from outward appearances the acorns containing plural seeds did not differ in shape or size from those with single seeds. Possibly the larger acorns when picked out showed more tendency to double seeds but, if so, the difference was slight. Here we have an ordinary chance case which upon examination shows over 30% of the acorns with plural seeds. This is sufficient proof of the frequency of the occurrence. It may be stated that the plural seeds are always at once easily distinguished or separated by the thin testa or seed coat which surrounds and separates them, so that however crowded or mis-shapen they may be there is no reason to confuse the seeds or pairs of cotyledons which are always contained in their own testal envelope.

While some small fruited species, like *Quercus palustris*, probably rarely, if ever, produce plural seeds, it is likely that the tendency will be found in many species in varying degree; probably also influenced by the age or vigor of the trees and the ecological conditions under which they grow.

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THE AMERICAN VARIATIONS OF STELLARIA BOREALIS.

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Stellaria borealis Bigelow presents in North America such pronounced variations that it has seemed desirable to attempt some organization of them, especially as the major varieties have rather definite and natural geographic ranges. Through much of the range of the species in North America the leaves are linear-lanceolate or lanceolate, the primary ones 2.5–8 cm. long; but in certain districts of both the Northeast and the Northwest there are varieties with short ovate, ovate-lanceolate or elliptic-lanceolate leaves only 0.7–2.5 cm. long.

The plants with elongate linear-lanceolate or lanceolate leaves have ordinarily been treated by American authors as *S. borealis*, which has been divided into a supposedly typical form, with the flowers axillary and the upper leaves scarcely reduced, and a variety "*alpestris*" or "*corollina*" with a loosely cymose inflorescence and the

upper leaves much reduced to scarious-margined bracts. These two tendencies of the species, though sometimes difficult to make out, are for the most part fairly pronounced, but a more significant character is found in the length of the mature calyx and capsule.

In the Northeast, from Labrador to Pennsylvania and the Great Lakes, and locally to the Rocky Mountains, *Stellaria borealis*, whether with only few axillary peduncles or with terminal many-flowered cymes has the mature calyx almost without exception 2–3.5 (rarely 4) mm. long and the mature (but unopened) capsule 3–5 (rarely 5.5) mm. long. In the extreme West, however, from the Behring Sea region to California, the mature calyx of both the plant with few axillary peduncles and the one with the terminal cymes, is 4–5.5 mm. long, the mature capsule 5–8 mm. long. These measurements indicate, then, that in the size of the calyx and the capsule the species breaks into actual geographic trends. The only notable exception, and that only apparently an exception, is the occurrence of plants with the large calyx and capsule on the lower St. Lawrence, from Bic to Anticosti, a region in which three-fourths of the vascular plants show identities or close affinities with the flora of the Northwest.

A glabrous plant with short ovate to elliptic-lanceolate leaves ordinarily less than 2.5 cm. long occurs from Greenland and Labrador to New England and New York, with us oftenest in alpine or boreal districts, and from Alaska to the mountains of Oregon, in Oregon and Washington being regarded as an alpine or subalpine species. This is the plant described by Bongard as *Stellaria calycantha* [1] and treated by some authors as identical with *S. borealis*, by others as a variety of it and by recent American authors as a distinct species of the Northwest.

Another variant, resembling *Stellaria calycantha* but with the young branches covered with dense crisp pubescence, is found on the mountains from Washington to northern California and eastward to Montana. This is the plant described by Howell as *Alsine Simcoei*,[2] which seems to be a pubescent extreme parallel with pubescent variants found in many other species of the *Alsineae*.

In the main these six variations of *Stellaria borealis* are well-marked and should be recognized in intensive studies of our flora; but, though some of them have been set off as species, they all show too many

[1] Bongard, Vég. Sitch. 127 (1832).
[2] Howell, Fl. N. W. Am. i. 83 (1897).

transitional tendencies to warrant their treatment as more than varieties.

The earliest publication of the species seems to have been by Michaux, who named the form with linear-lanceolate leaves and cymose small flowers *Spergulastrum lanceolatum*.[1] Michaux's plant, said to grow "in borealibus Americae septentrionalis," was actually collected, as shown by Michaux's herbarium, on the Saguenay River and Lake Mistassini. By Persoon [2] the Michaux plant was transferred to *Micropetalon* and by Torrey [3] to *Stellaria*, but owing to the existence of an earlier valid species, *Stellaria lanceolata* Poir.[4] from the Straits of Magellan, Michaux's name cannot be retained for the species under *Stellaria*.

In 1812 Ledebour published *Arenaria calycantha* [5] from Siberia and in 1832 Bongard, describing from Sitka the plant with short ovate leaves already referred to, called it *Stellaria calycantha*,[6] basing his name upon Ledebour's *Arenaria calycantha*. Subsequent authors for the most part treated *Stellaria calycantha* as identical with *S. borealis*, but Fries in 1842 accorded it varietal rank as *S. borealis*, var. *calycantha*.[7] In 1883, however, *S. calycantha* was revived as a species by Professor John Macoun who said, "Specimens. . . . are altogether unlike any form of *S. borealis* we possess. The character, 'leaves ovate-lanceolate, connate, the margin minutely ciliate with white hairs, much shorter than the internodes,' separates it from that species." [8] And in 1897, in the Synoptical Flora, Robinson, following Macoun, took up *S. calycantha* as seemingly a distinct species separated by "Leaves broader, ovate or broadly oblong, seldom an inch long." [9] If the extreme western material alone were under consideration *S. calycantha* could be easily kept apart from the plants with linear-lanceolate leaves, for *S. calycantha* has small flowers, the mature calyx 2–4 mm. long, the capsule 3–4.5 mm. long; while, as already pointed out, the extreme western plants passing as *S. borealis* have larger flowers, the calyx 4–5.5 mm., the capsule 5–8 mm. long. In the Rocky Mountains and the Northeast, however, numerous transitions

[1] Michx. Fl. Bor.-Am. i. 275 (1803).
[2] Pers. Syn. i. 509 (1805).
[3] Torr. Fl. i. 453. (1824).
[4] Poir. Encyc. vii. 416 (1806).
[5] Ledeb. Mém. Acad. Sc. Pétersb. v. 534 (1812).
[6] Bong. Vég. Sitch. 127 (1832).
[7] Fries, Novit. Fl. Suec. Mant. iii. 196 (1842).
[8] Macoun, Cat. Can. Pl. i. 75 (1883).
[9] Robinson in Gray, Syn. Fl. i. 235 (1897).

occur which leave no single character that can be held as belonging alone to one or another of these plants.

Furthermore, it is very improbable that Bongard's Sitkan *Stellaria calycantha* had anything to do with the Siberian *Arenaria calycantha* of Ledebour with which it has been universally identified and from which it derived its specific name. Were it not practically certain that Bongard had before him and described a different plant, the name *calycantha*, originating in 1812, would have to be taken up as the specific name for the complex species. But an examination of Ledebour's original description of *Arenaria calycantha* shows that he had a plant, possibly a true *Arenaria*, with two ovate bracts toward the summit of each peduncle. Ledebour's diagnosis of the species and his descriptions of the peduncle follow:

> "A. foliis oblongis acutis sessilibus basi ciliatis, pedunculis axillaribus unifloris diphyllis.
>
> . . . . . .
>
> Pedunculi terminalis et axillares, uniflori, supra medium diphylli.
> Flores nutantes, interdum bractea ovata, acuta, calyce majori suffulti." [1]

Although Bongard supposed his Sitkan *Stellaria calycantha* to be *Arenaria calycantha* Ledeb., it is clear from his account that he had not seen material of Ledebour's species but depended upon a determination by Meyer "(fide amiciss. D. Meyer, qui specimina originalia videt)." But Bongard's own species, based on Mertens's material from Sitka, has, as shown by a cotype in the Gray Herbarium labeled by Bongard himself as well as by his description, naked peduncles and is the plant of the Northwest which has been correctly identified with *S. calycantha* Bong.; but it obviously is not *Arenaria calycantha* Ledeb.

The Bongard *S. calycantha* of the Northwest, as already stated, reappears in the Northeast, being the short-leaved plant so familiar in the alpine region of the White Mountains; and, although *S. borealis* has of late been interpreted in America as a plant with elongate linear-lanceolate leaves, it becomes evident from Bigelow's original description that he had the White Mountain plant which closely matches *S. calycantha* Bong. The significant portion of Bigelow's description of *S. borealis* was as follows:

> "STELLARIA BOREALIS *Northern Stellaria.*
> *S. foliis ovali-lanceolatis; pedunculis axillaribus, elongatis, unifloris; petalis calyci subaequalibus.*
>
> . . . . . .

[1] Ledeb. l. c.

> This plant generally occurs without petals, in which state I discovered it on the White Mountains in July, 1816. I have since received it several times from the same place but always in the apetalous state, until last year, when Messrs. Greene and Little found it there in August with complete flowers." [1]

S. borealis, in this typical short-leaved form, appears to be a circumpolar plant, occurring outside North America, in Scandinavia, Russia, Siberia and Kamtschatka. But so far as the writer can determine the other American variations of the species are endemic.

The common lowland plant of the East, with elongate linear-lanceolate leaves and well-developed cyme, *Spergulastrum lanceolatum* Michaux, has, along with the larger-flowered cymose-paniculate plant of the Northwest, been confused with Fries's *Stellaria alpestris* and with Fenzl's *S. borealis, β. corollina;* but neither of these names can be safely applied to either of the North American plants.

S. alpestris, as first published by Fries in 1832, was based upon two plants previously published as varieties of *S. uliginosa* by Hartmann and by Laestadius. These two plants were treated by Fries as *S. alpestris* "α. foliis omnibus conformibus" and *S. alpestris* "β. foliis ad axillas caulis in bracteas suppressis, unde caulis apice paniculatus" [2] Later, however, in 1842, Fries [3] reduced his former *S. alpestris* α to *S. borealis*, var. *corollina* Fenzl, while an apetalous state which Fries in the meantime had distributed as *S. alpestris*, var. *aliflora* [4] was reduced to *S. borealis*, var. *calycantha* (Bong.) Fries. At the same time Fries restricted his *S. alpestris* to the Scandinavian plant with paniculate inflorescence, his earlier *S. alpestris* β which he had subsequently distributed as *S. alpestris*, var. *paniculata*,[5] and redefined the plant as a species distinct from *S. borealis*. Subsequent European authors have treated this emended *S. alpestris*, sometimes as a distinct species, sometimes as a variety of *S. Friesiana* Fenzl, and again as a hybrid of *S. borealis* and *S. Friesiana*. Authentic material of the plant from Laestadius and from Andersson shows it to be unlike either of the American plants with which it has been identified and there seems to be no reason why the name *alpestris* should be longer used for either of our plants with cymose inflorescences.

[1] Bigelow, Fl. Bost. ed. 2, 182, 183 (1824).
[2] Fries, Nov. Fl. Suec. Mant. i. 10 (1832).
[3] Fries, l. c. iii. 194–196 (1842).
[4] Fries, Herb. Norm. III. no. 31.
[5] Fries, l. c. VII. no. 34.

The other name which has been used for the two American plants with cymose-paniculate inflorescences is *S. borealis*, var. *corollina* Fenzl.[1] This supposition, that Fenzl's var. *corollina* was a plant with paniculate inflorescences, doubtless came about through his citation under it of *S. alpestris* Fries, which, as already shown, was two different species, and of *S. brachypetala* Bong; but there is nothing in Fenzl's treatment to indicate that he was establishing var. *corollina* for a plant with a paniculate inflorescence. On the contrary, he divided *S. borealis* into two varieties based merely on the presence or absence of petals: "α. *apetala:* floribus omnibus v. plurimis apetalis," etc., and "β. *corollina:* floribus omnibus 5 petalis v. paucissimis 3 petalis," etc.[2] Under each of his thus constituted varieties Fenzl distinguished some forms: of "β *corollina*" "*Lusus 1.* Calyces 1–1½ lin. longi. Caules plerumque abbreviati debiles" and "*Lusus 2.* Calyces plerumque 2 lin. longi. Caules saepe erecti longifolii elongati"; and in his citation of *S. brachypetala* Bong. as belonging to var. *corollina* he further indicates that it is "Lus. 2." Subsequent European authors have interpreted var. *corollina* merely as the form of *S. borealis* with petals and there is no clear reason why we should do otherwise. To be sure, Fenzl cited as belonging to his var. *corollina*, lusus 2, *S. brachypetala* Bongard with its "*Cyma* dichotoma";[3] but as the second form of his variety *S. brachypetala* can hardly be accepted as thoroughly typical of it. This plant, *S. brachypetala* Bong., is, as indicated by Fenzl, one of the large-flowered Northwestern varieties, and Bongard's descriptive phrase "*Cyma* dichotoma," may be taken as a fair indication that he had the large-flowered plant with loose cymes. There was, however, an earlier and quite different *S. brachypetala* of Bunge[4] from the Altai and on this account Bongard's *S. brachypetala* was renamed by Steudel *S. sitchana*,[5] which seems to be the first name for our large-flowered cymose plant free from incumbrances.

The other large-flowered plant, the variety with essentially uniform long leaves and scattered axillary flowers, was described from Mertens's Sitka material by Bongard as *S. longifolia* Muhl. But Bongard's description and a sheet of the Mertens collection in the Gray Herbarium show that it is the large-flowered plant which in the extreme

[1] Fenzl in Ledeb. Fl. Ross. i. 382 (1842).
[2] Fenzl, l. c.
[3] Bong. Vég. Sitch., 126 (1832).
[4] Bunge in Ledeb. Fl. Alt. ii. 161 (1830).
[5] Steud. Nom. ed. 2, ii, 637 (1841).

Northwest has been passing as *S. borealis* and that it cannot be placed with the earlier-described *S. longifolia* Muhl.

The American variations of *Stellaria borealis* here discussed may be distinguished as follows.

Mature calyx 2–3.5 (rarely 4) mm. long: mature but unopened capsule 3–5 (rarely 5.5) mm. long.
Leaves ovate, ovate-lanceolate or elliptic-lanceolate, the primary ones 0.7–2.5 cm. long.
Branches glabrous or essentially so.....1. *S. borealis.*
Branches densely pilose.....2. var. *Simcoei.*
Leaves lanceolate to lance-linear, the primary ones 2.5–5.5 cm. long.
Upper leaves long and but slightly reduced, herbaceous throughout; flowers few, axillary and terminal.....3. var. *isophylla.*
Upper leaves much reduced to short scarious-margined bracts: flowers numerous in terminal cymes.....4. var. *floribunda.*
Mature calyx 4–5.5 mm. long: mature capsule 5–8 mm. long: leaves lanceolate to lance-linear, the primary 2.5–8 cm. long.
Upper leaves long and but slightly reduced, herbaceous throughout: flowers few, axillary and terminal.....5. var. *Bongardiana.*
Upper leaves much reduced to short scarious-margined bracts: flowers numerous in terminal cymes.....6. var. *sitchana.*

1. S. BOREALIS Bigel. Fl. Bost. ed. 2, 182 (1824). *S. alpestris* α Fries, Nov. Fl. Suec. Mant. i. 10 (1832). *S. calycantha* Bongard, Vég. Sitch. 127(1832); T. & G. Fl. N. A. i. 186 (1838); Macoun, Cat. Can. Pl. i. 74 (1883); Robinson in Gray, Syn. Fl. i. 236 (1907); not *Arenaria calycantha* Ledeb. Mém. Acad. Sc. Pétersb. v. 534 (1812). *S. borealis,* var. *calycantha* Fries, Novit. Fl. Suec. Mant. iii. 196 (1842), in part. *Alsine borealis* Britton, Mem. Torr. Bot. Cl. v. 149 (1894), in part.— Wet or cool, often shaded situations; circumpolar. In North America from Greenland and Labrador to Alaska, south to Newfoundland, New Hampshire, western Massachusetts, central New York, Alberta and Oregon; southward often alpine or subalpine.

2. Var. **Simcoei** (Howell), n. comb. *Alsine Simcoei* Howell, Fl. N. W. Am. i. 83 (1897).— Alpine and subalpine habitats, Washington to Montana and northern California.

3. Var. **isophylla**, n. var., caulibus flaccidis 0.3–4 dm. longis; foliis lanceolatis vel lanceolato-linearibus omnibus conformibus vel subconformibus, primariis 2.5–5.5 cm. longis 2.5–7 mm. latis; floribus paucis plerumque terminalibus deinde axillaribus, pedunculis fructiferis divergentibus; calycibus fructiferis 2–4 mm. longis; petalis nullis vel inconspicuis; capsulis maturis 3–4.5 (–5) mm. longis.

Stems flaccid, 0.3–4 dm. long: leaves lanceolate or lance-linear, uniform or nearly so; the primary 2.5–5.5 cm. long, 2.5–7 mm. wide: flowers few, mostly terminal, becoming axillary; the fruiting peduncles divergent; fruiting calyx 2–4 mm. long: petals none or inconspicuous: mature capsules 3–4.5 (–5) mm. long.— *S. borealis* of many American authors.— Wet places, Labrador to Alaska, south to Newfoundland, Magdalen Islands, Prince Edward Island, New England,

Pennsylvania, Michigan and Utah. A plant from open woods, Gap Mt., Troy, New Hampshire, 13 June, 1898 (*Rand & Robinson*, no. 459 in Gray Herb.) may be designated as the type specimen.

4. Var. **floribunda**, n. nom. *Spergulastrum lanceolatum* Michx. Fl. Bor.-Am. i. 275 (1803). *Micropetalon lanceolatum* Pers. Syn. i. 509 (1805). *Stellaria lanceolata* Torr. Fl. i. 453 (1824), not Poir. Encyc. vii. 416 (1806). *S. borealis*, var. *alpestris* Gray, Man. ed. 5, 93 (1867) as to *Robbins* plant but not *S. alpestris* β. Fries, Nov. Fl. Suec. Mant. i. 10 (1832) nor *S. alpestris* Fries (emend.) l. c. iii. 194 (1842). *Alsine borealis alpestris* Britton, Mem. Torr. Bot. Cl. v. 149 (1894), in part, not *S. alpestris* Fries. *S. borealis*, var. *corollina* Robinson, Proc. Am. Acad. xxix. 286 (1894), in part, not Fenzl in Ledeb. Fl. Ross. i. 382 (1842).— Wet or shaded places, Newfoundland to British Columbia, south to Nova Scotia, New England, New York, Michigan, Wisconsin, Minnesota and the mountains of Utah.

5. Var. **Bongardiana**, n. nom. *S. longifolia* Bongard, Vég. Sitch. 126 (1832), not Muhl. in Willd. Enum. 479 (1809). *S. borealis* of American authors, as to plant of the extreme West.— Wet or shaded places, Alaska to California; also eastern QUEBEC: Anticosti, *Pursh;* Bic, *F. F. Forbes.*

6. Var. **sitchana** (Steud.), n. comb. *S. brachypetala* Bong. Vég. Sitch. 126 (1832), not Bunge in Ledeb. Fl. Alt. ii. 161 (1830). *S. sitchana* Steud. Nom. ed. 2, ii. 637 (1841). *S. borealis*, var. *corollina* Gray, Proc. Am. Acad. viii. 378 (1872); Robinson, l. c. 286 (1894) as to western plant, not Fenzl l. c. (1842). *Alsine borealis alpestris* Britton in Britton & Brown, Ill. Fl. ii. 24 (1897), in part, not *S. alpestris* Fries, ll. cc. *A. brachypetala* Howell, Fl. N. W. Am. i. 82 (1897) in part (as to Bongard synonym).— Wet, shady places, Alaska to Oregon and Idaho.

GRAY HERBARIUM.

A PUBESCENT VARIETY OF THE DWARF RASPBERRY.— While recently working over a collection of plants from the Penobscot Bay region of Maine, a specimen of the Dwarf Raspberry *Rubus pubescens* Raf. (*R. triflorus* Richardson) was noted which differed from the usual form in the pubescence. The common plant has the leaves glabrous or slightly pilose on the veins beneath, while the plant from Penobscot Bay has the mature leaves densely pilose beneath. Further examination of material in the Gray Herbarium and the Herbarium of the New England Botanical Club showed this to be a well marked tendency occurring in several places, and it should therefore be recognized as a variety, and may be called