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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CLVII

M. L. FERNALD

(Plates 912-962)¹

During recent studies of four somewhat complex and often misinterpreted genera, as represented in northeastern America, the following notes have accumulated. Since the proper interpretation of many of the species and varieties is greatly aided by careful illustration, I have asked Dr. BERNICE G. SCHUBERT to prepare plates which show the essential characters, these derived chiefly from types, isotypes or other authentic specimens.

I. KEY TO ANTENNARIA OF THE "MANUAL RANGE"

(Plates 912-958)²

From the time when its diversity and great interest first impressed our botanists in 1897 there was a concentration of our most active field-botanists upon this genus in the East for about thirty-five years. By the end of that period essentially all the wide-ranging species were apparently well collected and understood, although local or endemic species are still likely to be

¹ The cost of preparing the plates and of the engraver's blocks largely met through grants from the AMERICAN PHILOSOPHICAL SOCIETY and from the DEPARTMENT OF BIOLOGY OF HARVARD UNIVERSITY.

² The cost of printing the plates met through a gift from Mr. BAYARD LONG, Associate Curator of Botany of the Academy of Natural Sciences of Philadelphia.

The inflorescences, especially whitish ones mounted on white paper, are most difficult to photograph. Their outlines, at least, are partly visible in the plates. It should be remembered that the fresh pistillate involucre is much more cylindric than the loosened ones of dried specimens, which alone are here shown.

found in unexplored areas of Newfoundland and perhaps of Gaspé. So thoroughly have these plants been studied and so clear-cut are their differential characters, ranges and flowering seasons that we more active explorers of the "effete East" thought that we had them well in hand. Beginning with the publication by Greene in May, 1897, of *A. neglecta*, PLATES 924-926, (and a few western species), the recognition of species in the region to be covered by the next "Manual" has proceeded until the differentiation by Stebbins in July, 1935, of a probable but tiny grandfather and grandmother of some of them, *A. virginica* (PLATE 937) of the ancient Appalachian Upland. So many morphological characters are found in habit, leaves, leaf-tips or appendages, pubescence, inflorescences, involucre and their phyllaries, receptacles, corollas, pappus and achenes, that keen students like the late B. L. Robinson, a life-long specialist on the *Compositae*, S. F. Blake, another sound and generally recognized specialist on the *Compositae*, and Ledyard Stebbins, outstanding morphologist and student of phylogeny, have clearly understood the differences; while some of us who have, through decades, had a tremendous experience with them in the field and the herbarium recognize the amazing stability of the essential characters. It is, then, at least surprising to be told by one "who blew in from the West" so recently that his field-experience with the plants of the "Manual range" as delimited by him (from Gaspé County, Quebec, to western Minnesota, south to southern Virginia, Kentucky and Missouri) must have been more limited than that of lifelong explorers of the area,—it is startling to be assured that in all this diverse area we have only "three fairly well-marked species", and that the segregations which have been recognized by a host of our best technical students and most observant amateurs are "too dependent on temporary whim, or at best on individual opinion, to justify specific recognition".¹

Now it so happens that in the on-the-whole satisfactorily systematized series of eastern *Antennaria* (I can say nothing of the sort for the western species nor for the undifferentiated stacks in some other large herbaria) in the two collections before me, those of the Gray Herbarium and of the New England Botanical Club, there are approximately 2500 numbers or sheets of *Anten-*

¹ Cronquist, RHODORA, xlvii. 183 (1945).

naria from the "Manual range" (in my case including Newfoundland as well as Gaspé); and more than 700 of these were collected by myself or by my companions (Robinson, Wiegand, Collins, Pease, Long, Fogg, St. John, Stebbins, Weatherby or others) and me with such intelligence as the Lord vouchsafed us. It is, furthermore, amazing, if the recognition of our species is merely "dependent on temporary whim", that there should be, in case of all species in their own areas, essential unanimity in the identifications made by the 150 quite unwhimsical and lucid collectors and students of this vast series. I enumerate in the footnote¹ only about half of these students, none of them toadies and most of them ready to disagree if they cannot concur, some of them always seeking an opportunity to do so.

Since some readers, in spite of the stated editorial policy, still assume that everything published in RHODORA has the editorial stamp of approval, I hasten to put on record the key which is prepared for the next edition of Gray's Manual. That work will include Newfoundland; consequently 10 species here appear (nos. 1, 3, 4, 5, 6, 7, 9, 10, 13 and 14) which are outside the range covered by the projected Illustrated Flora. These are here included, although they were rather fully treated and illustrated in RHODORA, xxxv. 327-346, plates 263-268 (1933). Of the 22 species occurring from Gaspé Co., Quebec, to Minnesota and southward 8 are pontificated upon by Cronquist; the remaining 14 have not received his approval even as forms. Since, by his interpretation, they are presumable local whimsies I have asked Dr. Schubert to put concretely into plates some of the characters of most of those which have not previously been carefully illustrated. I am not at this time publishing the detailed drawings of them which have been prepared for the Manual.

It certainly would seem strange, if we have in the region from

¹ Allard, Ball (C. R.), Bartram (E. B.), Bicknell, Bissell, Blake (S. F.), Blanchard, Brainerd, Brunel, Bush, Chamberlain (E. B.), Chase (Agnes), Collins (J. F.), Deam, Deane, Dodge (C. K.), Eames (A. J.), Eaton (A. A.), Eggleston, Farwell, Fassett, Faxon (Edwin), Forbes (F. F.), Gates (F. C.), Greene, Greenman, Grimes, Griscorn, Harper, Hermann, Herriot, Hill, (A. F.), Hill (E. J.), Holm, House, Hunnewell, Kennedy (G. G.), Klugh, Knowlton (C. H.), Krotkov, Lansing (O. E.), Long, Louis-Marie, McDonald (F. E.), Mackenzie, Macoun (John), Macoun (J. M.), Malte, Marie-Victorin, Maxon, Moore (J. W.), Muenscher, Palmer (E. J.), Parlin, Pease, Peck (C. H.), Rand (E. L.), Raup, Robinson, Rolland-Germain, Rousseau, Seymour (F. C.), Smith (L. B.), Standley, Stebbins, St. John, Tatnall (R. R.), Taylor (T. M. C.), Wahl, Weatherby, Webb (R. J.), Wiegand, Williams (E. F.), etc., etc.

Gaspé County westward and southward only three species, *A. neglecta*, *plantaginifolia* and *solitaria*, that two tiny plants, *A. vexillifera* (PLATE 913) and *A. Peasei* (PLATE 915), utterly unlike any of the three elect, should have taken the whim to isolate themselves near or above such arctic-alpine companions as *Lycopodium alpinum* L., *Deschampsia atropurpurea* (Wahlenb.) Scheele, *Carex nardina* Fries, *C. rariflora* (Wahlenb.) Sm., *Juncus castaneus* Sm., *Luzula confusa* Lindeb., *Salix herbacea* L., *Betula glandulosa* Michx., *Oxyria digyna* (L.) Hill, and others likewise never found with *Antennaria neglecta* of low altitudes much farther south. These being "small-leaved", they have to go, apparently, into Cronquist's hodgepodge "*A. neglecta*."¹ True lowland *A. neglecta* (PLATES 924-926) has prolonged and nearly naked flagelliform stolons, the midrib of the basal leaves excurrent as a subulus, the inflorescence at first glomerulate but by elongation of the rachis (sometimes up to 1.5 dm. long) finally becoming spicate or racemose. As a result of the crazy whim by which, if the latest interpretation is valid, they isolated themselves on alpine and subalpine spots hundreds of miles away from the relatively southern true *A. neglecta*, they lost the flagelliform stolons and became compact, with crowded assurgent leafy offshoots, stubbed off the terminal subulus of the rosette-leaves (thus taking on a character of the large arctic-alpine series to which they really belong), and changed their inflorescences from ultimate racemes to mere unaspiring corymbs, and lost the characteristic papillae which occur on at least the young and undried achenes of *A. neglecta*, as well as of the other relatively southern species. In the latter character they belong with the great bulk of the Arctic and Eurasian series,² not with the common species of the eastern United States.

If, furthermore, the latest interpretation of *Antennaria* is not

¹ Although the title of Dr. Cronquist's paper emphasizes "the northeastern United States", his inclusion, as one of his varieties, of *A. gaspensis* indicates a broader eastern extension of his limits; for *A. gaspensis* is known only from the calcareous mountains, bluffs and slopes of easternmost Gaspé County (Mt. Ste.-Anne and coastal cliffs at Percé; Cap Gaspé; Le Forillon to Grande-Grève; Cap Rosier and Anticosti) and western Newfoundland. Since *A. gaspensis* of the extreme eastern tip of the Gaspé Peninsula is included by Cronquist it must be assumed that species found on the Peninsula farther west, *A. vexillifera*, *Peasei*, *subviscosa* and *appendiculata*, automatically come within his range, although he does not account for them in his "three fairly well-marked species" of the whole "Manual range".

² See the very significant article, *On the "Papillose" Achenes in the Genus Antennaria* by Morten P. Porsild in RHODORA, xxxiv. 213-222 (1931).

itself "too dependent on temporary whim" (as it seems to be) and is a sound and sensible treatment, we must also put *A. subviscosa* (PLATES 916 and 917) into all-inclusive *A. neglecta*, already defined, for, unlike the two alpine species just discussed, *A. subviscosa* has papillate achenes. If it is only *A. neglecta* in complete disguise it has been playing a great joke. *A. neglecta* has slender, lash-like stolons ending in tardily developed rosette-leaves, which are completely rotted off during the second year; its cauline leaves end in scarious appendages; its involucre is 6.5–9 mm. high; its corollas 5–6.2 mm. long; the style usually purple; the longer pappus-bristles 6–9 mm. long. Greatly excited, if the latest flash-interpretation is correct, by freeing itself from sex, which so generally characterizes *A. neglecta* and, therefore, by the theory involved, makes it a species, and getting into a sweeter soil than the sour and worn-out old fields and pastures where the relatively southern male and female *A. neglecta* persist in growing together, *A. subviscosa* must have taken a broad jump to the limestone walls which face north toward the vast lower River St. Lawrence and the Gulf, there finding new neighbors, Arctic, northern Cordilleran or North Pacific calcicolous specialties such as *Woodsia glabella* R. Br., *Festuca saximontana* Rydb., *Calamagrostis purpurascens* R. Br., *Carex concinna* R. Br., *Cerastium beeringianum* Cham. & Schl., *Arabis Holboellii* Hornem., *Saxifraga cespitosa* L., *Potentilla nivea* L., etc. Landed there, among neighbors who could never know of its earlier sexual existence farther south, and now safely apomictic, it further shook off any supposed alliance with *A. neglecta* by taking on a suffruticose habit, the larger plants (PLATE 916) trailing out as long-lived mats a full meter across, with the crowded branches heavily invested with long-marcescent basal foliage, the latter without the subulus of *A. neglecta*, the cauline leaves merely mucronate or subulate-tipped, the corymb viscid with glandular secretions, the pale involucre only 5–6.5 mm. high, the corollas shrinking down to a length of only 3.8–4.3 mm., the styles becoming diluted to a creamy tone, and the longer pappus-bristles shortening to only 4.5–5 mm. On the larger mats the old branches carry for many years the ancient flowering stems, holding on as marcescent remnants. Who ever saw any of our other eastern *Antennarias* do that? In fact, no one who understands *Antennaria* would

guess that *A. subviscosa* belongs with or ever had anything to do with *A. neglecta*. That, however, is the only place for it if, in all the Manual range, we are given a choice of only "three fairly well-marked species".

These three species and many more from Gaspé or elsewhere in Canada and the northernmost states, as well as some from farther south, have real characters, as real as those of *Polygonum viviparum* L., *Saxifraga cernua* L. and a host of other sexless and morphologically definite plants; and by those who, happily, still believe the stable morphological characters of more importance than "large" or "small" leaves alone they will be maintained. Furthermore, if the recent student of the genus were consistently retaining as species and varieties of *Antennaria* only those which are bisexual, he would be at least logical; but he includes as a variety under his "*A. neglecta*", the strictly apomictic and tremendously isolated *A. gaspensis*, which differs from everything else he puts into *A. neglecta* in its receptacle being higher than broad (instead of broader than high), a character which in *Eupatorium* is considered subgeneric (or even generic). If his treatment of *Antennaria* is typical of what is to be expected for other groups in the new Illustrated Flora, it would seem that that work will be an abbreviated pocket-novel, the next Gray's Manual a family bible.

KEY TO ANTENNARIA TO BE USED IN THE NEXT GRAY'S MANUAL

N. B.—The pistillate involucre only are intended in the measurements (unless otherwise specified); the counts and descriptions of *upper* cauline leaves refer to those *below* the inflorescence and exclude the bracteal leaves in the corymb.

- a. Basal leaves erect, oblanceolate to elliptic-acuminate, 2–18 cm. long, similar to the cauline ones; involucre of pistillate heads deep-brown to blackish; achenes glabrous, not papillate.
 Flowering stem with 4–10 leaves; pistillate corollas 3–4.3 mm. long; exserted tip of mature style three-fourths as long as corolla; longer pappus-bristles 6–7 mm. long; phyllaries of staminate heads fuscous; staminate corollas 3–4 mm. long. 1. *A. eucosma*.
- Flowering stem with 6–12 leaves; pistillate corollas 4.5–5.2 mm. long; exserted tip of mature style at most one third length of corolla; longer pappus 9–11 mm. long; phyllaries of staminate heads whitish; staminate corollas 4–5 mm. long. 2. *A. pulcherrima*.
- a. Basal leaves spreading, forming depressed rosettes, strongly contrasting in outline with the cauline leaves; plants humifuse to stoloniferous. . . . b.

- b. Larger basal leaves only 1–5 mm. wide, blunt or only obscurely mucronulate, whitened above; flowering stems only 0.05–1.8 dm. high; only pistillate plants known, their involucre deep-brown to blackish or, if pale, at most 7 mm. high. . . . c.
- c. Cauline leaves 15–28, very crowded (except in old individuals), the upper 7–20 with twisted scarious tips 2–3 mm. long; taller stems up to 4 (rarely –6) cm. high; involucre with 3–4 very unequal series of conspicuously imbricated phyllaries; achenes glabrous. . . . 3. *A. columnaris*.
- c. Cauline leaves 4–16, only the upper 1–7 with scarious tips; flowering stems mostly 4–18 cm. high; involucre with phyllaries subequal or in 2 or 3 unequal series (or in 4–6 series in no. 10, which has only 8–10 remote cauline leaves, with 3–5 appendaged, and pale involucre) . . . d.
- d. Involucres deep-brown to blackish; phyllaries subequal or in 2–3 unequal series. . . e.
- e. Involucres with the lower half prolonged, green and viscid, the phyllaries closely and firmly appressed or agglutinated to form an ellipsoid-campanulate falsely gamophyllous cup 7–9 mm. high; corollas 5–5.5 mm. long; achenes glabrous. . . . 4. *A. Foggii*.
- e. Involucres with loose and distinct phyllaries; corollas 3–5 mm. long. . . f.
- f. Phyllaries conspicuously unequal, in 3 series, the outer about half as long as the inner; corollas 4–5 mm. long
Cauline leaves 6–9, the 2 or 3 upper with unguiculate subulate tips 0.6–1.5 mm. long; involucre 6–7 mm. high, their outer and median phyllaries with scarious tips 1.2–2 mm. wide; style included or nearly so, subentire; achenes papillate, 1.1–1.4 mm. long. . . . 5. *A. Bayardi*.
- Cauline leaves 8–14, the 4 or 5 upper with flat scarious tips 2–3.5 mm. long; involucre 7.5–9 mm. high, their outer and median phyllaries with scarious tips 2–2.5 mm. broad; style exerted, 2-cleft; achenes glabrous, 1.8 mm. long. . . . 6. *A. brunnescens*.
- f. Phyllaries subequal, in 2 or 3 series, the outer nearly as long as the inner; corollas 3–4.5 mm. long; achenes glabrous. . . g.
- g. Flowering stems at most 1.2 dm. high, with 5–8 leaves; the 3–6 upper leaves with flag-like oblong-lanceolate flat tips.
Involucres 7–10 mm. high, with squarrose pale brown phyllary-tips 1.3–2 mm. broad; upper 3 or 4 cauline leaves appendaged; corollas 4–4.5 mm. long; achenes 1.2–1.4 mm. long. . . . 7. *A. cana*.
- Involucres 6–7 mm. high, with ascending fulvous phyllary-tips rarely more than 1 mm. broad; upper 4–6 cauline leaves appendaged; corollas 3–4 mm. long; achenes 1.6–1.8 mm. long. . . . 8. *A. vexillifera*.
- g. Flowering stems slender, up to 18 cm. high, their 8–15 leaves mostly subulate-tipped,

- only the uppermost with lance- or linear-involute scarious tips; involucre 5-6 mm. high, the outer ascending tips 1-1.7 mm. broad.....9. *A. confusa*.
- d. Involucres milk-white or ochroleucous or pale brown; achenes glabrous....h.
- h. Cauline leaves 5-10; involucre pale brown or stramineous, sometimes roseate or greenish, 5-7 mm. high; corollas 3.7-5 mm. long; mature pappus 4.5-5 mm. long....i.
- i. Involucres of 4-6 series of conspicuously unequal phyllaries, stramineous to pale brown....10. *A. straminea*.
- i. Involucres of 2 or 3 series of subequal phyllaries. Flowering stems 3-7 cm. high, not glandular; upper cauline leaves with oblong-lanceolate scarious appendages 2-3 mm. long; involucre not glandular; achenes glabrous.....11. *A. Peasei*.
- Flowering stems 5-18 cm. high, glandular above; upper cauline leaves with subulate or involute tips; involucre glandular-viscid at base; achenes papillose.....12. *A. subviscosa*.
- h. Cauline leaves 9-15; involucre milk-white or ochroleucous, 4.5-6 mm. high; corollas 3-3.3 mm. long; mature pappus 4-4.3 mm. long.....13. *A. albicans*.
- b. Larger basal leaves mostly wider, 0.2-5.5 cm. broad, usually distinctly apiculate or mucronate, green and glabrous to white-tomentose above; flowering stems, 0.4-5 dm. high; involucre whitish, greenish, pale brown or fulvous, 5-11 mm. high; staminate plants of some species known....j.
- j. 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....k.
- k. Middle and upper cauline leaves of pistillate plants terminated by a flat or merely inrolled scarious appendage....l.
- l. New rosette-leaves bright green and glabrous or promptly glabrate on the upper face....m.
- m. Rosette-leaves spatulate to cuneate-oblongate or narrowly cuneate-obovate, scarcely petioled, rounded at tip or only subacute, terminated by a mucro less than 0.5 mm. long; heads 1-6; plants of Nfld. and e. Que.....n.
- n. Basal offshoots crowded, scarcely elongate; basal leaves 6-13 mm. long, 2-4 mm. wide; flowering stem 5-13 cm. high, its longer leaves barely 1 cm. long; involucre brown, 6-8 mm. high; corollas 4.5 mm. long; achenes glabrous. 14. *A. Wiegandii*.
- n. Basal offshoots elongate, when well developed cord-like; basal leaves 1-3.5 cm. long, 4-12 mm. wide; flowering stem 0.5-3 dm. high, its longer leaves 1-2.5 cm. long; involucre whitish, 7-11 mm. high; corollas 4.8-6 mm. long; achenes papillate. Rosette-leaves broadly rounded at summit; lower and median cauline leaves obtuse, merely mucronate-tipped, the upper 1-3 with scarious appendages.....15. *A. spathulata*.

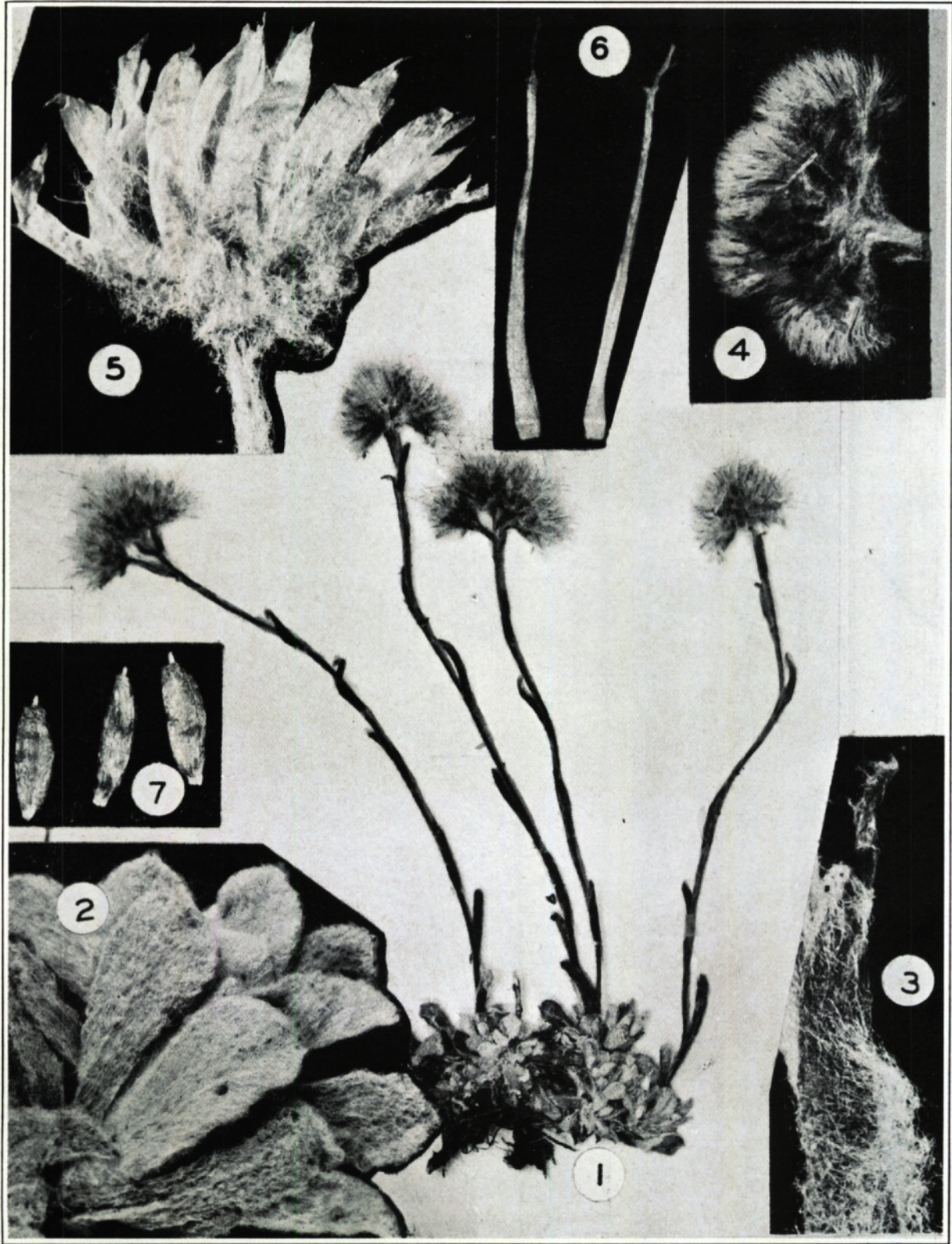


Photo. B. G. Schubert.

ANTENNARIA VEXILLIFERA: FIG. 1, plant, $\times 1$; FIG. 2, basal rosette, $\times 5$; FIG. 3, tip of cauline leaf, $\times 10$; FIG. 4, inflorescence, $\times 2$; FIG. 5, involucre, $\times 6$; FIG. 6, corollas, $\times 10$; FIG. 7, achenes, $\times 10$.

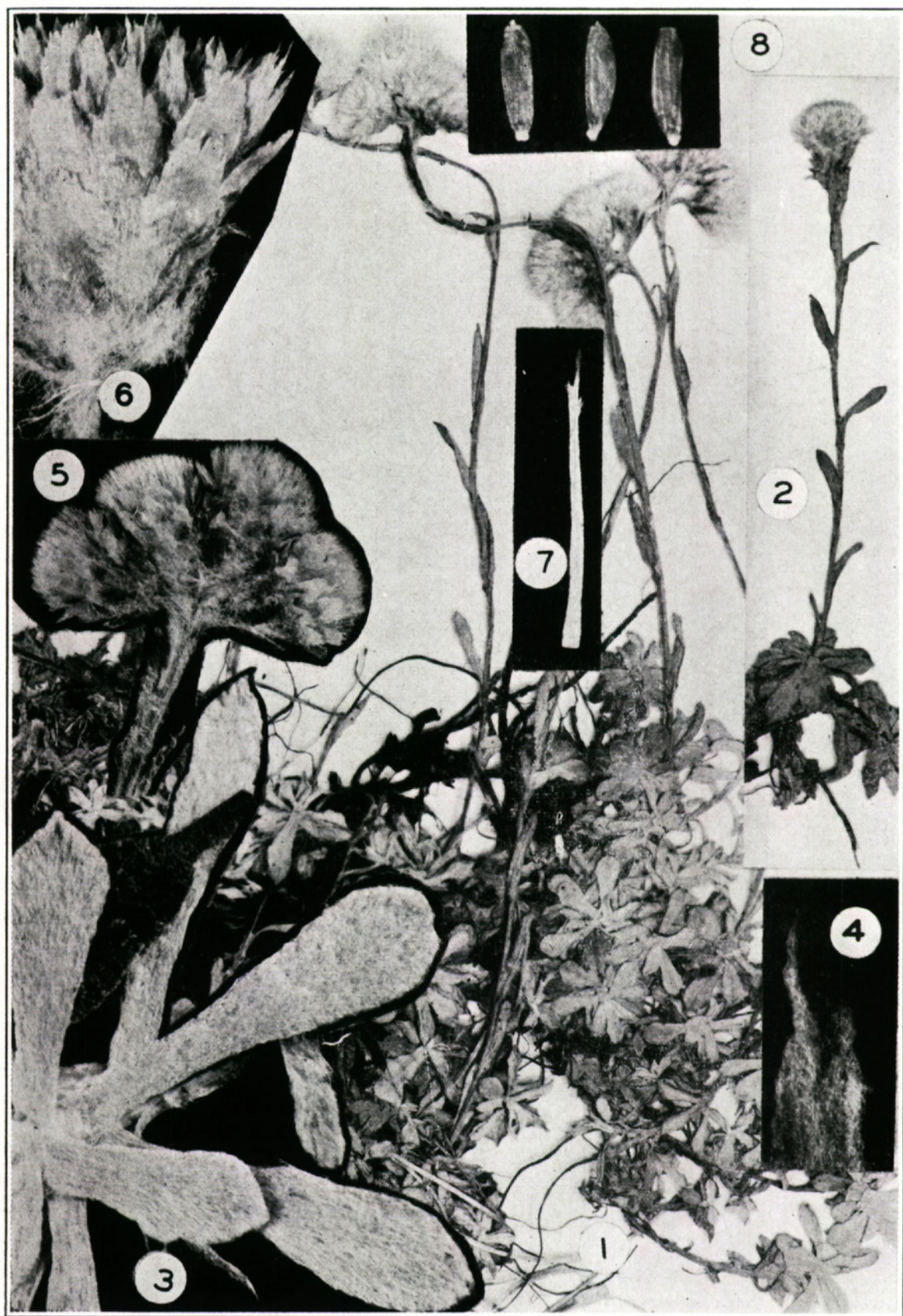


Photo. B. G. Schubert.

ANTENNARIA STRAMINEA: FIGS. 1 and 2, plants, $\times 1$; FIG. 3, portion of basal rosette, $\times 5$; FIG. 4, tips of cauline leaves, $\times 10$; FIG. 5, inflorescence, $\times 2$; FIG. 6, involucre, $\times 5$; FIG. 7, corolla, $\times 10$; FIG. 8, achenes, $\times 10$.



Photo. B. G. Schubert.

ANTENNARIA PEASEI: FIG. 1, plant, $\times 1$; FIG. 2, basal rosette, $\times 5$; FIG. 3, tip of cauline leaf, $\times 10$; FIG. 4, inflorescence, $\times 2$.



Photo. J. F. Collins.

ANTENNARIA SUBVISCOSA: small portion of large plant, $\times \frac{2}{5}$, trailing over limestone cliff.

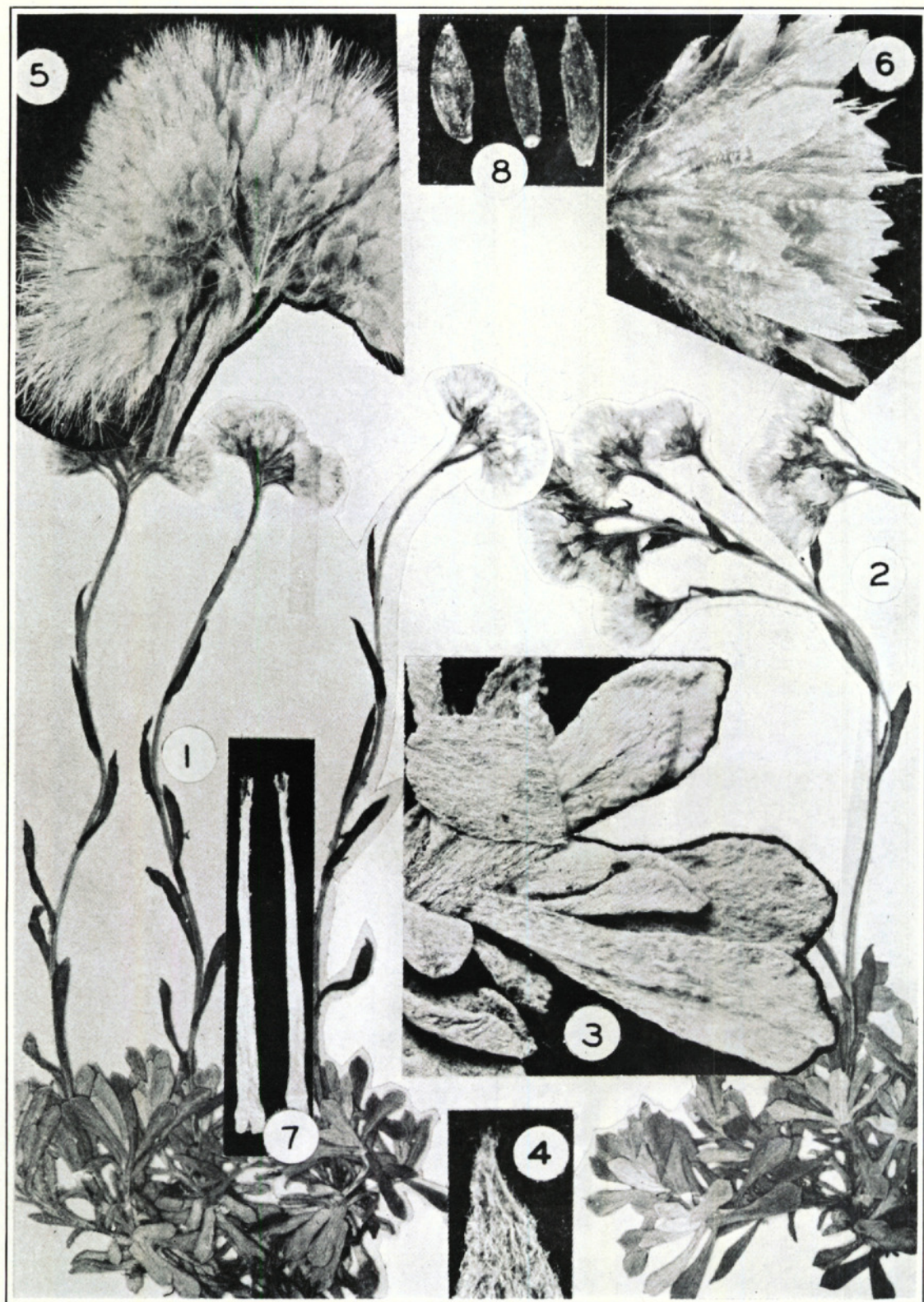


Photo. B. G. Schubert.

ANTENNARIA SUBVISCOSA: FIGS. 1 and 2, small plants, $\times 1$; FIG. 3, basal leaves, $\times 5$; FIG. 4, tip of cauline leaf, $\times 10$; FIG. 5, inflorescence, $\times 2$; FIG. 6, involucre, $\times 6$; FIG. 7, corollas, $\times 10$; FIG. 8, achenes, $\times 10$.

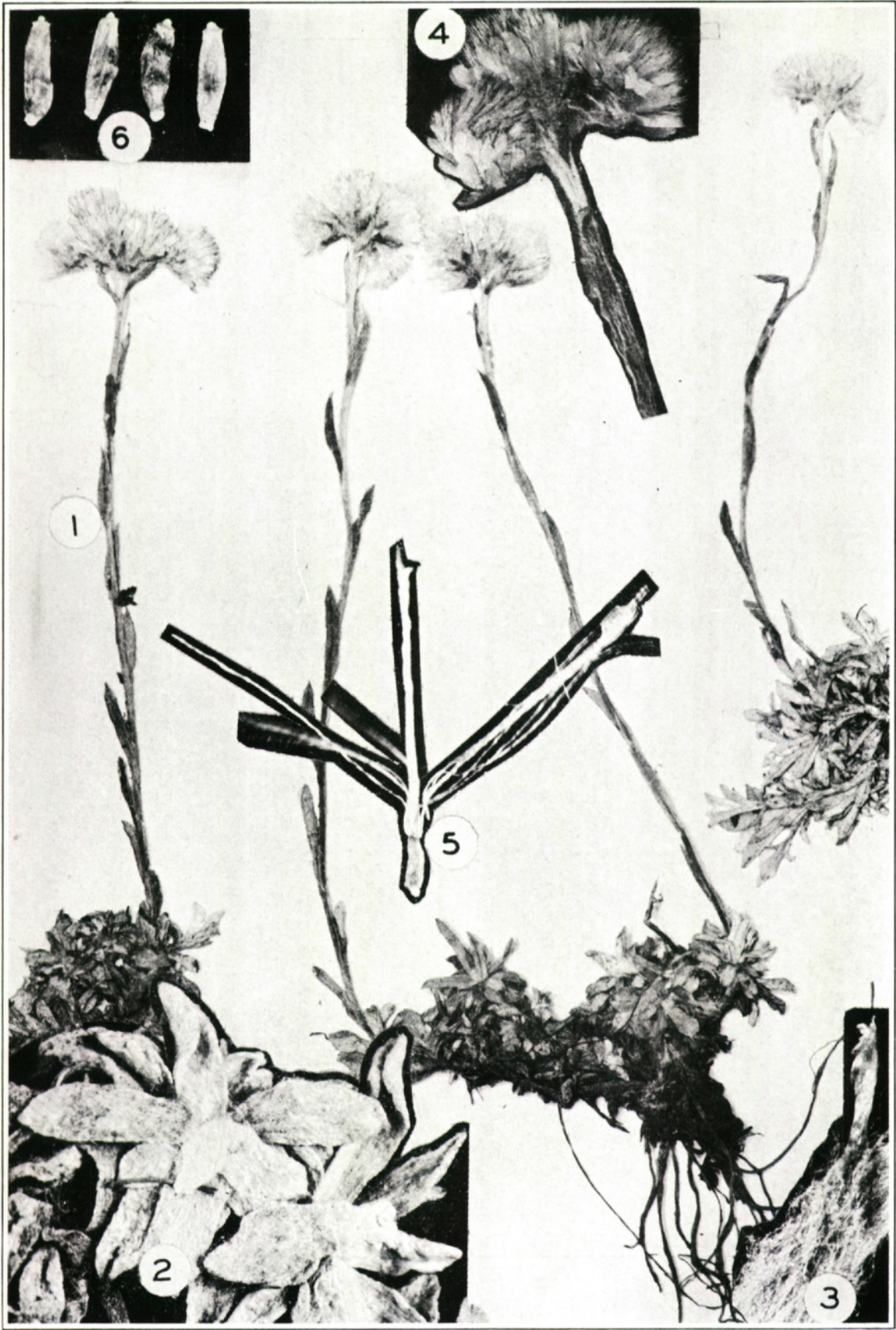


Photo. B. G. Schubert.

ANTENNARIA ALBICANS: FIG. 1, plants, $\times 1$; FIG. 2, basal rosettes, $\times 5$; FIG. 3, tip of cauline leaf, $\times 10$; FIG. 4, inflorescence, $\times 2$; FIG. 5, pistillate flower, $\times 10$; FIG. 6, achenes, $\times 10$.



Photo. B. G. Schubert.

ANTENNARIA WIEGANDII: FIG. 1, plant and a basal rosette, $\times 1$; FIG. 2, basal rosette, $\times 5$; FIG. 3, inflorescence, $\times 2$; FIG. 4, achenes, $\times 10$.



Fernald, Merritt Lyndon. 1945. "CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CLVII." *Rhodora* 47, 221–235.

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