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West Virginia University
COLLEGE OF ARTS AND SCIENCES
MORGANTOWN
DEPARTMENT OF BIOLOGY

Sept 27, 195[illegible]

Dear Mr Ball:

Can you identify the enclosed fragment, which was said to have been collected in Maryland?

I am now writing the text of my Winter Botany and would be glad to see any notes you may have for the identification of willows in winter. Of course I dont expect to include all of them - just the most common.

Thank you, and best wishes.

Sincerely
Earl L Core

Dr. Earl L. Core,
Dept. Botany, College of Arts & Sciences,
West Virginia University,
Morgantown, W. Va.

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

23 July, 1957.

Dear Dr. Core:

When your letter of July 19, with keys to willows in winter condition, was received, I looked in my files for previous correspondence and made a most astonishing and disgraceful discovery.

Attached to your letter of Oct. 17, 1955, was an unstamped envrlope containing a tiny willow fragmnt and a letter dated Sept. 27, 1955, but which never had been answered. It was a hand-written letter and you may not have a copy.

The fragment, inclosed herewith, is Salix Bebbiana Sargent, "said to have been collected in Maryland.". I greatly regret this long delay and apoligize most humbly.

I will give prompt study to your keys and make such suggestions as appear appropriate. These will cover both the species deserving inclusion and the characters used, and arrangement of the keys.

Cordially yours,

Carleton R. Ball.

West Virginia University
COLLEGE OF ARTS AND SCIENCES
MORGANTOWN

DEPARTMENT OF BIOLOGY

February 8, 1957

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

Dear Dr. Ball:

Some time ago I wrote to you about the possibility of preparing some sort of a key for winter characters of some of the common willows. You informed me that you had something started and I wonder if you would have perhaps come up with a tentative draft of your treatment by now. We are trying to complete the manuscript of our book within the next few months.

It occurred to me that perhaps a rather general statement might be better, after all, than an attempt at an arbitrary key. Such a statement might refer to the large number of species in the northeastern United States (the area to be covered by our book), to the difficulty of making precise determinations (even in summer!), to some of the morphological features useful in identifying willows in winter, and then to some of the more common and conspicuous species (introduced as well as indigenous), with hints as to how they can be detected in winter.

We would like the privilege of including some such statement from you more or less verbatim, with a footnote reference to its authorship.

Very sincerely yours,

Earl L Core

Earl L. Core, Head
Department of Biology

ELC:nd

(over)

(See over)

Dr. Earl L. Core,
Dept. Biology, Coll. Arts & Science,
West Virginia University,
Morgantown, W. Va.

3814 Jocelyn St., N.W.,
Washington 15, D.C.
18 February, 1957.

Dear Dr. Core:

Your letter of Feby. 8 came just when I was finishing up a flood of willows sent for determination. They are cleaned up now and I am getting caught up on letters.

I greatly regret to say that I have done no further work on winter keys for willows, and, at the moment, I am unable to find whatever material I may have prepared. As two papers promised are incomplete, I cannot get to work on that problem now.

In any case, I am inclined to believe that your suggestion of a general statement regarding charcaters evident in winter is the better one. Items most evident in winter are color and hairiness, other than size and habit. But color and hairiness are both are more largely physiological effects than physical characters.

If new twigs are yellow they will become darker (brown or reddish-brown) on the side most exposed to sun (upper or southern). In all cases the color deepens with each year thereafter, for two or three, or even four years.

Hairs change somewhat in color and abundance as the season progresses, but they become less and less hairy in the second and later years, under ordinary conditions. Of course, some are glabrous from the beginning.

These facts of color and hairiness hold true for bud-scales also and, while I try to give shape and general length of buds in my descriptions, I do not know offhand whether there is enough marked difference in the averages of shape and size to key out safely.

Of course, height and shapeseparate some species very well (if they are mature plants, and habitat difference help, but are not wholly conclusive.

A few species have distinctive characters which are visible in winter. For example, the pendant twigs of the weeping willow are easily recognized, and it also tends to hold its leaves into midwinter. Salix purpurea has the buds and leaves on the terminal portion of twi almost opposite, instead of alternate.

I hope that these observations may be of some service to you in deciding what you will try to do in this matter. If you try to grou the species into trees, large shrubs, small shrubs, and prostrate or creeping shrubs, that might be a good start. Special habit differenc might be added. Then any other special differences would be a third step. I'll note doen any relevant items as I go ahead with my two commitments, and will be glad to help you in any way I can.

Cordially yours,

Carleton R. Ball

West Virginia University
COLLEGE OF ARTS AND SCIENCES
MORGANTOWN

DEPARTMENT OF BIOLOGY

July 19, 1957

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

Dear Dr. Ball:

I enclose herewith copy of a tentative treatment of the winter characters of Salix, following your letter of February 18, 1957. I would be pleased to have you scan it carefully and make any corrections or additions which you regard as needful. Of course I have not tried to include all the willows of the northeast but only some of the more familiar ones. We could add a few, if you think of others that should be included.

I hope to have our material ready for the press within the next few weeks.

Best wishes.

Very sincerely yours,

Earl L Core

Earl L. Core, Head
Department of Biology

ELC:nd

Enclosure

Dr. Earl L. Core,
Dept. Biology, West Va. University,
Morgantown, West Virginia.

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

24 July, 1957.

Dear Dr. Core:

Your letter of July 19, and general description of winter stage of willows and keys to 13 species, is received and studied carefully. Here are my notes.

1. In this xxxx letter you refer to the "northeast", and in a previous letter to the "book". Just what is to be its title and geographic scope?

2. On the page bearing your description is a footnote: "Text by Carleton R. Ball" I cannot find record of promising text, so wish to know just what is to be covered.

3. In the description, I suggest that the description of buds start thus: Buds small to large, oblong to ovate, - - -. The buds vary from 1 to 12 or more mm. in length. As they are not being compared with other organs, they do vary from small to large.

The normal taxonomic sequence of the species covered in your keys is as follows: 1. S. lucida; 2. S. fragilis; 3. S. alba; 4. S. babylonica; 5. S. carolliniana; (? S. amygdaloides); 6. S. nigra; 7. S. interior; [redacted] S. S. rigida: (? S. petiolaris); 9. S. sericea; 10. S. discolor; 11. S. caprea; 12. S. humilis; (? S. tristis); 13. S. purpurea. S. amygdaloides and S. petiolaris are inserted in case they have been found in W.Va. since Davis and I published. If this work covers N.E. U.S., these and probably other would be included.

4. I inclose copy of a revision of your keys. I have tried to use language and sequence that seem most logical and easiet understood. For example, the 3 bud-sizes are kept at the same indentation, and mid-sized substituted for "Moderate". If the taxonomic sequence given above in 4 is adopted, the species numbers in the key would bechanged. If S. amygdaloides is included, it would be keyed as Buds mid-sized, I suppose. If S. petiolaris, goes in, it would be compared with S. rigida.

I greatly regret to discover that I have not included bud sizes in description as often as I should. I wished to include them in the Mss. for the revised Illus: Fl. but they allowed limited space and so none are given therein.

I shall be much interested in your reply to Nos. 1 and 2, above. Just now I am buried alive with determinations of Michigan Willows. 4 more large cartons arrived today. But I hope to get back to Salix writing soon.

Cordially yours,

Carleton R. Ball

W. VA

Dr. Earl L. Core,
Dept. Biology, West Va. University,
Morgantown, West Virginia.

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

24 July, 1957.

Dear Dr. Core:

Your letter of July 19, and general description of winter stage of willows and keys to 13 species, is received and studied carefully. Here are my notes.

1. In this xxxx letter you refer to the "northeast", and in a previous letter to the "book". Just what is to be its title and geographic scope?

2. On the page bearing your description is a footnote: "Text by Carleton R. Ball" I cannot find record of promising text, so wish to know just what is to be covered.

3. In the description, I suggest that the description of buds start thus: Buds small to large, oblong to ovate, - - -. The buds vary from 1 to 12 or more mm. in length. As they are not being compared with other organs, they do vary from small to large.

The normal taxonomic sequence of the species covered in your keys is as follows: 1. S. lucida; 2. S. fragilis; 3. S. alba; 4. S. babylonica; 5. S. carolinians; (? S. amygdaloides); 6. S. nigra; 7. S. interior; [redacted] 8. S. rigida: (? S. petiolaris); 9. S. sericea; 10. S. discolor; 11. S. caprea; 12. S. humilis; (? S. tristis); 13. S. purpurea. S. amygdaloides and S. petiolaris are inserted in case they have been found in W.Va. since Davis and I published. If this work covers N.E. U.S., these and probably other would be included.

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I greatly regret to discover that I have not included bud sizes in description as often as I should. I wished to include them in the Nss. for the revised Illus; Fl. but they allowed limited space and so none are given therein.

I shall be much interested in your reply to Nos. 1 and 2, above. Just now I am buried alive with determinations of Michigan Willows. 4 more large cartons arrived today. But I hope to get back to Salix writing soon.

Cordially yours,

Carleton R. Ball

West Virginia University
COLLEGE OF ARTS AND SCIENCES
MORGANTOWN

DEPARTMENT OF BIOLOGY

July 30, 1957

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

Dear Dr. Ball:

Thank you for your recent letters and the identification of the fragment of a willow. In answer to your questions and comments in your letter of July 24 I am pleased to submit the following:

1. The book to which I refer is to be called "A Manual of Winter Botany". It is to embrace essentially the region of Gray's Manual, 8th edition.

2. The "text" referred to includes only the description of the genus Salix, the key to the species, and the description of the winter characters of the species. I put the footnote at the bottom of the page to indicate how the acknowledgement might be given for your help. No further text is expected and I have written this much, the result of my third of a century's experience with winter botany, merely as a suggestion. If it meets with your approval (with your corrections) I would like your permission to include it over your name. The complete text is included herewith, with corrected numbers.

3, 4. Your notes and comments have been used as a guide in amendment of the enclosed text. Thank you very kindly.

With personal regards.

Very sincerely yours,

Earl L. Core

Earl L. Core, Head
Department of Biology

ELC:nd

Enclosures

CORE: A MANUAL OF WINTER BOTANY.

Dr. Earl L. Core,
Dept of Biology, Coll. of Arts & Sciences,
West Virginia University, Morgantown, W. Va.

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

20 August, 1957.

Dear Dr. Core:

Having recovered from a vicious attack of virus flu, and thereafter finished the determination of many large cartons of Michigan willows, I am ready for the next problem. As you have so kindly stated that you are giving me credit for authorship of the text on Salix in your forth-coming volume on winter characters of plants in the Gray's Manual range, that text must have priority. I am delighted to have a part in the project.

I have just reread my letter of Feby. 18, 1957; your letter of July 19 and my reply of July 24; and your recent letter of July 30, 1957. Some questions have been raised, others not, but all must be decided before final mss. can be prepared. The final decisions, of course, are yours. In the meantime, I will be filling the gaps in the present manuscript. Here are the questions to be settled.

1. Species To Be Included. The keys (to W. Va. willows) which I prepared originally covered your 13 species (8 native, 5 introduced) and a possible 14th species (S. petiolaris). Your draft of the keys, of course, contained the same 13.

In paragraph 5 of my letter of July 24, I suggested the possibility of including also S. amygdaloides, S. petiolaris, and S. tristis. As the volume covers the N.E. U.S. (instead of W.Va.), you may wish to consider including certain others also. My latest description and discussion of Northeastern species is in Gleason's edition of the Illustrated Flora. You may wish to consult that before deciding on the inclusion of the 3 additions named above and a possible 3 others. These are S. serissima, closely related to S. lucida; S. pyrifolia of Section Balsamiferae; and S. glaucophylloides Fernald (S. glaucophylla Bebb) of Section Commutatae. These last two sections follow immediately after Section Cordatae, represented by S. rigida Muhl.

If you wish to include any, or all, of these six additional species, let me know which ones, and I will proceed accordingly.

2. Arrangement and Numbering of Species in Taxonomic, or Some Other Order. The taxonomic order which I have tried to follow consistently is as follows:

Section Lucida (or Pentandrae): contains S. lucida (and S. serissima) as well as several western species and the introduced S. pentandra L.
Sect. Fragiles contains S. fragilis, S. alba, and S. babylonica.
Sect. Longifoliae contains S. interior and several western species.
Sect. Cordatae contains S. rigida Muhl., and several western species.
Sect. Balsamiferae contains S. pyrifolia Andersson.
Sect. Commutatae contains S. glaucophylloides Fernand and several western species
Sect. Bonplandianae includes S. caroliniana Michx., and others;
Section Triandrae includes S. amygdaloides Andersson and introduced species.
Section Nigrae contains S. nigra Marshall, and S. Goeddingii Ball.
Sect. Argentaeae includes S. petiolaris J.E. Smith, S. sericea Marsh., and others
Sect. Discolores includes, S. discolor Muhl., S. caprea L., S. humilis Marsh., and S. tristis Aiton.
Sect. Purpureae includes S. purpurea L.
These make a total of 19 species (13 included; 6 suggested).

You should decide whether you wish these presented and numbered in the taxonomic order, or otherwise. I will follow your decision. In any case, I think that the species in any one section should be numbered in consecutively.

In my letter of July 24 (par. 6), I stated that that S. petiolaris, if included, should be compared with S. rigida. That was an error. It would be compared with S. sericea of the same Section Argentaeae.

3. Discussions of Errors and Omissions in manuscript.

In my revision of keys to (supposed) W. Va. willows, on July 24, I omitted any No. 9 and gave No. 11 to both S. caprea and S. sericea. The latter species, S. sericea, should be No. 9.

In the other draft of keys, S. sericea is given ~~9~~ No. 11 also, instead of No. 9, while S. discolor, S. caprea, and S. humilis are given Nos. 9, 12, and 10, respectively, instead of the correct Nos., 10, 11, and 12, respectively.

In your copy of the keys (letter of July 30) the numbers are similarly mixed, and No. 6, S. alba, is omitted entirely. However, it appears as No. 6 in the list of species described, so I will reinsert it in the keys.

Your text describing the species stops with No. 7, S. interior. I will add descriptions of the other 6 species as I revise this ~~xxxxxxx~~ portion of the mss., and will also describe any additional species you may decide to include.

Although I have been delayed in preparing this reply, for reasons given, I will greatly appreciate as prompt a decision as possible on Questions 1 and 2, so that I may speed up completion of the manuscript.

I already have written a revised and fuller description of the genus Salix, in winter condition, and inclose 2 copies for your revision and comment.

With all good wishes, I am, Most Cordially Yours,

Carleton R. Ball.

West Virginia University
COLLEGE OF ARTS AND SCIENCES
MORGANTOWN

DEPARTMENT OF BIOLOGY

August 23, 1957.

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

Dear Dr. Ball:

Your letter of August 20 has been received, with the description of the genus Salix. I very much appreciate your interest in this matter. If anyone can prepare a usable key for Salix species in winter, you certainly should be in the best position for it.

Answers to your questions:

1. I would be glad to have you include the 6 additional species.

2. Please arrange them in the taxonomic order which seems most suitable to you.

To be consistent in length with other specific descriptions in the work, not more than 50 words for each species would be necessary, plus a statement on the geographic range. Many descriptions of species in our manuscript are less than 25 words in length.

Best wishes and again thanking you for your cooperation.

Very sincerely yours,

Earl L Core

Earl L. Core, Head,
Department of Biology.

ELC:bkh

Dr. Earl L. Core, Dept. of Biology,
College of Arts and Sciences,
West Virginia University,
Morgantown, W. Va.

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

26 August, 1957.

Dear Dr. Core:

Your letter of August 23 has just arrived, and I thank you for your very prompt attention to my queries.

I have arranged the 19 suggested species in the taxonomic order of their Sections, and of the species in each Section, and inclose a copy of the list for you use. You will see that I have placed Section F. agiles more nearly in the order in which you had arranged the species. In my first placement, I was thinking of the somewhat glandular petioles, as in Section Pentandrae. But the species of Section F. agiles have only 2 stamens and therefore come just before Section Longifoliae.

My real trouble with the winter descriptions will be the color and hairiness of the twigs. On many species these vary with the age of the twig, but how dark-colored the greenish or yellowish 1-year twigs get by the end of their first winter is another problem. In my rough draft I will write my regular description of twig and bud colors and pubescence (if any), and then check against herbarium specimens of late fall and early spring collection. If you have series of specimens collected in winter, you can check them against my rough-draft manuscript when received.

I note your desire for short description, not exceeding 50 words, and will try to keep them as brief as possible.

In writing the description of S. fragilis, I note that you wrote: "A tree becoming 30 m. tall (= 85 ft.)". Would not 30 m. actually be almost exactly 100 ft.?

Cordially Yours,

Carleton R. Ball

Dr. Earl L. Core, Dept. of Biology,
Cikkege of Arts and Sciences;
West Virginia University,
Morgantown, W. Va.

3814 Jocelyn St., N.W.,
Washington 15, D.C.
26 AUgust, 1957.

Dear Dr. Core:

I replied to your letter of August 23 this morning and had no expectation of writing to you again today, or soon. But when I began to write the text for S. fragilis, I was surprised to find that you had included "buds viscid" in both keys and text.

Never before had I seen any indication in print, or in herbariums, that the buds of S. fragilis, or any other species of Salix, were viscid. Remembering that you had stated that your new book will cover the range of Gray's Manual, I looked up the description of S. fragilis as given by Fernald in Gray, ed. 8, in 1950.

Sure enough, there it was, on p. 505: "buds viscid"; also "petioles - - - viscid toward summit when young". I would have been dumb-founded if I had not known Dr. Fernald for many years. He was a law unto himself and delighted in thumbing his nose at other taxonomists.

At his age, he knew that the new Gray's Manual (ed. 8) would be his final major work in botany, and he went the limit. A slight viscidity of the upper end of the petioles of S. fragilis might be possible where gum-exuding glands occur on the petioles, or sum of the stickiness might be carried onto the buds by crawling insects. Such action has never been recorded, to my knowledge. If it can happen, it should be much more common in the Section Pentandrae, where the glands are more numerous and larger.

Fernald messed up the willows in several other ways in Gray. ed. 8. HHere are sem of them. ~~He included several previously published hybrid species, placing an X before the names to indicate hybridity. Such inclusion inmanacks He is~~

He included several previously-published hybrid species, placing an X before the specific names to indicate hybridity. He also published some new species of his own which my later studies showed definitely to be real hybrids. He inserted S. cordata Michaux and S. syrticola Fernald as separate species althe they are absolutely identical.

He mixed up the sequence of the Sections as never was done before. From some sections he removed one of several closely related species and made it the basis of a new section : S. alba from Sect. Fragiles to new Sect. Albae; S. uva-ursi from Sect. Herbaceae to new Sect. Uva-Ursi; S. humilis and S. tristis from S. discolor in Sect. Discolores to Sect. ~~Rosmarinifolia~~ Grisease Berrer, where he lumped them with S. petiolaris (S. gracilis) and S. sericea, which really belong there.

Under Sect. Cordatae Barratt, he lumped S. rigida, S. lutea, and S. myrtillifolia, which really belong there, with S. glaucophylloides of Sect. Commutatae, and S. cordata Mixhx. (S. syrticola Fern.) of Sect. Chrysanthae, and then inserted a Sect. Chrysanthae with two other species in it.

S. tristis Aiton, universally recognized as a species for 125 years, he reduced to a var. of S. humilis. He also rejected the validity of the long established S. prtiolaris J.E. Smith (See Ball: "Salix petiolaris, American, not British." Bull. Torr. Bot. Club 75:178-187. 1948), and gave it a new varietal name under S. gracilis Anders.

These are the major items of discredit in his treatment. Cordially Yours.

Carleton R. Ball

Omitted from letter: He also described the leaves of S. fragilis as "green both sides" when they are distinctly glaucescent or fully glaucous beneath, and so described by all authors.

Dr. Earl L. Core, Dept. Biology,
College of Arts and Sciences,
West Virginia University,
Morgantwon, West. Va.

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

31 August, 1957.

Dear Dr. Core:

I have written rough-draft discussions (descriptions and distribution) of the first 10 species in the 19 to be covered by your book on winter characters of plants (Salix).

The species are numbered in order of taxonomic arrangement.

I had made only two copies, expecting to rewrite it later making three copies. I have decided to send it as is, so you get only one copy now. The different species were not written up in the order of numbers, so there are some differences (State names abbreviated in No. 2, etc).

Several questions are in mind. All of them are yours to decide.

I did not underscore the species name, because I do not know if you want it printed in italics, in capitals, or in heavy black type.

I have given as many as 3 common names. You may wish only one.

I have given the name of the Section of the genus to which each species belongs. It seems to me that it will be helpful to students, especially after the way Fernald messed up the sections in last Gary's Manual. You can cut them ot if not wanted.

I have tried to get ranges of height as accurately as possible for each species. In some cases, Britton (manual, 1901) and Britton and Brown (Illus. Flora, 1896) gave much greater heights and diameters. In a few cases I have referred to these in parentheses. You can cut out these references if not wanted.

I have tried to give the chief characters for bark, twigs, and buds, the three parts of a willow plant visible in wintwr. But my data are taken from various publications, plus a study of large numbers of herbarium specimens collected in spring and summer, and a few in autumn, but none in winter. I wish you would check these statements of color and hairiness very carefully against these characters on specimen collected in winter, if you have such a herbarium, or records. (see 2nd. par. below)

In general, I have tried to indicate that twig color progresses from original lighter colors to darker in the first year, and become still darker in 2nd and 3rd years, usually. You may wish to modify some of these statements.

I should have stated in 2nd. par. above, that the process of drying herbarium specimens undoubtedly has some effect in darkening the twig and bud colors in some cases, because we know that if not dried carefully, even the leaves qill be blackened.

As a meter equals 3,37 feet, I cannot quite understand some of the heights in feet which you gave (in parentheses with an *. Perhaps they were intended to represent average heights.

If you will correct these 10 sheets, as needed, and return them to me, I will chnage mine accordingly and return you set to you so that we will have similar sets in two places in case sof fire. For the other 9 I will make three copies and sent you two of each.

Do you have a clerical dtaff which will allow you to type the final fraft? If so you need not return these sheets to me. I will send the others soon. and then get at therevision of keys. I fear that will a real job. Sincerely

West Virginia University
COLLEGE OF ARTS AND SCIENCES
MORGANTOWN

DEPARTMENT OF BIOLOGY

September 4, 1957

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

Dear Dr. Ball:

Thank you for your letter of August 31, 1957, with the rough-draft discussions of the first 10 species of Salix. I supply below answers to the questions you raised.

1. It will be all right not to underscore species names. I sent the manuscript (minus Salix, index, etc.) off to the prospective publisher only today and we have not yet decided upon the style. We plan to publish the book privately and will decide upon format as prices become available.

2. We have used more than one common name in some other places, so please put in as many as you wish.

3. Section names may be used. For the sake of consistency and to save confusion on the part of the student, we may relegate them to a footnote, but it does seem desirable to have them. Please continue including them as you have started.

4. I will edit the references to height. My starred heights, as explained in an earlier footnote, are the maximums reported by the American Forestry Association's official Big Tree registry. I may after all omit them.

5. We do have clerical help and can prepare the final draft here.

6. I have noted with approval your other comments.

Best wishes.

Very sincerely yours,

Earl L. Core

Earl L. Core, Head
Department of Biology

ELC:nd

Dr. Earl L. Core, Dept. Biology,
College of Arts and Sciences,
West Virginia University,
Morgantown, W. Va.

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

6 September, 1957.

Dear Dr. Core:

Your letter of 4 Sept. is just received and I thank you for the information given. I am interested in your plans for publication, and trust they work out successfully. I am delighted to know that you have completed your manuscript and already have submitted to the publisher for study as to format.

I was just writing the last willow description when your letter came. It occurred to me yesterday that the very common northeastern species, Salix Bebbiana Sargent, ought to be included, so I have written it up as No. 19, changing S. purpurea to No. 20.

If you want to drop out Salix tristis, or some other, to keep the number down, that is OK with me. I mention S. tristis because it is a low inconspicuous shrub and probably not noticed by many.

I wish to emphasize again that I have written these description in the way that seemed to me to give information to those seeking winter identification. But I am new in this field. You are experienced, so I wish that you will cut out anything that you think not needed, and simplify and shortrn the text in that way. Or add other data.

For each species, I have consulted 6 to 10 manuals and numbers of othr published papers in the attempt to get descriptions of twigs and buds, as well as height and habit and bark. Bark descriptions are few. In the case of S. Bebbiana, I found only Rydberg's note on the bark of his (new var.) perrostrata, so I inserted his name there. You will cut it out. Of course, you may add much to these bark descriptions.

I am mailing you two copies each of these last 10 descriptions. You need not return one copy to me unless there is some change which you make that you wish to consult me about, and that seems unlikely.

I strongly feel not that, because of the work that you must do on this willow mss., you should be a joint author of it. As I have said, I do have the winter characers in mind from personal study and knowledge, and must depend on you to insure accuracy in the finished product.

I will now get at the keys. I feel still more worried about making a satisfactory separation on so few characters, but will do my best. In general, all species have very young twigs yellowish, and the color darkens with increasing age. How much, if any, of the lighter color appears in winter, I do not know. Luckily, I have abundant late August collection of species from 50 miles north of Montreal, Canada (as many as 50 or more specimens of each species), collected by Dr. Gerhard Gardner. Late August is late autumn up there, so the buds are fairly well developed.

Appreciating you courtesy and assistance, I am Most Cordially Yours,

Carleton R. Ball

Dr. Earl L. Core, Biology Dept.,
College of Arts and Sciences,
West Virginia Iniversity,
Morgantown, West Va.

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

21 September, 1957.

Dear Dr. Core:

I am inclosing the keys to NE. willows in winter condition. I wrote them on 2 pages and then discovered that I had omitted S. petiolaris and S. sericea. THat is why they are on 3 pages now, with portions stricken out at bottom of page 1 and top of page 3.

Yhis is my first attempt at winter keys and I am doubtful of the results. We have only 4 organs to key: plant, bark, twigs, and buds. Habit is well known, Bark characters are not used by botanists, the somef foresters use them. I can find few records and have put "(?)" after someof them because I fear they really may refer to the barkof the small branches from which the twigs were taken. I do hope that you can add authentic bark records.

Twigs and buds vary almost undescribably in size , color, and hairiness. T ese character vary during the progress of the season, and with succeeding seasons. Color varies with the position, whether on sunny or on shady side of the plant. Shininess probably varies in the same way.

I have given an arbitrary sizing of twigs and buds into small, midsized, and large (or stout). The included sizes are indicated in the keys and descriptions (in most cases). Unfortunately my descriptions were written and sent you before I gad made the keys. When I ran into the difficulties of keying, I studied and measured hundredy of specimens, and endeavored to describe more fully and accurately the colors of twigs and buds. This probably will require the adding of some changes to the descriptions of some species. I will check up on this very soon.

I trust that you will work over these keys and make any changes which your long attention to winter characters may make necessary. Also you may wish to delete some items which you do not think necessary in some of the keys

In a previous letter I suggested that I felt very strongly that the amount of work which you will have to do on descriptions and keys, especially the latter, fully entitles you to joint authorship of this chapter of your book. I hope that you will agree and that you will survive the extra labor put on you.

In my discussion above, I neglected to mention that pubescence also is extremely variale, with the progress of each season and successive seasons. Then, too, there have been described hairy varieties of normally glabrous (or glabrate) species. I have referred ot such varieties (and other variations of hairines) in the keys.

Before I wrote the keys, I prepared a table to show, in parallel columns, the winter characters of the 20 species, moree readily than in the single page descriptions of the species. I inclose a copy so that you may see the arrangement. It was made before my fuller studies necessary in making the keys.

I will greatly appreciate any comments or criticisms of the keys "as is" and your cooperation in making them better.

Cordially yours,

Carleton R. Ball

West Virginia University
COLLEGE OF ARTS AND SCIENCES
MORGANTOWN

DEPARTMENT OF BIOLOGY

October 1, 1957

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

Dear Dr. Ball:

I am sorry not to have replied sooner to your letter of September 21, with the key to northeastern willows in winter condition. This seems very good to me and so far as my experience goes I would say it is workable. I have been working with plants in winter for about a quarter of a century and our keys to West Virginia plants have gone through numerous editions, with steady refinement through the years. But this is our first venture into the broader area. I would say that only actual use will tell how accurate it is; "the proof of the pudding is in the eating".

I note your generous statement that you feel this section should appear as joint authorship. I do not exactly object to this, but do you not feel that my name on the title page of the book would be sufficient indication that I have at least edited your material? I shall, of course, go over it as carefully as I have all the other material.

We expect the completed book to appear around January 1 and I shall quickly send you a copy.

Best wishes.

Very sincerely yours,

Earl L Core

Earl L. Core, Head
Department of Biology

ELC:nd