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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 in Deam - Trees of Indiana
ed. 1 (rev.) p. 34-45. 1921

The Ball Archive copy is a page proof.

Salix cordata var. deamii in letter Feb. 29, 1920 and in list with mss no. 210 on Shrubby willows of Indiana.

w a a

Ball in Deam, C.C. Trees of Indiana ed. 1 (rev.). p 34-45. 1921

SALICACEAE. THE WILLOW FAMILY.

Trees or shrubs with bitter bark and simple alternate leaves in catkins, which fall off as a whole, the staminate after flowering, the pistillate after ripening and scattering of the seeds, the staminate and pistillate on different plants (dioecious); flower scales single, below each flower; fruit a lanceolate or ovate-lanceolate capsule opening lengthwise into 2 recurving carpels or valves; seeds numerous, minute, oblong, bearing a tuft of long hairs at the base. Genera 2, Salix, the willows, and Populus, the aspens and poplars, or cottonwoods, separated by the following characters, those applying only to Indiana tree species in parenthesis:

Buds covered by a single scale; (leaf-blades mostly elongated, more than twice as long as wide); flower scales entire or rarely shallowly toothed at apex; stamens mostly 2, or 3-8 or 10. ..... 1. Salix

Buds, covered by numerous scales; (leaf-blades mostly cordate-ovate, less than twice as long as broad); flower scales deeply cut or lacerate; stamens more than 10. ..... 2. Populus

1. SALIX. THE WILLOWS.

(The classical name of the willows)

Trees or shrubs (occasionally herbaceous) with usually clustered stems, twigs round; leaf-blades lanceolate and long- acuminate or elliptic-lanceolate and short pointed in all Indiana tree species, finely toothed or nearly entire; catkins appearing before (precocious), with (coetaneous), or after the leaves (serotinous); each pistillate flower with a little gland at the base of the pedicel on the inside.

A large genus of several hundred species varying from tiny shrubby or subherbaceous plants scarcely an inch in height and 2 feet or more in diameter, in alluvial lowlands; occuring under Indiana conditions from cold bogs and riverbanks to dry sand dunes. Willows are used for many purposes, among them ornament, shade hedges, posts, poles, mattresses or revetments to protect levees, baskets, fish weirs, whistles, etc., while the wood is used for charcoal, which is especially prized for gunpowder making, and the bark furnishes salacin, used for tanning and in medicine as a substitute for quinine and as a tonic and febrifuge.

Small to large trees; leaves narrowly to broadly lanceolate, mostly long pointed, finely and rather closely toothed; flowers appearing with the leaves; capsules not hairy.

Native trees; leaves green on both sides (No. 1) or white (glaucous) beneath (No. 2), and then with very long points and long slender twisted petioles, never glandular; stamens 3-5-7 or more.

Twigs dark green, spreading; leaves narrowly lanceolate, green on both sides, petioles short ..... 1. S. nigra

Twigs yellowish, somewhat drooping; leaves broadly lanceolate, glaucous beneath, petioles long, twisted ..... 2. S. amygdaloides

European trees, cultivated for ornament and use; leaves always glaucous beneath; stamens always 2.

Twigs tough, long, pendulous (weeping); leaves narrowly lanceolate, light green above; petioles never glandular; capsules only 1.5 mm. long (not fertilzed) 3. S. babylonica

Twigs brittle, short, spreading; leaves lanceolate, dark green above; capsules 3-5 mm. long.

Teeth on edge of leaf 8-10 to each cm. (20-25 to the inch); petioles sometimes glandular; capsules almost sessile ..... 4. S. alba

Teeth on edge of leaf 6-8 per cm. (15-20 to the inch); petioles usually glandular; pedicels 0.5-1 mm. long. ..... 5. S. fragilis

Shrub or rarely a small tree; leaves elliptical or oblanceolate, short pointed; margin entire or coarsely wavy or shallow-toothed; flowers before the leaves; stamens 2; capsules, long, hairy.

Twigs and leaves not hairy; leaves thin. ..... 6. S. discolor

Twigs and sometimes the lower surface of the leaves densely hairy, leaves thicker ..... 6 a. S. discolor eriocephala

1. SALIX NIGRA Marshall. WILLOW , BLACK WILLOW, Plate _ . Shrub or tree 5-20 m. (17-65 feet) high, dark green in mass color; bark of trunk thick, rough, flaky, dark brown to nearly black; twigs brittle at base, the younger pubescent and green, becoming glabrous and darker with age; buds ovate, small, 2-3 mm. (1/8 inch) long; petioles 3-6 or 8 mm. (1/8-3/8 inch) long; stipules small, ovate to roundish; leaf blades narrowly lanceolate, acute or rounded at base, long-acuminate at the apex, 6-11 cm. (2½-4½ inches) long, 7-12 mm. (¼-½ inch) wide, often falcate (scythe-shaped, the so-called variety falcata); finely serrate, green on both sides, shining above, paler and dull beneath; glabrous or sometimes pubescent beneath on midrib and larger veins.

Flowers appearing with the leaves in late April in the southern part of the State and well into May in the northern part; catkins slender, 2-5 or 6 cm. (4/5-2 or 2½ inches) long, the staminate bright yellow; capsules 3-5 mm. (1/8 inch) long, ovoid or ovoid-lanceolate, on pedicels 1-2 mm. (1/16 inch) long;

Distribution. New Brunswick and New England, westward to the eastern part of the Great Plains area from North Dakota to Texas, and, in some forms, westward across that State and into Mexico. It is interesting that this species, the first willow published in America, in the first book on American botany ever published in this country, should be abundantly and widely distributed in the United States

Economic uses. The black willow is used very extensively along the lower reaches of the Mississippi River in making mattresses which protect the levees ~~leaves~~ from washing. In 1912, it was estimated that 150,000 cords were used annually.

2. Salix amygdaloides Anderson, WILLOW? PEACH-LEAVED WILLOW. Plate _ . Trees 3-12 m. (10-40 feet) high, yellowish-green in mass color; bark of trunk fissured, dark brown or reddish-brown; twigs longer and less brittle than these of nigra, yellowish to reddish-brown, usually somewhat drooping, giving a "weeping" effect, which, with the color, makes the species easily recognizable from a distance; buds ovoid, about 3mm. (1/8 inch) long, colored as the twigs; petioles long, slender, twisted, 5-15 or 20 mm. (¼-4/5 inch) long; leaves lanceolate to broadly lanceolate or ovate-lanceolate, rounded of somewhat acute at base, long-pointed at apex, closely serrulate, 5-12 cm. (2-5 inches) long, 1.5-3 cm. (3/5-1¼ inches) wide, yellowish-green above, glaucous beneath, glabrous; flowers appear from late April throughout May, usually later than those of S. nigra. catkins slender, 3-5 cm. (1-2 inches) long, the fertile becoming 4-8 cm. (1½-3 inches) long in fruit; capsules lanceolate, 4-5 mm. (1/6 inch) long; pedicels slender, 2 mm. (1 line) long.

Distribution: From Western Quebec and Central New York, west to the Cascade mountains in B. C., Washington and Oregon, south to Colorado and Northwest Texas. In Indiana fairly common in the northern third, rare in the central third, and lacking in the southern portion of the State.

3. SALIX ALBA Linnaeus. WILLOW, WHITE WILLOW. Plate _ . Trees with 1 to 5 spreading stems, 5-20 m.(17 -65 feet) high; bark rough, coarsely ridged, gray to brownish; twigs brittle at base, green or yellowish, glabrous; buds 5-6 mm. (¼ inch) long; petioles 5-10 mm. (1/5-2/5 inch) long, seldom glandular; leaves lanceolate, 5-12 cm. (2-5 inches) long, 1-2.5 cm.(2/5 -1 inch) wide, acuminate at apex, usually acute at base; bright green above, glaucous beneath, thinly to densely silky on both sides when young, often permanently silky beneath, margins with about 9-10 teeth per cm. (2/5 inch), usually glandular; flowers with the leaves, in April and May; catkins slender, cylindrical, 3-6 cm. (1-2½ inches) long; scales pale yellow; capsule ovoid-conical, 3-5 mm. (⅛ inch) long, almost sessile. - The most common form usually is referred to var. vitellina (Linn.) Koch, with orange twigs and more glabrate leaves.

4. SALIX FRAGILIS Linnaeus. WILLOW, CRACK WILLOW. Plate —. Tree very similar to S. alba; twigs very brittle at the base (hence the name), green to reddish; petioles 7-15 mm. (1/4 -5/8 inch) long, glandular just below the base of the leaf; leaves lanceolate, acuminate, 7-15 cm. (3-6 inches) long, 2-3.5 cm. (4/5 - 1⅜ inches) wide, coarsely serrate with 5-6 teeth to each cm. (2/5 inch) of margin, dark green and shining above, paler to glaucous beneath, glabrous on both sides; catkins appearing with the leaves in late April and during May, 4-8 cm. (1⅝ - 3 inches) long; capsules slenderly conical, 4-5 mm. (1/5 inch) long, on pedicels 1/2-1 mm. (1/16 inch) long.

ECONOMIC USES. This species and the White Willow were introduced from Europe and extensively grown for the production of charcoal to use in powder making.

5. SALIX BABYLONICA Linnaeus. WEEPING WILLOW. Plate ---.

Tree 5-12 m. (17-40 feet) high, with grayish-brown bark and very long and slender, tough, green or yellowish pendulous twigs, leaves linear-lanceolate, 6-12 cm. (2½ - 5 inches) long, 5-15 mm. (1/5-3/5 inches) wide, long attenuate at the apex, unevenly spinulose & serrulate (very slender-toothed), glabrous, pale to glaucous beneath; catkins appearing with the leaves, 1-2 cm. (2/5-4/5 inch)long; capsule (unfertilized) narrowly ovoid, sessile, 1.5-2 mm. (1/16 inch) long. - Only female trees have been observed by the writer and the ovaries remain unfertilized and undeveloped.

6. SALIX DISCOLOR Muehlenberg. PUSSY WILLOW, SWAMP WILLOW, GLAUCOUS WILLOW. Plate . Shrub or small tree, 2-4 or occasionally 7.5 m. (7-15 or 25 feet) high; bark thin, usually smooth, reddish brown; twigs stoutish, reddish-purple to dark brown, often pubescent (see the variety); buds large, 5-10 mm. ($1/5$-$2/5$ inch) long, colored as the twigs; stipules large, mostly roundish, entire or toothed; leaves short-lanceolate to elliptic or elliptic-oblanceolate, acute or short acuminate at the apex, rounded or acute at the base 5-10 cm. (2-4 inches) long, 2-3.5 cm. ($4/5$-$1\ 1/2$ inches) wide, nearly entire to coarsely wavy-ttoothed on the margins, dark shining green above, densely glaucous and occasionally somewhat pubescent beneath, especially on midrib and primaries; flowers appearing in late March or in April before the leaves; catkins sessile on old wood, stout, dense, the staminate very beautiful (pussies), without leaf-bracts at base, 2-5 cm. (1-2 inches) long, the pistillate becoming 3-8 cm. ($1\ 1/2$-3 inches) long in fruit; scales elliptic-oblanceolate, densely cloth ed with long shining hairs; capsules conic-rostrate, 7-10 or 12 mm. ($1/4$-$1/2$ inch) long, densely gray-woolly; pedicels $1\frac{1}{2}$-3 mm. ($1/16$ - $1/8$ inch) long.

DISTRIBUTION. Nova Scotia south to Delaware and west to the eastern edge of the Great Plains area. Fairly well distributed over the entire State of Indiana.

6a. Variety ERIOCEPHALA (Michaux) Rehd. Andersson. Differs from the species chiefly in rather densely pubescent twigs and buds; thicker and more lanceolate leaves, usually more or less pubescent beneath, and the sometimes more densely pubescent catkins.

DISTRIBUTION. Range of the species but less common.

2 (p.1 lost - Jean May 9, 1920)
Dean draft.

cold bogs and riverbanks to dry sand dunes. Willows are used for many purposes, among them ornament, shade, hedges, posts, poles, mattresses, revetments to protect levees, baskets, fish weirs, whistles, etc., while the wood is used for charcoal, which is especially prized for gunpowder making, and the bark is used for tanning and furnishes salisin, which is used in medicine as a substitute for quinine and as a tonic and febrifuge.

Small to large trees; leaves narrowly to broadly lanceolate, mostly long pointed, finely and rather closely toothed; flowers appearing with the leaves; capsules not hairy.

Native trees; leaves green on both sides (No.1) or white (glaucous) beneath (No.2), and then with very long points and long slender twisted petioles which are never glandular; stamens 3-5-7 or more.

Twigs dark green, spreading; leaves narrowly lanceolate, green on both sides, petioles short.....1 S. nigra

Twigs yellowish, somewhat drooping; leaves broadly lanceolate, glaucous beneath, petioles long, twisted.....2 S. amygdaloides

European trees, cultivated for ornament and use; leaves always glaucous beneath; stamens always 2.

Teeth on edge of leaf 8-10 to each cm.(20-25 to the inch); petioles usually glandular; capsules almost sessile.....3 S. alba

Teeth on edge of leaf 6-8 per cm.(15-20 to the inch); petioles usually glandular; pedicels 0.5-1 mm. long.....4 S. fragilis

Shrub or rarely a small tree; leaves elliptical
or oblanceolate, short pointed; margin
entire or coarsely wavy or shallow-toothed;
flowers before the leaves; stamens 2; cap-
sules long, hairy.....

Twigs and leaves not hairy; leaves
thin.....4 S. discolor

Twigs and sometimes the lower sur-
face of the leaves densely hairy,
leaves thicker.....5 S. discolor eriocephala

Salix nigra

1. ~~SALIX NIGRA~~ Marshall. WILLOW; BLACK WILLOW. Plate.

Shrub or tree 5-20 m. (17-65 feet) high, dark green in mass color; bark of trunk thick, rough, flaky, dark brown to nearly black, twigs brittle at base, the younger pubescent and green, becoming glabrous and darker with age; buds ovate, small, 2-3 mm. (1/8 inch) long; petioles 3-6 or 8 mm. (1/8-3/8 inch) long; stipules small, ovate to roundish; leaf-blades narrowly lanceolate, acute or rounded at base, long-acuminate at the apex, 6-11 cm. (2½-4½ inches) long, 7-12 mm. (¼-½ inch) wide, often falcate(scythe-shaped, the so-called variety falcata), finely serrate, green on both sides, shining above, paler and dull beneath, glabrous or sometimes pubescent beneath on midrib and larger veins; flowers appearing with the leaves in late April in the southern part of the State and well into May in the northern part; catkins slender, 2-5 or 6 cm. (4/5-2 or 2½ inches) long, the staminate bright yellow; capsules 3-5 mm. (1/8 inch) long, ovoid or ovoid-lanceolate, on pedicels 1-2 mm.(1/16 inch) long.

Distribution. New Brunswick and New England, westward to the eastern part of the Great Plains area from North Dakota to Texas, and, in some forms, westward across the ~~at~~ State and into Mexico. It is interesting that this species, the first willow published in America, in the first book on American Botany ever published in this country, should be abundantly and widely distributed in the United States.

Specimens have been seen from the following counties in Indiana:- Allen(Deam); Bartholomew(Deam); Clark(Deam); Crawford(Deam); Dearborn(Deam); Dubois(Deam); Decatur(Deam); Floyd(Deam); Fulton(Deam); Harrison(Deam); Hendricks(Deam); Henry(Deam); Jackson(Deam); Jay(Deam); Jennings(Deam); Knox(Deam); Kosciusko(Deam); Lagrange(Deam); Marion(Mrs. Chas. C. Deam); Marshall(Deam); Miami(Deam); Morgan(Deam); Noble(Deam); Ohio(Deam); Parke (Deam); Perry(Deam); Porter(Deam); Posey(Deam); Pulaski(Deam); Ripley

(Deam); Steuben(Deam); Sullivan(Deam); Tippecanoe(Deam); Vermillion(Deam); Wabash(Deam); Warrick(Deam); White(Deam);

Economic Uses. The black willow is used very extensively along the lower reaches of the Mississippi River in making mattresses which protect the levees from washing. In 1912, it was estimated that 150,000 cords were used annually.

2. Salix amygdaloides Andersson, WILLOW, PEACH-LEAVED WILLOW. Plate Trees 3-12 m.(10-40 feet) high, yellowish-green in mass color; bark of trunk fissured, dark brown or reddish-brown; twigs longer and less brittle than those of Salix nigra, yellowish to reddish-brown, usually somewhat drooping, giving a "weeping" effect, which, with the color, makes the species easily recognizable from a distance; buds ovoid, about 3 mm.(1/8 inch) long, colored as the twigs; petioles long, slender, twisted, 5-15 or 20 mm. (1/5-4/5 inch) long; leaves lanceolate to broadly lanceolate or ovate-lanceolate, rounded or somewhat acute at base, long-pointed at apex, closely serrulate, 5-12 cm.(2-5 inches) long, 1.5-3 cm. (3/5-1¼ inches) wide, yellowish-green above, glaucous beneath, glabrous; flowers appear from late April throughout May, usually later than those of Salix nigra; catkins slender, 3-5 cm.(1-2 inches) long, the fertile becoming 4-8 cm. (1½-3 inches) long in fruit; capsules lanceolate, 4-5 mm.(1/6 inch) long; pedicels slender, 2 mm. (1/12 inch) long.

Distribution. From Western Quebec and Central New York, west to the Cascade Mountains in B.C., Washington and Oregon, south to Colorado and Northwest Texas. In Indiana fairly common in the northern third, rare in the central third, and lacking in the southern portion of the State.

Specimens have been seen from Indiana from the following counties: Elkhart(Deam); Fulton(Deam); Henry(Deam); Jasper(Deam); Kosciusko(Deam); Lake(Deam),(Umbach); Laporte(Deam); Marion(Mrs. Chas. C. Deam); Marshall (Deam); Pulaski(Deam); Steuben(Deam); Wells(Deam); White(Deam).

3. ~~SALIX ALBA~~ Salix alba Linnaeus. WILLOW, WHITE WILLOW. Plate. Trees with 1-5 spreading stems, 5-20 m.(17-65 feet) high; bark rough, coarsely ridged, gray to brownish; twigs brittle at base, green or yellowish, glabrous; buds 5-6 mm.(¼ inch) long; petioles 5-10 mm.(1/5-2/5 inch) long, seldom glandular; leaves lanceolate, 5-12 cm.(2-5 inches) long, 1-2.5 cm. (2/5-1 inch) wide, acuminate at apex, usually acute at base; leaves bright green above, glaucous beneath, thinly to densely silky on both sides when young, often permanently silky beneath, margins with about 9-10 teeth per cm. (2/5 inch), usually glandular; flowers with the leaves, in April and May; catkins slender, cylindrical, 3-6 cm.(1-2½ inches) long; scales pale yellow; capsules ovoid-conical, 3-5 mm.(⅛ inch) long, almost sessile. The common form usually is referred to var. vitellina (Linnaeus) Kohh, with orange twigs and more glabrate leaves.

Distribution. A native of Europe which has been frequently planted and sometimes escapes.

Specimens have been seen from Indiana from the following Counties: Gibson(Schneck); Hamilton(Mrs. Chas. C.Deam); Harrison(Deam); Switzerland (Deam); Warren(Deam); Wells(Deam).

4. ~~SALIX FRAGILIS~~ Salix fragilis Linneaus. WILLOW, CRACK WILLOW. Plate. Tree very similar to Salix alba; twigs very brittle at the base(hence the name), green to reddish; petioles 7-15 mm.(1/4-5/8 inch) long, glandular just below the base of the leaf; leaves lanceolate, acuminate, 7-15 cm. (3-6 inches) long, 2-3.5 cm.(4/5-1½ inches) wide, coarsely serrate with 5-6 teeth to each cm.(2/5 inch) of margin, dark green and shining above, paler to glaucous beneath, glabrous on both sides; catkins appearing with the leaves in late April and during May, 4-8 cm.(1½-3 inches) long; capsules slenderly conical, 4-5 mm.(1/5 inch) long, on pedicels 1/2-1 mm (1/16 inch) long.

Distribution. A native of Europe. It has been frequently planted and often escapes.

Specimens have been seenffrom the following Indiana Counties: Benton (Deam); Clark(Deam); Laporte(Deam); Switzerland(Deam); Union(Deam); Wells (Deam).

Economic Uses. This species and the White Willow are introduced from Europe and extensively grown for the production of charcoal to use in powder making.

5. SALIX DISCOLOR Muhlenberg. PUSSY WILLOW. SWAMP WILLOW. GLAUCOUS WILLOW. Plate . Shrub or small tree, 2-4 or occasionally 7.5 m.(7-15 or 25 feet) high; bark thin, usually smooth, reddish brown; twigs stoutish, reddish-purple to dark brown, often pubescent (see the variety); buds large, 5-10 mm.(1/5-2/5 inch) long, colored as the twigs; stipules large, mostly roundish, entire or toothed; leaves short-lanceolate to elliptic or elliptic-oblanceolate, acute or short-acuminate at the apex, rounded or acute at the base, 5-10 cm.(2-4 inches) long, 2-3.5 cm.(4/5-1½ inches) wide, nearly entire to coarsely wavy-toothed on the margins, dark shining green above, densely glaucous and occasionally somewhat pubescent beneath, especially on midrib and primaries; flowers appear in late March or in April before the leaves; catkins sessile, on old wood, stout, dense, the staminate very beautiful (pussies), without leaf-bracts at base, 2-5 cm.(1-2 inches) long, the pistillate becoming 3-8 cm.(1½-3 inches) long in fruit; scales elliptic-oblanceolate, densely clothed with long shining hairs; capsules conic-rostrate, 7-10 or 12 mm.(¼-½ inch) long, densely gray-woolly; pedicels 1½-3 mm.(1/16-1/8 inch) long.

Distribution. Nova Scotia south to Delaware and west to the eastern edge of the Great Plains area. Fairly well distributed over the entire State of Indiana. Specimens have been seen from the following counties: Allen(Deam); Dearborn(Deam); Decatur(Deam); Elkhart(Deam); Fulton(Deam); Gibson(Schneck); Hancock(Mrs. Chas. C. Deam); Henry(Deam); Jackson(Deam); Jay(Deam); Jefferson(Deam); Jennings(Deam); Knox(Deam); Lake(Deam);

Marion(Mrs. Chas. C. Deam); Marshall(Deam); Newton(Deam); Porter(Deam); Randolph(Deam); Ripley(Deam); Shelby(Mrs. Chas. C. Deam); Sullivan(Deam); Tippecanoe(Deam); Wabash(Deam); Warren(Deam); Wayne(Deam); Wells(Deam); White(Deam).

5 A. SALIX DISCOLOR variety ERIOCEPHALA. (Michaux) Anderson. Differs from the species chiefly in rather densely pubescent twigs and buds; thicker and more lanceolate leaves, usually more or less pubescent beneath; and the sometimes more densely pubescent catkins.

Distribution. Range of the species but less common. Specimens have been seen from the following Indiana Counties: Cass(Deam); Decatur(Deam); Fulton(Deam); Gibson(Schneck); Jackson(Deam); Jay(Deam); Knox(Deam); Laporte(Deam); Pulaski(Deam); Sullivan(Deam); Warren(Deam); Wayne(Deam).

December 7, 1918.

Prof. Charles C. Deam,

Bluffton, Indiana.

Dear Prof. Deam:

Your letter of November 27 was duly received and read with much interest. I have not had opportunity to reply until now.

I shall be glad to determine your unnamed and unmounted numbers for you at any time you send them to me. I shall be glad to retain the material for my own collection if you have an abundance of it. Please feel perfectly free to send them, however, even if you wish to have the determined specimens returned to you.

I will undertake to check the identifications of your mounted material, though can not promise immediate report thereon. As you will easily understand, I have foregone all work with willows during the past year, owing to the pressure of my regular duties in cereal production. The signing of the armistice has relieved that pressure somewhat, and I am now able to devote a little time to botanic studies.

I note that there are 161 sheets of Indiana material and something over 100 from other parts of the United States. I presume you will be interested first in obtaining identifications of the Indiana material, and this you may send if you wish at any time. If you do not care to send it all at once, it might be well to send it by groups of related species. The natural grouping would be: (1) alba and fragilis; (2) lucida and pentandra; (3) amygdaloides and nigra; (4) longifolia; (5) cordata, glaucophylla and syrticola; (6) candida and sericea; (7) discolor, humilis, rostrata and tristis; (8) pedicillaris.

Of the species reported for Indiana, as given in your list, all may occur except exigua, which is a western specie.

As to writing the willow portion of the proposed book, I can give no definite answer now. I have had an uncompleted manuscript for over two years, covering a revision of the Cordatae. I have agreed to do some work on the species of Utah and Nevada for a friend, and to prepare the manuscript for the Pacific coast species for Prof. Abrams of Stanford University. If you could give me a sample sheet, showing

the type of presentation, I might be able to make an estimate as to the time required and, therefore, the possibility of my undertaking it.

S. cordata variety myricoides was published as a new combination by Carey in the first edition of Gray's Manual, page 427, in 1848. By more recent botanists, however, it is recorded as a hybrid between Cordata and Sericea. It is not rare and probably it occurs in your State.

Very truly yours,

CRB/BGW

Cerealist in Charge.

STATE OF INDIANA
BOARD OF FORESTRY'S OFFICE
~~INDIANAPOLIS~~

Bluffton, Indiana. Dec. 10 1918

C.R.Ball,
Washington, D.C.

Dear Mr.Ball:-

I received your letter of Dec.7 this A.M. and I am surely very grateful for your acceptance to name my Salix. I do hope you will be able to write up the Salix for me. I have no specimen page, but we now have in press a reprint of the 1911 report, and we hope to have it in a month or two. Then I can send you a copy which contains my write up of the tree form that occur in Ind.

Ready I am sending you by this mail the unmounted specimens I have. You retain all I send, and report names by number only.

Now I have always so disliked the Salix, only because I was not acquainted with them, and because they hybridize, and I could never be sure of my det. that I have neglected to collect them. If you will in the future name sheets for me for the specimen, I will go to work in earnest to collect Salix. It is pretty hard to collect both fruit and leaves, at least the same year. We are expecting some legislation that will put our Dept. Forestry "out of business" but we are promised a much better law, with wider possibilities. This will go into effect before May 1 1919. Do not know how it will affect me. They say I must remain with the work. If I do I do not know how much I can collect. If I a "fired", I can work all the time at it. I mean I can devote my entire time to the collecting of specimens. The writing of the Trees & Shrubs will continue. If not as a State publication, I will publish it as a private affair.

Now you let me know when to send the mounted material. I can send it any time you can use it. I am very truly yours, Chas C Deam

STATE OF INDIANA
BOARD OF FORESTRY'S OFFICE
INDIANAPOLIS

Bluffton, Ind, Jan 1 1919

Mr.C.R.Ball,

Washington, D.C.

Dear Mr.Ball:-

I wish to acknowledge receipt of your letter announcing that you had gone through the packages sent. I am not surprised that you found some plants not correctly named. But it is rather surprising that you and Sargent do not agree on numbers, such as the one named S.pentandra, etc. Fact is I have little faith in his determinations. I have just received a list of the Celtis I sent him, and I am convinced that he is wrong in several instances.

I wish to thank you very much for the trouble of going over the specimens sent, since you make no charge. Now as to the manuscript for the Salix of Ind, you go ahead at your leisure and prepare it and I will gladly pay all clerical work on receipt of your bill. I do not know if I can get the State to pay it or not, but if it does not I will. As I told you I do not expect to be able to get the work done under two years, and each species is to be illustrated with a full page drawing or photgraph.

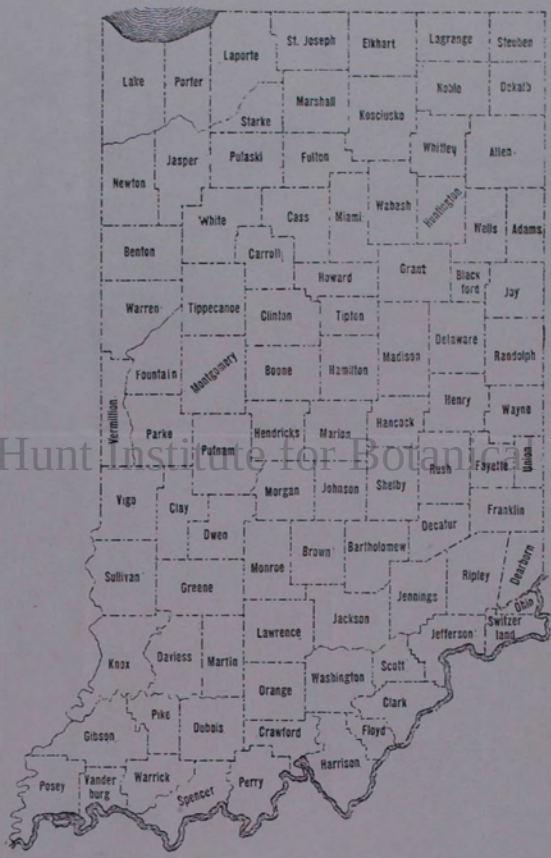
Now what do you think of me making a good collection of Salix the coming season? This would give us a better idea of the distribution, and possibly add some species, etc.

Also what do you say to making an effort to secure mounted material from all of the herbaria of the State, and have you pass on them. There would be a very little material to be gone over. DePauw, Purdue, Wabash and Notre Dame would be the only places where there would be any specimens. I have just consulted my record and I find there are two sheets of Salix in DePauw, and one in Wabsh Possibly it would not pay. No doubt Notre Dame has some, but I do know know if they would be willing to loan them. I am sure I could get the sheets from the other herbaria.

You speak of making a map of the distribution of each species on Ind. State maps. I have a map catalogue of the distribution of every plant of Indiana. I use a map similar to the enclosed one. Although it does not have the name of the counties on it, but it gives the principal river courses. On these maps I record all the published records in black, and I introduce my own records in red. On the back side of the map I record all the date given by the authors who report. At present I am out of the maps I use, but will have a supply in a week or such a matter. Now if you wish I will make a map cat. of the species that occur in Ind. that I have, and I will put also on the maps all of the records that have been reported. However, in making the write up, I would ignore all records except those based on specimens that you have seen. Let me know if I shall send you map cat. of Ind. species. You will note I use sheets that go into loose-leaf binders. This makes a nice way to handle the 2,000 species of plants that occur in Ind.

Now let me know if I can in any way extend your knowledge of the Salix of Ind, and if I can assist in any way. Yours respt. Chas C Deam

I enclose you an index sheet of the Trees of Ind. will send you a complete book in a few weeks. We hope to get an reprint in 3 weeks.



Deam's Indiana Willows 19?

See numbers changed on number list.
No 29788 sericea not changed on the herb. spec

No. 29402 from Parke Co., Ill as frogilis
Deam thinks should be alba.
Look up at Nat. Herb. + see

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

Bluffton, Ind.
Jan. 16 1920

C.R.Ball,

washington, D.C.

Dear Mr.pall: I wish to acknowledge receipt of your letter of recent date. I have made the alterations advised. I enclose your label for No.31,128.

discolor
bookeys

You asked me to look a numbers 30,385 and 30,668 and tell you which has the few and the one which has the many aments. No.30,385 has few and No.30,668 has numerous catkins.

My eyes have gone bad one me, and all I am able to do now is to read page proof. I now have practically all of the page proof read. I will yet have the final page proof to read. If things go along as I hope I should receive the book about the first of April. I will send you a copy when I get it, also white sheets of page proof of your article.

I am very respectfully yours,

Chas.C.Deam.

Write WB Samson also

STATE OF INDIANA
BOARD OF FORESTRY'S OFFICE
INDIANAPOLIS

January 20th
1920

C. R. Ball,
Bureau of Plant Industry,
Washington, D. C.

Dear Sir:-

I think last November I sent you three boxes of Salix which contained one specimen each of all of the numbers of Salix I collected in 1919. As yet I have not heard ffom you. I wish that you would, as soon as possible, send me a list of your determinations. I have a few definitions which I wish to distribute and this would give me a chance to write the labels at spare moments.

This is to remind you that I am depending upon you to write forthe new edition of the Trees of Indiana, the treatment of the genus Salix. Now this treatise is supposed to cover only the tree forms of our area. I believe, however, that it would be advisable in this new edition to include at least one more species of Salix. I think the Salix discolor could be included and if you wish to separate Salix discolor, variety ariosephala, that should also be included. I have seen the latter grow to at least three inches in diameter. There may be other forms that you think should be included. I wish that you would submit a list of the species you think should be included in the text. I wish you would have a copy of the write-up in my hands by April 15th. I hope to have the copy ready by that time.

Now as to the illustrating. I will say that I am planning to have photographic copies made, this time instead of drawings- that is, each species will be represented by a full page photographis illustration. In the event that you think a drawing would be better, I believe it would be better for you to employ your own artist to do the work and submit the bill to us. Mr. W. W. Eggleston has agreed to write up the Grataegus for me and if you decide drawings are the best, it might be that you and Eggleston could jointly employ the same artist.

Hoping to hear from you at an early date, I am

Yours very truly,

Chas. C. Deam State Forester

January 31, 1920.

Mr. Charles C. Deam,
Board of Forestry's Office,
Indianapolis, Indiana.

Dear Mr. Deam:

Your letter of January 20 was duly received. I was under the impression that I acknowledged receipt of the 3 boxes of willow specimens as soon as they came to hand. During the midwinter period I have been under heavy office pressure and have not been in good health, so that I have been giving no time at all to this work. When I first received them, I did take time to run through the entire series of specimens and make provisional determinations, writing out a numerical check list to match.

I am now able to check my preliminary determinations, species by species and will send you the results very promptly. As a starter I am enclosing herewith the list of numbers which I have determined to belong to the 2 species, nigra and anygdaloides.

I am mapping the distribution by counties as I complete the determinations so that when they are done I will have the distribution accurately mapped and ready for discussion. Much of this material I will return to you when the identifications are completed. Some of the specimens, however, I will wish to retain for my own collection in accordance with the permission given by you last year.

With reference to the proposed publication, I will endeavor to discuss this matter with Dr. Eggleston in the near future and write you concerning it.

Very sincerely yours,

CRB:WR

Cerealist in Charge.

STATE OF INDIANA
BOARD OF FORESTRY'S OFFICE
INDIANAPOLIS

February 5-1920

Dr. C. R. Ball,
Bureau of Plant Industry,
Washington, D. C.

Dear Dr. Ball:-

On returning to the office this morning I find your letter of January 31st and I am very glad indeed to hear from you. I am very much interested in the distribution of S. amigdaloides. I shall be glad when I get home to see where the numbers were taken. As I know the species, I have found it only in the northern part of the State.

In regard to the specimens sent you, I expect you to keep all that I sent you. I have duplicates and in the event that you do not want them for your private collection, you can present them to anyone you prefer.

Awaiting with interest your final report, I am

Yours very truly,

Chas C Deam

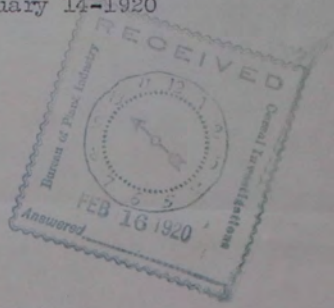
State Forester

CCD:HR

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

February 14-1920



Mr. C. R. Ball,
Bureau of Plant Industry
Washington, D. C.

Dear Sir:-

Believing that they might be interesting to you, I am sending you maps of the species of Salix on which you report.

The black stars represent the published reports on the species and the red stars represent the distribution of the species represented by my material.

The pages I am sending you are copies and need not be returned.

Yours very truly,

Chas. C. Deam

State Forester.

CCD:HR

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

Bluffton, Ind. Feb. 29 1920

Mr. C. R. Ball,
Washin ton, D.C.

Dear Dr. Ball:-I wish to acknowledge receipt of your letters of Jan. 31 Feb. 19 & Feb. 21. I have not answered because I wished to go over the specimens before I did so. I find I can not finish so I will answer before I finish. After I have gone over all of the sheets, I will write you.

(B) I note you name one lot Salix interior var. linearifolia but do not give author. Will you please give me the author. Also of
(A) Salix sericea forma glabrescens Ball Rydb.

What do you think of my way of giving the same number to specimen collected from same tree at different times, and then on label say in as many parts as you have times taken specimens, and on each sheet indicate the number of sheets of the set, and give the first sheet collected the first number. I have done this with all plants from which I take specimens at different times.

In regards to the circles on the sheets I sent you, I used them to distinguish indefinite records. For instance Phinney reported a list of plants from the Cent. East. Part of Ind. which comprised Delaware, Jay. Randolph and Wayne Counties. In his report he does not say that each plant reported occurred in each county, but in the area. So with Schneck. He reported plants from the Lower Wabash Valley which included Posey, Gibson, a part of Knox County Ind, and a corresponding stretch on the Illinois side. In indicating Schneck's plants I used only Gibson & Posey Counties and indicated them with a "o". So with Collins. He reported plants from Dearborn and the adjacent part of Kentucky. So I indicated his stations with an o. You may also find a star to the very southeast part of the map, but just outside of the State. This refers to Aikens report of the plants of Vicinity of Cincinnati. So with Higden & Raddin's report of the plants in the Vicinity of Chicago, and Nieuwland's plants of Berrien County Mich. I put these into serve as a guide, for I did not find a plant in the extreme northwest part of the State, but others had found in contiguous territory in Ill. I would not be justified in saying I had found the limits of its distribution, etc.

copy double space

I will not write the labels for the sheets you have named Salix interior linearifolia until I hear from to do so. In regards to the Var. Deamii, I shall also await until I hear from you. In the event the form proves sufficent ~~xxxxxx~~ distinct to have a name I shall be proud to have it bear my name, if you so choose to do so.

I am just ~~xxxxx~~ a sleep, and can scarcely write.

On Feb 13. 1919 you ~~there~~ sent me some of revenue stamps

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

C.R.Fall. #2.

Now in regards to the write up for the Rev.Ed.of Trees of Ind. will say I have decided to include only the species that grow to tree size.In my Rev.ed. I have given meaning to the terms of trees as follows:Small trees those 1-2 dm. in dia.b.h.;those over two and up to six dm. are medium sized trees.Those larger are large trees. Shrubby forms under 1 dm. in dia.b.h I am including in the shrub group.That is about the popular grouping.Of course in rare instances some of the forms I am excluding do reach the four inch or one ~~xxxx~~ dm.in diameter. So I suspect that the following will be the species you will use.S.alba,nigra,amygdaloides,and fragilis In my other editions I included S.lucida,but this is too small. What say ye? Do you think of any other. I have seen S.discolor,and var.eriocephala rarely 1dm. in dia.b.h. Then in our write up of the Shrubs of Ind. we will include the others. I believe I told I am instructed to write up the shrubs as soon as I get this present work done. By the way this brings up the question,are you willing to name another job lot of stuff I may be able to collect this year, of course I will try not collect the same species from the same county,except where I can conveniently collect both flowering and fruiting specimens from same tree. I wish you let me know,and if you agree,We will try to make known the distribution of Salix in Ind. Then if we get sufficient material together,I wish you would write up the Salix of Indiana,and publish it in some accessible place. We would very much like to have such a paper published in the Ind. Acad.Science proceedings. Publishing things in the Wash.Jour of Science,buries it for Ind. people. I do not know of a single copy coming into Ind.

Well I shall be glad to hear from any time,Please address me at Pluffton,I am here practically all of the time. Tell your stenographer to cut that Prof.from my name. I am just plain Deam,no title,no,money,no time,etc.

By the way I plan to illustrtate this edtion of trees with half tones,made from photos of herbarium sheets.I expect to try a few sheets of Salix,and if I do I will forward to you for approval.I have talked this matter with several tyros in tree identification,and every one prefer a photo reproduction.They are not able to "read into" a drawing all that should be.

I am very truly yours,

Chas.C.Deam.

See Griggs, R.F. The Willows of Ohio. Ohio Acad Sci 4: Pammel, L.H. The Willows of Iowa. Ia State Hort Soc. 53: 163-71

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

March 3-1920

Mr. C. R. Ball,
Cereal Investigation,
Bureau of Plant Industry,
Washington, D. C.

Dear Sir:-

I have just read in the Journal of the Arnold Arboretum that Schneider has changed the names of two of the willows that occur in Indiana. When you have had time to examine this, I will be glad to hear from you, to learn if you have adopted the change so that I can make the change on my herbarium sheets.

I have made photographs of the two species of Salix which I am sending for your inspection. If these meet your approval let me know or if you have photographs of the specimens of the species you propose to use that are better I wish you would send me a copy of them.

Yours very truly,
The Department of Conservation

Chas. C. Deam,

State Forester.

CCD:HR
enc*

March 6, 1920.

Mr. C. C. Deam,
State Forester,
Division of Forestry,
Bluffton, Indiana.

Dear Mr. Deam:

Your letter of February 29 is before me, and I appreciate the information given therein. I will try to answer your specific questions as well as I can.

Salix sericea forma glabrescens is my own. I applied this name to the form because the leaves were unusually lacking in hairs. I have not published this name and will not do so until I have studied more material from other sources.

Salix interior var. linearifolia should have Rydberg as the author but I am not certain that this narrow leafed form in Indiana can properly bear that name. We had some correspondence about this varietal name last year and you will find a paragraph about it in your letter to me written on February 13, 1919.

I seem never to have made a reply to the letter just referred to. I am interested in the map which you transmitted with that letter and the scheme you have evolved for indicating different classes of records.

I thank you for your kind offer to supply the plate from which this map was printed and will consider that when I get back to mapping the distribution of species again, which time is not very certain at the present writing.

Referring again to your letter of February 29, 1920, I note the meaning of the circles and will be guided accordingly.

I note your discussion of the species which you regard as trees, and would like to ask if you have ever found bebbiana reaching the limits of size you mention. As I have seen it in the upper Mississippi Valley, it frequently assumes a tree-like habit of growth, that is, it often has only one stem instead of cluster stems as most of the shrubby willows do. I do not have records, however, showing that it attains 4 inches in diameter at breast height in that section, though I feel rather certain that it does in New England.

I think your plan to illustrate the new edition with photographs will be very satisfactory. It is, as you state, very difficult to make pen

and ink drawings do more than show the shape of foliage and comparative dimensions of the larger parts. I have used photographs in some of my papers in the Botanical Gazette with satisfaction. The plan of photograph adopted by R. F. Griggs in his paper entitled "The Willows of Ohio", published in the Ohio Academy of Science, 4:257-314.1905, was a very good one as it provides for showing both surfaces of the leaves and enlargements of the fruit. The photographs themselves, however, are rather poor, due apparently to having made the prints too dark in many cases. The two twig photographs shown by Pammel in his paper on the willows and poplar of ~~Ohio~~ Iowa in Transactions of the ~~Ohio~~ Iowa State Horticultural Society, 53:163-173.1919, are much better, though they do not show the fruits.

I will be very glad to go over any material collected in 1920. As soon as I have a chance to study the maps I made while identifying your 1919 material, I will offer further suggestions as to the sections where special search is needed in order to determine distribution more completely.

I think your plan of giving the same number to specimens collected from the same plant at different times is good. It is especially desirable to show on each label how many parts there are. If you give in your note-books a separate and later number to each collection after the first, I think that number should follow the "Part 2," "Part 3," etc., on the labels of the second and third parts. If, however, you put the notes of the later collections under the original number in your note-book, this second and third number would not exist. I believe in your collections last season you applied a second number to the foliage specimen at the time you collected it but applied the original number when you wrote the labels. It was this second number which I included in parentheses in my check list of determinations, and I also placed it after Part 2 on the second label, thinking that this might be useful if I had occasion to write you later.

Very sincerely yours,

ORB:WR

Cerealist in Charge.

P.S. By the way, in that letter of Feby 13, 1919, you offered my son Robert, some old unused stamps you had put away in an envelope. He will be delighted to have them. B

No 27462

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

Pluffton, Ind. March 11 19120

C.R.Ball,
Washington, D.C.
Dear Dr.Ball:- I wish to acknowledge receipt of your letter of March 6. Thanks for the information contained in answer to my many questions.

well I have now named all of the sheets I had mounted, and I find that I have the following mounted sheets, which you have not reported on. Now it might be possible I did not send you a duplicate sheet but I think I did. No. 27,462 from Elkhart Co, which I take to be S. fragilis; 29,720 from Laporte which I take to be S. humilis.; No. 29,288 from Knox County which I take to be S. sericea. If you can help me out on these Nos. please let me hear from you.

You report on No. 29,284 from Knox Co as S. nigra which is correct. You also report this same number as S. sericea. No doubt a clerical error, or wrong number used for the last name. shld be 29288

You report on No. 29,402 for Parke County as S. fragilis. Should this not be S. alba?

You report on No. 29,511, White County, a roadside tree 2 ft. in dia. as S. amygdaloides. It seem to be to that species, neither do I know just to say it looks like. The leaves are glabrous above and below, look like nigra?, petioles to long for that species, about 1 cm. long, buds a very light brown, etc. I think this tree was planted along the roadside, and believe it is some form of S. alba.

I am sorry you had to call my attention to the old revenue stamps for the boy. I enclose all I have, and he is quite welcome to them. They are valueless to me and I hope they will be a help to him. I know that if he was to collect them now from patent medicine he could not get them. All were taken from old patent medicine. When I bought my store in 1891, I found several hundreds of dollars worth of "shelf warmers", and I discarded them all, saving the stamps.

In regards to S. sericea forma glabrescens Ball, I will not distribute duplites of this or the form of S. interior var. linearifol until I hear from you.

Referring again to the large map I had made for showing distribution, will say I will possibly never have any use for the same, and I will sell it for what it cost me. I think the 500 sheets with about 200 cheap sheets like I sent you with holder cost me 25,00. I reserve to cancel this offer until I see my daughter who plans to try for a Doctor's Degree on some problem of plant geography, and if she does she may wish to use it.

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

Ball # 2.

learn that.

I am migaty glad to agree to name all the Salix I take in 1920 as yet I do not know how extensively I will get to collect. Last year the Dept. allowed me 7¢ per mile but it really cost me 10½¢ per mile. Of course I collected some herbaceous plants, but that is paying too much for what I get. When I am out, instead of working the required 8 hours, I work from sun up until 10,00 P.M. However I will try to get some, and visit those counties I have not worked before, if I can. I have little hopes of finding any thing new It is possible I might find some northern form, but I very much doubt it, because I have walked the entire distance along Lake Michigan, and peddled around about 200 lakes of the State. If there any chance for some western prairie form being found in Ind, I would rather think I be able to run across it. I have worked this area of Ind. the least, although there is little of it. When you have time, let me know what to look out for, and I will try to "post" myself on the form, and keep on the lookout for it. Wish you could join me for a few days, and we would make a "killin", because I know the best collecting grounds in all parts of the State.

In regards to S. Bebbiana will say I have never seen it larger than say 8 or 9 ft. tall, and it usually grows with wide size branche and I do not believe it ever acquires a dia. of more than 1½ or 1½ in b.h. in our area. It is usually a shrub 5-6 ft. tall. It has a single stem.

In regards to the photographing of the illustrations for Rev. Ed will say, I have referred to those of the Iowa Hor. Soc. Vol. 53, and I believe we can get as good ones as these. The reason I prefer a photo is that one who is not acquainted with a thing can not supply the things missed by the artist. A mental picture of a whole will be of greater assistance that a drawing. I had sent to you a print of two species. I am sorry I do not have a specimen of S. alba which would make a good photo. May be you can arrange to get me a good one, of course we would pay you for it. If not I might be able to buy one of the Arnold Arboretum.

photo

In regards to numbering specimens, will say I give the series of specimens the number that I first use. subsequent collcetions from the same tree have the same number, but of course the date will be different. When I collcet them I give them my current field number. When this number is recorded, I cross number it, by referring back to first number, and I go to the first number and refer to the later number, so that there will be no mix up. When I collect from a plant which I hope to collect from again I make a note of it on a sheet from a pad which goes in the pay envelope which contains the stamps I am sending. On this memorandum I gave number (accession) and in detail describe the tree, which in addition I usually make by tying a narrow strip of tin around a branch about the height of the eye, and on north side. I adopt this uniformity to assist

(OVER)

In finding the same tree. If I have more than one tree in the same locality where I might confuse, I use two or more tin strips. The tin strips I get of the tinner. They are waste strips, hence cost nothing. I tried to mark trees by cutting a chip out, etc. and this is a rank failure. I also tried by pusing in the tree an upholsters tack at height of eye, or as near as I could. This is N.G. Tin or galvanized strips is O.K/ I always carry a field press, and these strips of tin are about 12-18 inhces long, and I carry them in the press. Mark tree by just twisting the tin around the trunk/branch, etc. In your field note you say now many tins are used, and if at an unusual height or place, note this. I usually describe the tree as located so many feet from an associated tree of such and such a species, and I give its diam. etc. so I never make a mistake on getting the same tree. I am careless in letter writing but in making specimens to get accurate data, I believe few can beat me.

Say I have another note here in regards to identification. It is on that var. Wheeleri of S. interior. I belie e there must be some mistake on my No. 28, 141, Lawrence Co. S. int. Wheeleri. I give the size of the tree as 7 in. dia. and 40 ft. tall. Surely that is too large for this specimen. Now there is a bare possibility I made a mistake, but I collected only one specimen in this locality. If not too much trouble I wish you would check the det. Might it be S. nigra. If not I had better "cut out the size" of the specimen.

By the way, I have observed S. interior along the low "summer" bank of the Ohio River in many places, and you can always distinguish two forms of it. I collected both forms but you call them same thing. When the specimens are green one is a much more yellow green than the other, When the specimens are dried, they do not show that feature. Have you ever observed this. If there is ant thing it I will try next year to investigate it.

Well I think this covers all the points of your letter, hoping to hear that you can get your part of the Rev. Ed. to me on time, I am very truly yours,

Chas. C. Deam.

P.S.

I referred to an envelope like the one I enclose. For years I have made notes on slips taken forom a pad which will just go in this envelope. When I go into a county, I get out the envelope and go through it, and find out the things I must be on the look out for, etc. I have an envelope for each county, and all of these notes, are very very valuable. In many instances I hope to find a specimen that has been reported from a county, and in many instances the exact place taken may be given, etc.

April 8, 1920.

Mr. Charles C. Deam,
Bluffton, Indiana.

Dear Mr. Deam:

Your letter of March 11 has remained unanswered because I have been unable to give time to willows recently. I am now endeavoring to answer some of your questions.

I did not receive a sheet of No. 27462 from Elkhart County, which you think if fragilis. I did receive, however, two sheets No. 27469, both from Elkhart County. One is interior, the other cordata. I am wondering if this is the one you suspect may be fragilis. I am enclosing a fragment of it herewith, which, doubtless, will enable you to answer this question.

No. 29720 from Laporte County I am determined to be tristis, and you will find it listed under that species instead of humilis.

I did not receive any No. 29288 from Knox County, but had received two sheets labelled No. 29284, both from that county. One of these was nigra and the other sericea. I suppose this last is really No. 29288, and I have changed the number accordingly on my list.

I have examined again No. 29511 from White County. This is not S. alba. It has the slender, yellowish, subpendulous twigs, and the lanceolate, long-acuminate leaves of amygdaloides, with their long, slender, twisted petioles and their very fine reticulation by transmitted light. They vary chiefly in being more slender and less glaucous beneath than usual but show no signs of alba. Possibly a hybrid with S. nigra, but I think not.

I have examined again No. 28411 from Lawrence County. This is not nigra but unquestionably, a form of interior. I enclose a few leaves, so that you may know whether your specimen is like the one you sent me. Because of its very broad leaves, I named it variety wheeleri. I doubt very much if the size recorded, namely, seven inches in diameter and forty feet high, belong to this species.

No. 29402 from Park County, identified as fragilis, I did not keep but sent to the National Herbarium. If it is now accessible, I will endeavor to locate it, and tell you more about it.

I thank you for the additional information given in your letter and will endeavor to write you about the photographs and manuscript very soon.

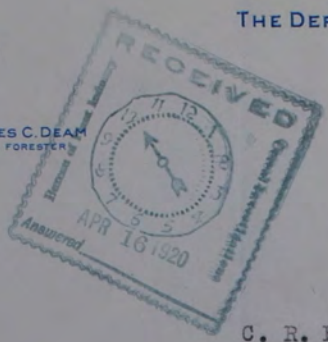
Very truly yours,

Cerealist in Charge.

CRB:RLL

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER



April 14-1920

C. R. Ball,
Cerealist in Charge,
Bureau of Plant Industry,
Department of Agriculture
Washington, D. C.

Dear Sir:-

I wish to acknowledge receipt of your letter of April 8th and note what you say in regard to the undetermined specimens. Specimen Salix cordata No.27469, Elkhart County, should be No.27462. In regard to No.29284 from Knox County, you are right, one is nigra and one is sericea and should have the number 29288. I don't see how I got those numbers mixed, which is only evidence that I should be more careful in the future, which I will endeavor to be.

Changed to last number

I wish you would get your manuscript to me as soon as possible. I received Eggleston's yesterday and I hope to have the whole thing in the hands of the printer within a month. In the event that you cannot send the manuscript at once, will you please indicate the species you expect to have in the write-up so that we can write the legend and number our prints?

Yours very truly,

Chas. C. Deam

C. C. Deam, State Forester,
The Department of Conservation.

CCD:HR

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

April 21-1920

Mr. C. D. Ball,
Bureau of Plant Industry,
U.S.Dept.of Agriculture,
Washington, D.C.

Dear Mr. Ball:-

I hope I am not tiring you with letters, but I am anxious to get your manuscript on the Salix. I am pleased to advise you that Mr. Pechter-ton has submitted his and the manuscript will be completed by the end of this week and I am anxious to turn it in at once, so, if you possibly can, I wish you would send in your manuscript at once and oblige,

Yours very truly,

Chas C Deam

(C. C. Deam) State Forester,
The Department of Conservation.

CCD:HR

April 23, 1920.

Mr. Charles C. Deam,
Division of Forestry,
Department of Conservation,
Indianapolis, Indiana.

Dear Mr. Deam:

Your letter of April 21 is received, and I am enclosing herewith Pages 1 to 3 of the desired manuscript. These pages cover the family and genus. Feel perfectly free to reduce or change them as you see fit. If the discussion, as I have given it, occupies too much space, you can cut out the least essential portion of the description at your pleasure. You will note that I have included weeping willow, S. babylonica, in the key. I believe nothing was said about it before, but am wondering if you wish to include it with alba and fragilis, or whether you wish to restrict the foreign species to those which have excaped cultivation. I do not know that the weeping willow excaped anywhere in Indiana. If you wish to omit this species, it will be necessary only to strike out that paragraph of the key.

A discussion of the species is being written and will follow very shortly. I regret the delay, but am working under heavy pressure.

Very truly yours,

Cerealist in Charge.

CRB:RLL

Enclosure.3 pgs. manuscript.

April 24, 1920.

Mr. Charles C. Deam,
State Forestry Office,
Bluffton, Indiana.

Dear Mr. Deam:

With further reference to my letter of yesterday, I am transmitting herewith a discription and notes on the six species of willows given in the key, which I sent you with that letter. Feel free to shorten these descriptions if you wish. If you decide to omit babylonica, the number of discolor and its variety should be changed from 6 to 5, and the same change should be made in the key.

I am leaving the seed distribution for you to fill as you know the method you wish to prepare it and have many records, of course, which are not in my possession.

Trusting that these descriptions will be found satisfacory, I am,

Very truly yours,

Cerealist in Charge.

CRB:RLL

Enclosure:

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

April 27-1920

Dr. C. R. Ball,
Washington, D.C.

Dear Dr. Ball:-

We wish to acknowledge receipt of the three pages of manuscript and I wish very much to thank you for them.

I have taken the liberty to cut out S.babylonica. I hope to finish the manuscript this week. Would have had it done had something not come up last week.

Yours very truly,

Chas C. Deam

C. C. Deam, State Forester,
The Department of Conservation.

CCD:HR

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

Apr 291920

C.R.Pall,

Washington D.C.

Dear Dr.Pall: I have your manuscript and I am havinh it copied and then it goest to Coulter for proofing,and then I will have it sent to you. I have taken the liberty to cut out S.Babylonica,also to mahe a few minor changes which do not alter the text.For instances we do not abbreviate generic names,since they are used very little. Also I have added to distribution all of the counties in which the specimen has been taken. I wish when the manuscript is returned to you that you would add any additional records you may have so as to make the distribution as complete as possible. I now plan to hand in manuscript by May 15 if possible. I am very sorry I do not have a good specimen of S.alba for making photo. It will do,but is not good. I think I can get a good one of S.discolor, and S.eriocephala will not be illustrated.

I was glad to see that you wrote the Salix up in detail.This will stimulate the study the genus. Now I hope and am planning for you to write up the genus for the Shrub Book which I will not be able to complete for a year or two. This year I plan to spend most of the year in the northern counties,at leat until Sept. I will collect Salix every where,and endeavor to make some fine specimens for photographing.

When you are through,please send in your bill in duplicate and receipt both in advance,and remittance will follow the first of the following month.

Yours Chas.C.Deam.

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

Bluffton, Indiana.
May 9 1920

C.R.Ball,

Washington, D.C.

Read

Dear Dr. Ball:- I enclose you a copy of the paper on Salix except the first page which has been lost. It is O.K. I think. Now if there are no corrections, it will not be necessary for you to write me. I am sending you a carbon copy of the final copy with the corrections made. I have made one note. You say the under surface of S.fragilis is always glaucous. Is this true?. If so O.K. I presume I will not get manuscript in yet for a week or possibly two. Every day, something is added to my work that I can not postpone, so Mr.Manuscript has to wait. I have every thing written and copied, except the introduction, but I must be out of office 5 days next week, then so far as I now know, I will stick to it day & night until I finish. The man who was helping me with the photo work, took the "flu". A continual "hard luck" story.

I am longing to get to the woods. Will be out all summer after I finish this dope.

Yours truly,

Chas. C.Deam.

May 20, 1920.

Mr. Charles C. Deam,
Department of Conservation,
Division of Forestry,
Indianapolis, Indiana.

Dear Mr. Deam:

Your letter of May 9, returning a carbon copy of the Salix material, was duly received during my unexpected absence from Washington, caused by the recent death of my father. Regarding the color of the under surface of the under leaves of fragilis, I think, upon examination of a large series of specimen, it would have been safer to omit the word,"always" and insert after the word, "glaucous", the following, "(rarely green)".

I have no Indiana material of the species under discussion. There may be specimen in the National Herbarium, but owing to the accumulation of work and the necessity of leaving Washington again in the near future, I am unable to examine the National Herbarium material at this time, which I greatly regret. Replying to your letter of April 29, I will say that there will be no charge for this manuscript.

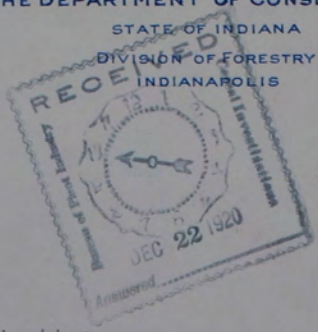
Very truly yours,

Cerealist in Charge.

CRB:RLL

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER



Bluffton, Indiana
December 20, 1920

C. R. Ball,
Cereal Investigation,
Dept. of Agriculture,
Washington, D. C.

Dear Mr. Ball:

I am sending you the galley-proof of your part of our publication, which I wish you would look over and return to me.

Since I have been home, my eyes have been on the blink, so I had my daughter read this proof for me. Some of her corrections may not be altogether as you wish them; if so, you will please change them to suit your pleasure.

I wish again to thank you and Mrs. Ball for the pleasant evening you gave me while in Washington.

Very truly yours,

Chas C Deam

36

1. SÀLIX. The Willows.

(Derived from the Celtic words, *sal*, near and *lis*, water; in allusion to their place of growth).

Trees or shrubs with slender branches, leaves mostly long and pointed, entire or glandular-toothed. There are thirteen species native to the State and a few European species have become well established. The genus has members adapted to the most varied conditions of life, ranging from the forest, low banks of streams and shores of lakes to the exposed and dry sand dunes of Lake Michigan. The species sometimes hybridize and the relationships of such hybrids are difficult of determination. This genus of trees yields salicin, a substitute for quinine. The bark of some species is used in medicine as a tonic and febrifuge. The wood is used to some extent in the manufacture of charcoal and wood pulp.

Twigs not yellow-green or yellow, stamens more than 2.
- Leaves green below, petioles without glands..... 1 S. nigra.
- Leaves glaucous or whitish beneath at least to near maturity, petioles with or without glands.
  - Buds about 3 mm. (⅛ inch) long, petioles usually without glands..... 2 S. amygdaloides.
  - Buds about 5-10 mm. (about ¼ inch) long, petioles always with glands..... 3 S. lucida.

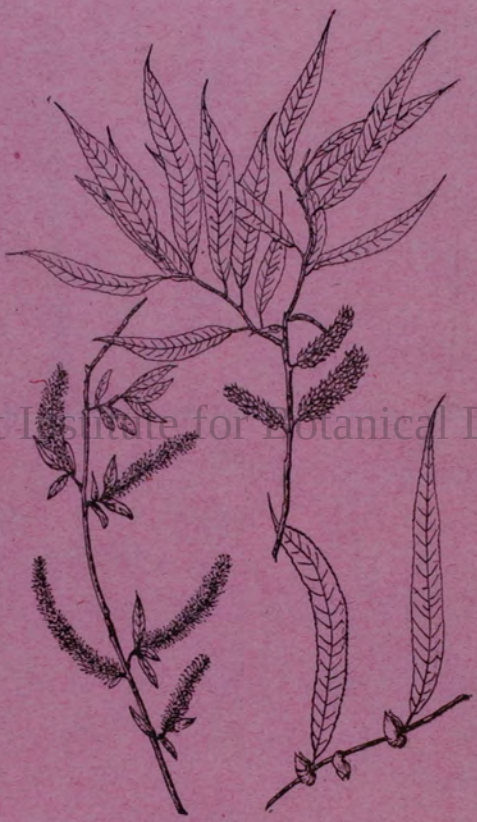
Twigs yellow-green or yellow, stamens 2..... 4 S. alba.

1. Salix nigra Marshall. Willow. Black Willow. Plate 15. Bark of trunk rough, thick, flaky, dark brown or nearly black; twigs very brittle at the base, shoots pubescent at first and green or greenish-brown, becoming smooth and darker; buds ovate, 2-3 mm. (⅛ inch)long, acute; leaves narrowly-lanceolate, commonly about 10 cm. (4 inches) long, 1 cm. (⅜ inch) wide, long taper pointed, acute or rounded at the base, finely serrate, bright green and smooth above, paler and smooth beneath or pubescent along the primary and secondary veins; petioles 4-8 mm. (⅛-⅜ inch) long; flowers appear in April or May. Variety **falcata** (Pursh) Torrey is a form with narrower and more curved leaves.

Distribution. New Brunswick west to North Dakota, south to Florida and west to Texas. More or less frequent throughout Indiana on the banks of streams and on the borders of lakes and swamps. On the low borders of some lakes and rivers it forms the principal stand on considerable areas. In this State it is usually a small crooked tree, except in the southwestern counties, where it frequently becomes a medium or large sized tree.

The published records of the distribution are as follows: Clark (Baird and Taylor) and (Smith); Delaware, Jay, Randolph and

PLATE 15.



SALIX NIGRA Marshall. BLACK WILLOW. (x ⅓.)

Dec. 25,1920.

Mr. Carles C. Deam,
Sate Forester,
Bluffton, Lnd.

Dear Mr. Deam:-

Ihave your letter of Dec. 20, and accomapnying proof of the willow manuscript. I am returning proof with necessary correction thereon. I note an index number "1" after the heading "Salicaceae", as if a footnote wre intended but do not find any footnote.

I have found a little time to confirm the determinations of the specimems we examined the night you gave us the pleasure of your company. I will endeavor to finish this job and send you the list not later than Monday, asilleave for Chicago then. So far I have made but one change in the determinations. Some of the hardest nuts are yet to crack, however.

With best holiday wishes to yourself and family, whom I shall hope mett some day, I am

Very sincerely yours,

December 27, 1920.

Mr. Charles C. Dean,
State Forester,
Bluffton, Indiana.

Dear Mr. Dean:

In accordance with my letter of Saturday I am transmitting herewith a list of the determinations of the 1920 willow collections. I have completed the determinations except in the case of a few forms or varieties which will require further study. I thought, however, that you would like to have these as promptly as possible, so I am not delaying the list any longer.

Yours very truly,

All in list but var. Planifolia not given under candida + interior.

Cerealist in Charge.

CRB-MVH

Label lost from 33320 longipes, Please send.
under amygdaloides, No 30122 is wrong.
May be 30,72 r' or 92 r. will look up at home

Willows of Indiana, 1920

Determined for Chas. C. Deam.
December, 1920.

S. alba L.
30,387 ♀

S. fragilis L.
31,134 ♀

S. amygdaloides Anders.
30,340 ♀
30,504 ♂
30,624 ♀
30,673 ♀
30,701 ♀
30,922 ♀
30,939 fol.

S. nigra Marsh.
30,621 ♂
30,672 ♀
30,697 ♀
30,810 ♀
30,902 ♂
30,903 ♀
31,036 ♀

S. longipes Sh.
30,220 fol.

S. lucida Muhl.
30,438 ♂♂
30,463 ♀
var. intonsa Fern.
30,622 ♂
30,705 ♀
30,826 ♂

S. serissima (Bail) Fern.
31,128 ♀ lost

S. adenophylla Hook
S. ~~cynthicola Fern.~~
30,816 ♂ (2)
30,825 ♀
32,351 fol.

S. interior Rowl.
30,472 ♂
30,572 ♂
30,619 ♀
30,788 ♀
31,172 ♀
31,308 ♀
31,384 ♀
31,642 ♀

S. interior var
30,295 ♀
30,396 ♀
30,704 ♀

S. pedicellaris
hypoglauca Fern.
30,460 ♀
30,476 ♀
30,597 fol
31,228 fol

S. cordata Muhl.
30,618 ♀
30,809 ♀ ang
30,907 fol

S. cordata x
30,393 ♀
30,454 ♀

S. cordata "deamii"
30395 ♀
~~Dekalb Co~~
1/2 mi E. St Joe

S. glaucophylla Bebb.
30,462 ♀
30,791 ♀
30,818 ♀

S. petiolaris Sm.

30,580 ♀
30,582 ♀
30,912 fol.

S. sericea Marsh.

30,281 ♀ fol.
30,323 ♀
30,384 ♀
30,415 ♀
30,434 ♀
30,667 ♀

S. candida Fl.

30,478 ♀
30,579 ♀
30,762 ♀
30,971 fol.
32,370 narrow leaves

S. candida var. mastos.

30,459 ♀
30,583 ♀

S. candida × ? (glaber. leaves)

30,458 ♀

S. discolor Muhl.

30,385 ♀
30,489 ♀
30,668 ♀
30,700 ♀

var. eriocephala (Mx.) And.

30,731 ♀

S. humilis Marsh.

30,699 ♀
31,247 fol

S. tristis Aitow

30,400 ♀
30,425 ♀
30,910 fol
31,556 fol

S. babbiana Sarg.

30,330 ♀
30,416 ♀
30,444 ♀
30,590 ♀
30,702 ♀
30,753 ♀
30,875 ♀
31,032 ♀
30,037 ♀

February 28, 1921.

Mr. Chas. C. Deam,

Bluffton, Ind.

Dear Mr. Deam:

Your card of Feb. 10, 1921, was duly received, together with the page proof mentioned, and I thank you heartily for this courtesy.

I am inclosing herewith preliminary draft of two keys based on foliage characters and floral and foliage characters combined. These keys are by no means in complete condition but I shall not be able to give any more attention to them at present. I would rather have one copy in your hands in their present stage of development in case anything should happen to me.

Yours very sincerely,

crb-as

Cerealist in Charge.

Inc.

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

March 3rd.

1921.

Mr. C. R. Ball,
Washington, D. C.,

Office Serial Investigation.

Dear Mr. Ball:-

I wish to acknowledge receipt of your key to the Willows and I am certainly very grateful for it. I will try and memorize it but if I do not memorize it I will carry it with me in the field so I will be able to detect the rare forms.

Don't forget the dates and if you can plan to be with me for a week or so I will be glad to have you.

Very truly yours,

Chas C Deam

(Chas. C. Deam), Forester.
The Department of Conservation.

CCD:B

THE DEPARTMENT OF CONSERVATION
State of Indiana
Indianapolis

March 20, 1921

Dear Sir:-

We are pleased to announce that a revised edition of the "Trees of Indiana" by Charles C. Deam is in press. The first delivery is promised April first.

We enclose you an advance sheet which shows the size of the page, quality of paper used, illustrations, and gives you an idea of how the subject matter is treated. The book contains 517 pages, fully indexed and is bound in green cloth. It contains full description of all the trees of Indiana and each of the 132 trees is illustrated with a full page photographic plate. Three of the plates are made from the type of the species.

The book is being published from the appropriation of the Department of Conservation which makes it necessary to make a charge to cover the cost of the publication. The book will be sent, Post paid, to any address on receipt of $1.25. We shall be pleased to receive your remittance for one or more copies. Make checks payable to the Department of Conservation.

Yours very truly,

The Department of Conservation.

June 11, 1921.

Mr. C. C. Deam,
State Forester,
Bluffton, Indiana.

Dear Mr. Deam:

I recently had occasion to cite your forthcoming volume on the trees of Indiana, and awoke to the fact that I did not know it's exact title. I gave it the title, "The Trees of Indiana", and there probably is not time to change this before the publication in which I used the citation will be in print. However, I would like to make a try at it, and in any case I will have the information in hand for use next time, if you will be kind enough to give me the exact title used.

I shall hope soon to send you a paper that is to come out in the Botanical Gazette this month.

Very truly yours,

CRB/CAR

Cerealist in Charge.

THE DEPARTMENT OF CONSERVATION
STATE OF INDIANA
DIVISION OF FORESTRY
INDIANAPOLIS

CHARLES C. DEAM
STATE FORESTER

June 14, 1921.

Mr. C. R. Ball,
U. S. Department of Agriculture,
Washington, D. C.,

Dear Mr. Ball:-

I have your letter of June 11th and you surmise correctly as to the title of the publication on the trees of Indiana. The title is "Trees of Indiana".

I was hoping that you and I might get together someday and do something with the Willows. My plans have been knocked sky high so I have not been able to collect much this Spring. I made a trip through the northern part of the State but it was about two weeks too early. I may have about about fifty numbers of the Salix for you. I could collect specimens this Fall but presume you would not care to be bothered with them. As I now plan, if I get out this Fall my route will be over very much the same territory I have been going over.

Under separate cover we are sending you a copy of the "Trees of Indiana" with the compliments of the Department. Hoping that you will be able to stop off in Indiana and call on me when you pass through, I am

Very truly yours,

Chas. C. Deam

(Chas. C. Deam) Forester. (MB)

Dictated but not signed.

June 19, 1921.

Mr. Chas. C. Deam,
The Department of Conservation,
Division of Forestry,
Indianapolis, Indiana.

Dear Mr. Deam:

Your good letter of June 14 is received together with a copy of the "Trees of Indiana", which I greatly appreciate.

Your plans have not been shot any higher than mine. When I shall hit the road I do not know, but I see little prospect of vacation enroute this year owing to the pressure of our research problems.

With best wishes, I am

Very truly yours,

CRB/CAR

Cerealist in Charge.