are similar in having interrupted Subantarctic and Andean ranges and in occurring in the northern hemisphere only in western America or in the region of the Gulf of St. Lawrence or in both areas.

II. THE DWARF ANTENNARIAS OF NORTHEASTERN AMERICA.

(Plate 142.)

The larger species of Antennaria of temperate eastern America are reasonably understood, but there is another series of highly localized species, chiefly of the calcareous areas from northern Labrador to Newfoundland, eastern Quebec and the James Bay region, which have not been so clearly defined. These are the plants which have passed chiefly as A. alpina (L.) Gaertn. and which, with it, form a rather natural group of species. In the cordilleran region of North America these plants have attracted much attention and a large number have been proposed as species. In eastern America they occur wholly beyond the habitations of resident botanists, unless we include in eastern America botanically quite similar Greenland. The Antennarias of Greenland have been carefully treated and beautifully illustrated by Porsild;1 but in the region immediately to the west and southwest of Greenland these plants are collected only by the chance botanical visitor and our knowledge of them, like our knowledge of the whole vast region from Gaspé and Newfoundland northward, is in very rudimentary condition. However, the necessity of properly identifying two quite distinct species discovered in 1923 on the Shickshock Mountains makes it desirable to draw into convenient form our knowledge to date of these plants. The following synopsis of the species occurring south of Hudson Straits is therefore presented, not because it is final but because it may draw attention to a group about which much more information is needed. Further exploration of Newfoundland, Anticosti Island, the Gaspé Peninsula and the Labrador Peninsula will surely bring to light many additional species; and, to judge from our experience to date, they may be most hopefully looked for on barrens and mountains of limestone, basic schists and traps.

¹ Porsild, On the Genus Antennaria in Greenland (Arbejder fra den Danske Arktiske Station paa Disko, Nr. 9), Meddel. om Groenl. li. 267-281 (1915).

In order properly to orient the small-leaved boreal series here specially considered, the leading features of the other sections of the genus represented in eastern America are indicated in the key.

a. Basal leaves¹ erect, oblanceolate to elliptic-acuminate, 2-16 cm. long, similar to the cauline ones: involucres of the pistillate heads brown to blackish: plants sparingly to not at all stoloniferous.

A. eucosma Fernald & Wiegand and A. pulcherrima (Hook.) Greene.

a. Basal leaves spreading, forming depressed rosettes, strongly contrasting in outline with the cauline leaves: plants humifuse or freely stoloniferous b.

b. Larger basal leaves only 1.5-5 mm. wide, blunt or barely

short-mucronate c.

c. All the involucral bracts of the pistillate heads2 deepbrown, drab or blackish d.

d. Bracts subequal, narrow; the inner linear or lanceolate and acute: heads 1-6 e.

e. Rosette-leaves terminated by a short but distinct glabrous mucro: corollas 3.5-5 mm. long f.

f. Rosette-leaves glabrous and bright-green or grayish-pubescent above: cauline leaves distant; the upper with an oblong glabrous scarious appendage: corollas 4-5 mm. long: pits of the denuded receptacle 20-30, 0.3-0.4 mm. broad, much broader than the intermediate ridges....1. A. alpina.

f. Rosette-leaves canescent: cauline leaves crowded; the upper with a lanceolate pubescent scarious appendage: corollas 3.5-4 mm. long: pits of denuded receptacle 60-100, 0.1 mm. broad, about as wide as the blunt-edged intermediate

obsolete or in old weather-worn leaves barely

visible: corollas 3-4 mm. long g.

g. Cauline leaves 9-15; the median and upper tapering to a slender subulate tip; only the very uppermost with a lanceolate scarious appendage. . 3. A. cana.

g. Cauline leaves 5-8; all but the lowermost with an oblong-lanceolate flat scarious tip 1.5-3 mm.

d. Bracts in about 5 outwardly shorter series, oblong, c. At least the inner bracts of the pistillate heads with

white or whitish tips: basal leaves whitened above

with minute pubescence h.

h. The 1-3 uppermost cauline leaves with slender scarious terminal appendages: rosette-leaves blunt or shortmucronate: pistillate involucres 4-7 mm. high, with appressed-ascending bracts i.

i. Involucre of 4-6 series of distinctly unequal palebrown bracts.....6. A. straminea.

By basal leaves are meant not only those of the basal rosette but the new broad leaves terminating the stolons or basal offshoots. On account of weathering the former are often bruised and uncharacteristic.

The only species of this series of which staminate plants are known is A. nitida. The descriptions of all the others, therefore, are drawn only from pistillate plants.

- i. Involucre of 2-3 (-4) series of subequal or obscurely imbricated whitish, creamy or roseate bracts j.
 - j. Indument of the rosette-leaves close and lustrous as if varnished: cauline leaves 9-18: inflorescence glomerulate: corollas 3-3.5 mm. long k.

 - k. All but the uppermost cauline leaf merely shortmucronate: involucre viscid-hirsute, with thick and firm bracts; the thick tips entire

j. Indument of the rosette-leaves a loose tomentum:
cauline leaves 5-10: inflorescence a corymb:

corollas 3.8-5 mm. long l.

l. Flowering stems 3-7 cm. high, not glandular:
the upper cauline leaves with oblong-lanceolate scarious appendages 2-3 mm. long: heads
2-5: involucre not glandular: achenes smooth. .9. A. Peasei.

Flowering stems 0.5-1.5 dm. high, glandular-hirsute above: upper cauline leaves with subulate or involute tips: heads 3-9: involucre glandular-viscid: achenes papillose...10. A. subviscosa.

h. The 5-8 upper cauline leaves with broad flat scarious appendages: rosette-leaves mucronate: involucre (except for the whitish tips) fuscous, 6-8 mm. high,

wide), distinctly mucronate or apiculate m.
m. Rosette-leaves comparatively small, 0.2-2.1 cm. wide,
with only the midrib prominent to the tip beneath,
the lateral ribs short and evanescent n.

n. Middle and upper cauline leaves terminated by a flat or merely involute scarious appendage...A. neglecta Greene, A. appendiculata Fernald, A. spathulata Fernald, A. canadensis Greene.

n. Middle and upper cauline leaves subulate-tipped or mucronate, without a scarious appendage (except sometimes on the bracteal leaves of the inflorescence)....A. petaloidea Fernald, A. glabrifolia Fernald, A. neodioica Greene.

m. Rosette-leaves comparatively large, 0.7-5.5 cm. broad, with 3-7 somewhat prominent ribs beneath . A. plantaginifolia (L.) Richardson, A. occidentalis Greene, A. fallax Greene, A. Brainerdii Fernald, A. Parlinii Fernald, A. solitaria Rydberg.

1. A. ALPINA (L.) Gaertn. Fig. 1. Humifuse, with trailing subligneous branches up to 1 dm. long: stolons short and crowded: rosette-leaves oblanceolate, 0.8–1.8 cm. long, 1.5–4 mm. wide, narrowed to a distinct subulate-mucronate tip, bright green or canescent above: flowering stem slender, subflexuous, up to 2.3 dm. high: cauline leaves 4–13, becoming distant by elongation of the stem; the middle and upper with oblong glabrous scarious tips: pistillate heads 1–5, sessile or short-stalked: involucre 7–9 mm. high, lanate at base: bracts about 3-seriate, subequal; the outer lanceolate to oblong, fuscous, acuminate; the inner attenuate: corollas 4–5 mm. long: longer pappus-bristles 5–6 mm. long: achenes glabrous, 1.3–1.5 mm. long: pits of

the denuded receptacle 20-30, 0.3-0.4 mm. broad, much broader than the intermediate ridges.

Three varieties with us:

Var. typica. Gnaphalium alpinum L. Sp. Pl. ii. 856 (1753). A. alpina (L.) Gaertn. Fruct. ii. 410 (1791).—Arctic America, south to Kangalaksiorvik Bay, Labrador (Owen Bryant) and mountains of British Columbia; also northern Eurasia. Fl. July-September.

Var. Canescens Lange, Fl. Dan. xvi. (fasc. xlvii.) 9, t. 2786, fig. 1 (1869); Fernald, Rhodora, xviii. 237 (1916). A. angustata Greene, Pittonia, iii. 284 (1898). Var. cana Fernald & Wiegand, Rhodora, xiii. 24 (1911), in part.—The commoner extreme in eastern America, extending south to Port Manvers, Labrador (Delabarre).

Var. ungavensis Fernald, Rhodora, xviii. 238 (1916).—Known

only from the type-region, Stillwater River, Ungava District.

2. A. Sornborgeri Fernald. Fig. 2. Humifuse, with trailing subligneous branches up to 1 dm. long: stolons very short and crowded: rosette-leaves oblanceolate, 6-12 mm. long, 1.5-2 mm. wide, narrowed at summit to the short-mucronate tip, canescent-pannose: flowering stem stiffly erect, 0.4-1.1 dm. high: cauline leaves rather crowded, 9-12, linear, 5-15 mm. long, 0.5-1.5 mm. wide; the upper with villous lanceolate scarious tips: pistillate heads 1-3, sessile, campanulate: involucre 6-7 cm. high, lanate at base: bracts about 3-seriate, subequal; the outer lanceolate, brown; the inner linear-attenuate, yellowish-brown, erose-serrulate: corollas 3.5-4 mm. long: longer pappus-bristles 4-5.5 mm. long: achenes glabrous, 1.2-1.4 mm. long: pits of the denuded receptacle 60-100, 0.1 mm. broad, about as wide as the blunt-edged intermediate ridges.—Rhodora, xviii. 237 (1916).—Rama, Labrador (J. D. Sornborger). Fl. August.

3. A. CANA (Fernald & Wiegand) Fernald, Fig. 3. Humifuse, the crowded leafy stolons very short (up to 2 cm. long): rosette-leaves narrowly cuneate-obovate or broadly oblanceolate, obtuse, not mucronate, broad-based, 3-11 mm. long, 2-5 mm. broad, white above with dense minute tomentum: flowering stems 2.5-12 cm. high, slender: cauline leaves 9-15, rather crowded, linear; the lower 8-15 mm. long, 1-2 mm. broad, subulate-tipped; the median and upper subu ate-tipped; only the uppermost with a lanceolate scarious tip: pistillate neads (1-)2-6, campanulate, corymbose, on pedicels up to 1 cm. long: involucres 5-7 mm. high, lanate at base: bracts 3-seriate, subequal, very thin; the outer oblong, brown; the inner lanceolate, tawny, slightly fimbriate: corollas 3.5-4 mm. long: longest pappus

4-5.5 mm. long: achenes glabrous, 1.2-1.6 mm. long: pits of the mature denuded receptacle 60-100, 0.1 mm. broad, much broader than the acute intermediate ridges.—Rhodora, xviii. 236 (1916). A. alpina, var. cana Fernald & Wiegand, Rhodora, xiii. 24 (1911), in part.—Dry limestone barrens, western Newfoundland. Fl. July, early August.

4. A. vexillifera, spec. nov. (Fig. 4), humifusa, stolonibus foliosis confertis perbrevibus (ad 2 cm. longis); foliis basalaribus late spathulatis vel cuneato-obovatis apice rotundatis vix mucronatis 5-12 mm. longis 3-4 mm. latis supra albidis, tomento denso minuto; caule florifero 6-10 cm. alto gracili; foliis caulinis 5-8 subdistantibus, imis oblanceolatis, mediis superioribusque linearibus 5-10 mm. longis cum apice scarioso oblongo-lanceolato 1.5-3 mm. longo munitis; capitulis femineis 1-5 corymbosis hemisphaerico-campanulatis basi rotundatis; involucro 6-7 mm. alto basi lanato; bracteis 2-3-seriatis subaequalibus tenuissimis, exterioribus anguste oblongis obtusis vel subacutis basi castaneis, interioribus lanceolatis fulvis plerumque acuminatis; corolla 3-4 mm. longa, lobis purpurascentibus; stylo purpurascenti; planta mascula ignota.—Matane County, Quebec: dry open gravel on the tableland-saddle (altitude about 1070 m.) between Mt. Mattaouisse and Mt. Collins, July 8, 1923, M. L. Fernald, Ludlow Griscom, K. K. Mackenzie, A. S. Pease & L. B. Smith, no. 26,056 (TYPE in Gray Herb.).

Closely simulating A. cana but at once distinguished by its cauline leaves. In A. cana these are 9-15, the median and upper ones tapering to a slender subulate tip, only the very uppermost with a scarious tip. In A. vexillifera the cauline leaves are fewer (5-8) and all but the very lowermost bear conspicuous broad pennant-like scarious tips (whence the specific name.)

A. vexillifera has the cauline leaf-tips of A. alpina, but that species has much narrower and distinctly mucronate basal leaves, larger heads with narrower and more fuscous involucral bracts and longer corollas (4-5 mm. long).

5. A. PYGMAEA Fernald. Fig. 5. Dwarf, 3-4.5 cm. high, monocephalous, humifuse; the assurgent stolons very short, not obviously elongated: basal leaves oblanceolate, mucronate, 8-14 mm. long, 2.5-3.5 mm. wide, glabrous or glabrate above; the cauline about 9, crowded, linear-oblanceolate, 6-14 mm. long, lanate beneath, glabrous or glabrate above, with a lanceolate or narrowly deltoid glabrous flat scarious tip 1.5-2 mm. long: pistillate involucre hemispherical, 7 mm. high, 12-13 mm. broad (in the dried material), lanate at base: bracts in about 5 series, definitely imbricated, oblong, obtuse; the outer fuscous, with a short stramineous tip; the inner with a long obtuse stramineous tip: corollas 4 mm. long: staminate plant unknown.—Rhodora, xvi. 129

(1914).—Known only from northeastern Labrador¹ (Weitz et al.).

Fl. August.

6. A. STRAMINEA Fernald. Fig. 8. Plant humifuse, the leafy stolons very short or slightly elongated (up to 7 cm. long): leaves of the rosette spatulate, subacute, barely mucronate, 5-12 mm. long, 2-4 mm. broad, white above with dense fine tomentum: flowering stem 3-14 cm. high, slender, remotely leafy: cauline leaves 8-10, linear, 6-14 mm. long, 1-2 mm. wide; the median attenuate to a dark subulate tip; the upper with a linear scarious tip: pistillate heads 1-7, usually in a close corymb, hemispheric-campanulate, rounded at base: involucre 5.5-7 mm. high, 4.5-8 mm. broad (in the dried specimens), with 4-6 series of very distinctly imbricated bracts: the outer bracts ovate or oblong, brown, slightly lanate at base, with a thin chartaceous stramineous obtuse or subacute tip; the median oblong, with a deltoid obtuse or subacute stramineous tip; the inner with a lanceolate erose stramineous tip: corollas 3.7-4.2 mm. long: achenes glabrous, 1.4 mm. long: longer pappus-bristles 4.5-5 mm. long: style yellowish, becoming brown: staminate plant unknown.—Rhodora, xvi. 130 (1914).— Rocky or turfy calcareous barrens and headlands bordering Notre Dame and Ingornachoix Bays, Newfoundland. Fl. July, early August.

7. A. Albicans Fernald. Fig. 6. Plant humifuse, the leafy stolons very short (up to 2 cm. long): basal leaves spatulate, subacute or obtuse, scarcely mucronate, 3-8 mm. long, 2-3 mm. wide, white above with dense minute somewhat shining tomentum: flowering stem 4.5-9 cm. high, slender, somewhat remotely leafy: cauline leaves 9-15, linear, 6-12 mm. long, 1-2 mm. wide; the median attenuate, subulate at tip; the upper with a glabrous linear scarious tip 2-2.5 mm. long: pistillate heads (1-)2-5 in glomerules, turbinate-campanulate: involucre

As noted when A. pygmaea was published, this is the plant which Gray in the Synoptical Flora treated as A. carpathica (Wahlenb,) R. Br.: "Labrador (a monocephalous form!)." But Gray, of course, was writing long before the intensive and highly productive studies of the genus had begun. A. carpathica belongs to the very strongly defined non-stoloniferous group of species with erect and elongate basal leaves (the section including A. eucosma Fernald & Wiegand, A. pulcherrima (Hook.) Greene, A. lanata (Hook.) Greene, etc.), while Gray's "monocephalous form" is a humifuse plant with depressed rosettes of tiny leaves. Dr. Theodor Holm, lamenting the disappearance of the name A. carpathica from American literature, cites Gray's record of the Labrador plant (A. pygmaea), which was not understood by Gray, as proof that A. carpathica does grow in America, though in Labrador it so far departs from the European type as to have only a single head (Rhodora, xxii. 142); and he reinforces his argument, that A. carpathica is North American, by the statement that, "Having examined a number of specimens of A. lanata Greene I find it impossible to distinguish them from A. carpathica." I have before me 19 collections of A. carpathica of Europe and 26 of the Rocky Mountain A. lanata. In the former 2 to 4 of the median and upper cauline leaves end in a lance- or linear-subulate scarious tip, only 1 or 2 of the uppermost leaves ever showing dilated appendages; but in A. lanata 4 to 9 of the cauline leaves have broad and conspicuous pennant-like appendages. This perfectly obvious character, supplementing the broader leaves, the smaller heads, shorter corollas and shorter pappus, clearly distinguishes A. lanata from A. carpathica and it is doubtful if other students of Antennaria will follow Holm in forcing it and the wholly different A. pygmaea back into the European A. carpathica.

- 4.5-6 mm. high, 4.5-6 mm. wide (in dried specimens): bracts in 2-3 series, subequal, thin; the outer 3-4 mm. long, oblong or lanceolate, obtuse or subacute, straw-color or brown, green and a little lanate at base; inner oblong, obtuse, lacerate-erose, milk-white: corollas 3-3.3 mm. long: achenes glabrous, 0.8-1 mm. long: longer pappus-bristles 4-4.3 mm. long: staminate plant unknown.—Rhodora, xvi. 197 (1914).—Dry limestone shingle, northern domes of Table Mt., Port à Port Bay, Newfoundland. Fl. July.
- 8. A. NITIDA Greene. Fig. 9. Resembling A. albicans. PISTIL-LATE PLANT with the stiffish stolons up to 6 dm. long: basal leaves 0.5-1.5 cm. long: flowering stems 0.5-2 dm. high: cauline leaves 9-18; the middle and upper merely short-mucronate: heads 5-9 in a glomerule: involucre 6-7 mm. high, viscid-hirsute: bracts about 4-seriate, very unequal; the outer 3-4.5 mm. long, oblong, obtuse, whitish, green and densely lanate at base; the inner white, gradually narrower, obtuse, entire or barely erose: corollas 3-3.5 mm. long: achenes 0.8-1.2 mm. long: longest pappus-bristles 5 mm. ong. Staminate plant with glomerules 1-2 cm. in diameter: involucre with firm creamy or yellowish oblong to obovate entire to merely crenulate bracts: corollas 3.5 mm. long: pappus 4-4.5 mm. long, upwardly barbellate; the slightly dilated (rarely broad) tips crenate.—Pittonia, iii. 283 (1898). A. arida viscidula E. Nelson, Proc. U. S. Nat. Mus. xxiii. 710 (1901). A. viscidula Rydberg, Fl. Colo. 369 (1906).—Dry limestone soil, Charlton Isl., James Bay, QUEBEC to ATHABASCA and UTAH. Fl. late June, July.
- 9. A. Peasei, spec. nov. (Fig. 11), humifusa, stolonibus foliosis confertis perbrevibus (ad 2 cm. longis); foliis basilaribus late oblanceolatis vel anguste cuneato-obovatis 7-12 mm. longis 2-4.5 mm. latis mucronatis supra albidis, tomento denso minuto; caule florifero 3-7 cm. alto gracili; foliis caulinis 5-7 lineari-lanceolatis 0.8-1.5 cm. longis, imis mediisque subulato-mucronatis, superioribus 2 vel 3 apice scarioso oblongo-lanceolato 2-3 mm. longo munitis capitulis femineis 2-5 dense corymbosis hemisphaerico-campanulatis basi rotundatis; invo ucro 6-7 mm. alto basi lanato; bracteis 2-3-seriatis subaequalibus chartaceo-petaloideis, exterioribus oblongis subacutis pallide brunneis basi subcastaneis, interioribus similibus acuminatis lacteis; corollis 3.8-5 mm. longis; stylo purpurascenti; achaeniis glabris; planta mascula ignota.-Matane County, QUEBEC: talus of mica-schist, chimney east of Razorback Ridge (altitude 850-1000 m.), Mt. Logan, July 13, 1923, A. S. Pease & L. B. Smith, no. 26057 (TYPE in Gray Herb.).

Related to A. albicans of western Newfoundland and A. subviscosa of Rimouski County, Quebec. From the former distinguished by the distinctly mucronate and loosely tomentose basal leaves, the few cauline leaves, the larger heads, the acuminate inner involucral bracts and the longer corolla; A. subviscosa is a coarser plant with trailing

branches often 4 or 5 dm. long. It has 7-9 cauline leaves, the uppermost with subulate or involute tips; its heads are more numerous (3-9) and its glandular-viscid involucres have more definitely imbricated bracts.

Various cordilleran species, A. umbrinella Rydberg, A. pulvinata Greene, etc., are related to A. Peasei but I am unable to find any

species to which it can be satisfactorily referred.

10. A. Subviscosa Fernald. Fig. 10. Plant densely humifuse, the trailing branches subligations, often 4-5 dm. long; stolons very short and crowded: leaves of the rosettes spatulate, obtusish, scarcely mucronate or with a very short mucro, 0.5-1.5 cm. long, 2-5 mm. broad, densely white-tomentose: flowering stems 0.5-1.5 dm. high, white-tomentose throughout, glandular-hirsute above: cauline leaves 7-10, tomentose; the lower linear-oblanceolate, mucronate, 1.5-2.5 cm. long: the upper linear-attenuate, with a subulate or involute subscarious pubescent tip: pistillate heads 3-9, densely or loosely corymbose: involucre turbinate-campanulate, 5-6.5 mm. high: bracts about 3-seriate; the outer 3-4 mm. long, oblong, subherbaceous, greenish or stramineous, often rose-tinged, glandular-viscid, with a thin obtuse cream-colored or rose-pink tip; interior narrower, acutish: corollas 3.8-4.3 mm. long: achenes papillose, 1-1.2 mm. long: longer pappusbristles 4.5-5 mm. long: staminate plant unknown.—Rhodora, xvi. 131 (1914).—Cold north-facing limestone sea-cliffs east of Bic, Rimouski Co., Quebec. Fl. July.

11. A. ISOLEPIS Greene. FIG. 7. Humifuse, the leafy stolons up to 7 cm. long: rosette-leaves oblanceolate or obovate, subacute or obtuse, short mucronate, 0.8–2.5 cm. long, 2–7 mm. broad, densely white-tomentose above: flowering stems 0.7–2.5 dm. high, flexuous: cauline leaves 9–18, linear-oblanceolate, tomentose, 1.5–3 cm. long, 2–4 mm. broad; the lower with subulate tips; the 5–8 upper with broad flat scarious tips: heads 5–9, corymbose: pistillate involucres 6–8 mm. high: bracts of about 3 lengths, fuscous except for the oblong erose white or whitish widely spreading petal-like tips: corollas 3–3.7 mm. long: achenes sparingly papillose, 1–1.2 mm. long: longest pappus-bristles 4.5–5.5 mm. long: staminate plant unknown.—Ottawa Nat. xxv. 41 (1911).—Coast of Hudson Strait, Ungava District, and south near the outer coast at least to Port Manvers, Labrador. Fl. July,

August.

EXPLANATION OF PLATE 142.

Fig. 1, Antennaria alpina × 1; 1a, tip of median cauline leaf × 4. Fig. 2, A. Sornborgeri × 1; 2a, tip of median cauline leaf × 4. Fig. 3, A. cana × 1; 3a, tip of median cauline leaf × 4. Fig. 4, A. vexillifera × 1; 4a, tip of median cauline leaf × 4. Fig. 5, A. pygmaea × 1; 5a, tip of median cauline leaf × 4. Fig. 6, A. albicans × 1; 6a, tip of median cauline leaf × 4; 6b, inner bract of involucre × 4. Fig. 7, A. isolepis × 1; 7a, tip of median cauline leaf × 4. Fig. 8, A. straminea × 1; 8a, tip of median cauline leaf × 4. Fig. 9, A. nitida × 1; 9a, tip of median cauline leaf × 4; 9b, inner bract of involucre of staminate plant × 4. Fig. 10, A. subviscosa × 1; 10a, tip of median cauline leaf × 4; 10c, central flower and achene × 4. Fig. 11, A. Peasei × 1; 11a, tip of median cauline leaf × 4; 11c, central flower and achene × 4.



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