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About the Institute

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

Ball, C. R.

Salix

In Core, E. L. - A manual of winter botany. Winter characters of north-
eastern willows. ca 1957

2. S. hispida Muhl. Hispid Greenbrier. S. tamnoides L. var. hispida (Muhl. Fern.). Stem climbing in thickets, glabrous, terete, the lower parts thickly hispid with numerous straight slender black prickles, the younger branches unarmed or nearly so; branches somewhat angled; berries bluish-black, 6 mm. in diameter. Rich woods, often on limestone outcrops, New York and South Dakota, south to Georgia and Texas. Fig. 25.

3. S. glauca Walt. Glaucous Greenbrier. Stem glabrous, terete, glaucous, armed with rather stout numerous or scattered prickles; branchlets somewhat angled; berries bluish black, 6 mm. in diameter. Sandy thickets and fields, Florida and Texas, north to New England, West Virginia, and Missouri. Fig. 26.

4. S. laurifolia L. Laurel-leaf Greenbrier. Blaspheme-Vine. Evergreen high-climbing vine, with knotty somewhat woody rhizomes and strong terete stems armed with rigid prickles; tendrils intermittent; leaves coriaceous, 0.6-2 dm. long, 1-1.5 dm. broad, the middle vein much more prominent than the lateral ones; berries black. Swamps and moist soil, Florida to Texas, north to New Jersey and Tennessee; also in the West Indies. Fig. 27.

Salix L.*

(Salicaceae)

Deciduous trees and shrubs. Bark on young twigs usually smooth, green, brown, yellow, or purplish, becoming rough on old stems. Twigs slender, terete; pith small, round, continuous, white. Buds small, oblong, appressed, solitary (or sometimes multiple), with a single exposed scale, the terminal bud lacking. Leaf-scars alternate (rarely opposite), low, narrow, curved; bundle-traces 3. Stipule-scars short (sometimes absent). Catkins often appearing in February or March.

*Text contributed by Carleton R. Ball

a. Weeping (tree with flexible, drooping branches) 5. *S. babylonica*

a. Not markedly weeping

b. Buds large, 10 mm. long 9. *S. discolor*

b. Buds smaller

c. Buds moderate, 4-6 mm. long

d. Buds frequently opposite;
introduced shrub 13. *S. purpurea*

d. Buds always alternate;
native shrub 3. *S. lucida*

c. Buds small, scarcely 3 mm. long

d. Trees; twigs mostly glabrescent

e. Twigs very brittle at base

f. Buds viscid; introduced tree 4. *S. fragilis*

f. Buds not viscid; native tree 1. *S. nigra*

e. Twigs not very brittle at base

f. Twigs dark yellow-brown or
green; native trees 2. *S. caroliniana*

f. Twigs light yellow or golden; introduced trees. 6. *alta*

d. Shrubs; twigs glabrescent to pubescent or velvety

e. Twigs thick; planted shrub 12. *S. caprea*

e. Twigs slender; native shrubs

f. Twigs glabrescent, reddish-brown

g. Extensively colonial,
stoloniferous 7. *S. interior*

g. Not stoloniferous 8. *S. rigida*

f. Twigs puberulent or velvety

g. Twigs gray-puberulent 10. *S. humilis*

g. Twigs purplish-puberulent 11. *S. sericea*

1. S. nigra Marsh. Black Willow. A shrub or tree 5-30 m. high (*85 ft.), the largest of the native willows; bark flaky, dark brown or black; twigs brown or green glabrescent, glabrescent, brittle at base; stipule-scars prominent; buds small, 3 mm. long or less, sharp-pointed, reddish-brown. The trunks are often clustered and leaning. Banks of streams and rich low woods, New Brunswick to North Dakota, south to Alabama and Arkansas. Fig. 28.

2. S. caroliniana Michx. Carolina Willow. Ward's Willow. (S. Wardii Bebb). A shrub or small tree, 10 m. high or less (*18 ft.); bark gray, deeply checkered; twigs yellowish, gray or gray-brown, glabrous or pubescent, brittle at base; stipule-scars usually relatively large. River banks and low woods, Florida to Texas, north to Maryland, Illinois and Kansas; also in Cuba.

3. S. lucida Muhl. Shining Willow. Shrub or small tree to 9 m. high, the trunk to 1.2 dm. in diameter; twigs yellowish-brown, glabrous, shining; buds moderate, 4-6 mm. long; leaf-scars lunate, the bundle-traces conspicuous. Shores and low ground, Labrador to Manitoba, south to Maryland, Illinois, and South Dakota.

4. S. fragilis L. Crack Willow. A tree becoming 30 m. tall (* 80 ft.); bark thick, rough; twigs glabrous, lustrous, brown, readily breaking away at the base (hence both the Latin and English names); stipule-scars minute or sometimes absent; buds viscid. Introduced from Europe and spread from cultivation to roadsides and fields.

5. S. babylonica L. Weeping Willow. A tree becoming 20 m. tall, the twigs very slender, greenish, elongated, drooping. Introduced from Eurasia, much cultivated, and locally escaped.

6. S. alba L. White Willow. A tree becoming 30 m. tall (* 85 ft.), the twigs red-brown (or yellow in the var. vitellina (L.) Stokes, Golden Willow), silky, glabrescent, flexible and not brittle at base; stipule-scars minute or absent. Introduced from Europe, much planted, and extensively naturalized.

7. S. interior Rowlee Sandbar Willow. (S. longifolia Muhl.). A colonial stoloniferous much-branched shrub, to 5 m. high (*24 ft.), the twigs glabrescent, red or reddish; buds 3 mm. long; stipule-scars none. Alluvial soils, often on sandbars and beaches, Quebec to Alaska, south to Maryland, Indiana, and Oklahoma.

Authors of Sections taken from Fernald, in Gary, Man.

CORE: WINTER CHARACTERS OF SALIX.

Ball Sept. 21, 1957

SECTIONS AND SPECIES (13 original and 6 additional) TO BE INCLUDED

Section Pentandrae: 1. *Salix lucida* Muhlenberg
Dumertier. 2. *Salix serissima* (Bailey) Fernald.

Section Benlandianae. 3. *Salix caroliniana* Michaux. (*S. longipes* Shuttl.; *S. Wiedii*
der
Schneider.

Section Triandrae. 4. *Salix amygdaloides* Anderssen.
Dumertier.

Section Nigrae. 5. *Salix nigra* Marshall.
Loudon.

Section Fragiles. 6. *Salix fragilis* L.
Kech.

(Ajbac, Berrrr) 7. *Salix alba* L.

8. *Salix babylonica*. L.

Section Longifoliae. 9. *Salix interior* Rawles.
Anderssen.

Section Cordatae. 10. *Salix rigida* Muhlenberg. (*S. cordata* Muhl., not Michaux).
Barratt

Section Balsamiferae. 11. *Salix pyrifolia* Anderssen.
Schneider.

Section Commutatae. 12. *Salix glaucephylloides* Fernald. (*S. glaucephylla* Bebb).

Section Argentae. 13. *Salix petiolaris* J.E. Smith.

(Bebbiae, 14. *Salix sericea* Marshall.
Berrrr)

Section Discolorae. 15. *Salix caprea*.
Barratt.

16. *Salix discolor* Muhlenberg.

17. *Salix humilis* Marshall.

18. *Salix tristis* Aiton.

19. " *bebbiana*

Section Purpureae. 20. *Salix purpurea* L.

(Helix, V
Dumertier

Section Capreae

Bluff and Fingerhuth

Section Chrysanthae.
W.D.J. Kech

Section Argrecarpae Fernald.

Section Roseae,
Anderssen.

Section Candidae
Schneider

Section Phyllicifoliae,
Dumertier.

Section Viminalae,
Bluff and Fingerhuth

Section Fulvae Barratt,
(S, Bebbiana)

Section Herbaceae Berrrr

Section Uva-Ursi Fernald (for *B. uva ursi* Pursh
Section Glaucac, Fries.

Ovalifoliae Rydberg

Section Reticulatae Fries.

KEYS TO WEST VIRGINIA WILLOWS IN WINTER

(Revision prepared for Dr. Earl L. Cere, 24 July, 1957.)

- a. Twigs and branches long, flexible, drooping (weeping). 4. *S. babylonica*.
- a. Twigs relatively short, stiff, vertical to right-angled.
 - b. Buds large, 6-10 or more mm. long. ⁹10. *S. discolor*
 - b. Buds mid-sized, 4-6 mm. long
 - c. Buds always alternate; native shrub. 1. *S. lucida*.
 - c. Buds frequently opposite; introduced shrub. 13. *S. purpurea*
 - b. Buds small, 2-3 mm. long
 - c. Trees, Twigs mostly glabrescent
 - d. Twigs brittle at base
 - e. Buds viscid; introduced tree. 2. *S. fragilis*
 - e. Buds not viscid; native tree. 6. *S. nigra*
 - d. Twigs not brittle at base
 - e. Twigs light yellow or golden; introduced tree. 3. *B. alba*.
 - e. Twigs dark yellow-brown or green; native tree. 5. *S. caroliniana*
 - c. Shrubs; twigs glabrescent to pubescent¹⁰ or velvety
 - d. Twigs stoutish; introduced shrub. ¹⁰11. *S. caprea*
 - d. Twigs slender; native shrubs.
~~BY TWIG DOGGLINGNESS OR STOUTNESS~~
 - e. Twigs glabrescent, reddish-brown
 - f. Steleniferous, forming extensive thickets. 7. *S. interior*
 - f. Not steleniferous; single plants. 8. *S. rigida*
 - e. Twigs puberulent to velvety
 - f. Twigs gray puberulent. ~~12~~ 12. *S. humilis*
 - f. Twigs purplish-puberulent. 11. *S. sericea*.
 - f. Not steleniferous, single plants
 - g. Twigs stoutish, 8. *S. rigida*
 - g. Twigs slender, 9. *S. petiolaris*

KEYS TO WEST VIRGINIA WILLOWS IN WINTER

1st
draft

(Revision prepared for Dr. Earl L. Core, 24 July, 1957.)

- a. Twigs and branches long, flexible, drooping (weeping). 4. *S. babylonica*.
- a. Twigs relatively short, stiff, vertical to right-angled.
 - b. Buds large, 6-10 or more mm. long. 10. *S. discolor*
 - b. Buds mid-sized, 4-6 mm. long
 - c. Buds always alternate; native shrub. 1. *S. lucida*.
 - c. Buds frequently opposite; introduced shrub. 13. *S. purpurea*
 - b. Buds small, 2-3 mm. long
 - c. Trees, Twigs mostly glabrescent
 - d. Twigs brittle at base
 - e. Buds viscid; introduced tree. 2. *S. fragilis*
 - e. Buds not viscid; native tree. 6. *S. nigra*
 - d. Twigs not brittle at base
 - e. Twigs light yellow or golden; introduced tree. 3. *S. alba*.
 - e. Twigs dark yellow-brown or green; native tree. 5. *S. caroliniana*
- c. Shrubs; twigs glabrescent to pubescent or velvety
 - d. Twigs stoutish; introduced shrub. 11. *S. caprea*
 - d. Twigs slender; native shrubs.
 - ~~EXTENSIVE GLABRESCENT, REDDISH-BROWN~~
 - e. Twigs glabrescent, reddish-brown
 - f. Stoloniferous, forming extensive thickets. 7. *S. interior*
 - f. Not stoloniferous; single plants. 8. *S. rigida*
 - e. Twigs puberulent to velvety
 - f. Twigs gray puberulent. 10 12. *S. humilis*
 - f. Twigs purplish-puberulent. 11. *S. sericea*.

Ball Sept. 21, 1957

- a. Trees, twigs mostly slender, yellowish (young) to brown or black; buds small to mid-sized (except S. fragilis), 1-5 or 6 mm. long, colored as twigs
- b. Twigs not markedly pendulous (weeping)
- c. Twigs yellow or yellowish, glabrous (Triandrae) 4. S. amygdaloides.
- c. Twigs yellowish or greenish (seasonal) to to dark brown or black; native trees
- d. small tree or shrub; bark gray; twigs not brittle; buds small, 1-3 mm. long. (Borelandianae) 3. S. caroliniana
- d. Large tree; bark dark brown to black; twigs brittle at base; buds small to mid-sized, 2-5 mm. long, reddish-brown. (Nigrae) 5. S. nigra
- c. Twigs greenish-yellow (younger) to reddish-brown (older); introduced trees (Fragiles)
- d. Bark gray, thick, rough; twigs very brittle at base; buds mid-sized to large, 3-7 or 10 mm. long 6. S. fragilis
- d. Bark gray-brown, rough, ridged; twigs not brittle; buds small to mid-sized 1-3 or 5 mm. long 7. S. alba
- b. Twigs long, pendulous (weeping) (Fragiles) 8. S. babylonica
- a. Shrubs, or occasionally small trees (as also is S. caroliniana above)
- b. Buds alternate
- c. Thicket-forming, stoloniferous shrub, 2-3 m. high twigs slender; buds small, 2-4 mm. long (Longifoliae) 9. S. interior
- c. Not thicket-forming or stoloniferous shrubs
- ~~a. Buds small to mid-sized, 1-6 or rarely 7 mm. long (except on S. discolor)~~
- ~~e. Older twigs and buds glabrous (except on hairy varieties, as noted; twigs mid-sized to stoutish, 2-6 or 7 mm. in basal diameter; buds mid-sized, 2-6 or 7 mm. long (except on S. fragilis))~~
- ~~f. Seasonal twigs yellowish-brown to older reddish-brown or darker, shining, less clearly furrowed, the larger somewhat grayish at base (Pentandrae)~~
- ~~g. Bark brown (?); twigs longish, hairy in var. intensa~~ 1. S. lucida
- ~~g. Bark olive-green, shining (?); twigs shorter~~ 2. S. serissima
- ~~f. Seasonal twigs yellowish to yellowish-brown,~~

~~e. Not thicket-forming or stoloniferous shrubs~~

d. Buds small to midsized, 2-6 or rarely 7 mm. long
(4-7 or 10 mm. in S. discolor)

e. Older twigs and buds glabrous (except in hairy varieties, as noted)

f. Twigs midsized to stout, 2-6 or 7 mm. wide at base

g. ^Sasnal twigs yellowish-brown, older reddish-brown or darker, shining, not clearly furrowed, the larger somewhat grayish at base (Pentandrae)

h. Bark brown (?), twigs lengthy (hairy in var. intensa)

1. S. lucida

h. Bark olive-green, shining (?), twigs shorter

2. S. serissima

g. ^Sasnal twigs yellowish-brown, older dark brown or blackish, shallowly straight-furrowed, some partly shining, many short and divaricate
(Balsamiferae)

11. S. pyrifolia

f. Twigs mostly slender to occasionally midsized, 1-4 or sometimes 5 mm. at base (Argentae)

g. Bark gray (?); twigs slender, leafy, young yellowish and occasionally puberulent, older dark brown or reddish-brown, glabrous, seldom shining

13. S. petiolaris

g. Bark ; twigs slender or sometimes midsized, lengthy, young yellowish-brown to dark brown, puberulent, older dark brown to black, glabrous or sometimes micro-puberulent (plants with older twigs pubescent probably represent S. subsericea)

14. S. sericea

f. Twigs stoutish, reddish or reddish purple to mostly dark brown, youngest thinly pubescent (more densely so in var. latifolia), older glabrous; buds large, 4-7 or 10 mm. long (Discolores)

16. S. discolor

- f. Seasonal twigs, and var. *latifolia*, pubescent; older twigs of this shrub or small tree mostly reddish brown to dark brown; buds large, 4-9 or 10 mm. long (*Discoleres*) 16. *S. discolor*
- e. Twigs and buds more or less hairy, not shining
- f. Tall shrubs to 5 or 6 m. high; twigs and buds mostly mid-sized
- g. Bark ; twigs slender to mid-sized, longish, 2-5 mm. in basal diameter, yellow to yellowish-brown (*Cordatae*) 10. *S. bigida*
- g. Bark ; Twigs mid-sized to stoutish, 2-5 or 7 mm. in basal diameter, short to long, yellow or yellowish brown to dark brown (densely white-tomentose on the common var. *albevestita*, with buds to 8 mm. long) (*Commistae*) 12. *S. glaucophylloides*
- f. Shrub or small tree, 2 to 6 or 9 m. high; bark grayish, rough, scaly; twigs 1-3 or 4 mm. at base, reddish to dark brown, often divaricate, the shorter often creased; buds mid-sized (*Restratae*) 19. *S. Bebbiana*
- f. Low many-stemmed shrub to 1 m. high; twigs slender, 1-3 mm. in diameter; yellowish-brown to brown; buds small, 1-3 or 4 mm. long (*Discoleres*) 18. *S. tristis*
- d. Buds mid-sized to large, 4-8 or 10 mm. long, pubescent
- a. Introduced shrub or small tree, bark gray (Fernald); 1-2-year twigs yellowish, older dark brown, stoutish (*Capreae*) 15. *S. caprea*
- e. Native shrubs or small trees; bark ; twigs mostly reddish-brown to dark brown (*Discoleres*)
- f. Few-stemmed shrub or small tree, 2-7 m. high; bark brown (.); younger twigs often pubescent (more densely so in var. *latifolia*), older glabrous, stoutish ; 6. *S. discolor*
- f. Sprangly shrub 1-3 m. high; bark twigs mid-sized, pubescent, younger yellowish 17. *S. humilis*
- b. Buds opposite, subopposite, or alternate (on same twig), mid-sized to large, 3-8 or 9 mm. long, glabrous (introduced shrub) (*Purpureae*) 20. *S. purpurea*

WINTER CHARACTERS OF WILLOWS: TREES AND SHRUBS OR BOTH

NAME HABIT-HEIGHT

BARK

(Younger)

TWIGS

(older)

Buds

3. *S. caroliniana* Mx. Sh. or sm. tree to 10m or more (16)? and 2,5 dm. diam Gray, checkered. Yellowish mostly slender, 1-4 mm. basal diam. sm. 1-3 mm. c & c as twigs. pubescent to glabrous, brown to black glabrous

4. *S. amygdaloides* Anders. Tree to 12 m (40ft) Brown, scaly. Slender, 1-3 mm. basal diameter, yellow, glabrous

5. *S. nigra* Marsh. Tree to 30 m. high (100 ft.) ~~Grayish-brown~~ Dark Greenish to dark brown to black. br. to black, flaky. Slender, 1-3 or 4 mm, m-l brittle at base. Pubesc. to glabrous.

6. *S. fragilis* L. Tree to 25 m. (83 ft.) Gray, thick, rough. Slender, very brittle at base, greenish-yellow to reddish-br., somewhat pubesc. to glabrous. lustrous.

7. *S. alba* L. Tree to 20 M. (67 ft.) Gray-brown, rough, ridged. Slender, Greenish-yellow to Pubescent to reddish brown, glabrous. small, 1-3 or 5 mm. color as twigs

8. *S. babingtonia* Lea L. Tree to 12 m. (40 ft) or more. Grayish-brown, green, brown Very slender, long, pendulous. Yellow to Yellowish-brown to brown, tough, puberulent to glabrous. Small, 1-4 or 5 mm. color as twigs

9. *S. bebbiana* Sarg. Sh. or sm. tree, to 9 m. (30 ft.) Grayish, rough scaly. Slender to mid-sized, 1-4 or 5 mm, often divaricate and the shorter oft. crooked, pubescent to thinly scabrous. glabrous Sm. to mid-sized, 3-5 or 6 mm. long.

10. *S. lucida* Muhl. Sh. or sm. tree, 3-6 or 9 m (30 ft), trunk to 1,2 dm. Brown, glabrous. Mid-sized to stoutish, 2-5 mm. base diam. Chestnut-brown to reddish-brown, or darker, glabrous (spec) or m-l hairy (v. intensa) shining 6 mid-sized, 4-6 mm. c. as twigs.

11. *S. serissima* (Baill.) Fern. Sh. 1-4m. high. Olive-green, lustrous. Slender, shining, glabrous to brown. mid-sized, 5-7 mm. color as twigs.

12. *S. caroliniana* Mx. Sh. or sm. t. to 10 m. (lgr westward) Gray, deeply checkered. Slender, 1-4 mm. Yellowish to brown to black. Pubescent to glabrous. small, 1-3 mm. c. & c. as twigs.

13. *S. interior* Rowlee Sh. 2-3 m., thick-ferrug, steleniferous Grayish/ Slender, red or reddish-brown, glabrescent to glabrous. small, 2-4 mm. brown, glabrous.

14. *S. rigida* Muhl. Stemmy shrub, 2-4 or 6 m. high ? Slender to mid-sized, 1-5 mm. basal diam. Yellowish & pubescent to dark brown & glabrous small, mid-sized, 2-4 mm. or 6 mm. brown. c. & c as twigs

NAME	HABIT-HEIGHT	BARK	YOUNGER	TWIG ⁽⁵⁾	OLDER	BUDS
11. <i>S. pyrifolia</i> Anders.	Sh. 1-5 or 6 m. stems clustered or ^{occasionally} tree-like	Grayish, smooth	yellowish to reddish brown or dark olive brown, glabrous and shining.			mid-sized, stout, 2-6 mm. color as twigs.
12. <i>S. glaucophylla</i> var. <i>absorptiva</i>	Stemmy shrub, 2-4 or 5 m. ?	Gray	usually short and stout, Yellowish to yellow-brown and dark brown (Tomentose in var.) Pubescent to glabrous.			mid-sized, 2-4 or 6 mm. long. c as twigs. (4-8 mm. on var.)
13. <i>S. petiolaris</i> J.E. Smith	Clumpy shrub to few-stem tree, 2-5, rarely 6-7 m.	Gray	Slender, leafy, yellow to yellowish-green to dark brown puberulent to glabrous.			2-5, rarely 6 mm., brown, glabrous.
14. <i>S. sericea</i> Marsh.	Cluster-stem sh. ? or small tree, 2-6 or 8 m. high.		Slender light brown to mostly dark brown, pubesc. to puberul to glabrate-glabrous. (closely related <i>S. subsericea</i> pubescent)			mid-sized, 2-5, rarely 6 mm. c. & cl as twigs
15. <i>S. caprea</i> L.	Sh. or emp. tree, 2-3 or 4 m. some- time single trk.	Gray (Fernald)	Stout, mostly 3-5 or 6 mm. basal diam. Yellowish (1-2 yr.)? to dark brown, Pubescent to glabrescent.			mid-size to large, 4-9 or 10 mm. c & c as twigs
16. <i>S. discolor</i> Muhl.	Few-stem sh. or sometimes tree.	Reddish-brown, thick, usually smooth.	Stout, 3-6 mm. basal diam. Reddish or reddish-purple to mostly dark- brown. (more so in v. <i>latifolia</i>). Pubescent to glabrous.			large, 4-9 or 10 mm., stoutish. c & c as twigs.
17. <i>S. humilis</i> Marsh.	Sprangly, sprding sh., 2-3 m. several, 1-2 or 3 m. high. low sh., 0.4-1 m. many-stemmed,	?	Mid-sized, 2-4 mm. basal diam. Greenish, or yellow-brown to reddish or dark- brown. Pubescent to glabrate.			large, 5-8 or 10 mm. brown, c & c as twigs.
18. <i>S. tristis</i> Aiton	Many-stemmed,	?	Slender, leafy, 1-3 mm. basal diam. Yellowish-brown to brown. pubescent.			Small, 1-3 or 4 mm., pubescent
19. <i>S. Bebbiana</i> Sarg.	Few-stem sh. or some- time small tree, 2-6, rarely 9 m.	Gray, rough, scaly.	Slender, mid-size, 1-3 or 4 mm. divaricate, shorter light reddish to darker brown, Pubescent to glabrate			small, 3-5 or 6 mm. crooked. c & c as twigs.
20. <i>S. purpurea</i> L.	Many-stem shrub, 1-2.5 m. or more	Smooth, very bitter.	slender, flexible, Yellow to yell-br. or reddish-brown, rarely Glabrous, somewhat shining.			Opposite, subopposite or alternate, mid-size to lg, 3-8 rarely 9 mm. yellowish to reddish-brown, glabrous.

Salix L. *

Salicaceae.

Deciduous trees and shrubs, with wood of light weight, the bark containing tannin and therefore somewhat bitter. Tree trunks 1-3 or 4, often somewhat leaning; shrubs often more clumpy and sometimes forming thickets by the growth of under-ground runners. Twigs mostly slender but sometimes stoutish (*S. discolor*, *S. caprea*), terete. Bark on young twigs usually smooth; green, yellow, brown, purplish, or black, sometimes shining; glabrous, glabrate, puberulent, gray-pubescent, or white-tomentose, varying with species, age of twigs, and season of the year; old twigs often becoming rough. Pith small, round, continuous, white. Buds small to large, 1-2 mm. to 10 mm. or more long, oblong to ovate, appressed, solitary (or sometimes multiple), with a single exposed scale, colored and clothed as the twigs; a terminal bud lacking. Leaf scars alternate or rarely subopposite or opposite (*S. purpurea*), shallow, narrow, curved; bundle-traces 3. Stipule scars tiny to obvious, sometimes present. Occasional dead leaves and stipules persistent during winter. Aments of precocious ~~some~~ species sometimes appearing in February or March.

* Text contributed by Carleton R. Ball.

Ball - descriptions
Sept. 6 1957

1. *Salix lucida* Muhlenberg. Shining Willow. (Section Pentandrae).

(30 64)
Shrub or small tree 3-6 or 9 m. high, the trunk to 1.2 dm. in diameter; bark (2-5 mm. in diameter) brown, glabrous; twigs slender to stoutish, mostly mid-sized, chestnut-brown to reddish brown or darker, ^{shining} glabrous (species) or young twigs more or less hairy (var. intensa Fern.); buds mid-sized, 4-6 mm. long, colored as the twigs; leaf-scars lunate; bundle-traces conspicuous.

Del., Pa., and no. parts of Ohio, Ind., Ill., ~~Tex.~~ and Ia., ^{and} to no. N. Dak., north to Newfield, and west to Man., Outlying stations in Roanoke Co. Va., and at Weeping Water, Nebr. Often confused with S. serissima by many collectors and writers.

2. *Salix serissima* (Bailey) Fernald. A ^Uttum Willow. (Section Pentandrae slender.

Shrub 1-4 m. high; branches with olive-brown, lustrous bark; twigs yellowish ^{MIDSIZED} brown to brown, shining, glabrous; buds lance-oblong, 5-7 mm. long, chestnut-brown to olive- or reddish brown, glabrous, shining.

Swampy and boggy ground, rather than along streams, from n. N.J. to N. Ohio and Ind., c. Minn., no N.D., and NW. Mont., north to n. Ind., James Bay, and n. Sask. and Alta. Outlying stations in the Black Hills of S.D. and on Long's Peak in No. Colo. (not on Pike's Peak, in Teller Co., as previously published. Confused with S. lucida Muhl. by many collectors and writers.

3
38. *Salix caroliniana* Michx. Carolina Willow, Ward's Willow (S. Wardii Bebb). Section Bonplandianae. Shrub or small tree to 19 m. (33 ft.) high in our area, larger westward; bark gray, deeply checkered; twigs slender, the seasonal 0.5-1 mm, older to 4 mm., the seasonal and sometimes the 1-year yellowish, becoming brown to black with age, the youngest pubescent to glabrous; buds very small, 1-3 mm. long, colored and clothed as the twigs.

Stream banks and low woods, Florida west to Sw. Texas, north to Maryland and sw. Pennsylvania, and west to Illinois and Kansas.; also in Cuba.

4
40. *Salix amygdaloides* Andersen. Peachleaf Willow. Sect. Tricharac.
Shrub or small tree with 1-3 often leaning trunks to 12 m. (40 ft.) high and to 4 dm. in diameter (some manuals say to 20 M. high (70 ft.) and 6 dm. in diam.); bark brown, scaly or fissured; twigs slender, 1-3 mm. in diameter, yellow, glabrous; buds small, 2-4 or 5 mm. long, yellow or yellowish-brown;

ovoid

Alluvial soils, usually near water, Pennsylvania to Texas and Arizona, north to Quebec and British Columbia.

5. *Salix nigra* Marshall. Black Willow. Sect. *Nigrae*. A shrub or tree to 30 m. (100 ft.) high, with 1-4 often leaning trunks to 5. dm. in diameter, the largest of the native willows (claimed by Britten and Britten and Brown in earlier manuals to reach 120 and 150 feet, respectively); bark flaky, dark brown slender, to black; twigs/~~greenish~~ greenish to dark brown (seasonal yellowish while emerging), glabrescent, somewhat brittle at base; buds small, 2-4 mm. long, reddish-brown. Abundant in alluvial soils along streams and in low woods, Florida to West Texas, north to New Brunswick, Nebraska, and Minnesota.

twigs 1-3 or 4 mm. in diameter.

6. *Salix fragilis* L. Brittle Willow, Crack Willow, English Willow. Sect. *Fragilis*. Tree to 20 or 25 m. high (67 to 83 ft.), sometimes with 2 or 3 trunks, 1-2 m. in diameter; bark thick, rough, gray; twigs slender, greenish-yellow to reddish-brown, somewhat lustrous, pubescent to glabrous, very brittle at base (hence the Latin and English names); buds mid-sized, 3-7 mm. or occasionally 10 mm. long, brown. Widely introduced from Europe in colonial days, for sentiment and for charcoal to use in making gunpowder, Extensively hybridized with *S. alba* both in Europe and America.

and sparingly escaped along watercourses near town and farmsteads.

A tree at Waterville, Maine, has a trunk circumference of 33 feet, and diameter of 11 feet; and divides into 2 or 3 trunks some feet above the ground.

7. *Salix alba* L. White Willow, Cricket-bat Willow. Sect. *Fragiles*.

Large tree to 20 m. (67 ft.) or more in height, and to 1 m. or more in diameter, often with two or three large trunks above the base; bark rough, coarsely ridged, seasonal gray to brownish; twigs greenish-yellow, pubescent; older twigs reddish brown, glabrous; buds very small, 1-3 or 5 mm. long, colored as twigs; Var. vitalina (L.) Koch has seasonal to 3-year twigs yellow, but is very rare in America where most of the collection so named really are hybrids of *S. fragilis* and *S. alba*. Widely introduced from Europe in early days for ornament, ^{basketry,} poles, and charcoal for making gunpowder, and has escaped to some extent.

8. *Salix babylonica* L. Weeping Willow. Sect. *Fragiles*. A tree to 12 m. (40 ft.) or more high and 1 m. in diameter; bark grayish-brown; twigs very slender, elongated, ~~pubescent~~ pendulous, the younger yellow, gradually becoming brownish to brown, tough, puberulent to glabrous; buds small, 1-4 or 5 mm. long, yellowish to brown, late-developing. Widely introduced from Europe, especially for canals and as an ornamental, and sparingly escaped. Not native to the Babylon area but the Latin name sentimentally based on Psalm 137 because long grown in Europe as a "mourning tree".

Claimed by Britton Manual, 1901, and Britton and Brown, *Illus. Fl.* 1896, to be 20 m. high and 1.8 m. in diameter.

9. *Salix interior* Rawles. Sandbar Willow, Long-leaf Willow. (*S. longifolia* Muhl.) Sect. *Longifoliae*. A thicket-forming, stoloniferous shrub, 2-5 m. (17 ft) high; stems 3-6 or rarely 10 cm. in $\frac{1}{4}$ diameter; bark grayish; twigs slender, red or reddish-brown, glabrescent-glabrous; buds small, 2-4 mm. long, late in ~~stages~~ developing. Common on alluvial soils, mudbars, sandbars, and beaches. Pennsylvania, Virginia, West Virginia, and Kentucky, thence south to the mouth of the Mississippi River and lower Rio Grande; west to the western edge of the Great Plains in the United States and southern Canada; and northwest to James Bay, Mackenzie, Yukon and Alaska.

10. *Salix rigida* Muhl. Cordate Willow, Heart-leaf Willow. (*S. cordata* Muhl., not Michx.). Sect. *Cordatae*. Several-stemmed shrub, 2-4 or 6 m. (20 ft.) high; twigs slender to mid-sized, 1-5 mm. in diameter, yellowish to becoming dark brown, the younger pubescent; buds small, 2-5 or 6 mm. long, colored and clothed as the twig. Common along stream banks and ditches and in mostly low grounds, Delaware to Virginia, Kentucky, Missouri, and Nebraska, north to Nova Scotia and west to James Bay, Saskatchewan, and northern Montana. Outlying stations in Georgia, Alabama, and Arkan-

11. *S. pyrifolia* Anderssen.

Twigs slender to stoutish, 2-6 or 7 mm. in diameter at base, the seasonal yellow to yellowish-brown, the older dark brown to blackish, , many short and divaricate some shining, others not, the cuticle shallowly furrowed or grooved; buds ~~2-6~~ small to midsized, 2-5 or 6 mm. long, stoutish, colored as the twigs.

11. *Salix pyrifolia* Anderssen. Balsam Willow. (*S. balsamifera* (Heek.) Barratt.

Sect. *Balsamiferae*. Shrub 1-5 or 6 m. high, with usually clustered stem, but occasionally tree-like; bark grayish, smooth; twigs yellowish (young) to reddish ^{or brown} or dark olive brown, glabrous, shining; buds 2-6 mm. long, stout, scarcely pointed, colored as twigs. Moist to wet or swampy ground, Nova Scotia and northern New England to central Minnesota and southern Alberta, north to Labrador and northern British Columbia.

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12. *Salix glaucephylloides* Fernald. Dune Willow. (*S. glaucephylla* Bebb, in part. Sect. *Commutatae*. Usually many-stemmed shrub 2-4 or 5 m. tall, occasionally tree-like; bark chestnut-brown and dark-brown, younger somewhat pubescent (or all white tomentose in var. *albovestita*); ~~twigs~~ usually rather short and stout, buds ~~2-6~~ midsized, 2-5 or 6 mm. long, stoutish, colored and clothed as in the species and variety. Sand dunes and sandy shores, calcareous slopes, and sometimes in swamps, Northern Maine to northern Indiana and Wisconsin, north to Newfoundland and Hudson Bay.

in (species) 0 or 4-6 mm. long (variety),

13 *Salix petiolaris* J.E. Smith. Slender Willow. Sect. Argenteae or Griseae. Clumpy shrub to few-stemmed tree (northward), 2-5 or rarely 6-7 m. (23 ft.) high; bark gray; twigs slender, leafy, yellowish to yellowish-green and puberulent (younger) to dark brown and glabrous (reddish brown in dry areas); buds small, 2-5 or rarely 6 mm. long, acute to obtuse, colored as the twigs. Moist meadows, streams, and lake shores, New Jersey to Nebraska, Colorado (Long's Peak), and Montana, north to New Brunswick, James Bay, and Alberta; sporadic in Virginia and Oklahoma.

14. *Salix sericea* Marshall. Silky Willow. Sect. Argenteae or Griseae. Shrub with clustered stems or small tree, 2-6 or 8 m. (27 ft.) high; bark twigs slender, light brown to mostly dark brown, younger somewhat pubescent to puberulent, older glabrate-glabrous (plants with older twigs pubescent probably represent *Salix subsericea* (Anderssen) Schneider, which occurs from Massachusetts to Nebraska and north to Nova Scotia and Alberta); buds small, 2-5 or rarely 6 mm. long, colored and clothed as the twigs. In moist, rocky to gravelly ground, often near or in running water, Georgia to Arkansas, north to central Nova Scotia, New Brunswick, Michigan, and Iowa. Occasional over much of the range but common in the central portion.

14. *S. sericea* Marshall

Twigs slender to occasionally mid-sized, 1-4 or 5 mm. at base; longish, younger yellowish-brown puberulent, older dark brown to black, glabrous (or sometimes micro-puberulent)

15. *Salix caprea* L. Goat Willow. Florist's Willow. Sect. Capreae.

Tall shrub or small tree, sometimes with a single trunk, ~~XXXX~~ 2-3 or 4 m. (13 ft.) high; bark gray (Fernald); twigs stout, mostly 3-5 or 6 mm. in ^{diameter} ~~diameter~~, yellowish-brown to dark brown, pubescent to glabrescent; buds stout at maturity, mid-sized to large, 4-9 or 10 mm. long, younger acute, older obtuse, colored and clothed as the twigs. Introduced from Europe, where it has many and varied uses. Sparingly cultivated in America, chiefly as a "pussy" willow, and used extensively by florists for early spring decorations, as are the introduced *S. cinerea* L. and the native *S. discolor* Muhl. Escaped around old nurseries. *S. cinerea* is closely related but twigs and buds are more densely pubescent.

16. *Salix discolor* Muhl. Pussy Willow, Glaucous Willow. Sect. Discolores.

Few-stemmed shrub or small tree, 2-5 or rarely 7.5 m. (25 ft.) high; bark thin, usually smooth, reddish-brown; twigs stout, 3-6 mm. in basal diameter, reddish, or reddish-purple to mostly dark brown, glabrous or youngest thinly pubescent (more densely so in var. *latifolia* Anders.); buds large, 4-9, or 10 mm. long, acute to obtuse, colored and clothed as the ~~twigs~~ twigs. Common in swamps and moist low-lands, Delaware to Kentucky, Missouri, South Dakota, and Montana, north to Newfoundland, James Bay, and British Columbia.

17. *Salix humilis* Marsh. Upland Willow, Prairie Willow. Sect. *Discoleres*.
Sprangly shrub with several spreading stems, 1-2 or 3 m. (10 ft.) high; twigs
midsized to stoutish, 2-4 mm. in basal diameter, greenish-yellow or yellowish-
brown (younger) to orange-red or reddish-brown to dark brown, pubescent to puber-
ulent to glabrate; buds midsized to large, 5-8 or 10 mm. long, colored and clothed
as the twigs. Scattered but common on upland areas in open woodlands, dry barrens,
BLUFFS
rocky, and sandy ground, and prairies; occasionally in swampy areas. Florida to
eastern Texas, north to Newfoundland, Quebec, North Dakota, and Saskatchewan.

18. *Salix tristis* Aiton. Dwarf Upland Willow, Dwarf Prairie Willow. Sect.
Discoleres. Low, many-stemmed shrub, 0.4-1 m. (3 ft.) high; twigs slender, leafy,
1-3 mm. in basal diameter, yellowish-brown to brown, pubescent; buds small, 1-3 mm.
or 4 mm. long, pubescent. Similar to *S. humilis* but smaller in every way. Occas-
ional on dry and often sandy uplands, roadsides, thicket-borders, mountain balds, etc.
Irregularly distributed from Florida to Oklahoma and north to Quebec and Saskatchewan.

19. *Salix Bebbiana* Sarg. Bebb Willow. Beaked Willow. Section *Restratae*. Few-stemmed shrub or small tree (sometimes single trunk), 2-6 or rarely 9 m. (30 ft.) high; bark ~~xxx~~ grayish, rough and scaly (Rydberg for var. parrestrata): twigs slender to ^{mid-sized} , 1-3 or 4 mm. in basal diameter, often divaricate, the shorter often crooked, reddish to brown or dark brown, sometimes orange-red or purplish, younger pubescent, older less pubescent to glabrous; buds ~~small~~ ³⁻⁵ or 6 mm. long, colored and clothed as the twigs; the projecting petiole-bud scars often conspicuous on basal portion of ~~xxx~~ older twigs. Common on moist to wet, ~~xxx~~ or somewhat drier, ground from New Jersey to South Dakota, southwest to New Mexico, and California, north to Newfoundland and Alaska, at lower elevations.

20. *Salix purpurea* L. Purple Osier, ~~Bitter~~ Bitter Willow. Sect. *Purpureae*. Many-stemmed shrub $\frac{1}{2}$ 1-2.5 m. (8.5 ft.) or taller; bark smooth, very bitter; twigs slender, flexible, yellow to yellowish-brown or reddish brown, rarely purplish, glabrous, sometimes shining; buds ^{often} remarkable for being opposite or sub-opposite as well as alternate, mid-sized, 3-8 or rarely 9 mm. long, acute to obtuse, yellow-brown to reddish-brown, glabrous. Widely introduced in Colonial times ~~xxx~~ and cultivated for basket-making and the staminate for ornament; sparingly escaped in the northeastern United States.