham, Arizona.

A large tree, 24 to 46 meters in height, with a trunk 0.90 to 1.20 meter in diameter, or at its extreme elevation reduced to a low, prostrate shrub; dry, gravelly slopes and ridges between 5,000 and 11,500 feet elevation; the most valuable timber tree of the central Rocky Mountain region, here forming extensive forests, generally above 8,500 feet elevation; rare and of small size in the mountains of Washington territory, Oregon, and Montana.

Wood very light, soft, not strong, very close, straight-grained, compact, satiny; bands of small summer cells narrow, not conspicuous, resin passages few, minute; medullary rays numerous, conspicuous; color, pale yellow tinged with red, the sap-wood hardly distinguishable; specific gravity, 0.3449; ash, 0.32; in Colorado manufactured into lumber and largely used for fuel, charcoal, etc.

The bark rich in tannin, and in Utah sometimes used in tanning leather.

NOTE.—Forms of northern Montana too closely connect this species with the allied *P. alba*. The two species occur here, however, only at different elevations, in different soils, and never mingle.

385.—Picea pungens, Engelmann,

London Gard. Chronicle, 1879, 334; 1882, 145.—Masters in London Gard. Chronicle, 1883, 725, f. 130.

P. Menziesii, Engelmann in Trans. St. Louis Acad. ii, 214 [not Carrière].

Abies Menziesii, Engelmann in Am. Jour. Sci. 2 ser. xxxiii, 330 [not Lindley].—Gray in Proc. Philadelphia Acad. 1863, 76.—Watson in King's Rep. v, 333, in part.—Parry in Am. Nat. viii, 179 [not Lindley].—Porter in Hayden's Rep. 1871, 494.—Hoopes, Evergreens, 166, in part.—Rothrock in Pl. Wheeler, 28; Wheeler's Rep. vi, 10 [not Lindley].—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 131 [not Lindley].—Vasey, Cat. Forest Trees, 33, in part.—Brandegee in Coulter's Bot. Gazette, iii, 32.

Abies Menziesii Parryana, André in Ill. Hort. xxiii, 198; xxiv, 53, 119.—Roezl in Ill. Hort. xxiv, 86.

Abies Engelmanni glauca, Veitch, Manual Conif. 69.

WHITE SPRUCE. BLUE SPRUCE.

Valley of the Wind river, south through the mountain ranges of Wyoming, Colorado, and Utah.

A tree 30 to 46 meters in height, with a trunk 0.60 to 0.90 meter in diameter; borders of streams, in damp or wet soil, generally between 6,000 and 9,000 feet elevation, never forming forests or reaching as high elevations as the allied *P. Engelmanni*; rare and local.

Wood very light, soft, weak, close-grained, compact, satiny; bands of small summer cells narrow, not conspicuous, resin passages few, small; medullary rays numerous, prominent; color, very light brown or often nearly white, the sap-wood hardly distinguishable; specific gravity, 0.3740; ash, 0.38.

386.—Picea Sitchensis, Carrière,

Trait. Conif. 1 ed. 260; Engelmann in London Gard. Chronicle, 1879, 344; Bot. California, ii, 122.

Pinus Sitchensis, Bongard in Mem. Acad. St. Petersburg, 6 ser. ii, 104.—Hooker, Fl. Bor.-Am. ii, 164.—Endlicher, Syn. Conif. 123.

Abies Menziesii, Lindley in Penn. Cycl. 1, 32.—Loudon, Arboretum, iv, 2321, f. 2232.—Forbes, Pinetum Woburn. 93, t. 32.—Nuttall, Sylva, iii, 131, t. 116; 2 ed. ii, 189, t. 116.—Knight, Syn. Conif. 37.—Lindley & Gordon in Jour. Hort. Soc. London, v, 211.—Newberry in Pacific R. R. Rep. vi, 56, 90, t. 9, f. 21.—Gordon, Pinetum, 6; 2 ed. 12.—Cooper in Smithsonian Rep. 1858, 262; Pacific R. R. Rep. xii², 25, 69, in part.—Wood, Bot. & Fl. 314.—Lyall in Jour. Linnæan Soc. vii, 131, 133, 144.—Henkel & Hochstetter, Nadelhölz. 187.—Nelson, Pinaceæ, 148.—Rothrock in Smithsonian Rep. 1867, 433.—Hoopes, Evergreens, 166, in part.—Watson in King's Rep. v, 333, in part.—Veitch, Manual Conif. 73.

Pinus Menziesii, Douglas in Lambert, Pinus, 1 ed. iii, 161, t. 71.—Hooker, Fl. Bor.-Am. ii, 162.—Antoine, Conif. 85, t. 33, f. 1, 2.—Hooker & Arnott, Bot. Beechey, 394.—Endlicher, Syn. Conif. 112.—Parlatore in De Candolle, Prodr. xvi², 418.

? Abies trigona, Rafinesque, Atlant. Jour. 119.—Endlicher, Syn. Conif. 124.—Carrière, Trait. Conif. 1 ed. 264.

? Abies falcata, Rafinesque, Atlant. Jour. 119.—Endlicher, Syn. Conif. 124.—Lindley & Gordon in Jour. Hort. Soc. London, v, 213.—Carrière, Trait. Conif. 268; 2 ed. 314.

Pinus Menziesii, var. *crispa*, Antoine, Conif. 85, t. 35, f. 2.

Abies Sitchensis, Lindley & Gordon in Jour. Hort. Soc. London, v, 212.—Koch, Dendrologie, ii², 247.

P. Menziesii, Carrière, Man. des Pl. iv, 339; Trait. Conif. 237; 2 ed. 318.

? Sequoia Rafinesquei, Carrière, Trait. Conif. 2 ed. 213.

TIDE-LAND SPRUCE.

Alaska, south to Mendocino county, California, not extending more than 50 miles inland from the coast.

A large tree of great economic value, 46 to 61 meters in height, with a trunk 2.40 to 5.19 meters in diameter; gravelly ridges and swamps, reaching its greatest development in Washington territory and Oregon near the mouth of the Columbia river, here forming a belt of nearly continuous forest growth 50 or, farther north and south, rarely more than 10 or 15 miles in width.

Wood light, soft, not strong, close, straight-grained, compact, satiny; bands of small summer cells narrow, not conspicuous, resin passages few, obscure; medullary rays numerous, rather prominent; color, light brown tinged with red, the sap-wood nearly white; specific gravity, 0.4287; ash, 0.17; largely manufactured into lumber and used for construction, interior finish, fencing, boat-building, the dunnage of vessels, cooperage, woodenware, etc.

387.—Tsuga Canadensis, Carrière,

Trait. Conif. 189; 2 ed. 248.—Sears in Bull. Essex Inst. xiii, 184.—Engelmann in Coulter's Bot. Gazette, vi, 224.

Pinus Canadensis, Linnæus, Spec. 2 ed. 1421.—Wangenheim, Amer. 39, t. 15, f. 36.—Ehrhart, Beitr. iii, 23.—Aiton, Hort. Kew. iii, 370; 2 ed. v, 320.—Michaux, Fl. Bor.-Am. ii, 206.—Lambert, Pinus, 1 ed. 50, t. 32; 2 ed. i, 56, t. 35; 3 ed. ii, 79, t. 45.—Willdenow, Spec. iv, 505; Enum. 989; Berl. Baumz. 277.—Poiret in Lamarck, Dict. vi, 521.—Persoon, Syn. ii, 579.—Pursh, Fl. Am. Sept. ii, 640.—Smith in Rees' Cycl. xxviii, No. 29.—Barton, Compend. Fl. Philadelph. ii, 182.—Nuttall, Genera, ii, 223.—Hayne, Dend. Fl. 176.—Elliott, Sk. ii, 639.—Sprengel, Syst. ii, 885.—Torrey, Compend. Fl. N. States, 359; Fl. New York, ii, 230.—Beck, Bot. 340.—Eaton, Manual, 6 ed. 264.—Darlington, Fl. Cestrica, 2 ed. 548.—Hooker, Fl. Bor.-Am. ii, 164, in part.—Eaton & Wright, Bot. 358.—Bigelow, Fl. Boston. 3 ed. 386.—Antoine, Conif. 80, t. 32, f. 3.—Endlicher, Syn. Conif. 86.—Gihoul, Arb. Resin. 46.—Darby, Bot. S. States, 515.—Parlatore in De Candolle, Prodr. xvi², 428.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 211, 212, t. 23, f. 3.—Bentley & Trimen, Med. Pl. iv, 264, t. 264.

Pinus Americana, Miller, Dict. 7 ed. No. 6.—Du Roi, Obs. Bot. 41; Harbk. 2 ed. ii, 151.

Pinus Abies Americana, Marshall, Arbustum, 103.

Abies Canadensis, Desfontaines, Hist. Arb. ii, 580.—Michaux f. Hist. Arb. Am. i, 138, t. 13; N. American Sylva, 3 ed. iii, 146, t. 140.—Nouveau Duhamel, v, 293, t. 83, f. 1.—Eaton, Manual, 111.—Richard, Conif. 77, t. 17, f. 2.—Audubon, Birds, t. 197.—Loudon, Arboretum, iv, 2322 & t.—Forbes, Pinetum Woburn. 129.—Nuttall, Sylva, iii, 133; 2 ed. ii, 190.—Spach, Hist. Veg. xi, 424.—Emerson, Trees Massachusetts, 77; 2 ed. i, 92 & t.—Griffith, Med. Bot. 606.—Knight, Syn. Conif. 37.—Lindley & Gordon in Jour. Hort. Soc. London, v, 209.—Parry in Owen's Rep. 618.—Darlington, Fl. Cestrica, 3 ed. 291.—Gordon, Pinetum, 14; 2 ed. 22.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 434.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 27.—Wood, Cl. Book, 661; Bot. & Fl. 313.—Porcher, Resources S. Forests, 506.—Henkel & Hochstetter, Nadelhölz. 153 (excl. syn. *aromatica*).—Nelson, Pinaceæ, 30.—Gray, Manual N. States, 5 ed. 471.—Hoopes, Evergreens, 184, f. 23.—Koch, Dendrologie, ii², 249.—Vasey, Cat. Forest Trees, 23.—Fl. des Serres, xxii, 206.—Guibourt, Hist. Drogues, ii, 247.—Bell in Geological Rep. Canada, 1879–'80, 51c.—Veitch, Manual Conif. 114, f. 29.

Picea Canadensis, Link in Linnæa, xv, 524.

HEMLOCK.

Nova Scotia, southern New Brunswick, valley of the Saint Lawrence river to the shores of lake Temiscaming, and southwest to the western borders of northern Wisconsin; south through the northern states to New Castle county, Delaware, southeastern Michigan, central Wisconsin, and along the Alleghany mountains to Clear Creek falls, Winston county, Alabama (*Mohr*).

A tree 21 to 33 meters in height, with a trunk 0.90 to 1.15 meter in diameter; dry, rocky ridges, generally facing the north and often forming extensive forests almost to the exclusion of other species, or, less commonly, borders of swamps in deep, rich soil; most common at the north, although reaching its greatest individual development in the high mountains of North Carolina and Tennessee.

Wood light, soft, not strong, brittle, coarse, crooked-grained, difficult to work, liable to wind-shake and splinter, not durable; bands of small summer cells rather broad, conspicuous; medullary rays numerous, thin; color, light brown tinged with red or often nearly white, the sap-wood somewhat darker; specific gravity, 0.4239; ash, 0.46; largely manufactured into coarse lumber and used in construction for outside finish, railway ties, etc.; two varieties, red and white, produced apparently under precisely similar conditions of growth, are recognized by lumbermen.

The bark, rich in tannin, is the principal material used in the northern states in tanning leather, and yields a fluid extract sometimes used medicinally as a powerful astringent.

Canada or hemlock pitch, prepared from the resinous secretion of this species, is used in the preparation of stimulating plasters, etc. (*U. S. Dispensatory*, 14 ed. 709, 903.—*Nat. Dispensatory*, 2 ed. 1109.—*Flückiger & Hanbury, Pharmacographia*, 552).

388.—Tsuga Caroliniana, Engelmann,

Coulter's Bot. Gazette, vi, 223.

Abies species, Gibbs in Proc. Elliott Soc. i, 286.

Abies Caroliniana, Chapman, Fl. S. States, Suppl. 650.

HEMLOCK.

Southern Alleghany region, Bluff mountain, North Carolina (*A. Gray*), "Saluda mountain," South Carolina (*L. S. Gibbs*), Pinnacle mountain, North Carolina (*Curtiss*), New river, North Carolina, and Cæsar's head, South Carolina (*Canby*), Whitesides mountain and Devil's Court-House peak, Jackson county, North Carolina (*J. Donnell Smith*).

A small tree, 12 to 15 meters in height, with a trunk 0.60 to 0.75 meter in diameter; dry, rocky ridges between 4,000 and 5,000 feet elevation; rare and local; long confounded with the closely allied *T. Canadensis*, from which it may be distinguished by its larger, glossier, blunter leaves, and larger cones with wide-spreading scales.

Wood light, soft, not strong, brittle, coarse-grained; bands of small summer cells narrow, not conspicuous; medullary rays numerous, thin; color, light brown tinged with red, the sap-wood nearly white; specific gravity, 0.4275; ash, 0.40.

389.—Tsuga Mertensiana, Carrière,

Trait. Conif. 2 ed. 250.—Engelmann in Bot. California, ii, 121; Coulter's Bot. Gazette, vi, 224.—G. M. Dawson in Canadian Nat. new ser. ix, 324.

?Abies heterophylla, Rafinesque, Atlant. Jour. 119.—Endlicher, Syn. Conif. 124.—Carrière, Trait. Conif. 1 ed. 265.

Pinus Mertensiana, Bongard in Mem. Acad. St. Petersburg, 6 ser. iii, 163.—Hooker, Fl. Bor.-Am. ii, 164.—Endlicher, Syn. Conif. 111.—Ledebour, Fl. Rossica, iii, 668.—Parlatore in De Candolle, Prodr. xvi², 428.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 211, 212, t. 23, f. 4.

Pinus Canadensis, Bongard in Mem. Acad. St. Petersburg, 6 ser. iii, 163 [not Linnæus].—Douglas in Companion Bot. Mag. ii, 127.—Hooker, Fl. Bor.-Am. ii, 164, in part.—Ledebour, Fl. Rossica, iii, 668.

Abies Mertensiana, Lindley & Gordon in Jour. Hort. Soc. London, v, 211.—Carrière, Trait. Conif. 1 ed. 232.—Gordon, Pinetum, 18; Suppl. 12; 2 ed. 29.—Lyall in Jour. Linnæan Soc. vii, 133, 144.—Henkel & Hochstetter, Nadelhölz. 152.—Rothrock in Smithsonian Rep. 1867, 433.—Cooper in Am. Nat. iii, 412.—Gray in Proc. Am. Acad. vii, 402.—Heopes, Evergreens, 192.—Koch, Dendrologie, ii², 250.—Vasey, Cat. Forest Trees, 33.—Macoun in Geological Rep. Canada 1875–'76, 211.—Hall in Coulter's Bot. Gazette, ii, 91.

Abies Canadensis, ? Cooper in Smithsonian Rep. 1858, 262; Pacific R. R. Rep. xii², 69 [not Desfontaines].

Abies Bridgesii, Kellogg in Proc. California Acad. ii, 37.

Abies Albertiana, Murray in Proc. Hort. Soc. London, iii, 149 & f.—Lawson, Pinetum Brit. ii, 111, t. 16, f. 1–18.—Nelson, Pinaceæ, 31.—Fowler in London Gard. Chronicle, 1872, 75.

Abies taxifolia, Hartweg, *ined.* (*fide* Murray in Proc. Hort. Soc. London, iii, 148).

Pinus Pattoniana, McNab in Proc. Royal Irish Acad. 2 ser. ii, 211, 212, t. 23, f. 2 [not Parlatore] (*fide* Engelmann in London Gard. Chronicle, 1882, 145).

Abies Pattonii, McNab in Jour. Linnæan Soc. xix, 208.

HEMLOCK.

Alaska, south along the islands and coast of British Columbia, and through the Selkirk, Gold, and other interior ranges to the Bitter Root mountains of Idaho, and the western slopes of the Rocky mountains of Montana (valley of the Flathead river, *Canby & Sargent*), extending south along the Cascade mountains to southern Oregon and in the Coast ranges to Marin county, California, between 1,000 and 4,000 feet elevation.

A large tree, 30 to 61 meters in height, with a trunk 1.20 to 3 meters in diameter; low, moist bottoms or rocky ridges; very common and reaching its greatest development in western Oregon and Washington territory, often forming extensive forests, especially along the western base of the Cascade mountains.

Wood light, hard, not strong, rather close-grained; bands of small summer cells thin, not conspicuous; medullary rays numerous, prominent; color, light brown tinged with yellow, the sap-wood nearly white; specific gravity, 0.5182; ash, 0.42; occasionally manufactured into coarse lumber.

The bark, rich in tannin, is the principal material used on the northwest coast in tanning leather.

390.—Tsuga Pattoniana, Engelmann,

Bot. California, ii, 121; London Gard. Chronicle, 145.

Abies Pattoniana, Jeffrey in Rep. Oregon Exped. i, t. 4, f. 2.—Murray in Edinburgh New Phil. Jour. new ser. i, 291, t. 9, f. 1–7.—Lawson, Pinetum Brit. ii, 157, t. 22.—Gray in Proc. Am. Acad. vii, 402.—Koch, Dendrologie, ii², 252.—Hoopes, Evergreens, 172.—Carrière, Trait. Conif. 2 ed. 30.—Hall in Coulter's Bot. Gazette, ii, 91.—Veitch, Manual Conif. 116, f. 31, 32.

? Picea Californica, Carrière, Trait. Conif. 261; 2 ed. 346.

Abies Hookeriana, Murray in Edinburgh New Phil. Jour. new ser. i, 289, t. 9, f. 11–17.—Lawson, Pinetum Brit. ii, 153, t. 21, 22, f. 1–22.—Nelson, Pinaceæ, 31.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 211, 212, t. 23, f. 1.—Veitch, Manual Conif. 115, t. 32.

Abies Williamsonii, Newberry in Pacific R. R. Rep. vi, 53, 90, t. 7, f. 19.—Wood, Bot. & Fl. 313.—Cooper in Am. Nat. iii, 412.—Vasey, Cat. Forest Trees, 33.

Pinus Pattoniana, Parlatore in De Candolle, Prodr. xvi², 429.

Abies Pattonii, Gordon, Pinetum, 1 ed. 10 (excl. syn. *trigona*).

Abies Pattoni, Gordon, Pinetum, Suppl. 12.—Henkel & Hochstetter, Nadelhölz. 151 (excl. syn. *trigona*).

Valley of the Fraser river, British Columbia, and probably much farther north, south along the Cascade mountains and the California Sierras to the headwaters of the San Joaquin river, extending east along the high mountains of northern Washington territory to the western slopes and summits of the Cœur d'Alêne and Bitter Root mountains of Idaho (Lolo trail, *Watson*), and the divide between Thompson and Little Bitter Root creeks, northern Montana (*H. B. Ayres*).

An alpine tree, rarely 30 meters in height, with a trunk 1.50 to 2.10 meters in diameter; dry slopes and ridges near the limits of tree growth, ranging from an elevation of 2,700 feet in British Columbia to 10,000 feet in the Sierras of central California.

Wood light, soft, not strong, close-grained, satiny, susceptible of a good polish; bands of small summer cells thin, not conspicuous; medullary rays numerous, obscure; color, light brown or red, the sap-wood nearly white; specific gravity, 0.4454; ash, 0.44.

391.—Pseudotsuga Douglasii, Carrière,

Trait. Conif. 2 ed. 256.—Engelmann in Wheeler's Rep. vi, 257; Bot. California, ii, 120.—G. M. Dawson in Canadian Nat. new ser. ix, 323.—Eichler in Monatsb. Acad. Berl. 1881, f. 18–22.—Rusby in Bull. Torrey Bot. Club, ix, 79.

Pinus taxifolia, Lambert, Pinus, 1 ed. i, 51, t. 33; 2 ed. i, 58, t. 36; 3 ed. ii, 82, t. 47.—Pursh, Fl. Am. Sept. ii, 640.—Smith in Rees' Cycl. xxviii, No. 28.—Sprengel, Syst. ii, 885.—Eaton, Manual, 6 ed. 264.—Eaton & Wright, Bot. 358.

Abies taxifolia, Poiret in Lamarck, Dict. vi, 523.—Nouveau Duhamel, v, 293.—Torrey & Gray in Pacific R. R. Rep. ii, 130.—Cooper in Smithsonian Rep. 1858, 262; Pacific R. R. Rep. xii², 69.

Abies Douglasii, Lindley in Penn. Cycl. i, 32.—Loudon, Arboretum, iv, 2319, f. 2230.—Forbes, Pinetum Woburn. 127, t. 45.—Bentham, Pl. Hartweg. 57.—Nuttall, Sylva, iii, 129, t. 115; 2 ed. ii, 187, t. 115.—Spach, Hist. Veg. xi, 423.—Knight, Syn. Conif. 37.—Lindley & Gordon in Jour. Hort. Soc. London, v, 209.—London Gard. Chronicle, 1854, 163.—Bigelow in Pacific R. R. Rep. iv, 17.—Torrey in Pacific R. R. Rep. iv, 141; Bot. Mex. Boundary Survey, 210; Ives' Rep. 28.—Newberry in Pacific R. R. Rep. vi, 54, 90, t. 8, f. 20.—Gordon, Pinetum, 15; Suppl. 10; 2 ed. 24.—Cooper in Smithsonian Rep. 1858, 262; Pacific R. R. Rep. xii², 24, 69; Am. Nat. iii, 411.—Wood, Bot. & Fl. 313.—Engelmann in Am. Jour. Sci. 2 ser. xxxiv, 330; Proc. Am. Phil. Soc. new ser. xii, 209.—Lyall in Jour. Linnæan Soc. vii, 131, 133, 143.—Henkel & Hochstetter, Nadelhölz. 155.—Nelson, Pinaceæ, 32.—Rothrock in Smithsonian Rep. 1867, 433; Pl. Wheeler, 28, 50; Wheeler's Rep. vi, 9.—Hoopes, Evergreens, 189.—Lawson, Pinetum Brit. ii, 115, t. 17, 18, f. 1–23.—Porter in Hayden's Rep. 1871, 494.—Watson in King's Rep. v, 334; Pl. Wheeler, 17.—Fowler in London Gard. Chronicle, 1872, 75.—Gray in Proc. Am. Acad. vii, 402.—Koch, Dendrologie, ii², 255.—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 131.—Murray in London Gard. Chronicle, 1872, 106.—Vasey, Cat. Forest Trees, 33—Hayden in Warren's Rep. Nebraska & Dakota, 2 ed. 122.—Macoun in Geological Rep. Canada, 1875–'76, 211.—Hall in Coulter's Bot. Gazette, ii, 91.—Brandegee in Coulter's Bot. Gazette, iii, 32.—Veitch, Manual Conif. 119, f. 35.

Abies mucronata, Rafinesque, Jour. Atlant. 119.—Endlicher, Syn. Conif. 126.—Lindley & Gordon in Jour. Hort. Soc. London, v, 213.—Carrière, Trait. Conif. 268; 2 ed. 312.

?Abies mucronata palustris, Rafinesque, Jour. Atlant. 129.—Carrière, Trait. Conif. 268; 2 ed. 313.

Pinus Douglasii, Lambert, Pinus, 1 ed. iii, 163, t. 21.—Hooker, Fl. Bor.-Am. ii, 162, t. 183.—Antoine, Conif. 84, t. 33, f. 3.—Hooker & Arnott, Bot. Beechey, 394.—Endlicher, Syn. Conif. 87.—Torrey in Sitgreaves' Rep. 173.—Parlatore in De Candolle, Prodr. xvi², 430.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 703, t. 49, f. 32, 32ª, 32ᵇ.

Abies Douglasii, var. *taxifolia*, Loudon, Arboretum, iv, 2319, f. 2231.—Gordon, Pinetum, 16; 2 ed. 25.—Henkel & Hochstetter, Nadelhölz. 156.

Pinus Douglasii, var. *brevibracteata*, Antoine, Conif. 84, t. 33, f. 4.

Picea Douglasii, Link in Linnæa, xv, 524.

Tsuga Douglasii, Carrière, Trait. Conif. 192.—Bolander in Proc. California Acad. iii, 232.

Tsuga Lindleyana, Roezl, Cat. Grain Mex. 8.

RED FIR. YELLOW FIR. OREGON PINE. DOUGLAS FIR.

Coast ranges and interior plateau of British Columbia south of latitude 55° N. (not reaching the coast archipelago north of Vancouver's island), east to the eastern slope of the Rocky mountains in latitude 51° N. (Bow River pass, *Macoun*); south along the mountain ranges of Washington territory, Oregon, the California Coast ranges, and the western slope of the Sierra Nevadas, through the mountain ranges east to Montana, Wyoming, Colorado, and the Guadalupe mountains of Texas; in the Wahsatch and Uintah mountains, the ranges of northern and eastern Arizona, and southward into Mexico; not detected in the interior region between the Sierra Nevada and the Wahsatch mountains, south of the Blue mountains of Oregon, and north of Arizona.

A large tree, 61 to 92 meters in height, with a trunk 0.83 to 3.66 meters in diameter, or in the Rocky mountains much smaller, here rarely 30 meters in height; the most generally-distributed and valuable timber tree of the Pacific region, growing from the sea-level to an elevation in Colorado of nearly 10,000 feet; often forming extensive forests, almost to the exclusion of other species, and reaching in western Oregon and Washington territory its greatest development and value.

Wood hard, strong, varying greatly with age and conditions of growth in density, quality, and amount of sap; difficult to work, durable; bands of small summer cells broad, occupying fully half the width of the annual growth, dark colored, conspicuous, soon becoming flinty and difficult to cut; medullary rays numerous, obscure; color, varying from light red to yellow, the sap-wood nearly white; specific gravity, 0.5157; ash, 0.08; largely manufactured into lumber and used for all kinds of construction, railway ties, piles, fuel, etc.; two varieties, red and yellow fir, are distinguished by lumbermen, dependent probably upon the age of the tree; the former coarse-grained, darker colored, and considered less valuable than yellow fir.

The bark is found valuable in tanning leather.

Var. macrocarpa, Engelmann,

Bot California, ii, 120.

Abies Douglasii, var. *macrocarpa*, Torrey in Ives' Rep. 28.—Vasey, Cat. Forest Trees, 33.

Abies macrocarpa, Vasey in Gard. Monthly, Jan. 1876.

HEMLOCK.

California Coast ranges; San Bernardino mountains to the Cuyamaca mountains.

A tree 30 to 54 meters in height, with a trunk 1.20 to 1.80 meter in diameter; dry ridges and cañons between 2,500 and 4,000 feet elevation.

Wood heavy, hard, strong, cross-grained, very durable, difficult to work; color, rather darker red than that of the species; specific gravity, 0.4563; ash, 0.08; somewhat manufactured into coarse lumber and largely used for fuel.

392.—Abies Fraseri, Lindley,

Penn. Cycl. i, 30.—Forbes, Pinetum Woburn. iii, t. 38.—Link in Linnæa, xv, 531.—Nuttall, Sylva, iii, 139, t. 119; 2 ed. ii, 196, t. 119.—Lindley & Gordon in Jour. Hort. Soc. London, v, 209.—Carrière, Trait. Conif. 200; 2 ed. 270.—Cooper in Smithsonian Rep. 1858, 257.—Chapman, Fl. S. States, 434.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 26.—Wood, Cl. Book, 661; Bot. & Fl. 314.—Henkel & Hochstetter, Nadelhölz. 169.—Gray, Manual N. States, 5 ed. 472, in part.—Hoopes, Evergreens, 202.—Bertrand in Bull. Soc. Bot. France, xviii, 379.—Koch, Dendrologie, ii², 216.—Vasey, Cat. Forest Trees, 35.—Engelmann in Trans. St. Louis Acad. iii, 596; London Gard. Chronicle, 1877, 147.—Veitch, Manual Conif. 96.

Pinus Fraseri, Pursh, Fl. Am. Sept. ii, 639.—Smith in Rees' Cycl. xxviii, No. 27.—Poiret, Suppl. v, 35.—Sprengel, Syst. ii, 884.—Beck, Bot. 340.—Eaton, Manual, 6 ed. 264.—Lambert, Pinus, 1 ed. iii, 74, t. 42.—Eaton & Wright, Bot. 358.—Antoine, Conif. 76, t. 29, f. 1.—Endlicher, Syn. Conif. 91.—Parlatore in De Candolle, Prodr. xvi², 419.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 684, t. 47, f. 10.

A. balsamea, var. *Fraseri*, Nuttall, Genera, ii, 223.—Spach, Hist. Veg. xi, 422.

Pinus balsamea, var. *Fraseri*, Torrey, Compend. Fl. N. States, 359.

Picea Fraseri, Loudon, Arboretum, iv, 2340, f. 2243, 2244.—Knight, Syn. Conif. 39.—Gordon, Pinetum, 148; 2 ed. 205.

BALSAM. SHE BALSAM.

High mountains of North Carolina and Tennessee.

A tree 18 to 24 meters in height, with a trunk sometimes 0.60 meter in diameter; moist slopes between 5,000 and 6,500 feet elevation, often forming considerable forests.

Wood very light, soft, not strong, coarse-grained, compact; bands of small summer cells rather broad, light colored, not conspicuous; medullary rays numerous, thin; color, light brown, the sap-wood lighter, nearly white; specific gravity, 0.3565; ash, 0.54.

393.—Abies balsamea, Miller,

Dict. No. 5.—Desfontaines, Hist. Arb. ii, 579.—Nouveau Duhamel, v, 295, t. 83, f. 2.—Richard, Conif. 74, t. 16.—Lindley, Penn. Cycl. i, 30; Fl. Med. 554—Forbes, Pinetum Woburn. 109, t. 37.—Link in Linnæa, xv, 530.—Spach, Hist. Veg. xi, 421.—Griffith, Med. Bot. 605, f. 268.—Lindley & Gordon in Jour. Hort. Soc. London, v, 210.—Carrière, Trait. Conif. 217; 2 ed. 292.—Richardson, Arctic Exped. 441.—Darlington, Fl. Cestrica, 3 ed. 291.—Cooper in Smithsonian Rep. 1858, 257.—Wood, Cl. Book, 661; *Bot. & Fl. 314.*—Porcher, Resources S. Forests, 506.—Henkel & Hochstetter, Nadelhölz. 176.—Gray, Manual N. States, 5 ed. 471.—Hoopes, Evergreens, 197.—Bertrand in Bull. Soc. Bot. France, xviii, 379.—Koch, Dendrologie, ii², 214.—Vasey, Cat. Forest Trees, 34.—Guibourt, Hist. Drogues, 7 ed. ii, 246.—Engelmann in Trans. St. Louis Acad. iii, 597.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Sears in Bull. Essex Inst. xiii, 184.—Bell in Geological Rep. Canada, 1879-'80, 46c.—Veitch, Manual Conif. 88.

Pinus balsamea, Linnæus, Spec. 1 ed. 1002.—Wangenheim, Amer. 40.—Aiton, Hort. Kew. iii, 370; 2 ed. v, 319.—Mœnch, Meth. 364.—Du Roi, Harbk. 2 ed. 144.—Lambert, Pinus, 1 ed. i, 48, t. 31; 2 ed. i, 52, t. 33; 3 ed. i, 72, t. 41.—Willdenow, Spec. iv, 504; Enum. 989; Berl. Baumz. 276.—Persoon, Syn. ii, 579.—Pursh, Fl. Am. Sept. ii, 639.—Eaton, Manual, 111; 6 ed. 264.—Nuttall, Genera, ii, 223.—Hayne, Dend. Fl. 176.—Elliott, Sk. ii, 639.—Sprengel, Syst. ii, 884.—Torrey, Compend. Fl. N. States, 359; Fl. N. York, ii, 229.—Descourtilz, Fl. Med. Antilles, iv, 59, t. 246.—Woodville, Med. Bot. 3 ed. v, 1, t. 1.—Beck, Bot. 340.—Hooker, Fl. Bor.-Am. ii, 163.—Eaton & Wright, Bot. 358.—Bigelow, Fl. Boston. 3 ed. 385.—Antoine, Conif. 66, t. 26, f. 3.—Endlicher, Syn. Conif. 103.—Gihoul, Arb. Resin. 45.—Darby, Bot. S. States, 515.—Parlatore in De Candolle, Prodr. xvi², 423.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 684, t. 47, f. 11.—Bentley & Trimen, Med. Pl. iv, 263, t. 263.

Pinus Abies Balsamea, Marshall, Arbustum, 102.

A. balsamifera, Michaux, Fl. Bor.-Am. ii, 207, in part.—Michaux f. Hist. Arb. Am. i, 145, t. 14; N. American Sylva, 3 ed. iii, 150, t. 150, in part.

Picea balsamea, Loudon, Arboretum, iv, 2339, f. 2240, 2241.—Knight, Syn. Conif. 39.—Gordon, Pinetum, 143; 2 ed. 200.—Henkel & Hochstetter, Nadelhölz. 176.—Emerson, Trees Massachusetts, 85; 2 ed. i, 101.—Nelson, Pinaceæ, 37.

Picea balsamea, var. *longifolia*, Hort.—Loudon, Arboretum, iv, 2339.

Picea Fraseri, Emerson, Trees Massachusetts, 88; 2 ed. i, 104 [not Loudon].

BALSAM FIR. BALM OF GILEAD FIR.

Northern Newfoundland and Labrador to the southern shores of Hudson bay, northwest to the Great Bear lake and the eastern base of the Rocky mountains; south through the northern states to Pennsylvania, central Michigan and Minnesota, and along the Alleghany mountains to the high peaks of Virginia.

A tree 21 to 27 meters in height, with a trunk rarely exceeding 0.60 meter in diameter, or at high elevations reduced to a low, prostrate shrub (*A. Hudsonica*, Hort.); damp woods and mountain swamps.

Wood very light, soft, not strong, coarse-grained, compact, not durable; bands of small summer cells not broad, resinous, conspicuous; medullary rays numerous, obscure; color, light brown, often streaked with yellow, the sap-wood lighter; specific gravity, 0.3819; ash, 0.45.

Canadian balsam or balm of fir, an aromatic liquid oleo-resin obtained from this and other species of *Abies* by puncturing the vesicles formed under the bark of the stem and branches, is used medicinally, chiefly in the treatment of chronic catarrhal affections, and in the arts (*U. S. Dispensatory*, 14 ed. 898, 900.—*Nat. Dispensatory*, 2 ed. 1417.—*Flückiger & Hanbury, Pharmacographia*, 552).

394.—Abies subalpina, Engelmann,

Am. Nat. x, 554; Trans. St. Louis Acad. iii, 597; Wheeler's Rep. vi, 255.—Vasey, Cat. Forest Trees, 34.—Hall in Coulter's Bot. Gazette, ii, 91.—Brandegee in Coulter's Bot. Gazette, iii, 32.—G. M. Dawson in Canadian Nat. newser. ix, 326.—Masters in London Gard. Chronicle, 1881, 236, f. 43, 44, 45.

?Pinus lasiocarpa, Hooker, Fl. Bor.-Am. ii, 163 [not Hort.].—Endlicher, Syn. Conif. 105.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 682, t. 46, f. 7, 7a; t. 47, 48, 49 (excl. syn.).

?A. lasiocarpa, Nuttall, Sylva, iii, 138; 2 ed. ii, 195.—Lindley & Gordon in Jour. Hort. Soc. London, v, 210.—Carrière, Trait. Conif. 1 ed. 221.—Cooper in Smithsonian Rep. 1858, 262.—Murray in Proc. Hort. Soc. London, iii, 313, f. 27–31.—Henkel & Hochstetter, Nadelhölz. 161 (excl. syn.).

?Pinus species, Torrey in Fremont's Rep. 97.

Picea amabilis, Gordon, Pinetum, 154, in part; 2 ed. 213, in part.

A. bifolia, Murray in Proc. Hort. Soc. London, iii, 320, f. 51–56; London Gard. Chronicle, 1875, 465, f. 96, 97.—Regel, Gartenflora, xiii, 119.—Henkel & Hochstetter, Nadelhölz. 420.

A. grandis, Engelmann in Am. Jour. Sci. 2 ser. xxxiv, 310 [not Lindley].—Carrière, Trait. Conif. 2 ed. 296, in part.—Watson in King's Rep. v, 334, in part.—Gray in Proc. Am. Acad. vii, 402 [not Lindley].—Porter & Coulter, Fl. Colorado; Hayden's Surv. Misc. Pub. No. 4, 131 [not Lindley].

Pinus amabilis, Parlatore in De Candolle, Prodr. xvi^2, 426, in part.

Picea bifolia, Murray in London Gard. Chronicle, 1875, 105.

A. subalpina, var. *fallax*, Engelmann in Trans. St. Louis Acad. iii, 597.

BALSAM.

Valley of the Stakhin river, Alaska, in latitude 60° N. (*Muir*), south through British Columbia and along the Cascade mountains to northern Oregon (*Collier*), through the Blue mountains of Oregon and the ranges of Idaho, Montana, Wyoming, Utah, and Colorado.

A tree 24 to 40 meters in height, with a trunk rarely exceeding 0.60 meter in diameter; mountain slopes and cañons between 4,000 (British Columbia) and 12,000 (Colorado) feet elevation; generally scattered and rarely forming the prevailing forest growth.

Wood very light, soft, not strong, rather close-grained, compact; bands of small summer cells very narrow, not conspicuous; medullary rays numerous, obscure; color, light brown or nearly white, the sap-wood lighter; specific gravity, 0.3476; ash, 0.44.

395.—Abies grandis, *Lindley*,

Penn. Cycl. i, 30.—Forbes, Pinetum Woburn. 123, t. 43.—Spach, Hist. Veg. xi, 422.—Nuttall, Sylva, iii, 134; 2 ed. ii, 192.—Lindley & Gordon in Jour. Hort. Soc. London, v, 210.—Carrière, Trait. Conif, 220; 2 ed. 296 (excl. syn.).—Cooper in Smithsonian Rep. 1858, 262; Pacific R. R. Rep. xii², 25, 69; Am. Nat. iii, 410.—Wood, Bot. & Fl. 314.—Lyall in Jour. Linnæan Soc. vii, 143.—Bolander in Proc. California Acad. iii, 232.—Henkel & Hochstetter, Nadelhölz. 160.—Nelson, Pinaceæ, 38.—Hoopes, Evergreens, 211.—Bertrand in Bull. Soc. Bot. France, xviii, 378.—Vasey, Cat. Forest Trees, 34.—Hall in Coulter's Bot. Gazette, ii, 91.—Macoun in Geological Rep. Canada, 1875-76, 211.—Engelmann in Trans. St. Louis Acad. iii, 593; London Gard. Chronicle, 1879, 684; 1880, 660, f. 119; Bot. California, ii, 118.—G. M. Dawson in Canadian Nat. new ser. ix, 326.—Masters in London Gard. Chronicle, 1881, 179, f. 33-36.—Veitch, Manual Conif. 97, f. 23, 24.

Pinus grandis, Douglas in Companion Bot. Mag. ii, 147.—Hooker, Fl. Bor.-Am. ii, 163.—Antoine, Conif. 63, t. 25, f. 1.—Hooker & Arnott, Bot. Beechey, 394.—Endlicher, Syn. Conif. 105.—Parlatore in De Candolle, Prodr. xvi², 427 (excl. syn.).—McNab in Proc. Royal Irish Acad. 2 ser. ii, 678, t. 46, f. 4, 4ª.

?A. aromatica, Rafinesque, Atlant. Jour. 119.—Endlicher, Syn. Conif. 125.—Lindley & Gordon in Jour. Hort. Soc. London, v, 213.—Carrière, Trait. Conif. 266; 2 ed. 310.

Picea grandis, Loudon, Arboretum, iv, 2341, f. 2245, 2246, in part.—Knight, Syn. Conif. 39.—Gordon, Pinetum, 155; Suppl. 5 (excl. syn. *Parsonsii*); 2 ed. 216.—Newberry in Pacific R. R. Rep. vi, 46, 90, f. 16, t. 6, in part.—*Murray in London* Gard. Chronicle, 1875, 135, f. 28.

A. Gordoniana, Carrière, Trait. Conif. 2 ed. 298 (excl. syn. *Parsonsii*).—Bertrand in Bull. Soc. Bot. France, xviii, 379.

A. amabilis, Murray in Proc. Hort. Soc. London, iii, 310, f. 22-24 [not Forbes].

WHITE FIR.

Vancouver's island, south to Mendocino county, California, near the coast; interior valleys of western Washington territory and Oregon south to the Umpqua river, Cascade mountains below 4,000 feet elevation, through the Blue mountains of Oregon (*Cusick*) to the eastern slope of the Cœur d'Alêne mountains (*Cooper*), the Bitter Root mountains, Idaho (*Watson*), and the western slopes of the Rocky mountains of northern Montana (Flathead region, *Canby & Sargent*).

A large tree, 61 to 92 meters in height, with a trunk 0.90 to 1.50 meter in diameter; most common and reaching its greatest development in the bottom lands of western Washington territory and Oregon in rich, moist soil; or moist mountain slopes, then much smaller, rarely exceeding 30 meters in height.

Wood very light, soft, not strong, coarse-grained, compact; bands of small summer cells broader than in other American species, dark colored, resinous, conspicuous; medullary rays numerous, obscure; color, light brown, the sap-wood rather lighter; specific gravity, 0.3545; ash, 0.49; in western Oregon manufactured into lumber and used for interior finish, packing-cases, cooperage, etc.

396.—Abies concolor, Lindley & Gordon,

Jour. Hort. Soc. London, v, 210.—Parry in Am. Nat. ix, 204.—Vasey, Cat. Forest Trees, 34.—Engelmann in Trans. St. Louis Acad. iii, 600; Wheeler's Rep. vi, 255; London Gard. Chronicle, 1879, 684, f. 114, 115; Bot. California, ii, 118.—Brandegee in Coulter's Bot. Gazette, iii, 32.—Masters in London Gard. Chronicle, 1879, 684, f. 114, 115.—Veitch, Manual Conif. 93.

Pinus concolor, Engelmann in herb.; Parlatore in De Candolle, Prodr. xvi², 426.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 681, t. 46, f. 6.

Picea concolor, Gordon, Pinetum, 155; 2 ed. 216.—Murray in London Gard. Chronicle, 1875, 135, f. 26.

Pinus lasiocarpa, Balfour in Rep. Oregon Exped. i, t. 4, f. 1 [not Hooker].—Murray in Proc. Hort. Soc. London, iii, 314, f. 25.—Henkel & Hochstetter, Nadelhölz. 429.

?A. balsamea, Bigelow in Pacific R. R. Rep. iv, 18 [not Miller].—Torrey in Pacific R. R. Rep. iv, 141.

Picea grandis, Newberry in Pacific R. R. Rep. vi, 46, in part.

Abies grandis, Carrière, Trait. Conif.; 2 ed. 296, in part.—Watson in Pl. Wheeler, 17 [not Lindley].

Picea Lowiana, Gordon, Pinetum, Suppl. 53; 2 ed. 218.—Henkel & Hochstetter, Nadelhölz. 419.

A. Lowiana, Murray in Proc. Hort. Soc. London, iii, 317, f. 38-41.

A. amabilis, Watson in King's Rep. v, 333 [not Forbes].

A. grandis, var. *Lowiana*, Hoopes, Evergreens, 212.

Pinus grandis, Parlatore in De Candolle, Prodr. xvi², 427, in part.

Picea concolor, var. *violacea*, Murray in London Gard. Chronicle, 1875, 464, f. 94, 95.

Pinus Lowiana, McNab in Proc. Royal Irish Acad. 2 ser. ii, 680, t. 46, f. 5.

A. lasiocarpa, Hort. [not Nuttall].

A. Parsonsii, Hort.

WHITE FIR. BALSAM FIR.

Northern slopes of the Siskiyou mountains, Oregon, and perhaps farther north in the Cascade mountains, south along the western slope of the Sierra Nevadas to the San Bernardino and San Jacinto mountains, California; along the high mountains of northern Arizona to the Mogollon mountains, New Mexico, northward to the Pike's Peak region of Colorado, and in the Wahsatch mountains of Utah.

A large tree, 30 to 40 meters in height, with a trunk 1.20 to 1.50 meter in diameter; moist slopes and cañons between 3,000 and 9,000 feet elevation, reaching its greatest development in the California sierras, varying greatly in the color and length of leaves, habit, etc., and perhaps merely a southern form of the too nearly allied *A. grandis*, from which it cannot be always readily distinguished.

Wood very light, soft, not strong, coarse-grained, compact; bands of small summer cells narrow, resinous, not conspicuous; medullary rays, numerous, obscure; color, very light brown or nearly white, the sap-wood somewhat darker; specific gravity, 0.3638; ash, 0.85; occasionally manufactured into lumber and used for packing-cases, butter-tubs, and other domestic purposes.

397.—Abies bracteata, Nuttall,

Sylva, iii, 137, t. 118; 2 ed. ii, t. 118.—Hartweg in Jour. Hort. Soc. London, iii, 225.—Lindley & Gordon in Jour. Hort. Soc. London, v, 209.—Carrière, Trait. Conif. 196; 2 ed. 265.—London Gard. Chronicle, 1853, 435; 1854, 459; 1859, 928.—Bot. Mag. t. 4740.—Lemaire in Ill. Hort. i, 14, t. 5.—Fl. des Serres, ix, 109 & t.—Naudin in Rev. Hort. 1854, 31.—Cooper in Smithsonian Rep. 1858, 262.—Murray in Edinburgh New Phil. Jour. new ser. x, 1, t. 1, 2 (Trans. Bot. Soc. Edinburgh, vi, 211, t. 1, 2).—Henkel & Hochstetter, Nadelhölz. 167.—Hoopes, Evergreens, 199.—Bertrand in Bull. Soc. Bot. France, xviii, 379.—Vasey, Cat. Forest Trees, 35.—Engelmann in Trans. St. Louis Acad. iii, 601; London Gard. Chronicle, 1879, 684; Bot. California, ii, 118.—Veitch, Manual Conif. 89, f. 14, 15.

Pinus venusta, Douglas in Companion Bot. Mag. ii, 152.

Pinus bracteata, D. Don in Trans. Linnæan Soc. xvii, 443.—Lambert, Pinus, 1 ed. iii, 169, t. 91.—Antoine, Conif. 77, t. 30.—Hooker & Arnott, Bot. Beechey, 394.—Hooker, Icon. t. 379.—Endlicher, Syn. Conif. 89.—Walpers, Ann. v, 798.—Parlatore in De Candolle, Prodr. xvi², 419.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 674, t. 46, f. 1.

Picea bracteata, Loudon, Arboretum, iv, 2348, f. 2256.—Gordon, Pinetum, 145; 2 ed. 202.—Lawson, Pinetum Brit. ii, 171, t. 25, 26, f. 1–7.—Nelson, Pinaceæ, 37.—Fowler in London Gard. Chronicle, 1872, 286.

A. venusta, Koch, Dendrologie, ii², 210.

Santa Lucia mountains, California, from the northern boundary of San Luis Obispo county about 40 miles northward.

A tree 46 to 61 meters in height, with a trunk 0.90 to 1.20 meter in diameter; moist, cold soil, occupying 4 or 5 cañons between 3,000 and 6,000 feet elevation, generally west of the summit of the range (*G. R. Vasey*).

Wood heavy, not hard, coarse-grained, compact; bands of small summer cells broad, resinous, conspicuous; medullary rays numerous, obscure; color, light brown tinged with yellow, the sap-wood not seen; specific gravity, 0.6783; ash, 2.04; probably more valuable than the wood of the other North American *Abies*.

398—Abies amabilis, Forbes,

Pinetum Woburn. 125, t. 44.—Lindley & Gordon in Jour. Hort. Soc. London, v, 210.—Carrière, Trait. Conif. 219; 2 ed. 296.—Cooper in Smithsonian Rep. 1858, 262.—Lyall in Jour. Hort. Soc. London, vii, 143.—Henkel & Hochstetter, Nadelhölz. 159.—Nelson, Pinaceæ, 36.—Hoopes, Evergreens, 209 (excl. syn. *lasiocarpa*).—Fowler in London Gard. Chronicle, 1872, 285.—Koch, Dendrologie, ii², 211 (excl. syn. *lasiocarpa*).—Macoun in Geological Rep. Canada, 1875–'76, 211.—Engelmann in London Gard. Chronicle, 1880, 720, f. 136–141; Coulter's Bot. Gazette, vii, 4.—Veitch, Manual Conif. 86.

Pinus amabilis, Douglas in Companion Bot. Mag. ii, 93.—Antoine, Conif. 63, t. 25, f. 2.—Hooker & Arnott, Bot. Beechey, 394.—Endlicher, Syn. Conif. 104.—Parlatore in De Candolle, Prodr. xvi², 426, in part.

Pinus grandis, Lambert, Pinus, 1 ed. iii, t. 26 [not Douglas].

Picea amabilis, Loudon, Arboretum, iv, 2342, f. 2247, 2248.—Knight, Syn. Conif. 39.—Gordon, Pinetum, 154; 2 ed. 213 (excl. syn.).—Newberry in Pacific R. R. Rep. vi, 51, 90, f. 18.

A. grandis, Murray in Proc. Hort. Soc. London, iii, 308, f. 18–21 [not Lindley].

A. grandis, var. *densiflora*, Engelmann in Trans. St. Louis Acad. iv, 599.

Valley of the Fraser river, British Columbia (*Engelmann & Sargent*), and probably farther north, south along the Cascade mountains of Washington territory and Oregon.

A tree 30 to 45 meters in height, with a trunk sometimes 1.20 meter in diameter, forming extensive forests on the mountains of British Columbia, between 3,500 and 5,000 feet, and upon the mountains south of the Columbia river between 3,000 and 4,000 feet elevation, here reaching its greatest development; its northern range not yet determined.

Wood light, hard, not strong, close-grained, compact; bands of small summer cells broad, resinous, dark colored, conspicuous; medullary rays numerous, thin; color, light brown, the sap-wood nearly white; specific gravity, 0.4228; ash, 0.23.

399.—Abies nobilis, Lindley.

Penn. Cycl. i, 30.—Forbes, Pinetum Woburn. 115, t. 40.—Link in Linnæa, xv, 532.—Spach, Hist. Veg. xi, 419.—Nuttall, Sylva, iii, 136, t. 117; 2 ed. ii, 193, t. 117.—Lindley & Gordon in Jour. Hort. Soc. London, v, 209.—Carrière, Trait. Conif. 198; 2 ed. 268.—Jour. Bot. & Kew Gard. Misc. ix, 85.—Cooper in Smithsonian Rep. 1858, 262.—Henkel & Hochstetter, Nadelhölz. 168.—Hoopes, Evergreens, 203.—Koch, Dendrologie, ii², 209.—Vasey, Cat. Forest Trees, 34.—Engelmann in Trans. St. Louis Acad. iii, 601, in part; London Gard. Chronicle, 1879, 885; Bot. California, ii, 119, in part; Coulter's Bot. Gazette, vii, 4.—Veitch, Manual Conif. 101.

Pinus nobilis, Douglas in Companion Bot. Mag. ii, 147.—Lambert, Pinus, 1 ed. iii, 167, t. 74.—Hooker, Fl. Bor.-Am. ii, 162.—Antoine, Conif. 77, t. 29, f. 2.—Hooker & Arnott, Bot. Beechey, 394.—Endlicher, Syn. Conif. 90.

Picea nobilis, Loudon, Arboretum, iv, 2342, f. 2249, 2250.—Knight, Syn. Conif. 39.—Lindley & Gordon in Jour. Hort. Soc. London, v, 209.—Gordon, Pinetum, 149; Suppl. 48; 2 ed. 207.—Newberry in Pacific R. R. Rep. vi, 49, 90, f. 17.—Lawson, Pinetum, Brit. ii, 181, t. 28, 29, f. 1–18.—Nelson, Pinaceæ, 39.

Pseudotsuga nobilis, Bertrand in Bull. Soc. Bot. France, xviii, 86.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 699, t. 49, f. 29, 29ª.

A. magnifica, Engelmann in Bot. California, ii, 119, in part.

RED FIR.

Oregon, Cascade mountains from the Columbia river south to the valley of the upper Rogue river, and along the summits of the Coast Range from the Columbia to the Nestucca river (*Collier*).

A large tree, 61 to 92 meters in height, with a trunk 2.40 to 3 meters in diameter, forming, with *A. amabilis*, extensive forests along the slopes of the Cascade Range, between 3,000 and 4,000 feet elevation; less multiplied in the coast ranges, here reaching its greatest individual development.

Wood light, hard, strong, rather close-grained, compact; bands of small summer cells broad, resinous, dark colored, conspicuous; medullary rays thin, hardly distinguishable; color, light brown streaked with red, the sap-wood a little darker; specific gravity, 0.4561; ash, 0.34.

400.—Abies magnifica, Murray,

Proc. Hort. Soc. London, iii, 318, f. 42–50; London Gard. Chronicle, 1875, 134.—Regel, Gartenflora, xiii, 119.—Henkel & Hochstetter, Nadelhölz. 419.—Koch, Dendrologie, ii², 213.—Engelmann in Trans. St. Louis Acad. iii, 601; London Gard. Chronicle, 1879, 885, f. 116; Bot. California, ii, 119; Coulter's Bot. Gazette, vii, 4.—Veitch, Manual Conif. 99.

A. campylocarpa, Murray in Trans. Bot. Soc. Edinburgh, vi, 370.

A. nobilis robusta, Hort.—Carrière, Trait. Conif. 2 ed. 269.

Picea magnifica, Gordon, Pinetum, 2 ed. 219.—Murray in London Gard. Chronicle, 1875, 105.

Pinus amabilis, Parlatore in De Candolle, Prodr. xvi², 426, in part.—McNab in Proc. Royal Irish Acad. 2 ser. ii, 677, t. 46, f. 3, 3ª?

A. amabilis, Vasey, Cat. Forest Trees, 34 [not Forbes].

Pseudotsuga magnifica, McNab in Proc. Royal Irish Acad. 2 ser. ii, 700, t. 49, f. 30, 30ª.

A. nobilis, Engelmann, Bot. California, ii, 119, in part.

RED FIR.

California, mount Shasta, south along the western slope of the Sierra Nevadas to Kern county.

A large tree, 61 to 76 meters in height, with a trunk 2.40 to 3 meters in diameter, forming about the base of mount Shasta extensive forests between 4,900 and 8,000 feet elevation; farther south less common and reaching an extreme elevation of 10,000 feet.

Wood light, soft, not strong, rather close-grained, compact, satiny, durable in contact with the soil, liable to twist and warp in seasoning; bands of small summer cells broad, resinous, dark colored, conspicuous; medullary rays numerous, thin; color, light red, the sap-wood somewhat darker; specific gravity, 0.4701; ash, 0.30; largely used for fuel and occasionally manufactured into coarse lumber.

401.—Larix Americana, Michaux,

Fl. Bor.-Am. ii, 203.—Michaux f. Hist. Arb. Am. iii, 37, t. 4; N. American Sylva, 3 ed. iii, 167, t. 153.—Audubon, Birds, t. 4.—Loudon, Arboretum, iv, 2399.—Emerson, Trees Massachusetts, 89; 2 ed. i, 105 & t.—Gihoul, Arb. Resin. 51.—Parry in Owen's Rep. 618.—Richardson, Arctic. Exped. 442.—Cooper in Smithsonian Rep. 1858, 257.—Hooker f. in Trans. Linnæan Soc. xxiii, 302.—Wood, Cl. Book, 662; Bot. & Fl. 314.—Nelson, Pinaceæ, 86.—Gray, Manual N. States, 5 ed. 442.—Hoopes, Evergreens, 247.—Regel, Gartenflora, xx, 105, t. 684, f. 7, 8 (Belg. Hort. xxii, 105, t. 10, f. 2, 3).—Bertrand in Ann. Sci. Nat. 5 ser. xx, 90.—Vasey, Cat. Forest Trees, 35.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Sears in Bull. Essex Inst. xiii, 185.

Pinus laricina, Du Roi, Obs. Bot. 49; Harbk. ii, 83.—Wangenheim, Amer. 42, t. 16, f. 37.—Mœnch, Meth. 364.

Pinus Larix rubra, alba and *nigra*, Marshall, Arbustum, 103, 104.

Pinus intermedia, Wangenheim, Amer. 42, t. 16, f. 37.—Du Roi, Harbk. 2 ed. ii, 114.

Pinus pendula, Aiton, Hort. Kew, iii, 369; 2 ed. v, 320.—Lambert, Pinus, 1 ed. i, 55, t. 36; 2 ed. ii, 63, t. 39; 3 ed. ii, 86, t. 49.—Willdenow, Spec. iv, 502.—Persoon, Syn. ii, 579.—Pursh, Fl. Am. Sept. ii, 645.—Smith in Rees' Cycl. xxviii, No. 32.—Eaton, Manual, 110; 6 ed. 365.—Nuttall, Genera, ii, 223.—Sprengel, Syst. ii, 887.—Audubon, Birds, t. 90, 180.—Beck, Bot. 339.—Hooker, Fl. Bor.-Am. ii, 164.—Eaton & Wright, Bot. 359.—Torrey, Fl. N. York, ii, 232.—Parlatore in De Candolle, Prodr. xvi^2, 409.

Pinus microcarpa, Lambert, Pinus, 1 ed. i, 56, t. 37; 2 ed. ii, 65, t. 40; 3 ed. ii, 88, t. 50.—Willdenow, Spec. iv, 502; Enum. 989; Berl. Baumz. 273.—Persoon, Syn. ii, 579.—Aiton, Hort. Kew. 2 ed. v, 321.—Pursh. Fl. Am. Sept. ii, 645.—Smith in Rees' Cycl. xxviii, No. 33.—Eaton, Manual, 110; 6 ed. 365.—Nuttall, Genera, ii, 223.—Hayne, Dend. Fl. 175.—Sprengel, Syst. ii, 887.—Torrey, Compend. Fl. N. States, 360.—Meyer, Pl. Labrador, 30.—Beck, Bot. 340.—Hooker, Fl. Bor.-Am. ii, 164.—Eaton & Wright, Bot. 359.—Bigelow, Fl. Boston. 3 ed. 387.—Antoine, Conif. 54, t. 21, f. 1.—Endlicher, Syn. Conif. 132.

Abies pendula, Poiret in Lamarck, Dict. vi, 514.—Nouveau Duhamel, v, 288.—Lindley & Gordon in Jour. Hort. Soc. London, v, 213.

Abies microcarpa, Poiret in Lamarck, Dict. vi, 514.—Nouveau Duhamel, v, 289, t. 79, f. 2.—Lindley in Penn. Cycl. i, 33.—Lindley & Gordon in Jour. Hort. Soc. London, 213.

L. tenuifolia, Salisbury in Trans. Linnæan Soc. viii, 313.

L. pendula, Salisbury in Trans. Linnæan Soc. viii, 313.—Forbes, Pinetum Woburn. 137, t. 46.—Carrière, Trait. Conif. 1 ed. 272.—Gordon, Pinetum, 129; 2 ed. 177.—Hooker f. in Trans. Linnæan Soc. xxiii, 302.

L. microcarpa, Desfontaines, Hist. Arb. ii, 597.—Forbes, Pinetum Woburn. 139, t. 47.—Spach. Hist. Veg. xi, 436.—Link in Linnæa, xv, 536.—Carrière, Trait. Conif. 275; 2 ed. 355.—Gordon, Pinetum, 129; 2 ed. 175.—Henkel & Hochstetter, Nadelhölz. 137.—Hooker f. in Trans. Linnæan Soc. xxiii, 302, 341.—Veitch, Manual Conif. 180.

L. intermedia, Loddiges, Cat. ed. 1836, 50.—Forbes, Pinetum Woburn. 141.—Link in Linnæa, xv, 535.

L. Americana rubra, Loudon, Arboretum, iv, 2400.—Knight, Syn. Conif. 40.

L. Americana, var. *pendula*, Loudon, Arboretum, iv, 2400.—Carrière, Trait. Conif. 2 ed. 356.

L. Americana, var. *prolifera*, Loudon, Arboretum, iv, 2401.—Carrière, Trait. Conif. 2 ed. 356.

L. decidua, var. *Americana*, Henkel & Hochstetter, Nadelhölz. 133.

LARCH. BLACK LARCH. TAMARACK. HACKMATACK.

Northern Newfoundland and Labrador to the eastern shores of Hudson bay, cape Churchill and northwest to the northern shores of the Great Bear lake and the valley of the Mackenzie river within the Arctic circle; south through the northern states to northern Pennsylvania, northern Indiana and Illinois, and central Minnesota.

A tree 24 to 30 meters in height, with a trunk 0.60 to 0.90 meter in diameter; moist uplands and intervale lands, or south of the boundary of the United States in cold, wet swamps, often covering extensive areas, here much smaller and less valuable.

Wood heavy, hard, very strong, rather coarse-grained, compact, durable in contact with the soil; bands of small summer cells broad, very resinous, dark colored, conspicuous, resin passages few, obscure; medullary rays numerous, hardly distinguishable, color, light brown, the sap-wood nearly white; specific gravity, 0.6236; ash, 0.33; preferred and largely used for the upper knees of vessels, for ship timbers, fence posts, telegraph poles, railway ties, etc.

The inner bark of the closely-allied European larch is recommended in the treatment of chronic catarrhal affections of the pulmonary and urinary passages; probably that of the American species would be equally efficacious.

402.—Larix occidentalis, Nuttall,

Sylva, iii. 143, t. 120; 2 ed. ii, 199, t. 120.—Newberry in Pacific R. R. Rep. vi, 59, f. 24, 25.—Cooper in Smithsonian Rep. 1858, 262; Am. Nat. iii, 412.—Lyall in Jour. Linnæan Soc. vii, 143.—Nelson, Pinaceæ, 91.—Hoopes, Evergreens, 253.—Regel, Gartenflora, xx, 103, t. 685, f. 8–10 (Belg. Hort. xxii, 101, t. 8, f. 3-5).—Vasey, Cat. Forest Trees, 35.—Gordon, Pinetum, 2 ed. 176.—Macoun in Geological Rep. Canada, 1875-'76, 211.—G. M. Dawson in Canadian Nat. new ser. ix, 329.—Veitch, Manual Conif. 130.

Pinus Larix, Douglas in Companion Bot. Mag. ii, 109 [not Linnæus].

L. Americana, var. *brevifolia*, Carrière, Trait. Conif. 2 ed. 357.

Pinus Nuttallii, Parlatore in De Candolle, Prodr. xvi², 412.

TAMARACK.

British Columbia, Selkirk and Gold ranges, south of latitude 53° N., extending west to the head of Okanagan lake (*G. M. Dawson*), south along the eastern slopes of the Cascade mountains to the Columbia river, through the mountain ranges of northern Washington territory to the western slopes of the Rocky mountains of Montana, and in the Blue mountains of Washington territory and Oregon.

A noble tree of great economic value, 30 to 45 meters in height, with a trunk 0.90 to 1.50 meter in diameter; moist mountain slopes and benches between 2,500 and 5,000 feet elevation; scattered among other trees and never exclusively forming forests; the thick bark long resisting the action of forest fires; very common, and perhaps reaching its greatest development in the region north of the Big Blackfoot river and in the valley of the Flathead river, Montana, here the largest and most valuable timber tree.

Wood heavy, exceedingly hard and strong, rather coarse-grained, compact, satiny, susceptible of a fine polish, very durable in contact with the soil; bands of small summer cells broad, occupying fully half the width of annual growth, very resinous, dark colored, conspicuous, resin passages few, obscure; medullary rays numerous, thin; color, light bright red, the thin sap-wood nearly white; specific gravity, 0.7407; ash, 0.09; occasionally manufactured into lumber, but principally used for fuel, posts, railway ties, etc.

403.—Larix Lyallii, Parlatore,

Enum. Sem. Hort. Reg. Mus. Flor. 1863; London Gard. Chronicle, 1863, 916 (Regel, Gartenflora, xiii, 244).—Lyall in Jour. Linnæan Soc. vii, 143.—Henkel & Hochstetter, Nadelhölz. 417.—Carrière, Trait. Conif. 2 ed. 361.—Hoopes, Evergreens, 256.—Regel, Gartenflora, xx, 103, t. 685, f. 11–13 (Belg. Hort. xxii, 102, t. 9, f. 1–3).—Bertrand in Ann. Sci. Nat. 5 ser. xx, 90.—Vasey, Cat. Forest Trees, 35.—Macoun in Geological Rep. Canada, 1875-'76, 211.—Veitch, Manual Conif, 130.

Pinus Lyallii, Parlatore in De Candolle, Prodr. xvi², 412.

"Cascade mountains, 6,500 to 7,000 feet, forming an open belt of trees mingled with *P. flexilis* (*P. albicaulus*); on the Galton range at 6,000 feet and in the Rocky mountains at 7,000 feet, growing with *P. flexilis*" (*Lyall*); mount Stewart, Washington territory (*Brandegee & Tweedy*, August, 1883); Grave Creek pass, northern Montana (*H. B. Ayres*, September, 1883).

A low, much-branched, straggling, alpine tree, rarely exceeding 15 meters in height, with a trunk sometimes 1.50 meter in diameter; dry, rocky soil, generally upon northern exposures, and associated with *Pinus albicaulis* and *Tsuga Pattoniana* along the upper limits of tree-growth between 5,500 and 7,000 feet elevation (*Brandegee*).

The wood not collected.

NOTE.—A well-marked species, distinguished from *L. occidentalis* by its alpine habit, the larger green or purple deciduous cones with ciliated scales, and by the dense tomentum covering the young shoots and leaf buds.

PALMACEÆ.

404.—Sabal Palmetto, Loddiges;

Rœmer & Schultes, Syst. vii, 1487.—Croom in Am. Jour. Sci. 1 ser. xxvi, 315.—Martius, Hist. Palm. iii, 247.—Kunth, Enum. iii, 247.—Spach, Hist. Veg. xii, 107.—Chapman, Fl. S. States, 438.—Curtis in Rep. Geological Surv. N. Carolina, 1860, iii, 64.—Wood, Cl. Book, 666; Bot. & Fl. 317.—Vasey, Cat. Forest Trees, 38.

Corypha Palmetto, Walter, Fl. Caroliniana, 119.

Chamærops Palmetto, Michaux, Fl. Bor.-Am. i, 206.—Michaux f. Hist. Arb.-Am. ii, 186, t. 10; N. American Sylva, 3 ed. iii, 5, t. 101.—Aiton, Hort. Kew. 2 ed. v, 490.—Nuttall, Genera, i, 231.—Elliott, Sk. i, 431.—Sprengel, Syst. ii, 137.—Eaton, Manual, 6 ed. 89.—Eaton & Wright, Bot. 191.—Darby, Bot. S. States, 546.—Cooper in Smithsonian Rep. 258.—Porcher, Resources, S. Forests, 526.

CABBAGE TREE. CABBAGE PALMETTO.

Smith island, off the mouth of Cape Fear river, North Carolina, south along the coast to Key Largo, Florida, and along the Gulf coast to the Apalachicola river.

A tree 7 to 12 meters in height, with a trunk 0.60 to 0.90 meter in diameter; sandy maritime shores; very common and reaching its greatest development upon the west coast of the Florida peninsula south of Cedar Keys.

Wood light, soft; fibro-vascular bundles hard, difficult to work, dark colored; color, light brown; specific gravity, 0.4404; ash, 7.66; impervious to the attacks of the teredo, and very durable under water; largely used for piles, wharves, etc.

405.—Washingtonia filifera, Wendland,

Bot. Zeit. xxxvii, 68.—Watson, Bot. California, ii, 211, 485.

Brahea dulcis,? Cooper in Smithsonian Rep. 1860, 442 [not Martius].

Pritchardia filamentosa, Wendland in Bot. Zeit. xxxiv, 807.—Vasey, Cat. Forest Trees, 38.—Fenzi in Bull Soc. Tosc. Ort. i, 116 & f.—Palmer in Am. Nat. xii, 598.

Brahea filamentosa, Hort.—Williams in London Gard. Chronicle, 1876, 80.

FAN-LEAF PALM.

San Bernardino county, California, from the eastern base of the San Bernardino mountains to the valley of the Colorado river.

A tree 12 to 18 meters in height, with a trunk 0.60 to 1.05 meter in diameter, forming groves of 250 to 500 plants in the depressions of the desert, in moist alkaline soil, or solitary and scattered near the heads of small ravines formed by water-courses; often stunted and greatly injured by fire.

Wood light, soft; fibro-vascular bundles hard, difficult to cut, dark colored, conspicuous; specific gravity 0.5173; ash, 1.89.

406.—Thrinax parviflora, Swartz,

Prodr. 57; Fl. Ind. Occ. i, 614.—Aiton, Hort. Kew. iii, 614; 2 ed. ii, 307.—Willdenow, Spec. ii, 202.—Persoon, Syn. i, 383.—Poiret in Lamarck, Dict. vii, 633.—Titford, Hort. Bot. Am. 112.—Sprengel, Syst. ii, 20.—Rœmer & Schultes, Syst. vii, 1300.—Martius, Hist. Palm. iii, 255, t. 103.—Kunth, Enum. iii, 253.—Dietrich, Syn. ii, 1091.—Walpers, Ann. v, 818.—Grisebach, Fl. British West Indies, 515.—Vasey, Cat. Forest Trees, 38.—Chapman in Coulter's Bot. Gazette, iii, 12; Fl. S. States, Suppl. 651.

T. Garberi, Chapman in Coulter's Bot. Gazette, iii, 12; Fl. S. States, Suppl. 651.

SILK-TOP PALMETTO.

Semi-tropical Florida, southern keys from Bahia Honda to Long's Key; in the West Indies.

A small tree, 9 meters in height with a trunk rarely exceeding 0.10 meter in diameter, or in pine-barren soil often low and stemless (*T. Garberi*).

Wood light, soft; fibro-vascular bundles small, hard, not conspicuous; color, light brown; specific gravity, 0.5991; ash, 3.99; the trunk used in making sponge- and turtle-crawls.

407.—Thrinax argentea, Loddiges;

Desfontaines, Cat. 3 ed. 31.—Rœmer & Schultes, Syst. vii, 1300.—Martius, Hist. Palm. iii, 256, t. 103, f. 3, t. 163.—Kunth, Enum. iii, 253.—Dietrich, Syn. ii, 1091.—Walpers, Ann. v, 818.—Grisebach, Fl. British West Indies, 515.—*Chapman, Fl. S. States, Suppl. 651.*

Palma argentea, Jacquin, Fragm. 38, No. 125, t. 43, f. 1.—Märter in Bom. Physik. Arbeiten. ii, 76.

SILVER-TOP PALMETTO. BRICKLEY THATCH. BRITTLE THATCH.

Semi-tropical Florida, on a nameless key 10 miles west of Key West, Elliott's Key, Key Largo, Piney Key, Boca Chica Key, Key West, Gordon Key, and on the small keys south and west of Bahia Honda Key (*Curtiss*); in the West Indies.

A small tree, 7 to 9 meters in height, with a trunk 0.15 to 0.20 meter in diameter.

Wood light, soft; fibro-vascular bundles small, very numerous; interior of the trunk spongy, much lighter than the exterior; specific gravity, 0.7172; ash, 3.01; used for piles, the foliage in the manufacture of ropes, for thatch, etc.

408.—Oreodoxa regia, HBK.

Nov. Genera & Spec. i, 305.—Martius, Hist. Palm. iii, 168, t. 156, f. 3-5.—Richard, Fl. Cuba, 348.—Kunth, Enum. iii, 182.—Spach, Hist. Veg. xii, 68.—Ill. Hort. ii, 28 & t.—Walpers, Ann. v, 807.—Grisebach, Fl. British West Indies, 327.—London Gard. Chronicle, 1875, 302, f. 66.—Chapman, Fl. S. States, Suppl. 651.

Œnocarpus regia, Sprengel, Syst. ii, 140.

O. oleracea, ? Cooper in Smithsonian Rep. 1860, 440.

ROYAL PALM.

Semi-tropical Florida, "Little and Big Palm hummocks," 15 and 25 miles east of cape Romano (*Curtiss*), near the mouth of Little river, and on Elliott's Key; in the West Indies.

A tree 18 to 30 meters in height, with a trunk 0.60 meter in diameter; rich hummocks, often forming extensive groves; in Florida rare and local.

Wood heavy, hard; fibro-vascular bundles large, very dark, conspicuous; interior of the trunk spongy, much lighter than the exterior; color, brown; specific gravity, exterior of the trunk, 0.7982, interior, 0.2128; ash, 2.54.

LILIACEÆ.

409.—Yucca canaliculata, Hooker,

Bot. Mag. t. 5201.—Baker in London Gard. Chronicle, 1870, 1217.—Engelmann in Trans. St. Louis Acad. iii, 43.

Y. Treculiana, Carrière in Rev. Hort. vii, 280.—Baker in London Gard. Chronicle, 1870, 828.—Engelmann in Trans. St. Louis Acad. iii, 41.—Vasey, Cat. Forest Trees, 38.—London Garden, xii, 328, t. 94.

SPANISH BAYONET.

Southern Texas, Matagorda bay, and from the Brazos and Guadalupe rivers south into Mexico.

A small tree, 5 to 8 meters in height, with a trunk 0.30 to 0.75 meter in diameter; dry, gravelly, arid soil.

Wood, like that of the whole genus, showing distinct marks of concentric arrangement, fibrous, spongy, heavy, difficult to cut and work; color, light brown; specific gravity, 0.6677; ash, 6.27.

The bitter, sweetish fruit cooked and eaten by the Mexicans; the root stock, as in the whole genus, saponaceous and largely used by the Mexicans as a substitute for soap.

410.—Yucca brevifolia, Engelmann,

King's Rep. v, 496; Trans. St. Louis Acad. iii, 47.—Parry in Am. Nat. ix, 141, 351.—Vasey, Cat. Forest Trees, 38.—Watson, Bot. California, ii, 164.

Y. Draconis, ? var. *arborescens*, Torrey in Pacific R. R. Rep. iv, 147.

THE JOSHUA. JOSHUA TREE.

Southwestern Utah, northwestern Arizona to southern Nevada, and the valley of the Mohave river, California.

A tree 6 to 12 meters in height, with a trunk 0.60 to 0.90 meter in diameter; dry, gravelly soil, forming upon the Mohave desert at 2,500 feet elevation an open, straggling forest.

Wood light, soft, spongy, difficult to work; color, very light brown or nearly white; specific gravity, 0.3737; ash, 4.00; occasionally manufactured into paper-pulp.

411.—Yucca elata, Engelmann,

Coulter's Bot. Gazette, vii, 17.

Y. angustifolia, var. *radiosa*, Engelmann in King's Rep. v, 496.

Y. angustifolia, var. *elata*, Engelmann in Trans. St. Louis Acad. iii, 50; Wheeler's Rep. vi, 270.

SPANISH BAYONET.

Western Texas to southern Arizona and Utah; southward into Mexico.

A small tree, 3 to 5 meters in height, with a trunk 0.20 to 0.25 meter in diameter; dry, gravelly *mesas*.

Wood light, soft, spongy; color, light brown or yellow; specific gravity, 0.4470; ash, 9.28.

412.—Yucca baccata, Torrey,

Bot. Mex. Boundary Survey, 221; Ives' Rep. 29.—Cooper in Smithsonian Rep. 1858, 266.—Baker in London Gard. Chronicle, 1870, 923.—André in Ill. Hort. 3 ser. xx, 23, t. 115.—Gray, Hall's Pl. Texas, 23.—Engelmann in Trans. St. Louis Acad. iii, 44; King's Rep. v, 496; Wheeler's Rep. vi, 270.—Loew in Wheeler's Rep. iii, 609.—Rothrock in Wheeler's Rep. vi, 52.—Watson, Bot. California, ii, 164.

Y. filamentosa, ? Wood in Proc. Philadelphia Acad. 1868, 167 [not Torrey].

SPANISH BAYONET. MEXICAN BANANA.

Western Texas, south of latitude 32° N., west through New Mexico to southern Colorado and San Diego county, California; southward into northern Mexico.

A tree 7 to 12 meters in height, with a trunk 0.60 meter in diameter, or often much smaller, and toward the northern limits of its range stemless; forming upon the plains of Presidio county, Texas, extensive open forests (*Havard*).

Wood light, soft, spongy, difficult to work; color, light brown; specific gravity, 0.4470; ash, 9.28.

The large juicy fruit edible and an important article of food to Mexicans and Indians; a strong coarse fiber, prepared by macerating the leaves in water, is manufactured into rope by the Mexicans.

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[NOTE.—In this index the names of families are indicated by "SMALL CAPS", of species by "Roman" type, and of synonyms by "*Italics*".]

A.

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