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STUDYING WILLOWS OR MAKING NEW SECTIONS IN THE GENUS Salix

Carleton R. Ball

Rhodora
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Recently, Fernald (Rhod. 48:44, 1946) has published two new sections (Uva-ursi and Argyrocarpae) in the genus Salix. The recognized right to publish entails responsibility for adequate information, which seems not to have been met. The equal right of discussion, and of criticism where warranted, also entails responsibilities, herein recognized. Three points should be considered in appraising the discussion.

1. Each of the two new sections contains but a single species. There are several other species in each of the two earlier sections to which these now-segregated species customarily have been assigned. In transferring a species from a plural-species section to become the type of a new 1-species section, there is obligation to show its relationship to all the species of the earlier section and not merely to the type thereof. The description and inclusiveness of a plural-species section always must be broader than those of its type species, just as the description of a plural-species genus always must be broader than that of its type species.

2. There are some 125 species of Salix in North America, and several hundreds in the world. Is each of them to become the type of a new section, without comparison with any except the type species of the earlier section (as in the case of Uva-ursi) or without any comparison whatever (as in the case of Argyrocarpae)? To exclude all other species from a new 1-species section because they differ from its type is no more logical than excluding new species from a genus because they differ from its type species.

3. In announcing conclusions about sections or species of a genus which is widely distributed on five continents, it seems desirable, even necessary, to consider species outside of any particular mammal range. For example, the nearest relative of the writer's S. Setchelliana, from Alaska and Yukon, is found in the Carpathian Mtns. of southeastern Europe.

New Section Uva-ursi Fernald

This new section, based on S. uva-ursi exclusively, was described by Fernald as differing from S. herbacea L., the type species of section Herbaceae Borrer, in having stems strongly ligneous, prostrate but not subterranean; branchlets leafy; leaves firm, not rounded and not conspicuously reticulate, whitened beneath; aments many-flowered; bracts conspicuously hairy; stamen usually 1.

Section Herbaceae Borrer (1830) was based exclusively on S. herbacea, the only species of the group occurring in Great Britain. It therefore could have been no broader or more inclusive than that species. Several species have been added since.

The idea of the scope of sections in Salix has been a gradual evolution, as have most ideas in systematic botany. From 1828 to 1866, Koch, Fries, Hartig, and Wimmer had placed S. herbacea, S. polaris, S. retusa, and S. reticulata (all the prostrate creeping willows they had in Europe) in a single section, though under three different section names. But by 1860, Kerner (Niederöst. Weid.) had placed S. retusa and S. herbacea in section Retusae, S. polaris in section Myrtosalix under S. myrsinites, and he and created a new genus, Chamites, for the Reticulatae (S. reticulata et al)

Andersson, described by Fernald (p. 77) as "the most accurate student ever to work on Salix", monographed the willows of the world (DC. Prodr. 16 (2)) in 1868. In section Myrtosalix, he placed most of the present section Ovalifoliae and also S. canadensis (as S. tenera, p. 286), S. phlebophylla (p. 290), and S. uva-ursi (as S. Outleri, p. 292). In section Retusae, he placed S. retusa (p. 293) with many Asian species, and in Herbaceae he placed S. herbacea, S. polaris, and S. rotundifolia, with some Old World species, and including S. glacialis which is merely juvenile S. ovalifolia (the type species of section Ovalifoliae). The two most closely related species, S. phlebophylla and S. rotundifolia, are placed in different sections.

Schneider (Bot. Gaz. 67:48. 1919) includes in section Herbaceae the following North American species: S. canadensis (NW. U.S. & adj. Can.), S. Dodgeana (NW. U.S.), S. phlebophylla (NW. N.A.), S. polaris (circumpolar), S. rotundifolia (NW. N.A.), and S. uva-ursi (NE. N.A.). He suggested, however, that S. uva-ursi was widely separated by its bicolored leaves and single stamen.

In creating section Uva-ursi, Fernald compares the type (and only) species, S. uva-ursi, solely with S. herbacea, the only other species of section Herbaceae occurring within the Manual range. No mention is made of the others, some of which are much more like S. uva-ursi than they are like S. herbacea. It seems desirable to take up the description of this 1-species section, point by point.

1. "Stems Strongly Ligneous". The five species commonly placed in section Herbaceae with S. herbacea and S. uva-ursi vary considerably in plant size but all of them have the ligneous prostrate stems, not or only partly subterranean, often "forming extensive superficial and very leafy carpets", as Fernald said of S. uva-ursi. S. polaris is ~~is~~ more nearly like S. herbacea. The other four are more like S. uva-ursi. Several authors speak of the stems of these others as being partly subterranean. Furthermore, S. herbacea is not always a delicate plant with slender stems. Dutilly 6605 (Herb. Ball) from Chesterfield Inlet has stout and strongly ligneous stems to 4 mm. thick, and other specimens have stems anything but delicate.

2. "Branchlets Leafy". Both species and section Uva-ursi are described as having "leafy branchlets", while S. herbacea is said to have ~~to have~~ short branchlets ~~with~~ with only 3-4 leaves. Most species have fewer leaves on short branchlets and more on longer ones. That holds for all those assigned to section Herbaceae. Linton, a life-long personal student of willows, says (M^og. Brit. Willows, p. 79, 1913) that the short branchlets of S. herbacea have 3-5 leaves. My Iceland specimen, specially collected by Wm. F. Palsson (No. 146) in 1939, has 5 branchlets with 6 leaves each and 2 branchlets with 7 leaves each. S. polaris shows about the same numbers. It is more similar in habit to S. herbacea while the other four are more similar to S. uva-ursi.

3. "Leaves Firm". The leaves of S. uva-ursi (S. Outleri) undoubtedly are firm, Andersson (1868) calling the adult leaves extremely rigid. But the leaves of S. phlebophylla, S. rotundifolia, S. Dodgeana, and S. cascadiensis also are firm. Of S. phlebophylla, Andersson said (1868, p. 290) that the leaves are coriaceous but, more strangely, he called those of S. polaris "coriaceo-rigidibus" also. The leaves of S. phlebophylla remain attached and skeletonizing for 2 or 3 years. For section Herbaceae, Andersson described the leaves as "coriaceo-indurata".

4. "Leaves Not Rounded". They also are not rounded in some of the other species of *Herbacea*. *S. phlebophylla* has obovate-spatulate or elliptical-spatulate leaves, *S. Dodgeana* has smaller but similar elliptical-obovate leaves, while those of *S. rotundifolia* are rounded. These three are very closely related. *S. cascadiensis* has linear-oblong or narrowly elliptical leaves. Of the seven related American species, three have leaves more or less rounded and four have not.

5. Leaf Margins. *S. uva-ursi* and *S. herbacea* are alike in having the blades crenulate-serrulate, a fact not mentioned by Fernald. The serrations of *S. herbacea* sometimes are prolonged and inflexed. *S. Spolaris* has the blades sometimes slightly crenulate-serrulate. The others have entire leaves.

6. "Leaves Not Conspicuously Reticulate". Study of 47 specimens of *S. uva-ursi* (Herb. Ball), 29 from New England and Lower Canada and 27 from Labrador Peninsula, shows that, practically without exception, their leaves are reticulate on one or both surfaces. "Reticulate" is used here as showing prominent tertiary veins connecting the secondary (lateral) veins, and so forming nets. On specimens collected early in the season, reticulation is not well developed but even then conspicuous reticulation will be found on the lower surface of several leaves and on the upper surface of one here and there. Its prominence increases as the season progresses and the leaves become older, many collections showing the lower surface conspicuously reticulate and the upper becoming more so. Collections in late August and September usually show both surfaces prominently reticulate, resembling those of *S. ovalifolia*. Andersson (1868, p. 292) stated that the leaves of *S. uva-ursi* (*S. Cutleri*) had the elevated nerves reticulate beneath, just as he said for both surfaces of *S. herbacea* (p. 198).

All of the species under discussion have the secondary (lateral) veins prominently developed. All of them show a tendency to become reticulate with age, especially *S. phlebophylla*, which is most comparable to *S. uva-ursi* in habits, and in size and shape of leaves, and in progressive reticulation also. The leaves of *S. rotundifolia*, though smaller, show exactly the same range of reticulation, and those of *S. Dodgeana* show it also but less markedly. These three are most closely related to *S. uva-ursi*. Even the long slender leaves of *S. cascadiensis*, with the secondaries closely crowded, show occasional reticulations on one or other side of individual leaves.

7. Leaves "Whitened Beneath". The leaves of S. uva-ursi are glaucescent ("whitened") beneath, whereas those of S. herbacea and the others species under discussion normally are green beneath. However, S. ^{as}canadensis, which extends from Wyoming and Utah to Washington and British Columbia, produces plants with some of the leaves glaucescent beneath throughout its range. No plant with all leaves glaucescent has been noted. Coville (Will. of Alaska) says that the leaves of S. polaris are green or somewhat glaucescent beneath, but the writer has not observed such glaucescence.

But Section Lucidae has green-leaved species (S. lucida and S. caudata) and glaucous-leaved species (S. serissima and S. lasiandra), ^{the} first member of each pair being eastern (mamual range) and the second western. Section Cordatae also has green-leaved species (S. myrtillifolia, S. monochroma, and S. pseudocordata) and glaucous-leaved species (S. cordata Muhl., S. ~~pernata~~ Farrae, S. ligulifolia, S. lutea, and S. mackenziana), the first-named species in each group occuring in the mamual range. And Fernald himself named a glaucous-leaved variety (brachypoda) of green-leaved S. myrtillifolia. He also named a widely-distributed glaucous variety (hypoglauca) of the narrowly localized green-leaved S. pedicellaris Ph. Evidently, glaucescence need not be uniform in sections.

8. Petiole Length and Thickness. The leaves of S. uva-ursi were said to be "short-petioled" (not included in section description) while those of S. herbacea were described as "slender-petioled". ^{the} These are not truly contrasting terms. Gray's Manual does not mention ~~the~~ the petioles. Those of S. herbacea are described in Britton [and Brown] (Illus. Fl.) and Britton (Man.) as "very slender, 4-8 mm. long" and those of S. uva-ursi as 2-4 mm. long.

A study was made on 57 specimens of S. herbacea (Herb. Ball), 7 from south of the St. Lawrence and 50 from north of it. In the southern plants the petioles were from 1-4 or occasionally 5 mm. long and mostly stout. On the 50 northern plants the leaves average smaller and the petioles shorter, mostly 1-3 mm., occasionally 4 mm., and only once reaching 5 mm. In width, they varied from 0.3-1 mm., and mostly between 0.5-0.6 mm., which is not "slender" for organs of those lengths. Gardner 176 from Cut-throat Id., Labrador, had leaves to 2.2 cm., and petioles to 3-5 mm. long and 0.8 mm. wide

(stout). Gardner 1075 from Hudson Bay has petioles 2-3 mm. long and 0.7 mm. wide. Potter & Briarly 8727 from Helipse Harbor, Labrador, has petioles 3 mm. long by 1 mm. wide. In European S. polaris, closely related to S. herbacea, the petioles range from 1-3 or 4 mm. long.

On 20 specimens of S. uva-ursi (Herb. Ball), ~~from~~ from New England and Lower Canada, the petioles average just a little less in width than those of S. herbacea. Of the two, therefore, S. uva-ursi really has the "slender" petioles.

9. "Aments Many-Flowered". The aments of section Uva-ursi are described as "many-flowered", while S. herbacea is said to have "2-3-flowered tiny aments". In Gray's Manual (1908), the aments of S. uva-ursi are described as 2-3 cm. long in fruit, while those of S. herbacea are said to be 4-10-flowered, on 2-leaved branchlets. Britton & Brown (Ill. Fl., in 1896) and Rydberg in Britton (Man., in 1901) both describe the pistillate aments of S. uva-ursi as 2-5 cm. long in fruit, and the aments of S. herbacea as 4-8 mm. long and 4-10-flowered, on 2-leaved branchlets.

Andersson (in DC. Prodr. 16) in 1868, is not definite about ament size on the 6 species included but he does say that those of S. herbacea (p. 298) are 3-12-flowered, on usually 2-leaved (subbifolios) branchlets, and that those of S. polaris ~~xxx~~ (p. 299) are 3-9-flowered. In 1858, however, he stated (Sal. Bor.-Am.) that the aments of S. uva-ursi (S. Gutleri) are an inch long and that those of S. phlebophylla (p. 73) are minute to $\frac{1}{2}$ inch or 1 inch long. Wimmer (Sal. Europ.), in 1866, not concerned with American S. uva-ursi, recorded the aments of S. herbacea as 4-12-flowered, S. polaris as few-flowered, S. retusa as 4-15-flowered, and S. reticulata as many-flowered. Linton, a life-time student of British willows, stated (Monog. Brit. Will., p. 79. 1913) that the catkins on S. herbacea are $\frac{1}{2}$ - $\frac{3}{4}$ -inch long, the pistillate 3-12-flowered and rarely elongating to nearly an inch. This is not exactly "tiny".

Most of the 57 specimens of S. herbacea in Herb. Ball are late-collected and do not have fruits. The mostly depauperate Labrador specimens have at least 8 flowers and perhaps more. One from Campbell Lake, NWNT, (Radford 186) has 10 or more. Steinmetz 1134 from Mt. Katahdin, Me., has aments 1 cm. long and with 10 or more flowers. Merrill from Mt. Katahdin in 1908 has one ament 1.7 cm. long (not tiny), and with 12 or more flowers.

It is difficult to count the capsules on mounted specimens without injuring them. European specimens of S. herbacea in my herbarium are 8-14 flowered. A vigorous Iceland specimen is 10-16-(or 17)-flowered (double the number allowed by Fernald) and the aments are up to 1.5 cm. long, which scarcely is "tiny".

10. Two-Leafed Peduncles of S. Herbacea. Fernald draws no distinction between S. uva-ursi and S. herbacea on this point. However, Andersson referred to the peduncles of S. herbacea as "subbifolios" and most later writers have called them "2-leafed". One Hungarian specimen in Herb. Ball shows 3 leaves and the Iceland plant has 3-4 leaves per peduncle.

11. "Bracts Conspicuously Hairy". The flower scales in new section Uva-ursi are described as "conspicuously silky" and those of S. herbacea as "nearly glabrous". Andersson in 1868 said that the bracts of S. herbacea were glabrous or gray-pilose and Linton in 1913 calls them glabrous or thinly pubescent. But in 1868, Andersson, "the most accurate student ever to work on Salix" (Fernald, p. 27), calls the bracts of S. uva-ursi (S. Outletii) obscurely villose; those of S. polaris "glabris vel villosulis"; those of S. phlebophylla white-pilose or barbate; and those of S. cascadiensis (S. tenera) as long-pilose. (those of S. rotundifolia as sufficiently long-ciliate; Do the white-pilose bracts of S. phlebophylla and the long-ciliate bracts of S. rotundifolia put these two intimately related species in different sections?

12. "Stamen Usually 1". The staminate ament of section Uva-ursi is described as having "stamen usually 1", and S. uva-ursi as having "stamens solitary (rarely 2)". Schneider says (p. 50) that he has "very rarely found two stamens in one flower". The uni-staminate condition is found to about the same degree in S. purpurea, the European basket willow widely introduced in Colonial America. It also characterizes S. sitchensis and S. Coulteri (section Sitchenses), and occurs occasionally in other diandrous species.

It is a phenomenon of the Diandrae only and is caused by more or less complete fusion of the two filaments. When the "rarely 2" stamens occur, ~~there is~~ the union has not taken place. But the staminate expression is not as simple as that. All

degrees of fusion occur. The two filaments may be entirely separate, as noted, or they may be united for any fraction of their length ($\frac{1}{4}$, $\frac{2}{8}$, $\frac{3}{4}$, $\frac{7}{8}$) or all of it. Sometimes when the filaments are completely united, there still will be two separate anthers. Sometimes these also will be united into one. The partial union of the 2 filaments occurs in numerous species of the Diandrae and usually is described as "filaments sometimes united at base" or "for part of their length".

In Summary. The characters alleged to separate section Uva-ursi from S. herbacea (type species of section Herbaceae) have been reviewed above, in comparison with those of five related North American species usually assigned to section Herbaceae. From the data presented, it is clear that either: (1), section Uva-ursi must be rejected outright; or (2), some four other American species must be added to it and the description completely rewritten. But first it must be decided whether there is sufficient difference between two groups in these seven species to warrant recognition of two separate subsections or sections. These two groups include S. herbacea and S. polaris, on the one hand, and S. uva-ursi, S. phlebophylla, S. rotundifolia, S. Dodgeana, and S. cascadiensis, on the other. That decision, however, will require full study of many related European and Asian species. Such study has not been made.

New Section Argyrocarpae Fernald

In creating section Argyrocarpae, Fernald says merely that the type species, S. argyrocarpa, "stands so far apart from other willows that it deserves a place in the system of sections". This is dogmatic assertion, not science. No supporting facts are given, except that Schneider, whom Fernald had just previously denounced (p. 14) ~~as~~ as the author of "what has been called this Schneid. treatment" of certain American willows, is here rehabilitated as a "close student of the genus" because he did not assign S. argyrocarpa to any existing section.

This new section includes only S. argyrocarpa Andersson, and the description reads: "Shrub 0.2-1.7 m. high; leaves shining-silky (micaceo-sericeis) beneath; pedicels elongated, 2-4 times as long as the two glands; stamens 2." Actually, instead of being "far apart from other willows", it is a blood brother to S. pellita, also of the Man-
closely related
ual range, and/to S. bella, S. Drummondiana, and S. subcoerulea of western America. ^
Previous treatments are discussed below. It is not distantly related to four or five other species.

Andersson, in 1867 (Monog. Sal., pp. 106 & 125) and 1868 (in DC. Prodr. 16(2):233 & 249), described two sections: 11, Argentaeae or Repentes, and 12, Virentes or Phyllicifoliae, and arranged all of the then-known American species of section Argentaeae in one or the other of the two. He described each section briefly but only a few really contrasting characters are given. These contrasts are noted below, with a few significant but non-contrasted characters included in parentheses.

Sect. 11, Argentaeae or Repentes. Shrub often low; leaves long, linear-lanceolate, most often silvery-tomentose, (sharply nerved above), margin revolute or serrate; aments subsessile; capsules more or less pedicelled, commonly sericeous; style short but distinct.

Under this section, Andersson arranged numerous species belonging to five more or less different groups: 1, S. sitchensis, the type species of section Sitchenses; 2, S. argyrocarpa, the subject of our discussion, of which more later; 3, S. petiolaris, and thereunder, as subspecies or varieties, ~~WEMEX~~ S. subsericea, S. gracilis, and S. sericea, presently recognized as species or varieties; 4, S. humilis and S.

tristis, commonly assigned to section Capreae, along with S. discolor, S. Scouleriana, and the European S. caprea and S. cinerea, grown in America as florists' willows; and 5, the little European S. repens, along with other Old World species.

Sect. 12, Virentes or Phyllicifoliae. Shrub often tall; leaves broad, subobovate or ovate-lanceolate, commonly glabrous, (glaucous below), remotely inflexed-serrulate, nerves subparallel; aments sessile; (bracts black-tipped, pilose), capsules pedicellate, (conic-rostrate);, commonly silky (called "glabrous or tomentose" in 1867. GRB.); style rostrate.

Four groups of ~~Willows~~ American willows were assigned by Andersson to this section: 1, S. phyllicifolia (S. planifolia Ph.) and S. fulcrata and S. phyllicoides (both S. pulchra), these and other American and Old World species actually comprising section Phyllicifoliae; 2, S. Drummondiana and S. chlorophylla Ands. (the latter including present S. pellita Anders. and S. subcoerulea Piper), all belonging to section Argenteae and discussed more fully later; 3, "S. macrocarpa Nutt.", which, whatever it was, obviously was not Nuttall's plant (S. Ceyeriana Anders.); and 4, S. humilis (S. arbusculoides Anders.), also discussed later on. He included also S. arbuscula L., and many other Old World species.

Under these two section names, Andersson thus assembled a miscellaneous mass of species actually belonging to several ^{widely} different sections of the genus. He should not be too severely blamed for this confusion. He was attempting the impossible task of writing up the willows of the world (for DC. Prodr.) in a limited time, and with inadequate material probably not all before him at one time.

Much inaccurate description results from these two groupings of unrelated species. For example, the Argenteae are assigned long, linear-lanceolate leaves but those of S. sitchensis, S. humilis, and S. tristis are distinctly oblanceolate and narrowed at the base, and in the first two species often broadly oblanceolate and cuneate. The leaves also are described as strongly nerved above but those of S. argyrocarpa are just the opposite. In section Phyllicifoliae, the leaves are described as broad, subobovate or ovate-lanceolate, and also are said to be "commonly glabrous" (the real Phyllicifoliae).

But those of S. pellita and S. arbusculoides are narrowly lanceolate and those of both S. pellita and S. Drummondiana are among the most densely hairy of American willows. The "conic-rostrate capsules" really occur on S. humilis and S. tristis, listed in section Argenteae but not belonging to either section.

Eight (or 9) of the ten (or 11) North American species commonly assigned now to section Argenteae are scattered at intervals, by Andersson, through both his Argenteae and Phyllicifoliae. Only four (or 5), S. argyrocarpa, S. petiolaris (and S. gracilis), S. sericea, and S. subsericea, were placed in Argenteae. Four others, S. arbusculoides, S. Drummondiana, and S. chlorophylla (covering both S. pellita and S. subcoerulea) were placed in Phyllicifoliae. These 8 (or 9) species, with two others not known to Andersson (S. bella Piper and S. coactilis Fernald), may be divided into two natural groups. Some may regard these groups as ~~sub~~ representing subsections and some as representing sections. In either case, the species of each group belong together.

The first group is characterized by leaves with margins revolute and either entire or sparingly undulate-grooved, the lower surface mostly densely velutinous or silvery-tomentose, the extra-numerous secondary veins impressed in the upper surface, prominently elevated beneath, and diverging from the midrib at relatively broad angles, like ^{and} the ribs of a vertebrate. Here belong S. argyrocarpa, S. pellita of the Manual range, and S. bella, S. Drummondiana, and S. subcoerulea of the Rockies and/or westward. Of these, only S. argyrocarpa is placed by Andersson in Argenteae, where it belonged.

The second group is characterized by leaves serrate or serrulate on the non-revolute margins, the lower surface densely to thinly covered with short silvery hairs or somewhat glabrate, the secondary veins of normal number and elevated on both surfaces, ^{the usual} and diverging from the midrib at sharper angles. This group includes S. arbusculoides (far Northwest) and S. coactilis Fern. (unknown to Andersson), S. petiolaris, S. sericea, and S. subsericea (all Manual range). Only S. arbusculoides was placed in Phyllicifoliae by Andersson.

Schneider, 50 years after Andersson, and with much more copious material, did almost as illogical a job. (Jour. Arnold Arb.). He follows Andersson in dividing these related species between two sections. In section Griseae (Argenteae), he placed (2:13-25. 1920) S. sericea, S. coactilis, and S. petiolaris, but omits S. argyrocarpa from both sections. He also adds, as did Andersson, S. humilis and S. tristis, both belonging to section Capreae. In section Phyllicifoliae (1:67-91. 1919), with the several species really belonging thereto, he placed S. bella, S. Drummondiana, S. pellita, and S. subcoerulea, but omitted S. arbusculoides from both sections.

Still later (2:84-89. 1920), he treats both S. ~~argyrocarpa~~ arbusculoides and S. argyrocarpa at great length but is unable to assign them to any existing section. Like Fernald, he gives no reason why he could not place each with its respective group, even if he could not unite the two groups. Like Andersson, Schneider was attempting the impossible task of a monograph of unfamiliar American willows in limited time and under conditions of physical and mental stress (he was interned, on meager pay, with an otherwise unsupported family in Germany).

There is nothing in Andersson's descriptions of his two species, S. argyrocarpa and S. pellita, which indicates other than closely related species. Andersson compared them himself and rejected close relationship because S. argyrocarpa had pedunculate aments and pedicelled capsules whereas S. pellita had sessile aments and short-pedicelled capsules. Yet Andersson, in 1868, reduced S. sericea to a variety of S. petiolaris, although the latter had leafy-peduncled aments and long-pedicelled capsule, while S. sericea had almost sessile aments and short-pedicelled capsules! Why should the same two characters which permitted one pair of distinct species to be arranged as a species and its variety prevent another pair, much more alike vegetally, from belonging to the same section? Such decisions are sheer nonsense, and it is not clear why Schneider and Fernald chose to follow them.

Both S. argyrocarpa and S. pellita have narrow leaves with revolute margins, the nerves impressed above and prominent below, the numerous secondaries diverging from the midrib at broad angles, ~~etc~~ and the blades covered densely with long silvery hairs at first but often quickly and unevenly becoming glabrate to glabrous. These facts should have brought recognition of their very close relationship long ago. On three sheets of unnumbered specimens of S. pellita, collected by Fernald at Ft. Fairfield, Me., on June 5, 1901 (Herb. Ball), different portions could be described as varieties velutina, pilosa, pubescens, abraxa, denudata, glabrata, and glabra. The same variation is seen commonly on S. argyrocarpa.

In Conclusion

1.

The whole purpose of botany, including taxonomy (but not synonymy) is to enable more people to know more about more plants. That purpose is not served by dogmatic assertions without supporting facts. Only useless, confusing, and expensive synonymy is increased thereby.

2. If more living plants and more herbarium specimens were studied more thoroughly, ^{2.} they would be much more knowledge and fewer names.

3. If keys were constructed primarily on vegetal characters, representing the major portion of the organism and present throughout most or all of the year, instead of floral characters (soon gone with the wind), willows would be much better known.

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May 16, 1946

Dr. M. L. Fernald,
Editor in Chief, of Rhodora,
14 Hawthorn Street,
Cambridge 38, Massachusetts.

Dear Dr. Fernald :

I inclose, for Rhodora, a manuscript entitled: Studying Willows: Or Making
New sSections in Salix. It discusses your two new sections, Uva-ursi and Agyro-
carpae, and gives some facts regarding all the American species involved.

It is a unique experience for me, this sending to a man, as editor, a manu-
script which criticizes some of his work as a taxonomist. Maybe it is a unique
experiment for you to receive such a manuscript. They say that life is rich in
proportion to its varied experiences.

It seems to me that we who are older should set a good example for the young-
sters just starting in the taxonomic field. Surely we do not want a continuing
avalanche of synonymy, a second catastrophe of Griseb. The spirit of my 11 E
generations of New England ancestors rebels against unnecessary burdens.

✓ Inclosed also is postage for the return of the manuscript if not accepted.

Cordially yours,

Carleton R. Ball

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Gray Herbarium



Harvard University

M. L. FERNALD, Director
Fisher Prof. Nat. Hist. (Bot.)
CHARLES A. WEATHERBY, Research Associate
FRANCIS WELLES HUNNEWELL, Research Associate
LYMAN B. SMITH, Curator

RUTH D. SANDERSON, Librarian
MARJORIE W. STONE, Bibliographer
ROBERT C. FOSTER, Assistant
BERNICE G. SCHUBERT, Technical Assistant

79 GARDEN STREET,
CAMBRIDGE 38, MASSACHUSETTS, U.S.A.
May 20, 1946.

Dr. Carleton R. Ball,
3814 Jocelyn Street,
Washington, D. C.

Dear Dr. Ball:

Thank you for your article on your views in regard to Salix, with your rules at the end, which are not necessarily those which would be adopted by an international Congress. We can find a place for your paper in Rhodora late in the present volume or early in the next one. Since it is several pages long it may have to wait its turn, as there are several long articles already in hand. It is natural that, with different experiences, different students arrive at different conclusions and I do not in any way resent your expressing your views as you seem to think I might do; neither do I necessarily concur in everything you say.

Sincerely yours,

M. L. Fernald

M. L. Fernald
Editor-in-Chief of Rhodora

MLF:S

(over)

3814 Jecelyn St., N.W.
Washington 15, D.C.

July 18, 1946

Dr. M. L. Fernald,
Editor-in-Chief, Rhodera,
Gray Herbarium of Harvard Univ.,
Cambridge, Massachusetts.

Dear Dr. Fernald:

In filing accumulated material today, I discover that your kind letter of May 20 is still unanswered, for which I am truly sorry.

I am glad to know that my paper, altho long, has been accepted for publication in Rhodera and probably will appear sometime around midwinter next.

I have been somewhat surprised at the quantity of widely-originating fan mail which has greeted my recent letter to Science on ~~the~~ "Why is Taxonomy Ill-Supported". My basic thesis is that plants (and plant names) were made for man, and not man made for plants and plant names. In other words, service rather than added burdens.

Cordially yours,

Carleton R. Ball



3814 J. celyn St., N.W.,

Washington 15, D.C.,

December 8, 1946

Dr. M.L. Fernald,
Editor, Rhodora,
Gray Herbarium,
Cambridge, Massachusetts.

Dear Dr. Fernald:

I inclose corrected proof of my Rhodora paper, which I was surprised to receive so quickly and am sorry to have delayed so long, but I was not at office for several days.

On gal. 13, I have changed the queried "rounded" to roundish, in two lines.

On. gal. 13, I have changed "glaucescence" to the more accurate "glaucousness."

On gal. 13, I would like to have the "-leafed" retained in the various instances if it will not outrage Rhodora requirements too much. Our English is an awful conglomerate and educators tell us that it takes our children about two years longer to reach the end of high school than would be required if we had a simpler language in spelling and pronunciation. "Leaf" is our root word and "leaves" the long-time plural form. Two ideas to learn instead of one. And leafs can be spoken just as well. However, prejudice being what it is, I have not dared to say "leafs" yet. But I have used "green-leafed", "glaucous-leafed", etc., before and survived. This helps to get people accustomed to new ideas, and promotes simplification.

On gal. 15, I have a complex sentence which I have tried to clarify by inclosing a long clause in parentheses ().

On gal. 15, I am exceedingly grateful to you for querying "humilis", which was a clumsy error of mine for the real S "humillima". I am ashamed of myself.

I inclose my signed order for 100 reprints, in addition to the 15 furnished to an author.

~~XXXXXXXXXXXX~~

Cordially yours,

Carleton R. Ball

P.S. Separately I send reprint of my paper from the Merrill memorial issue of Jour. Arnold Arb.

Gray Herbarium



Harvard University

M. L. FERNALD, Director
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ROBERT C. FOSTER, Assistant
BERNICE G. SCHUBERT, Technical Assistant

79 GARDEN STREET,
CAMBRIDGE 38, MASSACHUSETTS, U.S.A.

December 30, 1946.

Dr. Carleton R. Ball,
3814 Jocelyn St., N.W.,
Washington 15, D.C.

Dear Dr. Ball:

Naturally you may burrow for study the types of
Salix paraleuca, pedunculata, etc, when you need them.

Since you say to wait before sending them until you send
a fuller list we will wait. I am naturally much amazed,
in view of your expressed judgment of my understanding of

Salix in the recent Merrill number and in an article for
Rhodora, that you ask for my identifications of several
Labrador sheets. I think that we lack most of these.

When you have burrowed our specimens you will have an
opportunity for comparison yourself. The loan would have
to be to one of the Herbaria and the material used there.

Sincerely yours,

M. L. Fernald

M. L. Fernald,
Director.

(over)

3814 Jocelyn St., N.W.,
Washington 15, D.C.,
January 2, 1947

Dr. M. L. Fernald, Director,
Gray Herbarium of Harvard University,
79 Garden St., Cambridge 38, Mass.

My dear Dr. Fernald:

Many thanks for your letter of December 30. Presently I will place an official request for the desired type material, to be sent to the U.S. natl. Herbarium. I wonder if my personal Salix collection of nearly 20,000 mounted sheets, ever will attain the dignity of a "Herbarium"?

Now it is my turn to be amazed at your amazement. You and I have not reached our present ages without realizing that no two humans are alike and that the same person rarely is alike in two consecutive minutes. Therefore, why amazement?

Didn't you blow me up with a loud bang many years ago because I put the wrong termination on the specific name of a Salix? And didn't you do exactly the same thing twice in Rhodora *XX* 16:179, Oct., 1914? But I didn't explode then, or now! And didn't you accuse Schneider of making a "Schneid" treatment of Salix and then praise him as an able student of Salix, both in the same paper? It was the same Schneider.

I criticize, but I try to furnish a body of facts by which others may judge the validity of the statements.

With best wishes for the New Year, I am

Cordially yours,

Carleton R. Ball

P.S. I hope to camp down for a while in Gray Herbarium, next summer, and will even invite you out to lunch. That is a threat.

P.S.2. The Ball Salix Herbarium is housed in the fire-proof building of the U.S. Dept. of Agriculture, and in steel cases.



Gray Herbarium



Harvard University

L. FERNALD, Director
Fisher Prof. Nat. Hist. (Bot.)
CHARLES A. WEATHERBY, Research Associate
FRANCIS WELLES HUNNEWELL, Research Associate
LYMAN B. SMITH, Curator

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ROBERT C. FOSTER, Assistant
BERNICE G. SCHUBERT, Technical Assistant

79 GARDEN STREET,
CAMBRIDGE 38, MASSACHUSETTS, U.S.A.
March 28, 1947

Dr. Carleton R. Ball,
3814 Jocelyn Street, N. W.,
Washington 15, D. C.

Dear Dr. Ball:

In regard to reprints from Rhodora, there is always considerable delay. They are sent out and billed to the authors by the Intelligencer Press at Lancaster and not by the editors. The custom of the press, apparently, is to hold matter in type for some time and then when they get a chance to extract the reprints. We are always disturbed by their slowness in doing so. As I just said the bill for the reprints is sent out with them from Lancaster.

In regard to a check for \$7.50 which you say "was drawn to the Harvard Trust Company on December 13" I am naturally puzzled, since the Harvard Trust Company has no connection in any way with Rhodora, the New England Botanical Club nor the Intelligencer Press at Lancaster, and I cannot, of course, determine why you sent a check to them. At any rate they have never heard of Rhodora, nor have we heard from them about such a check. That is a matter which Rhodora and its editors cannot work out.

Sincerely yours,

M. L. Fernald

M. L. Fernald
Editor-in-Chief of Rhodora

MLF:S

P. S. Thank you for the reprint of your justified protest about publishing technical nomenclatural changes in a journal not devoted to the field. It would not be wise for me to discuss the author of the note you refer to, except to say that his publications are all of one grade and most unfortunate in their masses of inaccuracy and untenable decisions. In the recent note in Rhodora I refer to one or two discussions which show these characteristics of his work.

3814 Jocelyn St., N.W.
Washington 15, D.C. March 31, 1947
Dr. M. L. Fernald,
Gray Herbarium of Harvard University,
79 Garden St., Cambridge 38, Mass.
Dear Dr. Fernald:

Your full letter of March 28 is appreciated. I will await the reprints from the Intelligencer Press of Lancaster, Pa., with a calm mind and open pocketbook.

I inclose copy of letter just written to the Harvard Trust Co. It may tell me part of what's what. The concern of Rhodora and its editors would seem to be with the problem of how that particular bill for \$5.70, payable to the Harvard Trust Co., came to be attached to my Rhodora proof when it was sent to me. I hope that their reply will throw some light on that also.

I have known a lot about AAB and his doings for many years and agree with what you say, and more. Dr. Porter, of the Rocky Mountain Herbarium, has just saved him from making a new genus of grasses, and a new species, out of a well-described Mexican species belonging to another Tribe than that to which he insisted his novelty belonged. On Dr. P.'s suggestion he wrote to Mrs. Chase or Mrs. Reeder of the USNH and got his eyes opened.

Altho he is on the staff of the Agronomy Dept. in Wyoming, as well as in Calif., his contributions seem to be wholly in taxonomic botany. I have no connection in

Cordially yours,

Carlton R. Ball

Dear Dr. Ball:

Washington 15, D. C.
3814 Jocelyn St., N. W.
Dr. Carlton R. Ball

March 28, 1947
Cambridge 38, Massachusetts
Dr. M. L. Fernald

Carson B. Smith, Curator
Gray Herbarium, Harvard University
79 Garden St., Cambridge 38, Mass.
Dr. M. L. Fernald

Dr. M. L. Fernald, Curator
Gray Herbarium, Harvard University
79 Garden St., Cambridge 38, Mass.
Dr. M. L. Fernald

Gray Herbarium



Gray Herbarium

Studying Wilsons or