

furrows, puberulent; pappus of numerous, coarse, basally flattened bristles, these distichously ciliate throughout, unequal in length. Cotyledons (after germination) much elongate, terminally rhombic. Base chromosome number $x = 9$.

Marshalljohnstonia gypsophila Henrickson, sp. nov.

Folia ovato-rhomboidea vel spathulata irregulariter 1-2-dentata carnosae 45-95 mm longa; capitula terminalia solitaria erecta longipedunculata; phyllaria foliacea imbricata ovata vel elliptica; flores roseo-purpurei 27-39 mm longi; achenia truncata uniformiter 5-sulcata, puberula 7-9 mm longa; pappus distiche ciliatus.

Coarsely branched shrubs 5-7 dm high, to 12 dm wide, stems erect or the peripheral ones weak, somewhat decumbent but erect terminally; young branches 3-5 mm thick, glabrous, light brown throughout or maroon at the leaf base, the older ones 5-16 mm thick with coarse, horizontally and vertically fissured, roughened, gray periderm; shoots congested with internodes 1-2 mm long or elongate with internode 8-20 (-40) mm long; lactiferous in the phloem. Leaves 45-95 mm long, petiolate, blades fleshy, variably rhombic, ovate, elliptic to spathulate, or obovate, 32-50 (-70) mm long, 14-25 (-50) mm wide, acute to acuminate and prominently scarious-toothed at the tip, cuneate to narrowly attenuate at the base, scarious, entire or with 1 (-2) pair of pronounced whitened lateral teeth at the margins, glabrous, gray-green, isolateral, mostly erect, fleshy, the midrib prominent abaxially; petiole 1-2 (-4) cm long, narrowly to broadly winged, decurrent. Capitula solitary, on peduncles 1-3 (-6.5) cm long, 1-2 mm thick, with 1-4 narrowly elliptical, acuminate, sessile bracts 11-30 mm long, 1.2-5 mm wide; involucre 19-29 mm long, of 13-15 foliaceous, imbricate phyllaries, the inner ones narrowly elliptical, 19-30 mm long, 2-4 (-8) mm wide, acuminate-aristate, entire, erect, the outer ones more broadly ovate to elliptic, 15-20 mm long, 5-9 mm wide, broadly cuneate at the base, more recurved, one-half to two-thirds the length of the inner ones, gray-green, often with purplish margins; receptacle slightly convex, coarsely alveolate, with rims to 0.5 mm high; flowers 10-18, 27-39 mm long, the ligules 15-20 mm long, 5-6.5 mm wide, narrowing to the 5-toothed apex, the teeth 1.3-4 mm long, strong purple-pink, purple-striped over the five nerves, sparsely pilose on abaxial surface above the tube, anther column dull yellow, 8-9 mm long, with scarious rounded lobes at the tip, scarious and sagittate at base, exerted from tube at anthesis; style 27-47 mm long, dark purple, scabrous without, the branches 1.8-4 mm long, subterete, stigmatic within; achenes cylindrical, slightly fusiform, truncate at the apex, the outer ones slightly arcuate, with five evenly-spaced furrows, puberulent,

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hairs. — 5. Uniseriate hair, ca. 300 μ m long. — 6. Achene with pappus showing furrowed achene. — 7. Transverse section of achene ca. 1 mm in diameter. — 8. Pappus showing distichous nature of setae and gradual broadening towards base. All *Henrickson 13682* (type). All scale lines = 1 cm.



FIG. 1-8. *Marshalljohnstonia gypsophila*. — 1. Elongate central stem bearing shortened lateral shoots with terminal solitary, pedunculate flowers. Note fissured pattern on stem, variable leaf shape. — 2. Flower head with imbricate foliaceous bracts. — 3-4. Florets without pappus. 3. Abaxial view. 4. Side view showing position of uniseriate

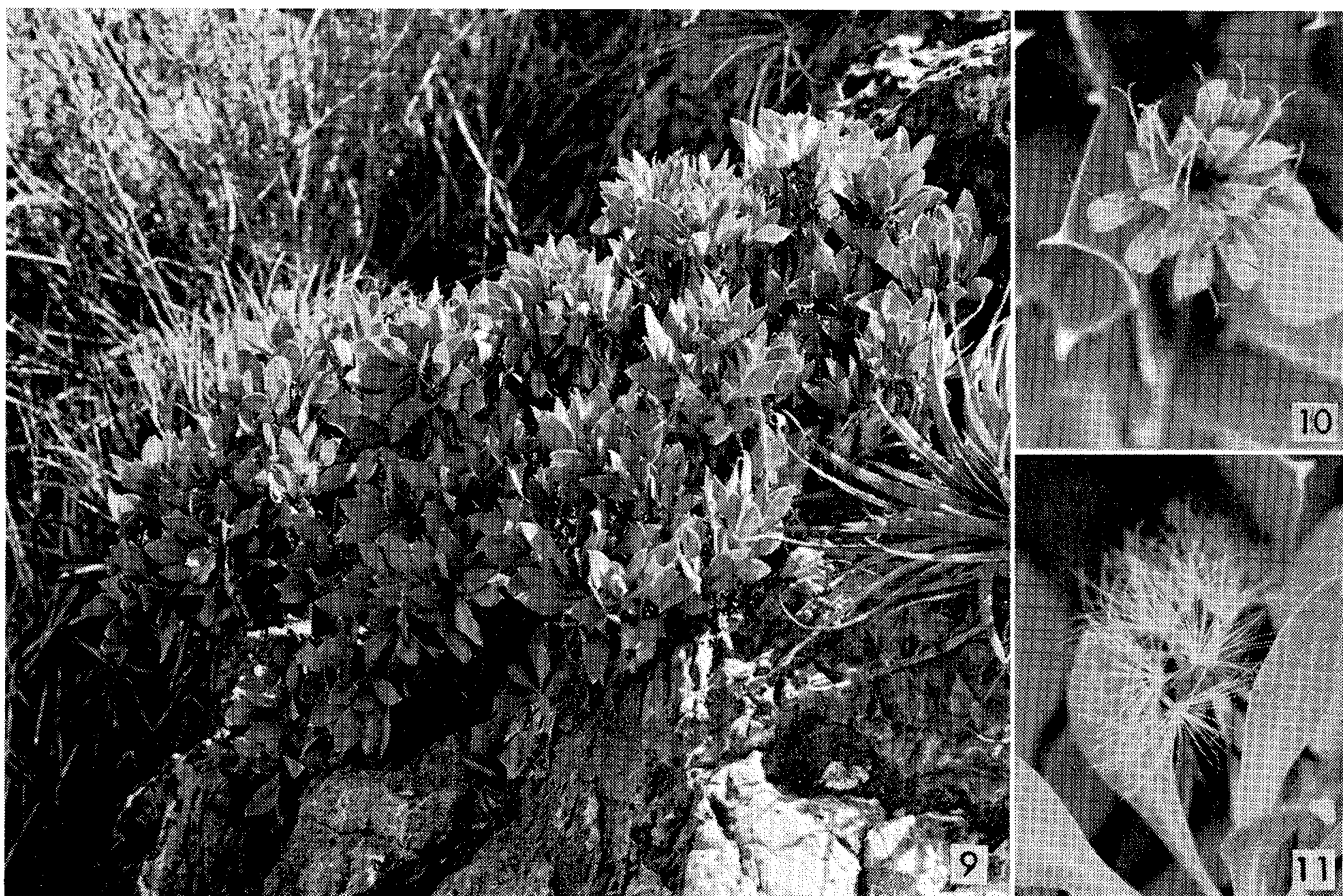


FIG. 9–11. *Marshalljohnstonia gypsophila*. — 9. Habit of plant about 5 dm high to 12 dm wide. Note sprawling lateral stems. — 10. Flowering head in late afternoon, partially closed. Note white apex of leaf. — 11. Fruiting head showing nature of pappus. All *Henrickson 13682*.

7–9 mm long, to 1.1–1.3 mm broad, light tan to stramineous; pappus of 47–60 light yellowish-tan bristles (10–) 15–18 mm long, slightly flattened (0.1–0.2 mm), slightly connate at the very base, narrower above, distichously ciliate from the base, the hairs to 0.2 mm long; pollen tricolporate, echinate with six abporeal lacunae, 45–50 μm in equatorial diameter. Chromosomes number, $n = 9_{\text{II}}$. (Fig. 1–11.)

MEXICO. COAHUILA: Ca. 115 (air) km SW of Cuatro Ciénegas, 2.4 km SW of Las Delicias, E side of Sierra de las Delicias above and S of Agua Grande; near 26,13N, 102,48W, ca. 1100 m, 29 Sep 1973, *Henrickson 13682* (TEX, holotype; ASU, CSLA, GH, NY, RSA, UC, US, isotypes). Other collections from the same general locality (TEX): 24 Mar 1973, *Johnston et al. 10389B*; 12 Aug. 1973, *Henrickson & Wendt 12297*; 15 Aug. 1973, *Henrickson 12447*; 26 Sep 1974, *Henrickson 14326*.

The name of the genus honors Marshall Conring Johnston, Professor of Botany, University of Texas, Austin. The new species is known only from the type locality where it occurs on steep north- and south-facing gypsum outcroppings of the Upper Cuchillo Formation deposited in the Lower Cretaceous, Aptian Epoch (Kelly, 1936). The highly weathered gypsum occurs in rather pure beds and is mixed with layers of dolomite and particu-

larly of limestone, which in many areas supports the finer gypsum. The vegetation here is open, and limestone and gypsum outcroppings tend to support distinct floras. On limestone *Hechtia scariosa* L. B. Smith, *Agave lecheguilla* Torrey, *Dasylirion* sp., *Jatropha dioica* Sesse ex Cervantes, *Mortonia greggii* A. Gray, *Acacia neovernicosa* Isely, *Hedyotis* sp., *Polio-mintha* sp., *Selaginella lepidophylla* (Hooker & Greville) Spring, and *Notholaena* sp. are the most conspicuous species. On gypsum *Drymaria elata* I. M. Johnston, *Coldenia greggii* (Torrey & A. Gray) A. Gray, *Castilleja lanata* A. Gray, *Euphorbia astyla* Boisser, *Fouquieria shrevei* I. M. Johnston, *Viguiera dentata* (Cavanilles) Spring, *Machaeranthera gypsophila* B. L. Turner, *Nerisyrenia johnstonii* Bacon, *Phacelia gypsogenia* I. M. Johnston, *Polygala racemosa* S. F. Blake, *Petalonyx crenulatus* A. Gray, and *Notholaena bryopoda* Maxon are more common.

In growth habit *Marshalljohnstonia* is a low, spreading shrub with thick stems and rather fleshy leaves (Fig. 9). Although most central stems are erect, the lateral ones are weak, often decumbent, and erect only at the tip. The leaves, produced in a $\frac{3}{8}$ phyllotaxy, are crowded near the tip in most stems. The internodes are 1–2 mm long, but under optimal conditions, elongate shoots with internodes to 40 cm may be produced (Fig. 1). If rains are sufficient during late summer (August–September), each shoot terminates in a single flower on an elongate bracteate peduncle. As moisture becomes limiting in the fall, the plant becomes dormant and may die back considerably. Growth resumes through the development of new shoots (innovations) from nodal regions on old stems that results in the moderate branching (Fig. 1). Growth, development, and flowering are closely tied to the amount of water available. Seedlings grown in greenhouses have been kept in leaf for two years.

In habit *Marshalljohnstonia*—with its thick stems, clustered terminal leaves, and moderate branching pattern—is a rosette shrub, a growth habit occurring in several genera of the Lactuceae with species in maritime or insular situations. Carlquist (1974) noted that climatic moderation involving both rainfall (generally 1000 mm per year) and temperature (averaging above 22 C without extremes) favors development of secondary woodiness from herbaceous ancestral stock. *Marshalljohnstonia*, in contrast, comes from a very arid environment where rainfall (as measured from Cuatro Ciénegas, 85 km to the northeast) averages 130 mm per year (Vivo & Gomez, 1946) and is both seasonal (July through September) and variable from year to year. Temperatures are also extreme, ranging from a maximum of 44 C to a minimum of about –10 C. *Marshalljohnstonia*, however, escapes some of these extreme conditions through dormancy.

The leaves of *Marshalljohnstonia* have a terminal tooth and two (less commonly none to four) lateral teeth and in this character vary considerably, even on the same stem. The teeth are achlorophyllous, strongly vascularized and develop a distinctive white encrustation of an undetermined noncrystalline material over their surfaces. A similar-appearing encrustation

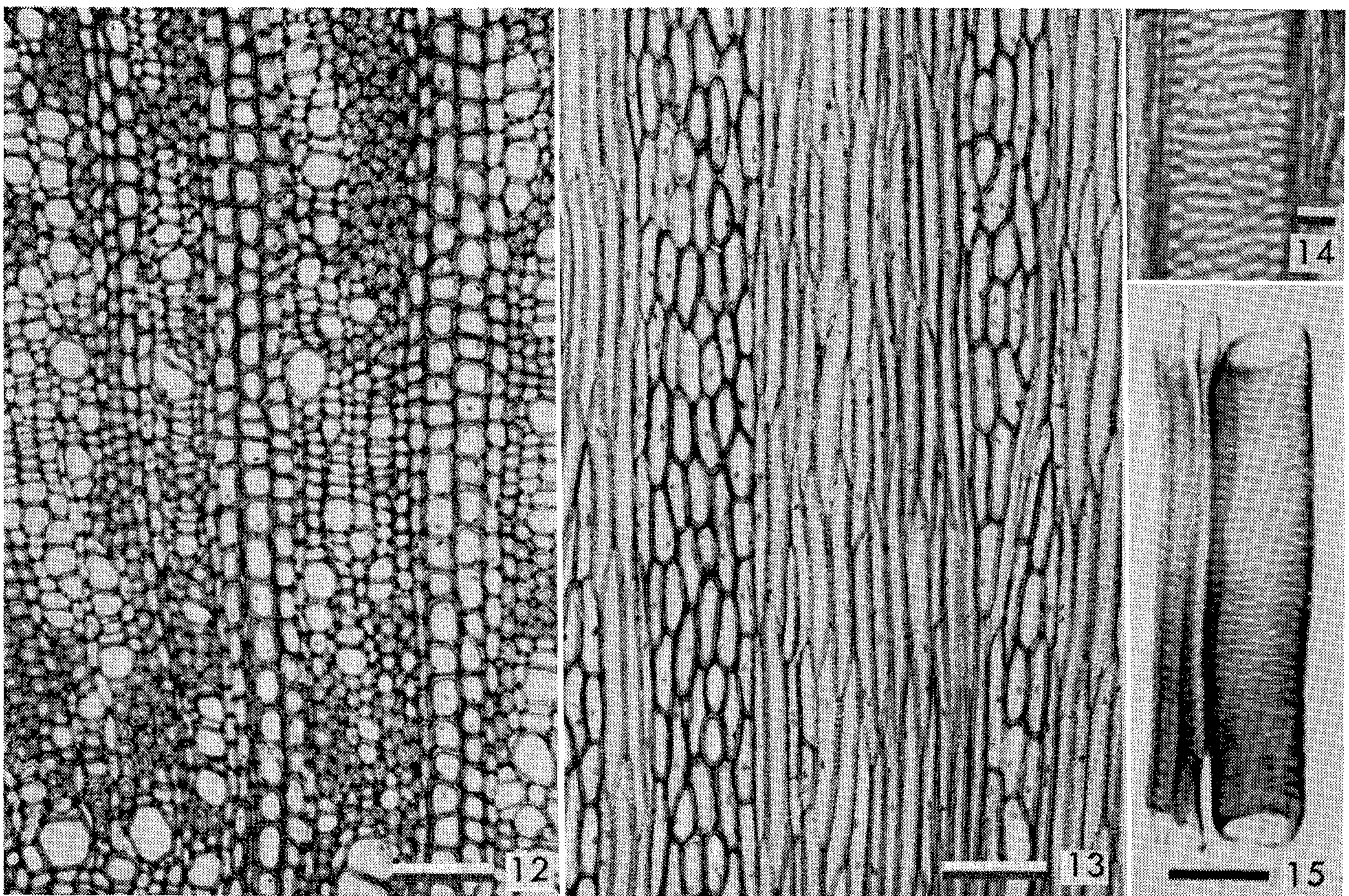


FIG. 12-15. Xylem of *Marshalljohnstonia gypsophila*. — 12. Transverse section showing two major rays and initiation of third (on left), patches of fibers and others of vessel elements and axial parenchyma. Note area of radially oriented cells at end of increment. — 13. Tangential section showing erect ray cells, storied elements. Most narrow axial elements are vessel elements. — 14. Vessel-element tangential wall showing transitional pitting. — 15. Vessel elements exhibiting great variation in diameter. All *Henrickson 13682*. Scale lines: in 12-13 = 100 μm ; in 14 = 10 μm ; in 15 = 50 μm .

was noted on leaves of some collections of *Pinaropappus roseus* (Lessing) Lessing.

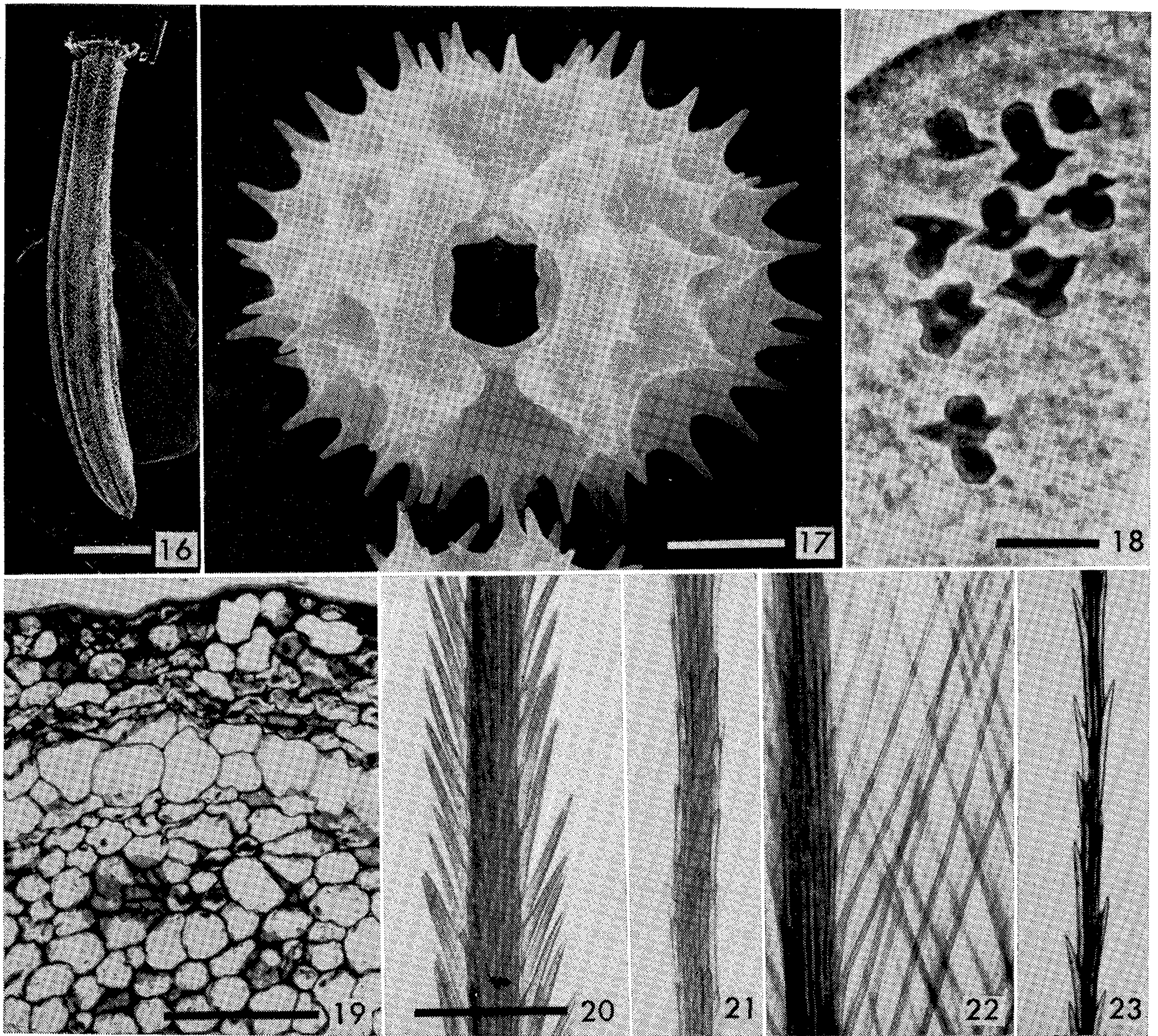
The leaves are isolateral, mostly vertically oriented, and notable fleshy. Stomata average 55-60 per mm^2 on abaxial and 60-70 per mm^2 on adaxial surfaces. The lamina are about 0.5 mm in thickness and the mesophyll is not divided into distinct palisade-spongy mesophyll layers, but rather all mesophyll cells are cylindrical or frequently variously lobed. Air spaces are well developed and chloroplasts line the walls of all mesophyll cells. Vascularization is also well developed with each leaf receiving three major traces from a trilacunar three-trace node. The two lateral traces diverge from the central vascular cylinder well below the medial trace as in *Lygodesmia juncea* (Pursh) D. Don (Spann, 1933), and these traces ramify greatly, producing as many as ten smaller bundles at the leaf base margin. A series of three to seven articulated anastomosing laticifers occur adaxial to the phloem, and broken leaves exude latex along all major veins. The leaves exhibit a number of xeromorphic characteristics that Shields (1951) noted in other gypsophiles. These include the isolateral structure, the

lack of distinct spongy mesophyll-palisade layers, the fleshiness, and concomitant reduction of surface-volume ratios. On the other hand, the large size of the leaves would seem to be an adaptation toward increased photosynthesis during the often brief time that the plants are in leaf.

Young stems of *Marshalljohnstonia* average about 4 mm in thickness and have a parenchymatous cortex 1.2–1.5 mm thick and a more or less continuous stele of vascular bundles separated by uniseriate, lignified, medullary rays and a lignified pith about 1 mm in diameter. A periderm develops within the cortex about 0.25 mm below the epidermis during the initial season (Fig. 19). Phellum cells are noticeably large (ca. 125 μm), nearly isodiametric, and stain positively for lignin and suberin. As the periderm develops the outer cortex-epidermis separates from the living inner cortex tissue and develops a characteristic vertical and horizontal fissure pattern (Fig. 1). In older stems a thick coarse layer of gray periderm develops that retains the coarse fissure pattern. In a stem 15 mm in diameter the periderm often exceeds 3 mm in thickness.

Articulated anastomosing laticifers occur in the phloem, which also contains sieve-tube elements with simple transverse sieve plates, companion cells, phloem parenchyma, and dilated phloem rays. Phloem fibers are absent.

The xylem exhibits a mosaic pattern with patches almost exclusively of fibers alternating with others of vessel elements and axial parenchyma (Fig. 12). Vessel elements are angular in transverse section and have simple, mostly oblique perforations and circular (alternate) but occasionally scalariiform (transitional) lateral wall pitting (Fig. 14). While the vessel-element length of 270 (175–365) μm is comparable or longer than that of other taxa studied in the tribe (Carlquist, 1960), vessel-element diameter at 29 (10–87) μm (Fig. 15) is significantly smaller, a feature which, Carlquist (1966, 1975) noted, correlates with xeromorphy as it allows the plant to withstand higher negative tensions that may develop in the vessels during periods of water stress. Tertiary helical thickening, however, is rare and poorly developed. Vessels, in distinct aggregations—often in radial groups of six (1–13)—also exhibit a dimorphism; areas with large vessel elements alternate with areas of very narrow elements that are often equal, and in transverse section, difficult to distinguish from axial parenchyma, a feature also noted in *Stephenomeria virgata* Benth and *S. (Munzothamnus) blairii* Munz & I. M. Johnston (Carlquist, 1960). A similar dimorphism is also noted in libriform fibers, which measure 470 (260–700) μm in length, 20–25 μm in maximum diameter, and 3–6 μm in wall thickness. As noted above, fibers tend to occur in uniform aggregations 60–350 μm in radial length (Fig. 12). While average fiber length is greater than that reported in other species of the tribe (Carlquist, 1960), fibers produced at the end of a growth increment are much shorter and have much thinner walls. In these regions (Fig. 12) the initial radial arrangement of the derivatives is retained for the vessel elements do not increase in diameter and the thin-



FIGS. 16–23. *Marshalljohnstonia gypsophila*. — 16. SEM photomicrograph of achene showing puberulent surface and furrows. — 17. SEM photomicrograph of acetolyzed pollen in equatorial view. Note fusion of spine bases around pore and distinct abpolar lacunae. — 18. First meiotic division showing nine chromosome pairs. — 19. Transection of outer cortex of young stem showing development of periderm (large cells) within cortex. — 20–23. Comparison of pappus structure and development of lateral setae. 20. *Marshalljohnstonia gypsophila* (Henrickson 13682). 21. *Lygodesmia dianthopsis* (Eaton ex King) Tomb. *Christ 2006* (CSLA). 22. *Stephanomeria tenuifolia* (Torrey) Hall. *Hood 124* (CSLA). 23. *Pinaropappus roseus* (Lessing) Lessing. *Powell & Edmonson 687* (TEX). Scale lines: in 16 = 1 mm; in 17–18 = 10 μm ; in 19, 20–23 = 100 μm .

walled fibers do not undergo significant apical intrusive growth—apparently a reflection of unfavorable environmental conditions. Also, when fiber lengths are grafted by size classes they show a distinct bimodal distribution.

Axial parenchyma is both apotracheal, associated with the last-formed elements on an increment, and paratracheal scanty, associated with the tracts of vessel elements where they form an incomplete sheath around larger vessel elements in a pattern characteristic of the tribe (Carlquist, 1960).

The nonextending derivatives of fusiform cambial initials (i.e., axial parenchyma and vessel elements) show a storied pattern. In the last-formed xylem of an increment where fibers do not undergo significant elongation, these also conform to the storied pattern (Fig. 13).

Both uniseriate and multiseriate rays are present, but uniseriate rays are rare, representing the initial development stages of multiseriate rays, and in this feature the species is unique in the tribe. In contrast, multiseriate rays are prominent (Fig. 13), measuring 4.4 (0.5–7.4) mm in height and 50–70 μm (3–6 cells) in width. These rays are by far the largest in the tribe (Carlquist, 1960). They are homocellular, consisting of erect and square cells, and number six to eight per tangential millimeter. In some marginal, more decumbent stems only about the first millimeter of the rays was lignified, and the outer rays were nonlignified. In most stems, however, all ray cells were lignified.

Xylem of *Marshalljohnstonia* shows traits characteristic of both xeromorphy and of the rosette-shrub habit. Strongest xeromorphic features include the very narrow vessel elements and the tendency for high vessel clumping (Carlquist, 1962, 1966, 1975). In contrast, the very long multiseriate rays composed entirely of erect and square cells, the moderately long vessel elements, and the occasional transitional pitting are among the characteristics described by Carlquist (1962, 1966, 1974, 1975) as paedomorphic and common in rosette shrubs.

Within the Stephanomeriinae, similar xylem occurs in *Stephanomeria*, particularly in *S. blairii*, which has storied wood, narrower vessel elements in terminal bands, etc. (Carlquist, 1960). Xylem from the caudex of the herbaceous genus *Pinaropappus*, which appears to be similar to the new genus on the basis of certain vegetative and floral features, is very different and clearly paedomorphic. Vessel elements are very short (average length 125 μm) and have scalariform lateral wall pitting. Vascular tracheids are also common. Some species of *Pinaropappus* have lignified fibers and axial parenchyma associated with the vessel elements, while in other species only vessel elements are lignified and fibers are absent.

RELATIONSHIPS

In the Lactuceae the glabrous *Marshalljohnstonia*, with its pinkish corollas, cylindrical fusiform achenes, setose pappus, echinate pollen, and relatively short style branches, best fits within the Stephanomeriinae as defined by Stebbins (1953). Its relationships within the subtribe, however, are much less clear. On the basis of gross morphology, *Marshalljohnstonia* appears most closely related to *Pinaropappus*, a genus of seven species primarily of Mexico and Texas. Though species of *Pinaropappus* are all perennial herbs, some with short rhizomes and one (*P. parvus* S. F. Blake) forming reduced mats, their basic structure is similar to that of *Marshalljohnstonia*. In both genera the leafy stems of a season's growth terminate in a solitary head on an elongate bracteate peduncle. They also have many floral

characteristics in common. Their involucre consist of imbricate "leafy" phyllaries; those of *Pinaropappus* are much thinner and have broad scarious margins whereas those of *Marshalljohnstonia* are of much thicker and more foliaceous. Achenes of both genera are marked with five equally spaced, narrow furrows. In *Pinaropappus* the achenes of most species are elongated distally into an attenuate beaklike portion that is furrowed and of the same texture as the achene body (i.e., not forming a true beak) whereas in other species achenes are truncate. In all species the achenes are glabrous though relatively roughened. Achenes of *Marshalljohnstonia* are truncate, and occasionally the outermost in the head may be slightly attenuate (Fig. 6, 7, 16). They are also smooth and puberulent (as in *Chaetadelpha*). The two genera also have the same base chromosome number of $x = 9$.

Although these genera share a number of common characteristics, there are some significant differences. In *Pinaropappus*, the receptacle is chaffy; the bracts are much elongate with attenuate tips, and the flowers are borne on small receptacular protuberences. In contrast, the receptacle of *Marshalljohnstonia* is deeply honeycombed (alveolate) with prominent rims to 0.5 mm thick, similar to those in *Lygodesmia* and *Stephanomeria*. However, Tomb (pers. comm.) noted specimens of *P. parvus* without chaffy bracts.

There are also significant differences in pollen morphology. Whereas both *Pinaropappus* and *Marshalljohnstonia* have tricolporate, echinate pollen, *Pinaropappus* has uniformly echinate pollen with no fusion of spine-bases around the germ pore (Tomb et al., 1974). Pollen of *Marshalljohnstonia* is characterized by a fusion of the basal portion of the spines in the vicinity of the germ pores and the development of a series of six distinct abporal lacunae, three above and three below (i.e., poleward) from each germ pore (Fig. 17). This latter pollen type is also characteristic of *Lygodesmia*, *Stephanomeria*, *Rafinesquia*, and *Chaetadelpha* (Tomb et al., 1974). Pollen characteristics have good systematic value in the Stephanomeriinae for most genera are uniform in pollen type. In addition, *Marshalljohnstonia* can be clearly distinguished from *Pinaropappus* on the basis of its woody habit and on a number of other anatomical features.

Tomb (pers. comm.) thinks that certain considerations speak strongly for relationship with *Stephanomeria* and *Lygodesmia*. First, the pollen type characteristic of *Marshalljohnstonia* also occurs in *Stephanomeria*. *Lygodesmia* also has a base number of $x = 9$, and some species have a large karyotype as indicated by the sum of its two sets of chromosomes. While no karyotype analysis has been made for *Marshalljohnstonia*, the chromosomes are clearly large, as in some species of *Lygodesmia*, whereas those of *Pinaropappus* are distinctly smaller (Tomb, 1974; and pers. comm.). Chemically *Marshalljohnstonia* is very similar to *Lygodesmia* in having only five flavonoid compounds, all nonmethoxalated flavone glycosides (Olsen, pers. comm.). (No information is available on flavonoid compounds in the genus *Pinaropappus*.) The basic pappus structure of *Marshalljohnstonia* is also similar to that of *Lygodesmia* and *Stephanomeria*; in all

three the body of the pappus is thick (Fig. 20–22), and lateral setae, when developed, are distichous. The pappus of *Pinaropappus*, in contrast, is not distichous and is composed of fewer cells (Fig. 23).

Stebbins (1953) divided the Stephanomeriinae into two phyletic lines that differ in habit, involucre shape, and number of florets per head. In *Stephanomeria*-like group, consisting of *Lygodesmia*, *Chaetadelpha*, *Stephanomeria*, *Rafinesquia*, and *Shinnersoseris* (Tomb, 1974), plants are usually much branched, have narrow cylindrical involucre with relatively few florets, leaves are reduced in size in the upper stem, and the pollen has well developed ridges of fused spine bases around the apertures (Tomb et al., 1974). The genera in the *Malacothrix*-like group—*Pinaropappus*, *Malacothrix*, *Calycoseris*, *Anisocoma*, *Prenanthes*, *Atrichoseris* and *Glyptopleura* (Tomb 1974; Tomb et al., 1974)—are less branched or acaulescent, have broader involucre with more florets, and have pollen-lacking paraporal ridges. *Marshalljohnstonia* has characteristics of both lines. In branching pattern and involucre structure it is similar to the *Malacothrix* line; palynologically and in other features noted above, it is like the *Stephanomeria* line. Whether the seemingly intermediate position of *Marshalljohnstonia* is the result of past hybridization or if the genus is relictual can presently be only a matter of conjecture. More information on chemistry, cytogenetics, and karyotype structure is necessary before one can completely analyze the relationships of this distinctive monotypic genus.

Marshalljohnstonia would be a notably discordant element if included in either *Pinaropappus*, *Lygodesmia*, or *Stephanomeria*. This is particularly so since generic lines in the tribe Stephanomeriinae traditionally have been very finely drawn, often on the basis of one or more characters of the pappus (*Atrichoseris*, *Chaetadelpha*) or achene (*Rafinesquia*, *Calycoseris*), usually in association with cytological or minor secondary features.

LITERATURE CITED

- CARLQUIST, S. 1960. Wood anatomy of Cichorieae (Compositae). *Trop. Woods* 112: 65–91.
- . 1962. A theory of paedomorphosis in dicotyledonous woods. *Phytomorphology* 16: 17–38.
- . 1966. Wood anatomy of Compositae: a summary, with comments on factors controlling wood evolution. *Aliso* 6: 25–44.
- . 1974. *Island Biology*. New York.
- . 1975. *Ecological Strategies of Xylem Evolution*. Berkeley.
- KELLY, W. A. 1936. Evolution of the Coahuila Peninsula, Mexico, Part II. *Bull. Geol. Soc. Amer.* 47: 1009–1039.
- SHIELDS, L. M. 1951. Leaf xeromorphy in dicotyledon species from a gypsum sand deposit. *Amer. J. Bot.* 38: 175–190.
- SPANN, L. 1933. Morphology and anatomy of *Lygodesmia juncea* (Pursh) D. Don. *Univ. Kansas Sci. Bull.* 21: 421–438.
- STEBBINS, G. L. 1953. A new classification of the tribe Cichorieae, family Compositae. *Madroño* 12: 65–80.
- TOMB, A. S. 1974. Chromosome numbers and genetic relationships in subtribe Stephanomeriinae (Compositae: Cichorieae). *Brittonia* 26: 203–216.

- , D. A. LARSON & J. J. SKVARLA. 1974. Pollen morphology and detailed structure of family Compositae, tribe Cichorieae. 1. Subtribe Stephanomeriinae. *Amer. J. Bot.* 61: 486–498.
- VIVO, J. A. & J. C. GOMEZ. 1946. *Climatologia de México*. Inst. Panamericano Geogr. Hist. Publ. No. 19.

PLANTS CONSUMED BY MAN. *B. Brouk.* x + 460 pages. Illustrated. Academic Press, London, New York, San Francisco. 1975. \$39.25.

The aim of this book is to provide a survey of plants consumed by humans as well as plants that are used for flavoring, coloring, smoking, thickening, and industrial purposes. Discussions of the plants are grouped by a mixture of taxonomic and use categories such as “vegetables” (which includes some algae, fungi, ferns, and angiosperms), cereals and pseudocereals (the latter covering such plants as Amaranth, Buckwheat, Chia, Guinoa, and *Trapa*); fumitories and masticatories; extracts; and fermentative microorganisms. This method of grouping results in multiple-use plants being discussed in more than one section. Cashew is discussed under “Nuts” and also under “Fruit”; Carob is discussed under “Plant Extracts” and also under “Fruit.” Over 300 plant species are discussed, mostly rather briefly, and each major listing is accompanied by one or more line drawings that range in quality from accurate to fanciful (e.g., Peyote). Major crops, which are well discussed in other compendia, are given brief treatment, at least in comparison to minor ones. For example, Maize is allotted a little over three pages, where rose hips are treated in a page and a half. Within each section, most plants are listed alphabetically according to an arbitrarily chosen common name. Thus, Jicama is listed under Yam Bean; Rutabaga under Swede; and the author insists that our western huckleberries be listed under Bilberry. Having taught economic botany for several years I believed that I was familiar with most plants of even minor economic value. I confess that I have never heard of plants such as Bambarra Groundnut (*Voandezia subterranea*), Bael (*Aegele marmelos*), Rambutan (*Nephelium lappaceum*), Oyster Nut (*Telfairia pedata*), or Niger Seed (*Guizotia abyssinica*). All are discussed and illustrated. The text is in general accurate, although I noticed a few minor errors. Because of its high price and encyclopedic nature the book will probably find little use as a text, but it is a valuable reference work and is particularly useful for its coverage of minor economic plants.—ROBERT ORNDUFF.

ISLAND BIOLOGY ILLUSTRATED BY THE LAND BIRDS OF JAMAICA. *David Lack.* xvi + 445 pages. University of California Press, Berkeley and Los Angeles. 1976. \$25.00.

Although this book concerns the avifauna of Jamaica and the West Indies, it is an important contribution to the theory of island biogeography. In the preface Jared Diamond comments that Lack's view “is that (a) ecological poverty on remote islands favors communities of few species with broad niches; (b) such communities are stable and resist invasion by competition. MacArthur did not consider (a) to be a major reason for low species numbers on remote islands. . . . Essentially MacArthur and Lack disagree on how small remote islands come to have few species, but they agree that these communities of few species competitively resist invasion.”