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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.

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1948

SCHNEIDER'S THREE NEW CANADIAN WILLOW SPECIES

(*Salix anamesa*, *S. fullertonensis*, and *S. hudsonensis*).

By Carleton R. Ball.

In October, 1918, Dr. Camillo Schneider published two new species and one hybrid of American willows from the Hudson Bay area of Canada. These were *Salix anamesa*, *S. fullertonensis*, and *S. fullertonensis* X *S. groenlandica* (= *S. arctophila* Coll.). In January, 1919, he republished the hybrid as a third new species, *S. hudsonensis*.

At our entry into World War I, Dr. Schneider was visiting the United States. He was interned as a German national but permitted to accept employment at the Arnold Arboretum. Being a dendrologist, he was set to monographing the American willows. Naturally, he was worried about his own situation and also about that of his family, in Germany without financial support. He had little personal knowledge of American *Salices* and almost no opportunity for travel and observation. He also was working under pressure for speed in publication. The best work is not done under such circumstances.

Finally, like many others, he had certain obsessions in taxonomic matters. One was that the presence or absence of stomas in the epidermis of the upper surface of the leaf was a genetic character of high value for taxonomic purposes. He clung to this belief in spite of finding scarcely a species which was wholly consistent in this regard. Unlike many taxonomists, however, he recorded his doubts and uncertainties, although these seldom deterred him from taxonomic action.

In the light of this background, let us examine his three new Canadian species. With the third, we must consider, also, his previous treatment of an older species (*S. anglorum* Cham.), which treatment was basic to his conclusion.

1. *Salix anamesa* Schneider, spec. nova.

Salix anamesa was published in 1918 (Bot. Gaz. 66:348-351, Oct., 1918) as a member of Section *Claucae*. After a 46-line description, Schneider cites 14 specimens and then adds 2.5 pages of discussion of his uncertainties. Of the 14 specimens cited, he expressed doubts of the actual relationships of nine. This would seem to indicate

extreme uncertainty as to the validity of his species, which he compares with S. cordifolia Pursh and S. glauca L. (American forms) of the Section Glaucæ and ~~XX~~ with S. anglorum of the Section Ovalifoliae. His discussion begins: --

"As already said, this species is certainly most closely related to S. cordifolia, from which it chiefly differs by the presence of stomata in the upper leaf surface. I should have treated it as a variety of this species were it not for the fact that there are a number of quasi intermediate forms between it and S. anglorum." (p. 350).

In other words, if there were stomata in the upper leaf surface it was S. ananassa and if there were no stomata it was S. cordifolia, even if the specimens were completely indistinguishable by other characters. As to S. anglorum, Schneider already had discussed it at great length in August, 1918, including three new varieties, but had failed to visualize the species itself, as will be shown in discussion of his third species.

Dr. Fernald, in 1926, monographed the widely distributed and normally variable S. cordifolia and six varieties, including four new (Rhodora 28:181-188) and concluded that S. ananassa Schn. was not separable from his S. cordifolia var. intensa. Fernald referred to Schneider's recorded doubts of the true affinities of numerous specimens he had assigned to his S. ananassa, and concludes: "Until its own author can recognize S. ananassa, its claims for specific rank are not likely to appeal to others". (p. 186).

2. S. fullertonensis Schneider, nov. spec.

Salix fullertonensis was published in October, 1918 (Bot. Gaz. 66:340-342), along with S. ananassa, as a member of Section Glaucæ. The description shows it to be related to S. brachycarpa Nutt. but differing markedly in the normally trailing branchlets and the much more elongated ament-bearing leafy peduncles, reaching lengths of 1-2 or sometimes 3 cm. The leaves also are duller and sometimes denticulate. An examination of most of the specimens cited, and of several others, from the west side of Hudson Bay, shows it to be a valid species of the Section Glaucæ. In its trailing habit, ^{however} it simulates most members of the Section Ovalifoliae (Arcticae), to which S. anglorum and S. arctica belong.

3. *Salix hudsonensis* Schneider, "spec. nov."

Schneider, in his second paper, discussing species related to *S. glauca*, described his *S. anamesa* and *S. fullertonensis* and immediately followed the latter with the description of a supposed hybrid, *S. fullertonensis* X *S. groenlandica* (Bot. Gaz. 66:342-343, Oct., 1918). His opening sentence reads: "The following specimens look to me more or less like forms that might be taken for *S. fullertonensis* X *S. groenlandica*." *S. fullertonensis*, as noted above, is a trailing, long-peduncled species related to *S. brachycarpa* Nutt. of Section Glaucae. *S. groenlandica* is the former name of the prostrate *S. arctophila* Chll. of Section Ovalifoliae. Note the uncertainty evidenced by Schneider's phrases: "look to me", "more or less", and "might be taken".

In his 10-line description, Schneider pictures a prostrate plant with leaves broadly ovate- or obovate-elliptical, oval, or obovate-oblong, with acute and often plicate apices, the bases rounded or broadly cuneate, the mostly glabrous upper surface shining green, and the lower surface glaucous and distinctly reticulate. The bracts were broadly obovate but he does not state their color. As representing his supposed hybrid, he cited nine specimens collected from the west side of James Bay and Hudson Bay northward to Bathurst Inlet at Lat. 67°-69° N., Long. 109°-111° W. These specimens actually represent extreme that/part of *S. anglorum* and/or var. *kophophylla* with the broadest, though not the largest, leaves, and therefore most resembling those of *S. arctophila*.

Three months later, in his third paper, Schneider redescribed his supposed hybrid as a new species, *S. hudsonensis* (Bot. Gaz. 67:57-58, Jan., 1919), and correctly assigned it to Section Ovalifoliae. This Section includes *S. arctica* Pallas of western Canada and Alaska; *S. anglorum* Chamisso, widely distributed across Canada as species and varieties; and *S. arctophila* Chll. of eastern Canada and Greenland. His 10-line description refers to the former equally brief description but now the leaves are narrower and more acute, up to 3.5 by 1.7-2 cm., and the capsules, formerly 7 mm., now are 9 mm. long.

Schneider states that his new species is:--

" . . . closely related to S. arctophila, from which it chiefly differs in the shorter pedicels and the more elongated gland. Judging by the flowers alone, one might be inclined to take it for a form of S. anglorum, but the leaves are mostly without any trace of stomata in the upper epidermis, and their color and texture are more like in S. arctophila. . . . Unfortunately I have not yet seen young female or male flowers, and further investigation is needed to elucidate the real affinity of this form, . . .".

Schneider refers to the specimens cited under his previously supposed hybrid and cites four additional specimens collected by the Prebles on the lower west side of Hudson Bay, ~~thier~~ Nos. 43 and 46 being the pistillate and staminate types, respectively. As noted above, the leaves described for the hybrid were exactly those of the broader-leaved aspects of S. anglorum Chamisso, but not including their larger leaf dimensions. The change in leaf description for S. hudsonensis merely recognizes the very common variation in the direction of Schneider's var. antiplatea of S. anglorum Cham. It also represents the relatively narrow leaves found commonly on heavily fruiting twigs, where the nutrients are used to develop the heavy crop of seeds and the leaves remain small. Furthermore, it represents the normal shape of the young and still developing leaves on many specimens of S. anglorum in the flowering stages. Schneider said (quotation above) that he had not seen young flowers of either sex in S. hudsonensis. He certainly had seen them for S. anglorum, judging by annotated specimens.

Actually, both the supposed hybrid and the later alleged new species are S. anglorum Chamisso, an old, well-known, and widely distributed Canadian species. Why did Schneider not recognize that his material belonged to that species? We can only guess. The workings of the human mind (including my own) are past finding out. It may be worth while, however, to speculate on possible reasons, as an aid to preventing similar errors in future.

Schneider's first study covered Section Ovalifoliae: "The species related to S. arctica Pall." (Bot. Gaz. 66:116-142, Aug., 1918). S. anglorum is the most widely distributed species in this Section. Schneider devoted 9.3 pages (l.c. 126-135) to a discussion of it and to the publication of three new varieties. Of this space, 4.5 pages (126-130) were devoted to the synonymy, original descriptions, types, and an 11-line

description of S. anglorum. Schneider did not have access to the type and contented himself with a brief description based on those of Brown and Richardson. He studied and annotated numerous specimens as S. anglorum but cited none of them. Nor did he amplify his description to include the variations in the abundant material so studied. It seems certain that, because he did not describe S. anglorum fully, he gained no clear mental picture of it and therefore did not remember it clearly later as he studied other Sections but turned up additional abundant material belonging to S. anglorum.

On the other hand, his three new varieties of S. anglorum were treated with unusual fullness. Var. konhophylla, with short, broad, relatively obovate leaves, got a 44-line description and 15 specimens ^{cited.} ~~studied~~ It bears the same relation to S. anglorum that var. Macounii bears to S. cordifolia. Var. araioclada had a 25-line description and 22 specimens cited, while var. antiplasta had a 22-line description and 5 specimens cited. His var. antiplasta had leaves narrowly oval, elliptical-oblong, narrowly obovate-oblong, or sometimes oblanceolate, rarely elliptical or obovate-elliptical, more or less acute at both ends, with apexes often plicate, 1.5-3 cm. long by 1-1.5 or rarely 1.8 cm. wide. Only 5 specimens, all from the Gaspé Peninsula of Quebec, were cited. The abundant similar material from the Hudson Bay area and northward was completely omitted.

It seems certain that his obsession regarding the diagnostic value of stomas in the upper leaf surface (see quotation above) was largely responsible for this rejection of annotated material. His failure to record a complete description of S. anglorum in his first paper probably was a second factor contributing to the error. An accurate concept of S. anglorum would have saved the publication of S. hudsonensis and greatly extended the north-western range of his var. antiplasta, the narrow-leaved form of S. anglorum.

In conclusion, it may be stated definitely: (a), that the specimens cited were ^{not} hybrids of the two species named; (b), that they did not represent a new species, S. hudsonensis; (c), that they represented the normally variable S. anglorum Chamisso and its varieties, along with many other specimens annotated as that species but not cited or described; and (d), that S. hudsonensis certainly is a synonym of S. anglorum, and apparently a partial synonym of its var. antiplasta also.

* Recently, Dr. Sernald (Rhodora 48:44, Mar., 1946) changed S. anglorum var. antiplasta Schneider to S. arctica Pallas, var. antiplasta (Schn) Comb. nov., without explanation.

Dr. Harold A. Senn,
Div. Botany, Central Expt. Farm,
Ottawa, Canada.

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

Sept. 17, 1948

Dear Dr. Senn:

Your air-mail letter of Sept. 16, with proof of my paper on "Schneider's Three New Canadian Willow Species, is just here.

I have just read the proof carefull and corrected 3 unimportant typographical errors. That was a might good job of typesetting. Corrected proof is inclosed.

I wish to order 100 reprints, at \$7.25, and will appreciate the additional 50 copies, if that is your practice.

I have written a short abstract, as per request, and inclose that also.

Two papers have appeared since I sent you *Salix* reprints, and copies are sent separately.

Appreciating your courtesies, I am

Cordially yours,

Carleton R. Ball

(abstract)

Schneider's three alleged new species of Hudson Bay willows were published in 1918-1919, under stress of war interment and worry. Their publications contained many expressions of uncertainty as to their relationships, and revealed a conviction that the presence or absence of stomas in the foliar upper surface was of taxonomic value.

Careful study and comparison maintains only one. *Salix anamesa* proves to be *S. cordifolia* Ph., var. *intensa* Fernald. *S. fulletonensis* is a valid species of Section *Glaucæ*, related to *S. brachycarpa* Nutt., but prostrate. *S. hudsonensis*, first described as a hybrid (*S. fulletonensis* X *S. greenlandica*), is *S. anglorum* Chamisso with some admixture of its var. *antipilesta* Schneider.

Carleton R. Ball

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Ottawa

The Canadian Field-Naturalist

A CONTINUATION OF THE OTTAWA NATURALIST
DEVOTED TO THE STUDY AND PUBLICATION OF ORIGINAL RESEARCH IN
CANADIAN NATURAL HISTORY, PUBLISHED BY

The Ottawa Field-Naturalists' Club
(FOUNDED 1878)

WITH THE ASSISTANCE OF AFFILIATED SOCIETIES

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DIVISION OF BOTANY
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Ottawa

September 16, 1948.

OTTAWA, CANADA

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AIR MAIL

Dr. Carleton R. Ball,
3814 Jocelyn St., N.W.,
WASHINGTON 15, DC

Dear Dr. Ball:

Please find enclosed proof of your paper entitled, "Schneider's three new Canadian willow species." I would appreciate your correcting this and returning it to me as soon as possible.

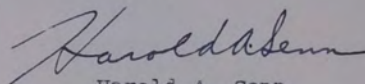
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Please prepare an abstract of your paper on the attached form and return the form to me.

Very truly yours,


Harold A. Senn,
EDITOR.

HAS:pc

(over)

3814 Jocelyn St., N.W.,
Washington 25, D.C.

June 10, 1947

Dr. Harold A. Senn,
Editor, Canad. Field-Naturalist,
Dept. of Botany,
Central Expt. Farm, Ottawa, Canada.

Dear Dr. Senn:

Returning today, I find your letter of June 6, and am glad to know that the paper on Schneider's Canadian willows can be accepted for Canadian Field-Naturalist. I shall wish to order reprints, presumable when proof is received.

Separately I send a copy of Virginia Willows, by Massey and Ball. This was issued as a conservation publication and contains a summary of the many uses of willows, without regard to species or uses in Virginia.

Your packet of reprints has arrived and I have looked at the titles and know that I shall find some very useful. Others I will return to you after scanning or reading, or will pass them along to the botanists at the National Arboretum Herbarium, in the Bu. Plant Industry, U.S. Dept. Agric., as you prefer. Many thanks for making them available.

Cordially yours,

Carleton R. Ball

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~~no 6 - P. S. I nearly forgot to say that I am sending to you separately~~

President
W. H. LANCELEY
23 ELMDALE AVE.
Ottawa

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OTTAWA, CANADA

June 6, 1947.

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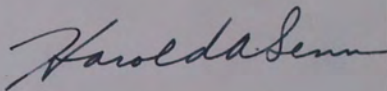
Dr. Carleton R. Ball,
3814 Jocelyn St. N.W.,
Washington 15, D.C.

Dear Dr. Ball:

Thank you for your letter of June 4
and your manuscript entitled "Schneider's three new
Canadian willow species". We will be very glad to
publish this in the Canadian Field-Naturalist.

I appreciate your kindness in sending
me reprints and I am sending you separately a few
of mine which may possibly be of some interest.

Very truly yours,



Harold A. Senn,
EDITOR.

(over)

Prof. Harold A. Senn,
Dept. Botany,
Central Experiment Farm,
Ottawa, Canada.

June 4, 1947

Dear Professor Senn:

Back in 1918 and 1919, Dr. Schneider published three new species of *Salix* from the Hudson Bay-Ungava area of Canada. In monographing American willows, I have just studied abundant material and conclude that one of them, *S. fullertonensis*, is valid, and that two of them, *S. anamesa* and *S. hudsonensis*, are not.

S. anamesa was reduced by Dr. Fernald to *S. cordifolia* Pursh var. ~~galli~~ *intensa* Fernald some years ago. *S. hudsonensis* was first published by Schneider as a supposed hybrid of *S. fullertonensis* and *S. ~~xxx~~ groenlandica* in 1918. *S. groenlandica* is now known as *S. arctophila* Gill. He published it as *S. hudsonensis* in 1919 and cited new types. I have seen them and many, many more specimens and it certainly is *S. angulorum* Chamisso.

I have discussed all three alleged new species in a 5-page paper and an inclosing with a view to publication in *Canadian Field-Naturalist*, if thought suitable.

Separately, I am sending some recent reprints which may be of interest.

Cordially yours,

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3614 Jocelyn St., N.W.

Washington 12, D.C.

Dear Prof. Senn:

June 5, 1947

After sending my letter of June 4, in which I promised recent reprints, I was completely unable to find any card in my file showing that I had sent you any reprints previously.

Accordingly, I have mailed all of which I still have copies. If by chance, some of them had been sent before, you can pass along to duplicates to others.

Cordially yours

Corleton H. Hall