THE SOUTH AMERICAN SPECIES OF LEPIDIUM

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RESUMEN

Las especies sudamericanas de « Lepidium ». — El autor da una clave para la determinación de las 42 especies de *Lepidium*, describiéndolas e ilustrando sus caracteres diferenciales. Describe ocho especies nuevas: *L. grandifructum*, *L. Kalenbornii*, *L. Johnstonii*, *L. Morrisonii*, *L. scabrifructum*, *L. demissum*, *L. Danielsii* y *L. filisegmentum* y una variedad: *L. cyclocarpum* Thellung var. *crassius*; crea la nueva combinación: *L. abrotamifolium* Turs. var. *Fraseri* (Thellung) Hitchcock.

There has accumulated in North American herbaria a fairly sizable number of collections of South American Lepidia which cannot be satisfactorily identified by means of Thellung's Monograph of the genus *(Denks. Schweiz. Gesell. Naturwiss.* **41**, abh. 1: 1-340. 1906). Many of the types on which this study was based have probably been destroyed at Berlin, so it is doubtful if it will ever be possible to interpret Thellung's work completely. Fortunately, however, many of his types were photographed by the Field Museum of Natural History on the Rockefeller Foundation Fund for Photographing Type Specimens. Not only are the Berlin-Dahlem types of *Lepidium* represented by excellent photographs, but the Field Museum has fragments of many of the types, as well as photographs of the type specimens from the other European herbaria.

By means of these photographs and type fragments, it has been possible to determine the identity of most of the South American species that have been described up to the present

time, although the exact nature of several of Philippi's species are still in doubt.

It is hoped that the present study will enable South American Taxonomists to interpret their material and that eventually through their study we may arrive at an adequate treatment of the South American species.

My sincere appreciation is hereby expressed to the curators of the following herbaria from whom I have borrowed material:

University of California (C); Field Museum (F); Gray Herbarium (G); Private Herbarium of B. A. Krukoff (Kr); Missouri Botanical Garden (MBG); New York Botanical Garden (NY); Stanford University (S); United States National Herbarium (US).

KEY TO SPECIES

1. Sepals persistent until fruits are mature in size or nearly so.
   2. Silicles prominently reticulate, often sparsely ciliate-pubescent; glands linear, ca. 0,5 mm long. **35.** *L. strictum*
   2. Silicles not prominently reticulate, usually glabrous; glands less than 0,5 mm long.
      3. Styles 0,3-1 mm long; plants perennials from thick fleshy roots (see also *Weddellii*). **4.** *L. Meyenii*
      3. Styles less than 0,3 mm long, usually lacking, if over 0,1 mm then plants usually annuals.
         4. Perennials.
            5. Cauline leaves pinnatifid, their bases nearly always auriculate (see also *L. subvaginatum* and *L. auriculatum*). **19.** *L. bipinnatifidum*
            5. Cauline leaves seldom pinnatifid, but if so, their bases not auriculate.
               6. Glands linear, ca. 0,3 mm long; silicles 2-2,5 (3) mm long, elliptic-obovate. **6.** *L. Kalenbornii*
               6. Glands usually less than 0,3 mm long; silicles usually over 3 mm long.
                  7. Cauline leaves mostly entire to serrulate or serrulate-laciniate, mostly 3-15 mm broad; stems 1-4 dm long, puberulent to strigillose with hairs 0,1-0,3 mm long. **11.** *L. chichicara*
                  7. Cauline leaves usually either entire and but 1-3 mm broad, or pinnatifid in part at least; branches 0,5-2 dm long, very densely puberulent with hairs less than 0,2 mm long.

8. Petals usually longer than sepals; styles 0,05-0,15 mm long. **13.** *L. depressum*
8. Petals always shorter than sepals, often lacking; styles usually lacking.
9. Leaves never auriculate; sinus of silicles $^1/_8$-$^1/_{15}$ length of fruit; basal leaves 2-4 cm long; whole plant densely puberulent; pedicels pubescent on lower as well as upper surface. **7.** *L. abrotanifolium*
9. Cauline leaves semi-auriculate; sinus of fruit $^1/_4$-$^1/_{10}$ length of fruit; basal leaves to 10 cm in length; plant glabrous to strigillose; pedicels pubescent on upper surface only. **19.** *L. bipinnatifidum*

4. Annuals.
10. Cauline leaves (in part) auriculate-based.
11. Glands oblong-lanceolate, 0,1-0,2 mm long; upper part of stem very densely puberulent with hairs 0,1-0,2 mm long; upper cauline leaves usually not pinnatifid. **17.** *L. aletes*
11. Glands linear-lanceolate, 0,2-0,5 mm long; upper cauline leaves usually pinnatifid.
12. Stems simple or but few-branched; upper cauline leaves very strongly clasping-auriculate. **20.** *L. subvaginatum*
12. Stems usually freely branched; upper cauline leaves with small non-clasping auriculate bases. **21.** *L. auriculatum*
10. Cauline leaves not auriculate-based
13. Plants glabrous.
14. Leaves all linear, almost capillary. **23.** *L. angustissimum*
14. Leaves pinnatiparted. **37.** *L. curicoanum*
13. Plants pubescent.
15. Cauline leaves entire or at most one-toothed. **39.** *L. Horstii*
15. Cauline leaves at least several-toothed.
16. Glands linear-lanceolate, ca. 0,3 mm long; silicles ovate, 3,5-4 mm long, glabrous or sparsely ciliate. **29.** *L. demissum*
16. Glands more nearly oval, less than 0,3 mm long; silicles elliptic or suborbicular, glabrous or ciliate.
17. Upper portion of stems densely puberulent with spreading hairs 0,1-0,2 mm long; silicles oval or oblon-oval to oblong-obovate, 2,5-4 mm long, emarginate $^1/_6$-$^1/_8$ of their length. **17.** *L. aletes*
17. Upper portion of stem not pubescent as above; silicles more nearly elliptic or orbicular, or averaging 4 mm or over in length.
18. Plants of Central America and Colombia, silicles mostly 4-4,5 mm long, their tips alate. **40.** *L. costaricense*
18. Plants of South America, south of Colombia, silicles not as above.

19. Silicles elliptic, ca. 3 mm long. **33.** *L. filisegmentum*
19. Silicles suborbicular to orbicular, 3,5-5 mm long.
20. Cauline leaves pinnatisect; silicles 4-5 mm long, deeply emarginate. **30.** *L. Raimondii*
20. Cauline leaves few-toothed; silicles 3,5-4 mm long, shallowly (ca. $^1/_{10}$ length of silicle) emarginate. **28.** *L. Rahmeri*

1. Sepals caducous soon after flower opens, usually shed with stamens.
21. Styles evident, usually at least 0,2 mm long.
22. Annuals; styles seldom over 0,3 mm long; silicles no more than 5 mm long.
23. Cauline leaves serrate to dentate, not pinnatisect. **32.** *L. Danielsii*
23. Cauline leaves pinnatisect.
24. Silicles suborbicular, 4-5 mm long. **30.** *L. Raimondii*
24. Silicles considerably longer than broad.
25. Stamens 6. **42.** *L. sativum*
25. Stamens 2. **40.** *L. costaricense*
22. Perennials, or if annuals, the styles at least 0,3 mm long, or silicles over 5 mm in length.
26. Cauline leaves, in part at least, subpinnatifid; stems seldom over 1,5 dm long.
27. Styles ca. 0,2 mm long. **5.** *L. Weddellii*
27. Styles usually over 0,3 mm long. **4.** *L. Meyeni*
26. Cauline leaves entire or nearly so, at least no pinnatifid; stems 1-5 dm tall.
28. Silicles suborbicular.
29. Glands 0,2-0,7 mm long; silicles scarcely at all retuse, slightly longer than broad. **9.** *L. cyclocarpum*
29. Glands 0,2-0,3 mm long; silicles retuse, usually at least as broad as long. **10.** *L. spathulatum*
28. Silicles decidedly longer than broad.
30. Cauline leaves entire or at most with few shallow teeth, 1-3 mm broad. **8.** *L. Philippianum*
30. Cauline leaves not entire, or if so, over 3 mm broad.
31. Styles 0,3-0,5 mm long; silicles 5-7 mm long; cauline leaves entire, 3-10 mm broad. **1.** *L. grandifructum*
31. Styles less than 0,2 mm long; silicles no more than 4 mm long; cauline leaves few-toothed, usually 3-5 mm broad. **12.** *L. Trianae*

21. Styles obsolete, no more than 0,2 mm long.
32. Silicles cordate or at least as broad as long, somewhat inflated, very prominently reticulate, 2,5-3 mm long. **34.** *L. inclusum*
32. Silicles usually not cordate, decidedly longer than broad, or over 3 mm long, or not inflated, usually indistinctly reticulate.

33. Fruits very prominently reticulate, usually ciliolate, 2,5-3 mm long ; glands linear, ca. 0,5 mm long ; leaves bipinnatifid.
35. *L. strictum*

33. Fruits not prominently reticulate, seldom ciliolate ; glands usually less than 0,4 mm long ; leaves various.
34. Perennials.
35. Stamens 4 or 6.
36. Silicles over 4 mm long. **8.** *L. Philippianum*
36. Silicles less than 4 mm long. **22.** *L. quitense*
35. Stamens 2.
37. Styles usually visible although very short.
38. Silicles nearly twice as long as broad. **5.** *L. Weddellii*
38. Silicles over half as broad as long.
39. Leaves with divisions but 1-2 mm broad ; silicles ; ca. 4,5 mm long. **2.** *L. Parodii*
39. Leaves with divisions as much as 3 or 4 mm broad ; silicles ca. 3,5 mm long.
12. *L. Trianae* (see also *L. chichicara)*
37. Styles obsolete, the stigmas apparently sessile.
40. Silicles at least 3,5 mm long, if but 3,5 mm long then scarcely any of leaves pinnatifid.
41. Silicles orbicular, 3,5-4 mm long, ciliolate.
28. *L. Rahmeri*
41. Silicles considerably longer than broad.
42. Plants mostly decumbent ; basal leaves 3-10 cm long, 0,5-3 cm broad, oblanceolate, crenate to semipinnatifid ; cauline leaves 3-10 mm broad. **11.** *L. chichicara*
42. Plants erect ; basal leaves either pinnatifid or but 3-8 mm broad ; cauline leaves (upper ones) but 1-2 mm broad.
43. Basal leaves pinnatifid. **2.** *L. Parodii*
43. Basal leaves no more than serrate.
3. *L. Cumingianum*
40. Silicles usually less than 3,5 mm long, but if that long, at least the basal leaves pinnatifid (see also *L. Parodii*).
44. Silicles ca. 2 mm long, pedicels terete or nearly so, not wing-margined ; glands scarcely 0,1 mm long.
26. *L. brevicaule*
44. Silicles at least 2,5 mm long, wing-margined.
24. *L. Morrisonii.*
45. Plants glabrous or if sparsely pubescent less than 1 dm tall.
46. Plants glabrous, 10-15 cm tall. **25.** *L. Steinbachii*
46. Plants sparsely pubescent, 3-5 cm tall.
24. *L. Morrisonii*

45. Plants pubescent, usually over 1 dm tall.
47. Basal leaves and many cauline leaves pinnatifid; branches 1-2 dm long; silicles mostly 3-4 mm long. **6.** *L. Kalenbornii*
47. Basal leaves often not pinnatifid; cauline leaves very seldom pinnatifid; branches usually over 2 dm long; silicles often less than 3 mm long.
48. Silicles 2,5-3 mm long; basal leaves 1-3 cm long, 2-5 mm broad. **14.** *L. spicatum*
48. Silicles 2,5-4 mm long; basal leaves 3-15 cm long, 5-30 mm broad. **11.** *L. chichicara*

34. Annuals.
49. Pedicels very greatly flattened, 2-6 times as broad as thick; silicles either suborbicular or ciliate-pubescent (also, possibly, *L. curicoanum*).
50. Silicles 4-4,5 mm long, coarsely ciliate-pubescent, apices more or less porrect; cauline leaves pinnatifid. **31.** *L. pubescens*
50. Silicles glabrous, apices not porrect; cauline leaves mostly not pinnatifid.
51. Basal leaves pinnatifid into linear segments. **36.** *L. nitidum*
51. Basal leaves not pinnatifid into linear segments. **32.** *D. Danielsii*
49. Pedicels not greatly flattened but sometimes wing-margined, or silicles neither suborbicular nor ciliate-pubescent.
52. Stamens 6; silicles 5-6 mm long, cauline leaves mostly pinnatisect. **42.** *L. sativum*
52. Stamens less than 6, or if 6 the plants otherwise not as above.
53. At least some of cauline leaves usually auriculate.
54. Silicles orbicular, ca. 2,5 mm long. **18.** *L. Johnstonii*
54. Silicles not orbicular, but if suborbicular then over 2,5 mm long (see also, *L. bonariense*). **17.** *L. aletes*
53. Cauline leaves not auriculate.
55. Silicles ca. 2 mm long; petals $^1/_2$-$^1/_3$ length of sepals; glands scarcely 0,1 mm long. **26.** *L. brevicaule*
55. Silicles usually over 2 mm long, if that small then petals lacking.
56. Silicles orbicular or suborbicular in outline, certainly no more than $^1/_4$ again as long as broad.
57. Basal leaves bi- to tripinnate; silicles 2,5-4 mm long. **15.** *L. bonariense*
57. Basal leaves usually no more than pinnate, if bipinnate, the silicles over 4 mm long.
58. Glands ca. 0,3 mm long; cauline leaves practically entire; silicles less than 3 mm long. **39.** *L. Horstii*
58. Glands less than 0,3 mm long; cauline leaves either pinnatifid or silicles 3 mm long.

59. Cauline leaves pinnatisect ; silicles 4-5 mm long. **30.** *L. Raimondii*

59. Cauline leaves not pinnatisect ; silicles mostly no more than 4 mm long.

60. Silicles scabrous-ciliate ; pedicels minutely wing-margined ; glands ovate, narrowed to lanceolate acute tips. **28.** *L. Rahmeri*

60. Silicles glabrous ; pedicels not wing-margined. **38.** *L. virginicum*

56. Silicles ovatish to nearly elliptic or elliptic-obovate, often over $^1/_4$ again as long as broad.

61. Cauline leaves nearly entire ; silicles with 2 acute spreading teeth ; glands ca. 0,1 mm long. **16.** *L. argentinum*

61. Cauline leaves usually at least laciniate, if entire then the silicles not acute-toothed at apex ; glands mostly over 0,1 mm long.

62. Cauline leaves linear and entire ; plant foetid ; petals absent, silicles elliptic. **41.** *L. ruderale*

62. Cauline leaves not linear and entire or plant not foetid, or petals present, or silicles not elliptic.

63. All leaves divided to pinnatifid ; silicles mostly at least 4 mm long, the tips alate. **40.** *L. costaricense*

63. All leaves not divided pinnatifid, or if so the silicles less than 4 mm long and not alate-tipped.

64. Silicles usually pubescent-margined, elliptic, ca. 3,5 mm long ; cauline leaves toothed-pinnatifid. **27.** *L. scabrifructum*

64. Silicles not pubescent-margined, if elliptic usually less than 3,5 mm long, or cauline leaves entire or nearly so.

65. Upper portion of stems very densely powdery-puberulent ; silicles 2,5-3 mm long ; cauline leaves usually linear and entire. **14.** *L. spicatum*

65. Upper portion of stems puberulent or strigillose to retrorsely puberulent ; silicles 2,5-4 mm long ; cauline leaves usually toothed at least (entire).

66. Upper stems strigillose to retrorsely puberulent. **15.** *L. bonariense*

66. Upper stems puberulent with fine spreading hairs. **17.** *L. aletes*

1. **L. grandifructum** sp. nov.

Fig. 3.

Perenne (semper ?) ; caulibus 2-4 dm altis, ad basim glabris, superne puberulentis ; foliis caulinis oblanceolatis, 2-4 cm longis, 3-10 mm latis, breviter-petiolatis vel sessilibus, non auriculatis, integris ; racemis 5-15 cm longis ; pedicellis fructibus subaequilongis, erectis vel patentibus, puberulentis, subcylindricis, marginibus alatis ; sepalis ca. 2 mm longis, glabris, caducis ; petalis spathulato-oblanceolatis, calycibus subaequalibus ; staminibus 6, subaequalibus ; glandulis 6, ovato-lanceolatis, 0,1-0,2 mm longis ; siliculis 5-7 mm longis, oblongo-obovatis vel elliptico-obovatis, glabris, leviter reticulatis, 0,3-0,5 mm emarginatis ; stylis sinibus subaequilongis, 0,3-0,5 mm longis ; seminibus 2-3 mm longis ; cotyledonibus incumbentibus.

Type: « Plants of the Upper Rio Negro River, Brazil », March 3, 1906.

Perennial ? glabrous below, sparsely puberulent above especially in the inflorescence ; stems to 4 dm tall, branched freely; basal leaves not seen, the cauline oblanceolate, 2-4 cm long, 3-10 mm broad, short-petiolate to sessile, not auriculate, entire; racemes 5-15 cm long, rather loosely-flowered ; pedicels slightly shorter than fruits, erect to spreading, puberulent, terete but somewhat wing-margined ; sepals ca. 2 mm long, glabrous, caducous ; petals spatulate-oblanceolate, ca. equal to sepals ; stamens 6, nearly equal ; glands 6, oval-lanceolate, 0,1-0,2 mm long ; silicles 5-7 mm long, oblong-obovate to elliptic-obovate, glabrous, indistinctly veined, sinus open, scarcely 0,5 (0,3-0,5) mm deep ; styles ca. equal to sinus, 0,3-0,5 mm long; seeds 2-3 mm long.

Weiss and Schmidt (NY).

Because of its broad leaves, very large fruits, and comparatively long style, this plant is decidedly distinct from any other American species, standing well apart from *L. Cumingianum* which it most closely resembles. I cannot be sure that it is not a very rank-growing annual, but judge the plant to be perennial, since the base of the stem is woody and nearly 5 mm thick.

2. **L. Parodii** Thell.

Fig. 1.

Thellung, Fedde, *Rep. Sp. Nov.* **21** : 254. 1925, including forms *integriusculum* and *divisiusculum*, *op. cit.* 255.

Perennials from thick roots, suffrutescent at base, stems 2-4 dm tall, simple to branched, glabrous to puberulent; basal leaves to 10 cm long, pinnatifid to bipinnatifid into linear segments 1-2 mm broad, their bases more or less marcescent, cauline leaves simple and entire to pinnatifid with linear divisions, often distinctly sagittate at base; racemes 5-15 cm long, rather densely flowered, finely puberulent; pedicels shorter than fruits, not flattened, narrowly wing-margined; sepals 1-1,5 mm long, caducous; petals spatulate-obovate, slightly exceeding sepals; stamens 2; glands 4, 0,1-0,2 mm long, oblong-ovate; silicles 3,5-4,5 mm long, rhombic-elliptic to elliptic-oval, glabrous or sparsely ciliate, indistinctly veined, sinus $^1/_{10}$-$^1/_{15}$ length of fruit, open styles lacking; seeds 1,5-2 mm long; cotyledons incumbent.

Material seen. — ARGENTINA: Avellaneda, Buenos Aires, Parodi 6540 (G); City Bell, around La Plata, Buenos Aires, Cabrera 2459 (NY); vicinity of General Roca, Río Negro, Fischer 226 (F, G, MBG, NY, US).

I have seen neither of the two collections Thellung cited (Parodi 5836 and 5840), but feel sure that the above Parodi and Cabrera collections belong to this species. It seems probable that Thellung's forms may be valid entities. The Fischer collection is included here with some hesitancy, since the plants are practically devoid of all leaves, and they must, therefore, be judged solely by the fruits, which are somewhat smaller than those of the other collections cited, but more similar to them than to any other species I have seen. This form from Rio Negro may prove to be at least sub-specifically different from the plants from Buenos Aires.

Thellung compared his species with *L. chichicara* and *L. ecuadorensis,* but did mention its similarity to *L. Cumingianum* from which it differs scarcely at all in flower and fruit-character. I believe these two species to be very closely related but

separable because of the broader, simple leaves, somewhat larger silicles, and non-entire glands of the Chilean plant.

3. L. Cumingianum Fisch. and Mey.

Fig. 3.

Fischer et Meyer, *Ind. Sem. Hort. Petrop.* **1** : 30. 1835; Thellung, *op. cit.* 218.

L. Berteronianum Steud., *Nom.* ed. II, **2** : 26. 1841 (based on Bertero 387 and 1082).

L. Cumingianum ssp. *Berteronianum* (Steud.) Thell., *op. cit.* 218, and vars. *canescens* and *subsagittatum* Thell., *op. cit.* 219.

L. Cumingianum ssp. *orbiculatum* Thell., *loc. cit.* ?

Apparently perennial, the stems simple to branched, puberulent, 3-5 dm tall; basal leaves linear-oblanceolate, 3-10 cm long, 3-8 mm broad, serrulate, long-petiolate, cauline leaves smaller and narrower, the upper ones linear, 1-5 cm long, 1-2 mm broad, sessile, not auriculate (?) entire; racemes rather loosely flowered, 5-20 cm long, glabrous or puberulent; pedicels subequal to fruits, puberulent, not flattened, but narrowly wing-margined, spreading to recurved; sepals 1-1,5 mm long, sparsely hirsutulous on back, caducous; petals spatulate-obovate, longer than sepals; stamens 2; glands 4, 0,1-0,3 mm long, oblong to oval, crenate to bilobed; silicles elliptic to rhombic-orbicular, 4-5,5 mm long, glabrous, indistinctly veined, the sinus $^1/_{10}$-$^1/_{15}$ length of silicles, open; styles lacking; seeds 2-2,5 mm long; cotyledons incumbent.

Material seen. — CHILE: locality and collector uncertain (MBG 3 sheets, US); Cachapual, Bertero 367, fragment of type (F, photos F, Kr); Valparaíso, Bertero 1082 (F, G); Valparaíso, Bertero 1082 and 387 (NY); Concepción, Jaffuel 2920 (G).

Again Thellung's subspecific categories are being disregarded since it is doubted that he studies sufficient material to justify their creation. His variety *subsagittatum* may be a significant entity, but I have seen no material of this species with sagittate leaves. This apparently is the only species of *Lepidium* in the Americas which has erose to bi-lobed glands.

4. **L. Meyeni** Walp.

Figs. 4-10

Walper, *Nov. Act. Acad. Leop. Carol.* **19**, Suppl. 1 : 249. 1843, *Rep.* **5** : 42. 1845-46 ; Thellung, *op. cit.* 202.

L. gelidum Weddell, *Ann. Sci. Nat.* V, **1** : 283, 1864.

L. Meyeni Walp. ssp. *gelidum* (Wedd.) Thell., *op. cit.* 203.

L. Meyeni Walp. ssp. *gelidum* (Wedd.) Thell., f. *rotundatum* and *rhombicum* Thell., *loc. cit.*

L. Meyeni Walp. var. *gelidum* (Wedd.) Hass., *Bol. Acad. Nac. Cien. Córdoba* **26** : 101. 1921.

L. Orbignyanum Weddell apud Thell., *loc. cit.* (in synonymy).

L. marginatum Griseb., *Abhandl. König. Gessell. Gött.* **19** : 72. 1874.

L. Meyeni Walp. ssp. *marginatum* (Griseb.) Thell., *op. cit.* 204.

L. affine Weddell, *Ann. Sci. Nac.* V, **1** : 284. 1864, not of Ledebour.

L. Meyeni Walp. ssp. *affine* (Wedd.) Thell., *loc. cit.*

L. Weddellii Macbr., *Candollea* **5** : 357. 1934 (new name for *L. affine* Weddell), not same as *L. Weddellii* O. E. Schulz, *Notizblatt* **11** : 391. 1932.

Plants perennial from thick fleshy tap root, branches spreading or prostrate to erect, 3-10 (18) cm long, glabrous to puberulent, rather fleshy ; basal leaves 3-8 cm long, persistent by marcescent bases, rather fleshy, pinnatifid and often more or less lyrate, the lobes often again deeply pinnatifid, cauline leaves similar but reduced, upper ones merely laciniate or toothed, not auriculate, glabrous to pubescent ; racemes mostly short, 1-2 (5) cm long, compounded, often partially concealed by leaves, usually first raceme formed in very center of plant and nearly sessile ; pedicels mostly longer (shorter) than fruits, glabrous to pubescent, slightly wing-margined, not flattened ; sepals (1) 1,5-2,5 mm long, glabrous, usually caducous with petals, very rarely persistent until fruits nearly grown ; petals linear to spatulate, mostly longer than sepals ; stamens 2 (4 or 6 ?) ; glands 4 (6 ?), semi-circular, 0,1-0,2 mm long ; silicles (2,5) 3-4,5 mm long, from nearly rotund to rhombic-elliptic, elliptic or obovate-elliptic, indistinctly veined, glabrous, sinus usually ca. $^1/_8$-$^1/_{10}$ length of fruit, open, sometimes lacking ; styles 0,3-1 mm long, often barely exceeding sinus ; cotyledons incumbent.

I have seen a comparatively small number of collections of

this plant and therefore am none too sure of its nature. It seems, though, that most workers have failed to take into consideration the variation to be expected in such a widespread species. Various specimens of one collection may show considerable range in length of styles, for example. The age of the plant when collected has a lot to do with the size of the fruit. Very definitely, I do not believe that entities can be separated within the species on the length of the style or sepals as there is a completely gradate series from one extreme to the other.

Material seen. – ARGENTINA: without locality, Mayen, photograph of type of *L. Meyeni?* and really from Peru? (F, Kr); Salta, San Carlos, Venturi 6885 (US); Tucumán, Estancia Santa Rosa, Venturi 6870 (US) and 9232 (US); Catamarca, Santa María, Venturi 6608 (US); Andalgalá, Jörgensen 1195 and 1836 (G, MBG); Jujuy, Laguna Colorada, near Tilcara, Balls 6011 (US).

This material might all be called ssp. *marginatum* according to Thellung, yet none of it has sepals 3 mm long.

BOLIVIA: Weddell 3955, type of *L. gelidum*, photo (F, Kr); Mandon 931, cited by Thellung as ssp. *gelidum*, photo (F, Kr); Mandon 927, type of *affine*, photo (F, Kr) fragment (F); Bang 2802 (G, MBG, NY, US); La Paz, Asplund 6194 (US), Buchtien 7 (NY, US); 30 kilom. NE. of La Paz, Buchtien 1867 (US); Charaña, Asplund 6209 (US); Oruro, Hammarlund 103 (NY); Potosí, Cárdenas 396 (US), some plants with exserted style and caducous sepals, others otherwise similar but with shorter styles and persistent sepals.

PERÚ: Cordillera above Torata, Moquegua, Weberbauer 7473 (F, US); Carumas, near Volcán Ticsani, Moquegua, Weberbauer 7321 (F, G, NY, US), (the two preceding collections have more finely dissected leaves than do the majority of collections); Río Blanco, Macbride 3022 (F, NY, US).

The last cited collection has the smallest fruits and largest glands of any collection of *Meyeni* seen; Schulz has identified it as *Meyeni* ssp. *gelidum* f. *rhombicum*. Were it not for the variation seen in all collections, this specimen, at least, would be assigned varietal status, as it alone, of the collections cited here, seems to be unique.

When Macbride proposed the name *Weddellii* in 1934, he apparently did not realize that Schulz had already published that name in 1932. Since both men apparently were merely changing the name *L. affine* Weddell, it would be assumed that they had the same plant in mind, and therefore, if *affine* is to be considered synonymous with *Meyeni,* then *Weddellii* of Macbride and of Schulz would necessarily belong there also. That is certainly true of Macbride's name. However, the plant Schulz cited, Weberbauer 7232, is not quite the same as the other specimens I have included here, and it is felt his plant may more properly be accorded specific status. Since he did not cite *L. affine* of Weddell as a synonym, I believe it is permissable to use the name *Weddellii* for the entity.

5. **L. Weddellii** O. E. Schulz

Fig. 17.

O. E. Schulz, *Notizblatt* **11** : 391. 1932, not of Macbride, *Candollea* **5** : 357. 1934 (= *L. Meyeni* Walp.).

Similar in habit and character to *L. Meyeni,* but differing chiefly as follows: leaves less fleshy; stems and inflorescence densely puberulent; sepals 1-1,5 mm long, caducous, pubescent on back; petals scarcely exceeding sepals; silicles elliptic, proportionately narrower than in *L. Meyeni;* styles 0,1-0,2 mm long, scarcely equalling sinus.

Material seen. — Perú: Cordillera of Pelagatos, Pallasca, Ancash, Weberbauer 7232, cited by Schulz (F); vicinity of Oroya, Kalenborn 132, annotated by Schulz as « *L. Meyeni* subsp. *affine* f. *rhombicum* Thellung = *L. Weddellii* Schulz spec. propr. » (S, US); Chuquibambilla, Dept. Puno, Pennell 13396 (F, G).

I am including the Pennell collection here even though there is a strong possibility that it may prove to be subspecifically, if not even specifically distinct from either *Weddellii* or *Meyeni*. The plants have the longest branches I have seen in this complex (to 18 cm in length), they have less fleshy more entire cauline leaves, thinner sepals and shorter glands than do the other two specimens of *Weddellii*. Schulz identified the collec-

tion as *L. Meyeni*, but it is aberrant in that species as in this one.

Supposedly Schulz was merely proposing to treat the entity which Thellung called « *L. Meyeni* subsp. *affine* (Weddell) Thellung » as a species. Since the specific name *affine* was preoccupied by *L. affine* Ledebour, *Ind. Sem. H. Dorpat.* (1821) app. 1, p. 22, he was obliged to propose a new name for the entity. Schulz cited as a synonym only the subspecies *affine* (Weddell) Thellung and not *L. affine* Weddell. He cited three collections under *Weddellii* of which I have seen one (Weberbauer 7232). That plant (well matched by Kalenborn 132) appears to me to be sufficiently unique to warrant its maintenance as a species distinct from *L. Meyeni*, the chief peculiarities of the plant being its short styles and very narrow fruits. It is entirely possible, however, that additional material will show a complete gradation between the two.

The fruits of the Kalenborn and the Weberbauer collection are quite unlike those described for *L. Weddellii* by Macbride, namely, « usually orbiculate » whereas that epithet correctly covers *L. affine* of Weddell.

6. **Lepidium Kalenbornii** sp. nov.

Fig. 15.

Perenne; caudicibus multicipitibus; caulibus 3-15 mm longis, decumbentibus vel erectis, dense puberulentis, pilis vix 0,1 mm longis; foliis basi 1-3 (4) cm longis, 5-10 mm latis, marcescentibus, pinnatifidis, pinnis 1-2 mm latis, integris vel dentatis, foliis caulinis 5-10 (15) mm longis, oblongis vel obovatis, saepe pinnatifidis, non auriculatis; racemis multis, 1-5 cm longis, multifloris; pedicellis fructibus subaequilongis, ascendentibus vel divaricatis, leviter compressis, alatis; sepalis ca. 0,7 mm longis; petalis absentibus vel linearibus et $^1/_2$ longitudinis sepalorum; staminibus 2; glandulis 4, linearibus, ca. 0,3 mm longis; siliculis 2-2,5 mm longis, 1,5-2 mm latis, elliptico-obovatis, leviter reticulatis, glabris, sinibus latis, ca. $^1/_{10}$ siliculorum longitudinis aequalibus; stylis absentibus; seminibus ca. 1 mm longis; cotyledonibus incumbentibus.

Type : Dry soil, 10-13000 feet alt., Oroya near Luma, Andes Mt., Perú, A. S. Kalenborn 20 (Stanford herb. n° *103313*). Isotype at NY and US.

Perennial from a thick taproot and branched caudex, the branches decumbent to erect, 3-15 cm long, densely puberulent, the hairs scarcely 0,1 mm long; basal leaves 1-3 (4) cm long, 5-10 mm broad, marcescent by their petiolate bases, pinnatifid, the pinnae 1-2 mm broad, entire or toothed, cauline leaves 5-10 (15) mm long, oblong to obovate, mostly pinnatifid, their bases broad but not auriculate; racemes numerous, 1-5 cm long, many-flowered; pedicels subequal to fruits, ascending to spreading, slightly flattened and distinctly wing-margined; sepals ca. 0,7 mm long, pubescent on back, persistent until fruits are nearly mature in size; petals linear vestiges ca. $^1/_2$ length of calyx (or lacking ?); stamens 2; glands 4, linear, ca. 0,3 mm long; silicles 2-2,5 (3 but averaging about 2,2) mm long, 1,5-2 mm broad, elliptic-obovate, very indistinctly veined, glabrous, sinus ca. $^1/_{10}$ length of fruit, open; styles none; seeds ca. 1 mm long; cotyledons incumbent.

Material seen. — Perú: between Huanta and Hacienda Pargora, Dept. Ayacucho, Killip and Smith 22200 (US); Juliaca, Puno, Rose and Rose 19102 (US); Andes Mt., Oroya near Luma, 10-13000 feet alt., A. S. Kalenborn 20 (NY, US).

The type collection bears the notation—« 5-50 cm high » but there is nothing about the specimen to indicate that this is correct, the longest branches being less than 15 cm in length.

The species is easily distinguished because of the perennial habit, small indistinctly veined silicles, persistent sepals, and long glands.

7. **L. abrotanifolium** Turcz.

Fig. 11.

Turczaninow, *Bull. Soc. Nat. Mosc.* **27**: 308. 1854.

Perennials from thick roots, 5-20 cm tall, spreading, the whole plant (except leaves) very densely puberulent-pubescent, the hairs 0,1-0,15 mm long; basal leaves 2-4 cm long, pinnatifid, the divisions 1-2 mm broad, entire or few-toothed, sparsely puberulent, cauline leaves 1-3 cm long, linear to obovate and

entire to few-toothed or even laciniate-pinnatifid, not auriculate; racemes many, multiflowered, 3-6 cm long; pedicels broadly wing-margined, equal to, or more usually, longer than silicles, spreading to recurved, puberulent on upper and lower surfaces; sepals ca. 1 mm long, pubescent on back, persistent until fruits are mature in size; petals linear, shorter than sepals (lacking ?); stamens 2; glands 4, linear, truncate or thickened on end, mostly 0,15-0,25 mm long; silicles elliptic to narrowly elliptic-obovate (3) 3,2-4,2 mm long, 2-2,5 mm broad, glabrous, indistinctly veined, the sinus open $^1/_8$-$^1/_{15}$ length of fruit; styles wanting; seeds 1,2-1,5 mm long; cotyledons incumbent.

Although, there is considerable variation in the lobing of the leaves, it appears that there are two distinct phases of the plant.

KEY TO VARIETIES

Cauline leaves mostly entire, linear; silicles ovate.
L. abrotanifolium var. *Fraseri*

Cauline leaves mostly toothed to pinnatifid, often oblong or oblanceolate; silicles elliptic to elliptic-obovate. *L. abrotanifolium* var. *typicum*

7*a*. **L. abrotanifolium** Turcz. var. **typicum**

L. abrotanifolium Turcz., *loc. cit.*; Thell., *op. cit.* 246, in large part.
L. Fraseri Thell. var. *decipiens* Thell., *op. cit.* 217.

Cauline leaves usually toothed or even pinnatifid (2) 3-10 mm broad; silicles more nearly elliptic or elliptic-obovate than ovate.

Material seen. — ECUADOR: Antisana, Quito, Jameson, fragment of type (F), photo of type (F, Kr); without locality, Sodiro 55, photo of type of var. *decipiens* (F, Kr); Paramo on east flank of Mt. Chimborazo, A. S. Hitchcock 22033 (G, NY, US); Urbina, Chimborazo, Anthony and Tate 392 (US); Pichincha, Mt. Pichincha, Firmin 559 (F, US); Monte Pichincha, Oct. 1863, Jameson (US), Apr. 1864, Jameson (US), and May, 1859, Jameson 105 (NY).

The Firmin collection is composed of rounded plants with spreading or prostrate lower branches, and few-toothed leaves. It is well matched by the Jameson collections and by the photo-

graph of the type of *decipiens*. I have seen no material referrable to *abrotanifolium* from Peru or Bolivia. Since Thellung cited considerable material of the species from those two countries, it is possible that the species is more widespread than my citations would indicate. I suspect, however, that I would place some of the plants, which he called *abrotanifolium*, in *Meyeni*. I have not seen any material referrable to the var. *Steinmanni* Thell., *op. cit.* 247, but believe it would be referrable to *L. Meyeni*.

7 *b*. **L. abrotanifolium** Turcz. var. **Fraseri** (Thell.) comb. nov.

L. Fraseri Thell., *op. cit.* 217.

Cauline leaves entire, 1-2,5 mm broad, 1-2 cm long; silicles ovate-elliptic.

Material seen. — Ecuador, Fraser, photo of type (F, Kr).

The type of Thellung's species is sufficiently distinct from other material of *abrotanifolium* to merit varietal status, although the specimen was fragmentary and does not necessarily reveal the true habit of the plant. Thellung acknowledged that it was very similar to *abrotanifolium*.

8. **L. Philippianum** (O. Kuntze) Thell.

Fig. 18.

Thellung, *op. cit.* 200, including vars. *typicum, brachystylum and boliviense*.

Nasturtium Philippianum O. Kuntze, *Rev.* **1** : 937. 1891.

L. suffruticosum Phil., *Linnaea* **28** : 670. 1856, not of L.

L. Reichei Philippi ex Reiche, *Fl. Chil.* **1** : 64. 1896.

Perennials from a multicipital caudex and thick root, the branches mostly simple, puberulent, 5-20 cm tall, basal leaves rosulate, 2-4 cm long; long-petiolate, the blades 2-4 mm broad, oblanceolate to lanceolate, entire to denticulate (few-toothed), cauline leaves linear to lanceolate, 1-3 mm broad, entire; racemes 3-8 cm long; pedicels subequal to silicles, puberulent, not flattened but very narrowly wing-margined; sepals ca. 1,5 mm long, caducous; petals spatulate-obovate, longer than sepals;

stamens 4 (6?); glands 4 (6?), triangular-ovate, ca. 0,2 mm long; silicles narrowly rhombic-elliptic, 5-5,5 mm long, glabrous, indistinctly veined, scarcely at all retuse; styles 0,1-1 mm long; seeds not seen.

Material seen. — CHILE: Santiago, Philippi 630, photo of type (F, Kr); Potrero Grande, Santiago, Dec. 1933, Grandjot (MBG); BOLIVIA: Valley of la Paz, Penland, photo of type of var. *boliviense* (F, Kr).

This interesting species can easily be told from any other of the American species because of the long narrow (*Draba*-like) silicles and entire leaves.

The Grandjot collection consists of parts of two plants, one apparently staminate, the other pistillate. It seems fairly certain, therefore, that the plant is dimorphic, and this may account for much of the difference between var. *typicum* and var. *brachystylum* of Thellung, both of which were described from one collection, Philippi 630. I have seen a photograph of the type of var. *boliviense* and find little difference between it and the Grandjot collection (from Chile) in so far as fruits are concerned. I believe this is another case where Thellung did not take into account the normal variation to be expected in a species, but accentuated the difference he observed between the two collections he saw (Philippi 630 and the Penland plant) to the extent that he made 3 separate varieties from them.

I am including *L. Reichei* here as a synonym chiefly because it, too, was described as a low perennial with entire leaves, the type locality being Cordillera de Santiago, Chile (same as that of *L. Philippianum*). The description is rather meagre, but I doubt that there are two such perennial, entire-leaved, « oval »-fruited species at Santiago.

9. **L. cyclocarpum** Thell.

Fig. 14.

Thellung, *op. cit.* 214.

Plants annual or perennial, 5-50 cm tall, simple or with few branches, sparsely to very densely soft-pubescent or villose, leaves obovate to oblanceolate, the basal as much as 8 cm long

and 2,5 cm broad, long-petiolate, crenate to crenate-serrate, sparsely to very densely pubescent, the petioles often long ciliate, cauline leaves smaller, petiolate to sessile and distinctly auriculate, mostly 5-10 mm broad; racemes 3-6 cm long, loosely flowered; pedicels slender, at least as long as silicles, scarcely flattened but narrowly wing-margined, densely puberulent-strigillose; sepals 1,5-2 mm long, sparsely hirsutulous on back, caducous; petals broadly spatulate-obovate to oblanceolate, at least as long as sepals; stamens 2 (4 or 6 ?); glands 4 (6), lanceolate, truncate, 0,2-0,7 mm long; silicles nearly rotund, 3,5-5 mm long, glabrous, very indistinctly veined, scarcely if at all retuse; styles 0,3-0,8 mm long; mature seeds not seen.

Thellung described his species as an annual and all the material from the region of Lima appears to be annual in habit, but a collection from Arequipa is a shrubby perennial. Although there apparently are other differences between the plants from the two localities, it is felt that the two entities are too similar to be considered specifically distinct. They may be distinguished. in the following manner:

KEY TO VARIETIES

Plants annual; leaves sparsely pubescent, not auriculate (?); glands less than 0,4 mm long. *L. cyclocarpum* var. *typicum*

Plants perennial; leaves very densely pubescent, the upper cauline ones auriculate; glands at least 0,4 mm long. *L. cyclocarpum* var. *crassius*

9 *a*. **L. cyclocarpum** Thell. var. **typicum**

L. cyclocarpum Thell., *loc. cit.*

Plants apparently always annual, 5-20 cm tall, sparsely pubescent; leaves thin, none of them auriculate; petals not much exceeding sepals; glands 0,2-0,3 mm long; styles less than 0,5 mm long.

Material seen. — PERÚ: Amancaës-Berge bei Lima, Weberbauer 1614, photo of type at Berlin (F, Kr); from same locality, Mathews 752, cited by Thellung, photos (F, Kr); San Agustín, Lima, Weberbauer 5242 (F, G); vicinity of Lima, Rose and Rose 18580 (NY, US) and 19476 (US).

9 *b*. **L. cyclocarpum** Thell. var. **crassius** var. nov.

Planta a var. typica differens: perennis, suffrutescens, 30-50 cm alta; foliis crassioribus carnosioribusque, pubescentioribus, foliis superioribus auriculatis; petalis longioribus quam sepala; glandulis 0,4-0,7 mm longis; stylis plus quam 0,5 mm longis.

Type: 40 km. S. of Chala, Arequipa, Perú, alt. 700 m, Sept. 22, 1938, Worth and Morrison 15701 (MBG). Isotypes at C and G.

Much like the var. *typicum*, but plants perennial, suffrutescent, to 50 cm tall; leaves thicker and more fleshy, much more pubescent, the upper ones auriculate; petals considerably longer than sepals; glands as much as 0,7 mm long; styles mostly over 0,5 mm long.

Since this phase of the species is a perennial, it closely resembles *L. spathulatum* wich is also a perennial, but it differs from that species because of the more prominent style (since a sinus is lacking), and in general habit. It is believed that some of the differences pointed out as existing between vars. *typicum* and *crassiorum* will not prove to be constant when more collections are available for comparison, but even so, the two plants appear to be sufficiently different to warrant their maintenance as separate varieties.

10. **L. spathulatum** Philippi

Fig. 16

Philippi, *Fl. Atac.* 8 1860.
Nasturtium spathulatum (Philippi) O. Kuntze, *Rev.* 1: 937. 1891.

Perennial from a woody crown, the stems herbaceous, 1-5 dm tall, fairly densely pubescent-villose throughout; basal leaves oblong-elliptic to oblong-lanceolate, to 15 cm in length and 2,5 cm in width, long-petiolate, deeply serrate; cauline leaves mostly 1-4 cm long, 3-10 mm broad, short-petiolate to sessile, serrate to serrulate; racemes many, rather closely-flowered (3) 5-10 cm long; pedicels scarcely flattened but narrowly wing-margined; sepals ca. 2 mm long, sparsely pilose on back, caducous; petals obovate-spatulate, longer than sepals; stamens 2; glands 4,

triangular, truncate, 0,2-0,3 mm long; silicles glabrous, very indistinctly reticulate, suborbicular, 3,5-5 mm long, usually slightly broader; sinus very shallow and open, ca. $^1/_{10}$-$^1/_{15}$ lenght of fruit; styles 0,3-0,6 mm long; seeds ca. 2 mm long; cotyledons incumbent.

Material seen. — CHILE: Vicinity of Aguada Grande («Cachinal de la Costa» of Philippi), near Antofagasta-Atacama boundary, Johnston 5772 (G, US); El Rincón, N. of Paposo, Taltal, Antofagasta, Johnston 5514 (G); vicinity of Aguada de Miguel Díaz, Taltal, Antofagasta, Johnston 5388 (G).

Lepidium spathulatum is most similar to *L. cyclocarpum* from which it differs in its proportionately broader, more retuse silicles. It is also a much more freely flowering plant. Because of its broad silicles it is suggestive of *L. Fremontii* of North America, and it would seem as though these three species, *Fremontii*, *spathulatum* and *cyclocarpum*, are more closely related than their present distribution might indicate.

11. **L. chichicara** Desv.

Fig. 21.

Desvaux, *Journ. Bot.* **3**: 165, 179. 1814; Thell., *op. cit.* 220.
L. chichicara var . *pseudo-bipinnatifidum* Thell., *op. cit.* 221.
L. chichicara var. *lanceolatum* (Walp.) Thell., *loc. cit.*
L. chichicara Thell. var. *rhombocarpum* Thell., Fedde, *Rep. Spec. Nov.* **11**: 309. 1912. The type, which was at Berlin, has not been seen.
L. lanceolatum Walp., *Nov. Act. Nat. Cur.* **19**, suppl. 1: 250. 1843.
L. ecuadoriense Thell., *op. cit.* 222 (?)

Perennial from a thick root, the caudex simple or branched, branches 1-4 dm long, decumbent or spreading at base to ascending, rather densely puberulent to strigillose, the hairs 0,1-0,3 mm long; leaves very variable, the basal 3-10 (15) cm long, 0,5-1,5 (3) cm broad, broadly to narrowly oblanceolate, long-petiolate, crenate or serrate to lobed or semi-pinnatifid, the primary segments sometimes again toothed, cauline leaves oblanceolate to oblong or linear, 1-5 cm long, 3-10 (15) mm broad, entire or serrulate to serrate-laciniate, rarely the lower ones more deeply divided, upper ones, at least sessile and broad-

based but very seldom auriculate; racemes numerous (3) 5-10 (15) cm long, puberulent or strigillose to glabrous; pedicels scarcely flattened, very narrowly wing-margined, usually about equalling fruits, sometimes much longer, usually spreading; sepals ca. 1 mm long, white-margined, usually pubescent on back, caducous or persistent for short time but soon deciduous; petals mostly spatulate or oblong and subequal to sepals, but not infrequently linear vestiges only; stamens 2; glands 4, semi-circular to oval-acute, 0,1-0,2 mm long; silicles rhombic-elliptic, or ovate-elliptic, to obovate-elliptic, 2,5-3,5 (4) mm long, glabrous, indistinctly veined, sinus shallow $^1/_{10}$-$^1/_{15}$ length of fruit), the tips of the silicles somewhat winged and rounded to pointed; styles usually obsolete (to 0,2 mm long); seeds 1,5-2 mm long; cotyledons incumbent.

Material seen. — PERÚ: without definite locality, Dombey, fragment of type (F) and photos of same (F, Kr); without definite locality, Meyen, photos of type of *L. lanceolatum* (F, Kr); Cuzco, Vargas 648, leaves auriculate, and 649 (F); Río Blanco (plant diseased), Macbride and Featherstone 660 (F, G) and 659 (F, NY); Saltacuna, Rose and Rose 18686 (NY); Matucana, Macbride and Featherstone 140 (F, G), 483 (F), and 437 (F, NY); Chachani Mts., N. of Arequipa, Hinkley and Hinkley 62, plant almost glabrous (F, G); Rimac River, Ball in 1882 (NY); Ollantaytambo, Cook and Gilbert 365 (US); Huancayo, Junín, Ledig 50 (US); Huacapistana, Junín, Killip and Smith 24135, possibly a hybrid with *Kalenbornii* (NY); Río Chile, Tingo, Arequipa, Munz 15492 (G, W); Carumas, Moquegua, Weberbauer 7312 (F).

BOLIVIA: vicinity of Sorata, Prov. Larecaja, Mandon 921 (F, G); La Paz, Buchtien 6 (F, G in part, NY, US), 522 (F, MBG, NY), and 3975, intermediate with *Kalenbornii* (NY, US), Bang 15 (G, MBG, NY, US) and 23 (G), Rusby 1203 (NY), and Pennell 14222 (F); Tunan, O. Kuntze (NY); Milluguaya, Buchtien 4119 (G, NY, US); Oruro, O. Kuntze (NY); Cotaña, Buchtien 6209 (G, US); Potosí, Cárdenas 415 (US).

CHILE: Arica, Jaffuel 1665 and 1688 (G).

Although *L. chichicara* is sometimes confused with *bipinnatifidum*, it need not be, the less deeply divided, non-auriculate

leaves and caducous sepals usually being sufficiently distinctive for separation. I have included *L. ecuadoriense* as a doubtful synonym, since I have seen no material referrable to that species, and it may well be that it is a valid entity. However, some of the characters by which Thellung separated it from *chichicara*, e. g.

chichicara	*ecuadoriense*
silicles 3-3,5 mm long, 2,5 mm broad	4-4,5 mm long, 3 mm broad
petals not over $^3/_4$ length of calyx	petals $^1/_4$ longer than calyx, spatulate
stems over 10 cm long	stems 6 cm long
cauline leaves oblong-oblanceolate.	cauline leaves oblanceolate-cuneate.

are scarcely convincing, since many specimens of *chichicara* (e. g. Buchtien 6 at US) have silicles 4 mm long and 3 mm broad and not infrequently the flowers of *chichicara* have petals as long as the sepals.

Lepidium chichicara is surely closely related to *L. trianae* and *L. depressum* (as I have recognized those species), but seems to be sufficiently distinct that the three can be maintained. Although it usually is easily recognizable from *L. Kalenbornii*, having larger silicles, less divided leaves, and shorter glands than that species, two collections have been seen, both from Peru, namely Pampa de Arrieros, Arequipa, Pennell 13331 (F) and Río Blanco, Lima, Killip and Smith 21544 (F, NY), that are almost intermediate in nature between the two, having the more dissected leaves and longer glands of *Kalenbornii* but the larger apiculate silicles of *chichicara*. They may prove to be a distinctive variant, or of course they may be of hybrid origin.

12. **L. Trianae** Thell.

Fig. 20.

Thellung, *op. cit.* 214.
L. bogotense Triana ex Thell., *loc. cit.*, publ. in synonymy.

Perennial, stems 1-several, 3-6 dm tall, usually freely branched, glabrous to sparsely strigillose below to increasingly pubescent above, especially in the inflorescence; basal leaves 3-15 cm long, 2-4 cm broad, bipinnatifid, the rachis 1-3 mm

broad, lower cauline leaves scarcely different, or pinnatifid, the divisions serrate, or merely laciniate, the upper leaves sessile, usually linear-oblanceolate, 3-toothed at apex, otherwise entire, 2-4 cm long; racemes many, rather closely flowered, 3-18 cm long; pedicels ca. equal to silicles, not flattened but distinctly wing-margined, pubescent, ascending; sepals ca. 1 mm long, caducous, pilose on back; petals spatulate-oblanceolate, slightly longer than sepals; stamens 2; glands 4, 0,1-0,2 mm long, triangular-lanceolate; silicles obovate-elliptic. mostly ca. 3,5 mm long, glabrous, slightly retuse (sinus $^{1}/_{10}$-$^{8}/_{15}$ length of fruit); style equalling or slightly exceeding sinus (ca. 0,2 mm long); cotyledons incumbent.

Material seen. — COLOMBIA: Prov. de Bogotá, Nouvelle-Granada, Triana in 1852-57, fragment of type (F), photos of same (F, Kr), Isotype (NY); Sabana de Bogotá, Dept. Cundinamarca, Cuatrecasas 496 and 497 (US); Canoas, Apollinaire and Arthur 110 (US); Potreros de la Sabana de Suba, Dept. Cundinamarca, Barriga 10047 (Herbario Nacional Colombiano).

Lepidium Trianae is, as Thellung pointed out, related to *L. chichicara,* but differs from that species in that the fruits have longer styles, and the upper cauline leaves are three-toothed at apex. Although, as shown by the Cuatrecasas collection, the lower leaves of the plant are more variable than Thellung apparently believed them to be, there seems to be suficient basis for maintaining the entity distinct from its close relative.

13. **L. depressum** Thell.

Fig. 12 and 13.

Thellung, *op. cit.* 21.

L. Walpersii Mabcr., *Candollea* **5**: 357. 1934, new name for *L. lanceolatum* Walp., not Presl., in large part, at least.

Perennial from thick taproot, the crown usually branched; branches many, decumbent or spreading to erect, 5-15 (20) cm long, rather densely puberulent with spreading to retrorse hairs scarcely 0,1 mm long; basal leaves often somewhat marcescent, 3-6 (10) cm long, long-petiolate, the blades pinnatifid, the pinnae entire or more commonly again pinnatifid or cleft into 3-5

segments, the ultimate divisions 1-2 mm broad, cauline leaves very variable, from long and slenderly petiolate and pinnatifid to merely crenate or sub-entire and broad-based or sessile, mostly 1-3 (5) cm long, not auriculate, subglabrate; racemes many, 2-6 (10) cm long, loosely to closely many-flowered; pedicels about equaling fruits, ascending to spreading or even recurved, slightly flattened and distinctly wing-margined, puberulent; sepals 1-1,3 mm long, broadly white-margined, usually pubescent on back, persistent until fruits are nearly mature, rarely caducous; petals usually obovate-spatulate and longer than sepals, or sometimes lanceolate vestiges scarcely half as long as these; stamens 2; glands 4, oblong-lanceolate, truncate, 0,1-0,2 (0,3) mm long; silicles 3-3,5 (4) mm long (ovate-elliptic) elliptic or rhombic-elliptic (elliptic-obovate), indistinctly veined, glabrous, sinus very shallow $^1/_{15}$-$^1/_{20}$ length of fruit), open; styles 0,05-0,15 mm long, usually shorter than but sometimes slightly exceeding sinus; seeds ca. 1,4 mm long; cotyledons incumbent.

Material seen. — BOLIVIA: Amasuyos, viciniis Achacache, 4000 m, Jan. May, 1861, Mandon 922, photo of type (F, Kr); La Paz, Buchtien 677 (G) and 3973 (G, NY, US) both these collections with small petals, caducous sepals, and glands but 0,1 mm long, as contrasted with the large petals, persistent sepals, and longer (0,2-0,3 mm) glands of the following specimens: La Paz, Buchtien 6, in small part-mixed with *chichicara* (G), 3972 (G, NY, US), and 4475 (MBG, US, but not G); Unduavi Valley, Bro. Julio 377.

I feel fairly sure of the identity of this species, even though I have seen only a photograph of the type and the material here included has smaller silicles than the species was said to have (3-3,5 as contrasted with 3,5-4 mm). However, judged from the photograph, Thellung erred in giving a length greather than 3,5 mm for the fruits. The perennial habit, pinnatifid cauline leaves, persistent sepals, conspicuous petals (usually), and short styles are sufficiently distinctive characters to set the plant well apart from its near relatives such as *chichicara*. Because of its short styles, *depressum* may be mistaken for *L. Trianae* (as Schulz mistook the last specimen cited above).

However, the Colombian species is much taller and has larger and more nearly entire cauline leaves.

There is considerable variation in the material, and it seems not unlikely that subspecific entities may be separable; however, due to the dearth of material I am grouping several plants here since they are more similar to one another than to any other species. One collection in particular. La Paz, Asplund 6208 (US) has broader, more nearly entire cauline leaves than any other collection seen.

Lepidium Walpersii was proposed by Macbride as new name for *L. lanceolatum* Walpers, since the name *lanceolatum* was preoccupied by *L. lanceolatum* Presl. Macbride's description leaves little doubt that this is the plant he had in mind — « sessile cauline leaves that are not at all auriculate, often subentire, smaller pods (than *chichicara*), style quite equalling pod margins ». If Thellung's type should prove to be dissimilar to the material here cited, Macbride's name would be usable for this entity, were Walper's *lanceolatum* truly conspecific with this plant. I can do little more than guess, but I suspect that *lanceolatum* of Walpers and Thellung's *L. chichicara* var. *lanceolatum* (Walp.) belong more properly under *L. chichicara,* since I have seen no material from Perú with I can refer to *S. depresum.*

14. **L. spicatum** Desv.

Fig. 19.

Desvaux, *Journ. Bot.* **3** : 164, 178. 1814; Thell., *op. cit.* 258.
L. spicatum Desv. var. *microcarpum* Hicken, *Physis* **2** : 13. 1916 ?
L. racemosum Griseb., Goett. Abhl. **6** : 116. 1854.

Perennials (annuals ?), 5-25 cm tall, branched from base, the stems numerous, densely puberulent, the hairs almost dust-like; basal leaves 1-3 cm long, 2-5 mm broad, laciniate-pinnatifid to entire, cauline leaves linear to linear-lanceolate, 1-3 cm long, 1-3 cm broad, sessile but not auriculate, entire, or not uncommonly, few-toothed; racemes rather densely-flowered, 3-10 cm long, densely and finely puberulent; pedicels shorter than (subequal to) fruits, distinctly wing-margined; sepals ca. 0,7 mm long, caducous; petals linear vestiges scarcely half as

long as sepals, or wanting; stamens 2; glands 4, oval, scarcely more than 0,1 mm long; silicles 2,5-3 mm long, elliptic to oval (or obovate), glabrous, indistinctly veined, the sinus scarcely $^1/_{10}$ length of silicles; styles lacking; cotyledons incumbent.

Material seen. — ARGENTINA: Magellan, Commerson, photograph of type of *L. spicatum* at Paris ? (F, Kr); Lechler 1114, photograph of type of *L. racemosum* (F, Kr) fragment of type (F); 50 km N. of San Julián, Magallanes, Santa Cruz, Eyerdam, Beetle and Grondona 23898 (C); R. Bueno, Magallanes, Hicken 361, mited with *aletes* and *inclusum* (F, G, NY); Río Colorado and Río Negro, Scala 51 (G), Minerales, Santa Cruz, Donat 268, mixed with *aletes* (C, MBG, NY); Pirovano, Buenos Aires, Burkart 7077 and 7082 (G).

The entity here described surely includes *L. racemosum* Griseb., as a fragment of that type has been seen. I am not so sure, however, that it includes *L. spicatum* itself. That plant was said to have orbicular silicles, whereas none of the material I have examined and cited here has silicles so nearly rounded. I am, therefore, relying largely upon the fact, firstly, that these plants are the only ones from Magellanes (type locality of *spicatum*) that come near to fitting the description of that species, and secondly, that Thellung, who examined the types of both *racemosum* and *spicatum,* felt they were conspecific. The photograph of the type of *spicatum* at Paris is much more suggestive of *aletes* (= *calycinum*) than it is of the material cited here as *spicatum*. The silicles seem to be similar to those of Riggs 84 and Fiebrig 296 (cited under *aletes*). Burkart 7077 comes closest to matching the Commerson plant in habit as well as fruit character, but is so far out of the range of *spicatum* as exemplified by the other collections included, that I wonder if it is not an entire-leaved variant of *aletes*. If, therefore, as I am inclined to suspect, *spicatum* proves to be conspecific with *aletes,* «*spicatum*» will have to be used for the name of that entity, and this species will be called *L. racemosum*. *L. aletes* is an annual, this entity is perennial, but the type of *spicatum* does not have roots, so can not be classified in this respect.

However, as recognized here «*spicatum*» differs from *aletes* as follows, it has shorter pubescence, more nearly entire, non-auri-

culate leaves, and more promptly deciduous sepals. I have not seen material labelled var *microcarpum* by Hicken, so am including that varietal name here with considerable uncertainty.

15. **L. bonariense** L.

Fig. 25.

Linnaeus, *Sp. Pl.* 645. 1753; Thell., *op. cit.* 256, and probably nearly all of his subspecific categories proposed in Fedde, *Rep. Sp. Nov.* **11**: 310. 1912.

L. bonariense L. f. *gracilis* Chodat et Hassler, *Pl. Hassl., Bull. Herb. Boiss.* **2**, 3: 795. 1903.

L. calycinum L. var. *graciles* (Chod. et Hassl.) Thell., *op. cit.* 245.

L. mendocinum Phil., *Anal. Univ. Chile* **36**: 160. 1870, fide Thell. description too meager for certainty.

Annual, 10-50 cm tall, usually freely branched especially above, the stems ascending to erect, glabrate to long strigose below, usually strigillose to retrorsely puberulent above; basal leaves several, 3-7 cm long, usually bi- or tripinnatifid into narrow segments but 1-2 mm broad, long-petiolate, glabrate to strigose, pubescent, or more or less lanate; cauline leaves less compounded, the upper ones often but toothed, rarely linear and entire, scarcely ever auriculate; racemes many, 3-15 cm long; pedicels subequal to or longer than silicles, appressed or ascending, slightly flattened, scarcely if at all wing-margined pubescent on upper side, usually glabrous on lower side, occasionally entirely glabrous; sepals ca. 1 mm long, with few long hairs on back, caducous with petals and stamens; petals usually linear or lanceolate vestiges about half as long as sepals, occasionally wanting; stamens 2; glands 4, scarcely 0,1 mm long, oval; silicles oval, elliptic, or nearly orbicular, 2,5-3,5 (4) mm long, glabrous, the veins not prominent, sinus $^1/_8$-$^1/_{10}$ length of fruit, rather narrow; style lacking, the stigmas sessile; seeds ca. 1,5 mm long; cotyledons incumbent.

Typical material seen. — Locality uncertain Commerson (S); Campinhas Brasil? 10/25/1896, Novaes 826 (US).

BRASIL: Pernambuco, Pickel (US); Pesqueira, Pernambuco, Pikel 897 (G, US); Minas Geraes, Widgren (US); Santa Cruz do Río Pardo, Sao Paulo, Archer 4216 (US).

PARAGUAY: locality uncertain, Jörgensen 3843 (S).

URUGUAY: Pocitos, Montevideo, Herter 64 *a* (F, NY); Santiago Vázquez, Montevideo, Herter 64 *b* (F), Herter 64 (C, G, MBG, NY); Sayago, Montevideo, Herter 64 *g* (MBG); Malvin, Montevideo, Herter 241 (C, F, G, MBG, NY); Progreso, Rosengurtt B 1878 (G, US).

ARGENTINA: Hicken 517 (NY); Corrientes, Parodi 11928 (G); Santa Fe, Rosario, Burkart 8771 (F, NY); Jujuy 3 km SE of Jujuy, Eyerdam and Beetle 22398 (C); Buenos Aires, Puerto de La Plata, Cabrera 2231 (NY); Buenos Aires, Commerson (NY); Buenos Aires, Capital Federal, Mele (MBG); Buenos Aires, Juancho, Cabrera 2721 (G); Córdoba, O. Kuntze (NY); Córdoba, Pampa de Achala, Burkart 7188 (G); Chaco, Antequera, Schulz 869 (NY); Chaco, Las Palmas, Jörgensen 2593 (G, US); Entre Ríos, Delta del Paraná, Burkart 8319 (F); Entre Ríos, Isla del Francés, Burkart 8884 (F); Catamarca, Andalgalá, Jörgensen 1032 (C, MBG, US); Salta, Candelaria, Venturi 5447 (G); Tucumán, Río Salí, Capital, Venturi 888 (G); Patagonia: Moreno and Tonini 566 (NY); Río Negro, Wilkes Exp. (US).

I am following Thellung and others in regarding this entity as *L. bonariense,* even though I have no acquiantance with the type. As here treated *bonariense* is a widespread species showing a number of very striking variations that might well merit subspecific or specific distinction. However, since I have been unable to see the types of the various varieties and subspecies proposed by Thellung, it is impossible, at this time, to assign names to these variations. Among these, perhaps the least significant is the variation which Thellung called *L. calycinum* var. *gracile* (Chod. et Hassl.) Thell., originally described as *L. bonariense* f. *gracile* Chodat et Hassler. There was little reason for Thellung to place this plant under *calycinum* as it is, it seems to me, only a spindly form of *bonariense* and it surely comes within the variation attributable to ecological conditions. Plants of such a nature include: Prope Concepción, Paraguay, Hassler 7545, type collection (F, G, photos at F, Kr); San José, Uruguay, Osten 19681 (US); vicinity of Copiapó, Atacama, Chile, Nov., 1865, Gigoux (G).

There is much variation in the length and quantity of pubescence present on various plants, such a plant as that collected at Sierra de la Ventana, Buenos Aires, Argentina, Cabrera 5313 (G), being among the most hirsute seen. This collection is also unique in that the cauline leaves are but 1-2 cm long and rather uniformly 5-8 toothed, and the sepals are more tardily caducous than usual.

Two other collections, from Candarave, Tacna, Perú, Weberbauer 7380 (F, US), and Río Calera, Tucumán, Agentina, Venturi 1881 (G) are as « spindly » as the type of *gracile,* but differ in lacking petals and having longer glands. Apparently there is considerable intergradation between this species and *aletes* but because the leaves are not auriculate these specimens are more nearly referrable to *bonariense* than to *aletes.* On the other hand, occasional plants such as that from Santiago Vásquez, Montevideo, Uruguay, Herter 64 (NY), have auriculate leaves, yet in all other characteristics are similar to the bulk of the material of *bonariense* from the same region.

Several collections from Argentina, mamely- Catamarca Andalgalá, Jörgensen 1032 (G); Salta, Bruch 10402 (G); Córdoba, O. Kuntze in 1892 (US) and Río Negro, Wilkes Exped. (NY), are included here even though they have cauline leaves that are usually no more than toothed.

Certain plants, mostly from Chile, such as: Vicinity of Copiapó, Atacama, Johnston 4991 (G, US); Quebrada de Potrerillos, Chañaral, Atacama, Johnston 3665 (G), and Ovalle, Claude Joseph 5186 (US), as well as Río Negro Valley, General Roca, Argentina, Fischer 226 (US), have fruits that are nearly orbicular in outline. In general aspect they might be mistaken for *L. chichicara.* They appear to merit the rank of forma *suborbiculatum* assigned them by Thell. (Fedde, *Rep. Sp. Nov.* 13: 303. 1914).

Two other collections from Chile, Hacienda Cuncumen, Dept. Illapel, Loosser 2121 (G) and a collection from middle Chile, Buchtien (US) are more branched at the base and are densely short pubescent.

Thus, although *bonariense* seems to intergrade with *aletes* and *chichicara,* it can usually be distinguished from the former

by its lack of auriculate leaves and by its caducous sepals and from the latter by its more divided basal leaves and smaller cauline leaves.

A collection from 5 km NE. of Humahuaca, Jujuy, Argentina, West 6302 (C, G) probably belongs under *bonariense,* having soft-pubescent stems and inflorescence and small cauline leaves. However, the silicles are more like those of *chichicara.* The collection may prove to be representative of a distinctive variant of *bonariense.*

16. **L. argentinum** Thell.

Fig. 29.

Thellung, *Physis* **9**: 9. 1928.

L. argentinum var. *virginifolium* Thell. and var. *stenocarpum* (Thell). Thell., *op. cit.* 10.

L. bonariense var. *stenocarpum* Thell., Fedde, *Rep. Sp. Nov.* **11**: 310. 1912.

Annual, 1,5-4 dm tall, simple or few-branched, the branches mostly erect or ascending, rather densely soft-pubescent, the hairs 0,05-0,15 mm long, mostly curled or retrorse; basal leaves not seen, the cauline thin, 1,5-3 cm long, 2-4 mm broad, mostly entire but occasionally few (usually 3)-toothed near apex, ciliate, petiolate or at least not auriculate; racemes very loosely 60-100-flowered, 5-20 cm long, puberulent; pedicels terete, but narrowly wing-margined, puberulent, from slightly shorter to a little longer than fruits, spreading; sepals ca. 0,7 mm long, long-pubescent on back, caducous; petals linear vestiges ca. $^1/_2$ length of sepals; stamens 2; glands 4, oblong-lanceolate, ca. 0,1 mm long; silicles 3,5-4 mm long, 2,2-2,5 mm broad, rhombic-elliptic, glabrous, indistinctly veined, the tips on either side of sinus sharp pointed, porrect, sinus $^1/_5$-$^1/_{10}$ length of fruit, acute; styles lacking; seeds ca. 1,3 mm long; cotyledons incumbent.

Material seen. — ARGENTINA: Prov. La Rioja, Sañagasta, Chilecito, 1-30-1927, Parodi 7783 (G), isotype of var. *virginicifolium.*

Although, as Thellung pointed out, this species resembles

bonariense in many respects, it is unique among the South American Lepidia in having sharply pointed fruits, in this respect (and only this respect) resembling the North American *L. oxicarpum*.

17. L. aletes Macbr.

Fig. 24.

Macbride, *Candollea* **5** : 357. 1934.

L. calycinum Godron, *Mém. Acad. Montpell.* **1** : 416. 1843, not the same as *L. calycinum* Steph. ex Willd., *Sp. Pl.* **3** : 433. 1800 (= *Smelowskya calycina* [Steph. ex Willd.] C. A. Mey.); Thellung, *Monog. Lepid.* 243. 1906, which see for further synonymy.

L. setipetalum Thell., *l. c.* in synonymy.

L. pubescens Desv. var. *typica* and var. *salinicola* Speg., *Anal. Mus. Nac. Buenos Aires* **7** : 226. 1902.

Annual, 3-45 cm tall, simple to freely branched, especially above, the branches ascending to erect, sparsely to densely retrorsely strigillose at base with hairs 0,3-0,7 mm long, the hairs of upper part of stem and inflorescence dense, shorter (0,1-0,2 mm), softer and finer, more spreading; basal leaves in rosettes of 5-15, 3-7 cm long, long-petiolate, once or twice pinnatifid into segments mostly 1-2 mm broad, glabrous or very sparsely strigillose, cauline leaves similar, the upper ones considerably reduced, mostly one pinnatifid or but toothed, sessile and usually auriculate, glabrous or nearly so; racemes densely fruited, 3-15 cm long, pedicels mostly shorter than silicles, strongly ascending but sometimes recurved near tip, flattened and wing-margined, about twice as broad as thick, densely soft-pubescent on both sides, or less commonly glabrate on lower surface; sepals 1-1,3 mm long, mostly with few long hairs on back, usually persistent until fruits are nearly mature in size; petals linear vestiges from nearly as long as sepals to completely lacking; glands 4, 0,1-0,2 mm long, oblong-lanceolate, truncate; stamens 2; silicles (2) 2,5-4 mm long, oval or oblong-oval to oblong-obovate, very lightly veined, sinus $^1/_6$-$^1/_8$ length of fruit, rather open to acute; stigmas sessile; seeds 1,25-2 mm long; cotyledons incumbent.

Type: Port Juvénal près Montpellier, 1853, Touchy (fide

Thellung). This plant has not been seen. In the original description, no type is mentioned, so it is assumed that Thellung has determined the type in the Godron herbarium. The description fits the following South American plants fairly well, except that they have but 2 (rather than 6) stamens.

Material seen. — BRAZIL: Rio Grande do Sul, Nov. 9, 1904, Bornmüller 167 (G.).

URUGUAY: Montevideo, Isabelle in 1838 (F, photo at F and Kr), Osten 5278 (US); Santa Lucía, 1, 1, 86, Safford (US).

PARAGUAY: Jörgensen 3843 (F, MBG, NY, US); Cordillera de Altos, Fiebrig 296 (F, G, US); Río Pilcomayo, Morong 1056 (NY).

ARGENTINA: locality uncertain: Hicken 518 (NY); Osten 219 (G); Buenos Aires, 9, 20, 39, Cabrera 5259 (G) and 10, 12, 88, Morong 12 (NY); Formosa, Jörgensen 2596, (MBG); Córdoba, Sierra Chica, Burkart 7185 (G); Chubut, Riggs 84, Rio Chico (F, G, MBG, US); Chubut, Illin 110 (C); Santa Cruz, Minerales, Donat 268, in part only (MBG, NY), and in total (F, G).

CHILE: Río Bueno, Magallanes, Hicken 361 (F, in part only); Concepción, Joseph 4076 (US) and Jaffuel 2917; Temuco, Joseph 4868 (US); Valparaíso, Joseph 3699 (US); Angol, Ladino 157 (C); East of Puerto Aysen, Pirion 3469 (G).

PERÚ: Pampa de Arrieros, Arequipa, 4, 18, 25, Pennell 13330 (G).

Although there is considerable variation in the material seen, the species is rather easily recognized because of the persistent sepals, the usual presence of auriculate cauline leaves, and the dense soft pubescence. In can usually be told from *bonariense* by means of the last two caracteristics.

I have not seen material which Thellung cited as belonging either to his *L. calycinum* var. *macrocarpum* (*Monog.* 244. 1906) or *calycinum* var. *integrifolium* (Fedde, *Rep. Spec. Nov.* 11 : 309. 1912) so cannot be very sure of their exact nature. There is much variation in fruit and leaf size in the plant, but these differences correlate well with plant size, and it is rather certain that such plants as Riggs 84, from Río Chico, Chubut, Argentina, and Donat 268, from Minerales, are merely depauper-

rate specimens. They vary in height from 3 to 8 cm, the siliques are but 2-2,5 mm long, and the leaves are greatly reduced, subentire or narrowly lobed, and in many cases no more than 5 mm long. In one or two of the larger plants the bases are subauriculate, however. It is my belief that Spegazzini mistook plants of this nature for *L. pubescens (Plant. Pat. Austr.* N° 34) and distinguished them as his var. *typicum* and var. *salinicola.*

The taller, more vigorous plants seen have larger, more truly auriculate leaves, and larger fruits. Morong's collection from the Pilcomayo River (type locality of var. *integrifolium*) matches the description of that entity fairly well. It is a peculiar, spindly plant, with cauline leaves that are toothed from $^1/_3$ to $^3/_4$ the way to the midvein. I can see no good reason for assigning it distinctive rank. The var. *macrocarpum* may be a valid entity, but I have seen no material with siliques over 4 mm long as described for that variation.

There is considerable variation in the quantity and length of the pubescence, the Bornmüller collection from Brazil being the most « shaggy » seen. Only one plant has been seen that has caducous sepals, that the Joseph collection from Chile (US) consisting of 2 plants, one of which has « normal » persistent, the other caducous, sepals.

18. **Lepidium Johnstonii** sp. nov.

Fig. 28.

Annuum; multis patentibus vel erectis caulibus, partibus inferioribus pubescentissimis, pilis 0,1-0,3 mm longis, patentibus, partibus superioribus caulium racemorumque dense pubescentibus, pilis patentibus, minus 0,2 mm longis; foliis basalibus paucis, 1-2,5 cm longis, sparse appresso-pubescentibus, profunde lobatis vel pinnatifidis, segmentis 1-2 mm latis; foliis caulium minoribus, foliis superne ca. 1 cm longis, dentatis vel lobatis, saepe distincte auriculatis; racemis 3-6 cm longis; pedicellis fructibus subaequilongis, ascendentibus, aliquid compressis, pubescentibus, marginibus leviter alatis; sepalis ca. 1 mm longis, caducis; petalis absentibus; staminibus 2; glandulis 4, ca. 0,25 mm longis latisque, rotundis, reticulatis sine discrimine; sinibus latis, $^1/_{10}$-$^1/_8$ silicu-

lorum longitudinis aequalibus ; stylis absentibus ; seminibus 1-1,5 mm longis ; cotyledonibus incumbentibus.

Type : 5-6 km. NE. of Taltal, Dept. Taltal, Prov. Antofagasta, Chile ; wet places among rocks overlooking ocean, elev. ca. 300 m. Oct. 14, 1938, Worth and Morrison 15845 (U. of Calif. Herb. N° 633016).

Annual, 5-20 cm tall, freely branched from base to top, the branches spreading to erect, lower portion of plant densely pubescent, the hairs as much as 0,3 mm long, spreading, upper portion of stems and inflorescence densely soft pubescent with spreading hairs less than 0,2 mm long ; basal leaves few, 1-2,5 cm long, sparsely appressed-pubescent, deeply lobed to pinnatifid, the divisions but 1-2 mm broad ; cauline leaves reduced, the upper ones mostly ca. 1 cm long, toothed or lobed, usually distinctly auriculate ; racemes 3-6 cm long, pedicels subequal to fruits, ascending, somewhat flattened and slightly wing-margined, both surfaces pubescent with soft hairs ; sepals ca. 1 mm long, deciduous shortly after anthesis ; petals lacking ; stamens 2 ; glands 4, ca. 0,25 mm long and half as broad at base, tapered to truncate apex ; silicles rotund, ca. 2,5 mm long, equally broad, both surfaces about equally rounded, indistinctly veined, sinus scarcely $^1/_8$ length of fruit, open ; style lacking ; seeds 1-1,5 mm long ; cotyledons incumbent.

Material seen. — CHILE : hill directly back of Punta Grande, vicinity of Paposo, Dept. Taltal, Prov. Antofagasta, grassy open crest in fertile belt, Nov. 29, 1925, Johnston 5209 (G, US) ; 5-6 km NE. of Taltal, Dept. Taltal, Prov. Antofagasta, oct. 14, 1938, Worth and Morrison 15845 (U. of Calif. Herb. N° 633016).

The Worth and Morrison collection is selected as type since it consists of 6 plants representing all stages of development. The Johnston collection is so like the type that the complete picture of the species can be obtained from it, except that basal leaves are lacking. I have some hesitation in proposing these plants as new, since I cannot be sure that they have not been described by Philippi, but I can find no previously published description which covers them.

On his collection I. M. Johnston has noted « Resembles much

the type collection (cultivated material) of *L. auriculatum* but the calyx is caducous, glands very short, silique lightly emarginate, perhaps undescribed species — fide Thellung *in lit.* VII, 1927 ».

I do not agree that these plants are particulary suggestive of *auriculatum*, even though the glands of the two are very similar. They differ for example, in size and shape of fruit, pubescence, sepal persistence, and pedicels. The entity is much more suggestive of *L. aletes (L. calycinum)*, which also has auriculate leaves and soft dense pubescence in the inflorescence, but *L. Johnstonii* has smaller, more rounded fruits, shallower sinus, caducous sepals, and less flattened pedicels.

19. **L. bipinnatifidum** Desv.

Fig. 32.

Desvaux, *Journ. Bot.* 3 : 165, 177. 1814; Thell. *op. cit.* 241, including synonymy (*L. Humboldtii, L. coronopifolium, Senebiera dubia* HBK., *L. auritum* Turcz., and *L. sectifolium* Steud).

Perennial, glabrous to strigillose or pubescent, the branches 1-4 dm long, ascending to prostrate; basal leaves to 10 cm long and 3 cm broad, bipinnatifid into segments 1-1,5 mm broad, long-petiolate, the cauline much smaller, the upper ones pinnatifid to laciniate, sessile, and some, at least, almost always auriculate; racemes many, 3-8 cm long, densely-flowered, puberulent (glabrous); pedicels slightly flattened, wing-margined, from shorter than fruits to considerably longer than they, spreading to recurved, sparsely puberulent; sepals ca. 0,75 mm long, sparsely hairy, usually persistent until fruits are mature in size; petals usually tiny linear vestiges $^1/_2$-$^1/_4$ as long as sepals, rarely lacking; stamens 2; glands 4, lanceolate, 0,1-0,3 mm long; silicles 2,5-3,5 (4) mm long, ovate-elliptic or elliptic to obovate-elliptic, glabrous, very indistinctly veined, sinus $^1/_4$-$^1/_{10}$ length of fruit, open; styles nearly obsolete (to 0,1 mm long); cotyledons incumbent.

Material seen. — VENEZUELA : Mastuerzo, Pittier 12687 (NY, US); near Piedra Gorda, Pittier 13273 (US); Laguna Verde, Mérida, de Bellard 41, 302, and 250 (US).

COLOMBIA: Prov. Bogotá, Triana (G, NY, US); prope cataractam Tequedamam, Holton 8 (G) and 681 (NY); vic. La Baja, Santander, Killip and Smith 18081 (G, NY, US); near Bogotá, Pring 76 and 77 (MBG), Cuatrecasas 47 and 5026-A (US); Bogotá, Arbeláez 1196 (US); Puracé, Cauca, von Sneidern 1778 (F, G, NY); Cuesta de Tocatá, Cauca, Pittier 1512 (NY, US); « Canaan », Mt. Puracé, Cauca, Pennell and Killip 6507 (G, NY, US); Volcán Puracé, Popayán, Lehmann 5603 (F, G); Popayan, Lehmann 5424 (F, G, US); near Medellín, Antioquia, Archer 1134 (US); Monserrate, Cundinamarca, Amórtigui 234 (US); Ziapquirá, near Bogotá, Niemeyer 117 (US).

ECUADOR: without locality, Humboldt, Bonpland et Kunth, photo of type of *S. dubia* (F); in Andibus Ecuadorensibus, Spruce 5100 (NY); in Andibus Quitensibus, Jameson in 1859 (G); Pichincha, Quitensian Andes, 10, 29, 1855, Couthay (G, NY) and Firmin 40 (US) and 233 (US); Malchingui to Pomasqui, Pichincha, Hitchcock 20866 (US); Riobamba, Chimborazo, Rosse 42 (G, NY, US), Penland and Summers 458 (F, W), and Rimbach 668 (F); Huigra, Chimborazo, Hitchcock 20309 (G, NY, US); Ambato, Tungurahua, Pachano 6 (NY, US) and 46 (US); Luisa, Rose and Rose 22316 (G, NY, US); Quito, Jameson 772, photo of type of *L. auritum* (F, Kr), fragment (F); 10 mil. NE. of Ambato, Tate 551 (US).

PERÚ: Habitat in Peruvia, photo of type? (F, Kr); Viso, Macbride and Featherstone 569 (F, G); San Andrés de Chicca, Cuzco, Vargas 11005 (C, F); Mito, Macbride and Featherstone 1782 (F, NY); Matucava, Macbride and Featherstone 484 (F); Ollantaytambo, Cook and Gilbert 364 (US), 790 (US), and 1897 (US); Río Blanco, Lima, Killip and Smith 21544 (US); Huacapistana, Junín, Killip and Smith 24135 (US).

BOLIVIA: La Paz, Murillo, Hammarlund 485 (F, NY), Buchtien 4 (US), 154 (F, G, MBG, NY), 1488 (G), and 3974 (F, US), Pennell 14218 (F, G), Bang 23 (US), Williams 2364 (US), Claude-Joseph 1158 (US), and Rusby 1201 (G, NY); Chicla, 4, 21-23, 1882, Ball (NY); Larecaja, Mandon 921 (NY); Incachaca, Cochabamba, Steinbach 5839 (F); near Yungas, Rusby 1201 (G, NY, US).

ARGENTINA: Chubut, Illin 49 (C).

BRAZIL: Porto Alegre, Rio Grande do Sul, Remeck (G).

The following collections surely belong here also, but do not have auriculate leaves. Popayán, Colombia, B. T. 378 (NY); Matacuna, Perú, Macbride and Featherstone 484 (NY); BOLIVIA: La Paz, Bang 23 (MBG, NY), Williams 2364 (NY); Titicaca, Bandelier 30 with some doubt (NY); Pongo, Tate 167 (NY).

L. bipinnatifidum shows considerable variation in pubescence, leaf base, and silicle shape, but subspecific entities are not apparent. It has often been reported from North America, but I have seen no specimen from that region which I could refer here. *Lepidium oblongum* is the most closely related North American species, but differs in having caducous sepals and non-auriculate leaves.

20. **L. subvaginatum** Steud. ex Thell.

Fig. 27.

Thellung, *op. cit.* 249.

L. subvaginatum Steud., *Nom.* ed. II, **2**: 28. 1841, without description; *L. Berteroi* Planchon ex. Thell., *loc. cit.*, in synonymy.

Very similar to *L. auriculatum*, differing only vegetatively; stems mostly one and simple, sometimes sparingly branched, 1-4 dm tall, pubescent; basal leaves bi- to tri-pinnatifid, the divisions 0,5-2 mm broad, cauline leaves ovate-lanceolate, mostly 1-2 (3) cm long, deeply serrate-laciniate to pinnatifid, the leaves longer than the internodes, very strongly clasping-auriculate; pedicels wing-margined; sepals ca. 1 mm long, persistent; petals usually linear vestiges ca. $^1/_2$ length of sepals; stamens 2; glands 4, linear-lanceolate, 0,2-0,5 mm long; silicles elliptic-oblong, not prominently reticulate, glabrous, ca. 3,5 (4) mm long; styles obsolete; sinus $^1/_6$-$^1/_{10}$ length of fruit.

Material seen. — CHILE: Mt. Leona, Rancagua, in 1818, Bertero 364 photo of type? (F, Kr), isotype? (F, G in part), and in 1828, Bertero 365 (F in part, NY); Talca, Claude-Joseph 4324 (US); Colchagua, Bridges and Cuming? (NY).

This plant is puzzling; in most collections it is mixed with *auriculatum* but apparently is distinct from that species and

can readily be recognized because of the simple or near-simple stems and more entire, much larger, and «eared» leaves. There can be little doubt that the material cited here is similar to that which Thellung included under his species, yet the supposed type, photographed at the Delessert herbarium (Bertero 364) is a much larger-leaved specimen than any which I have seen. It appears to have the same characteristic upper cauline leaves as the other collections cited.

Why Thellung maintained that his species was closely related to *L. pubescens* Desv. (in actuality Thellung's *pubescens* is *L. strictum*) I cannot understand. *L. subvaginatum* is a more strict plant, its cauline leaves are entirely distinctive, and the fruit is not at all similar to the plant to which Thellung likened it.

21. **L. auriculatum** Regel and Körnicke

Fig. 26.

Regel and Körnicke, *Ind. Sem. Hort. Petrop.* **51**. 1857.

L. pubescens Desv. var. *fallax* Thell., *Bull. Herb. Boiss.* II, **8** : 913, 1908.

L. araucanum Phil., *Anal. Univ. Chile* **81** : 335. 1892.

L. bipinnatifidum Desv. var. *araucanum* (Phil.) Reiche, *Anal. Univ. Chile* **90** : 95. 1895.

Annuals or possibly perennials, 1-several-stemmed, the branches 5-25 cm tall, rather densely strigose-hirsute; basal leaves to 10 cm long, long-petiolate, the blades bi- or tri-pinnatifid into filiform segments scarcely 1 mm broad, cauline leaves sessile and auriculate-based, mostly pinnatifid into toothed or entire divisions 1-1,5 mm broad; racemes numerous, rather densely-flowered, 3-8 cm long, the rachis very densely long-pubescent; pedicels shorter than, to equal to silicles, spreading to recurved, slightly flattened and distinctly wing-margined, very pubescent; sepals ca. 1 mm long, persistent until fruits are nearly or quite mature, pubescent on back; petals wanting or linear vestiges $^1/_3$-$^2/_3$ as long as sepals; stamens 2; glands 4, linear-lanceolate, 0,2-0,3 (0,4) mm long; silicles oblong to oblong-obovate, ca. 3,5 mm long, glabrous, indistinctly veined, the sinus ca. $^1/_{10}$-$^1/_6$ length of fruit, open; styles obsolete; cotyledons incumbent.

Material seen. – CHILE: Bertero 1080, Philippi 317, photo (F, Kr); San Juan, prov. Valdiviensis, Philippi, fragment of type? (F); Valparaíso, Bertero 1080 (G), and on 10, 10, 95, Buchtien (NY, US); Valdivia, 11, 8, 96, Buchtien (G, US); « Poeppig, *Coll. pl. Chil.* I. 169. *Lepidium pubescens* Desv. var. *microcarpum* Kz. *Diar.* 93, Ad vias, in posi arid. ubique prope Concon, Jul. flor. » probably isotype of var. *fallax* (MBG); Talca, Claude-Joseph 4323 (US); Concepción, Claude-Joseph 4967 (US) and 4946 (US); Valle de Marga Marga, Aconcagua, Jaffuel and Pirion 3045 (G); Rancagua, Bertero 1080 and 364 (F, G, MBG, NY).

Thellung was of the opinion that this plant was closely related to *L. calycinum,* but is seems to me it much more similar to *L. subvaginatum* and *bipinnatifidum.* It has more finely divided, less conspicuously auricled cauline leaves than the former, and is more densely pubescent and has more finely divided leaves and more nearly oblong fruits than the latter.

Although Thellung specified that it lacks petals, *L. auriculatum*, like *bipinnatifidum* and other « apetallous » species, may have linear vestiges of petals present — in some instances they are quite conspicuous.

Thellung's *L. pubescens* var. *fallax* was said to differ from *auriculatum* only in that it had petals $^1/_2$ as long as calyx. I believe it belongs here, even though it is somewhat intermediate to Thellung's *L. pubescens (L. strictum).* Poeppig 169, which is probably an isotype, has more deeply emarginate fruits and longer glands than any other collection seen *(strictum* characters). However, it does not have strictum's prominent reticulations or porrect lobes to the fruits, and is otherwise very similar to *auriculalum.*

Most plants appear to be blossoming in their first season of growth, but others, for instance those of Buchtien's collection of 1896 (G) appear to be older plants, therefore I am not sure whether or not the species differs from *bipinnatifidum* in its duration.

I have not seen type material of *L. araucanum* Phil. *(bipinnatifidum* var. *araucanum* (Phil.) Reiche), but believe it to be conspecific with *L. auriculatum.* The species was reported from

Arauco, San Vicente and Curanilahue, Chile. *L. auriculatum* but not *L. bipinnatifidum*, has been seen from there.

22. **L. quitense** Turcz.

Fig. 30.

Turczaninow, *Bull, Soc. Nat. Mosc.* **27** : 309. 1854, Thell., *op. cit.* 213, including varieties *typicum* Thell., *integrifolium* Thell., and *microphyllum* Thell.

L. microphyllum Willd. ex Thellung, *loc. cit.*, a herbarium name of Willdenow which Thellung published in synonymy.

Perennial from suffruticose base, the branches slender, erect, 2-4 dm tall, finely puberulent; basal leaves not seen, but lower cauline leaves pinnatifid into filiform-subulate segments no more than 1 mm broad, upper cauline leaves linear-subulate, ca. 1 mm broad, 1-3 cm long; silicles loosely-flowered, puberulent, pedicels 1-2 times as long as silicles, not flattened, very narrowly wing-margined; sepals ca. 1 mm long, glabrous, caducous; petals spatulate, equalling or longer than sepals; stamens 4 (2 or 6 ?), well-exserted; glands 4 (6 ?), lanceolate-ovate; silicles elliptic to elliptic-ovate, 3-3,5 mm long, indistinctly veined, glabrous, the sinus very shallow, $^1/_{10}$-$^1/_{15}$ length of silicle; styles obsolete, the stigmas nearly sessile; seeds not seen.

Material seen. — ECUADOR : Plains of Pomasqui, Jameson 892 fragment of type (F), photo of type (F), Isotype (US), Sodiro 56, photo of type of var. *integrifolium* (F, Kr).

Although I have seen only a photograph of the type of Thellung's var. *integrifolium* and neither the type nor authentic material of his var. *microphyllum*, I cannot feel that either variety is of significance. In his treatment of the species, Thellung made three varieties, one represented by 2 collections, the others each by a single collection. As shown below, they differed in such insignificant details that is not felt they could be maintained, were abundant material available.

var. *typicum*	var. *integrifolium*	var. *microphyllum*
lower cauline leaves pinnatipart.	leaves all entire	some of leaves pinnatipart
silicles narrowly rhombic-ovate, 3,5 mm long ; subequal to pedicels.	silicles rhombic	silicles elliptic-ovate, 3 mm long, $^2/_3$ as long as pedicels.

The isotype of var. *typicum* at the United States National Herbarium has silicles much shorter than some of the pedicels.

23. **L. angustissimum** Philippi

Philippi, *Anal. Univ. Chile* **81** : 333. 1892.

Annual ? to 13 cm tall, glabrous, sparingly branched ; leaves all linear, almost capillary, to 18 mm long, 0,5 mm broad ; pedicels 2,5 mm long ; « flowers minute », calyx 2-2,5 mm long, petals as long ; silicles orbicular, 4 mm in diameter, emarginate, narrowly winged.

Type : « In deserto Travesia dicto inter Chañarcillo et vallem Carrizal, Septembri 1885 invenit Frid. Phillipi ».

I have seen no material of the above nature, *L. quitense* being the only species of which I know that has entire leaves but 0,5 mm broad. However, *quitense* has no such flowers or fruits as those described for this species, so it would seem that if really a *Lepidium* it is surely a distinct entity.

24. **L. Morrisoni** sp. nov.

Fig. 31.

Perenne ; caudicibus simplicibus vel multicipitibus ; caulibus 2-5 cm altis ; foliis basi 2-3 cm longis, pinnatifidis vel bipinnatifidis, segmentis linearibus, parce 1 mm latis, glabris ; foliis caulinis similibus vel linearibus et integris ; racemis 1-4 cm longis, glabris vel glabratis, pedicellis quam siliculis brevioribus vel subaequilongis, anguste alato-marginatis sed non compressis, glabris vel sparse puberulentis ; sepalis ca. 0,75 mm longis, pubescentibus, caducis ; petalis lineari-setaceis, $^1/_2$ sepalorum longitudinis aequalibus ; staminibus 2 ; glandulis 4 ; ovato-oblongis, parce 0,15 mm longis ; siliculis ellipticis, 2,5-3 mm longis, 2 mm latis, glabris, reticulatis

sine discrimine, sinibus $^1/_{12}$-$^1/_{15}$ *siliculorum longitudinis aequalibus; stylis absentibus; seminibus ca. 1,3 mm longis, angustissimis; cotyledonibus incumbentibus.*

Type: Río Ojotas, NE. of La Vega Redonda, in the Andes back of Cuncumen, Coquimbo, Chile, 3000 m, Feb. 25, 1939, Morrison and Wagenknecht 17418 (C). Isotypes at Kr and MBG.

Perennial from simple to multicipetal caudex, the stems 2-5 cm tall; basal leaves 2-3 cm long, pinnatifid to bipinnatifid into linear segments scarcely 1 mm broad, glabrous, the bases usually marcescent-persistent; cauline leaves similar or the upper linear and entire; racemes very closely flowered, 1-4 cm long, glabrous or essentially so, pedicels shorter than to equal to silicles, narrowly wing-margined but not flattened, glabrous or sparsely puberulent; sepals ca. 0,75 mm long, pubescent, caducous; petals linear vestiges ca. $^1/_2$ length of sepals; stamens 2; glands 4, oval-oblong, scarcely 0,15 mm long; silicles elliptic, 2,5-3 mm long and 2 mm broad, glabrous, indistinctly veined, sinus $^1/_{12}$-$^1/_{15}$ length of fruit; styles lacking; seeds ca. 0,3 mm long, very narrow; cotyledons incumbent.

This collection was identified as *L. brevicaule* and may possibly be that species; at least it is perennial and has a habit similar to that of Gay's species. However, the near glabrosity of the plant, the very narrow leaf-segments, and the larger silicles seem adequate distinctions for proposing it as new. There is also the possibility that it may be conspecific with *L. Steinbachii* but since that species was said to be glabrous and 10-15 cm tall, I am assuming this is a different plant.

It is being named for Mr. J. L. Morrison, a member of the University of California Second Botanical Garden Expedition to the Andes.

25. **L. Steinbachii** O. E. Schulz

O. E. Schulz, *Notizbl. Bot. Gard. Berl.* **9**: 1037. 1926.

Perennials, stems mostly one, 10-15 cm tall, glabrous, simple or branched; basal leaves deciduous or the bases persistent, cauline smaller and short-petioled, the upper ones subsessile,

pinnatisect, the lobes linear; pedicels 3-4 mm long, filiform, erect-spreading; sepals 0,75 mm long; petals shorter than sepals, linear; stamens 2; silicles elliptic, 2,5-3 mm long, 2 mm broad, apex shallowly emarginate, base subrotund; stigma subsessile; seeds 1,5 mm long, 0,75 mm broad.

Type: Bolivia, Pampitas del Río Piray, Prov. Cercado, Dept. Santa Cruz, Steinbach 2724 (was at Berlin).

I have seen no material that I can say would match this description, and assume that it is a valid species. Schulz contrasted it with *bonariense* in such inconclusive fashion (his plant glabrous, leaves all pinnatisect, lobes and rachis very narrow) that one wonders if it might not be conspecific with that species, although *S. Steinbachii* was said to be perennial, whereas *bonariense* is annual.

26. **L. brevicaule** Barn.

Fig. 33.

Barn, in Gay, *Fl. Chil.* 1: 165. 1845; Thell., *op. cit.* 205.

Annuals (biennial, or even perennial?), stems simple and erect to branched from base and the branches decumbent to erect, 5-15 cm long, finely soft-pubescent; basal leaves 1,5-3 cm long, long-petiolate, soft-pubescent, pectinate-pinnatifid, divisions 1,5-2 mm broad, entire to crenate-toothed; racemes many-flowered, 3-7 cm long, finely pubescent; pedicels mostly slightly longer than silicles, terete but very narrowly wing-margined, pubescent; sepals ca. 0,5 mm long, ovate, caducous; petals linear vestiges $^1/_2$-$^1/_3$ length of sepals; stamens 2; glands 4, ovate, scarcely 0,1 mm long; silicles oval-elliptic, ca. 2 (2,2) mm long, glabrous, indistinctly veined, sinus scarcely $^1/_{12}$ length of fruit, styles lacking; cotyledons incumbent.

Material seen. — CHILE: Cordillera de Coquimbo, photograph of type at Paris (F, Kr); vicinity of Laguna Grande, Atacama, Johnston 5933 (G).

Another collection, Pazña or Tazña, Bolivia, Buchtien 1871 (US), is being referred here also. The specimen looks to be somewhat diseased and is so poorly preserved it cannot be referred with certainty to any species. It may more properly belong with *L. depressum*.

Since *brevicaule* is the smallest-fruited South American species, it seems very probable that Johnston's plant, the smallest-fruited specimen I have seen, which Thellung identified as *brevicaule*, belongs here. This plant resembles the type in many ways, especially in flower and fruit character, but differs from the type in having smaller leaves and a more branched habit. It is surely an annual plant. Gay described *brevicaule* as an annual also, but Thellung believed it to be a perennial. It is to be regretted that the photograph of the type is of little help in settling the question. The type specimens appear to have roots of the same nature as those of the Johnston collection but one cannot be sure whether they are annuals or perennials.

27. **L. scabrifructum** sp. nov.

Fig. 34.

Annuum, caulibus paucis, erectis, pubescentibus, 5-15 cm altis; foliis oblanceolatis, basi paucis, 2-3 cm longis, pinnatifidis, segmentis 5-9, integerrimis vel 1-2-dentatis, 1,5-2,5 mm latis, foliis caulium 3-5-dentati-pinnatifidis; racemis paucis, laxis, multifloris, 4-10 cm longis; pedicellis patentibus, fructibus subaequilongis, leviter compressis, marginibus parce alatis, puberulentis; sepalis ca. 1 mm longis, puberulentis, caducis; petalis absentibus vel rudimentariis, staminibus 2; glandulis 4, ca. 0,15 mm longis, ovato-lanceolatis; siliculis ellipticis, ca. 3,5 mm longis, ca. 2,5 mm latis, scabro-ciliatis (glabris), reticulatis sine discrimine, sinibus ca. $^1/_{10}$ *siliculorum longitudinis aequalibus, angustioribus; stylis absentibus; cotyledonibus incumbentibus.*

Type: Atocha, Andine Region, Bolivia, March 20, 1921, at 3700 m, Asplund 6205 (US).

Annuals, stems few-branched, 5-15 cm tall, the branches erect, moderately pubescent; leaves oblanceolate in outline, the basal ones few, 2-3 cm long, pinnatifid into 5-9 entire (1-2 toothed) divisions 1,5-2,5 mm broad, the cauline but 3-5-toothed-pinnatifid; racemes few, loosely but many (30-50)-flowered, 4-10 cm long; pedicels spreading, ca. equal to fruits, narrowly wing-margined and very slightly flattened, puberulent; sepals ca. 1 mm long, puberulent, promptly caducous; petals tiny vestiges

or wanting entirely; stamens 2; glands 4, ca. 0,15 mm long, oval-lanceolate; silicles elliptic, ca. 3,5 mm long, ca. 2,8 mm broad, scabrous with few tiny marginal scale-like hairs (glabrous), very indistinctly reticulate, the sinus ca. $^1/_{10}$ length of fruit, rather narrow; styles obsolete; cotyledons incumbent.

This plant is one of the five Andean annuals with pubescent, silicles, the others being *pubescens, Rahmeri, strictum*, and *demissum*. It can be distinguished from any of these by its elliptic, lightly-veined silicles, caducous sepals, and small once-pinnatifid leaves.

28. **L. Rahmeri** Philippi

Philippi, *Anal. Mus. Nac. Chile* **5**. 1890; Thell., *op. cit.* 250.

Annual (perennial?), branched from base, the branches spreading to erect, 5-10 cm long, grayish-strigose, the hairs 0,2-0,3 mm long, spreading, stiff; leaves, except for a few cauline ones, lacking, these linear-oblanceolate, few-toothed, 1-3 cm long, 0,2-0,3 mm broad; racemes numerous, 3-7 cm long, rachis and pedicels grayish strigose; pedicels ca. half as long as fruits, wing-margined but not flattened; flowers (in material seen) lacking, no sepals, petals, and stamens not seen; glands 4, ca. 0,2 mm long, ovate but narrowed to lanceolate-acute tips; silicles orbicular, 3,5-4 mm in diameter, very indistinctly veined, margins sparsely short-scabrous-ciliate, sinus open, ca. $^1/_{10}$ length of silicle; style obsolete; seeds ca. 1-5 mm long; cotyledons incumbent.

Material seen. — BOLIVIA: Atocha, Andine Region, Asplund 6204 (US); Tarapaca, Chile, Philippi, photo of isotype (F, Kr).

I am not sure that the Asplund collection is conspecific with *Rahmeri*, since I have seen a photograph, only, of Philippi's isotype. It resembles Philippi's plant very closely, however, in most observable characters. The large rotund fruits, short pedicels and broad, abruptly narrowed glands are common to the Philippi plant (as described by Thellung) and to the Asplund collection. The Asplund specimen is surely an annual, whereas Philippi's plant appers to have been a biennial, at least. No mention was made of pubescence on the silicles of *Rahmeri* by

either Philippi or Thellung. If the plant here described proves not to be conspecific with *Rahmeri*, it is thought it will prove to be an unnamed species. Although there is also a possibility that it is *L. Raimondii* Schulz, that species was said to have pinnatifid leaves and « apice profunde emarginatae ».

29. **L. demissum** sp. nov.

Fig. 22.

Annuum ; multis patentibus vel erectis caulibus, 5-10 cm altis, pubescentibus, pilis 0,1-0,2 mm longis ; foliis 1-3 cm longis, pinnatifidis, segmentis ca. 1 mm latis, integerrimis vel pauci-dentatis, basibus foliorum superiorum latis sed non auriculatis ; racemis laxis, 5-20-floriferis, 2-5 cm longis, puberulentissimis ; pedicellis siliculis brevioribus vel subaequilongis, pubescentibus, leviter compressis, marginibus late alatis ; sepalis ca. 1 mm longis, sparse pubescentibus, persistentibus ; petalis absentibus (vel vestigiis linearibus) ; staminibus 2 ; glandulis 4, lineari-lanceolatis, ca. 0,3 mm longis ; siliculis ovatis, 3,5-4 mm longis, reticulatis sine discrimine, glabris vel sparse breve scabrido-ciliatis, lobulis alatis ; sinibus latis, siliculis ca. $^1/_{10}$ siliculorum longitudinis aequalibus ; stylis absentibus ; seminibus ca. 1,6 mm longis ; cotyledonibus incumbentibus.

Type : La Paz, Bolivia, at 3900 m, Apr. 3, 1919, Buchtien 4475 (G). Isotype at U.S.

Annual, branched from base, the stems spreading to erect, 5-10 cm tall, moderately pubescent with hairs 0,1-0,2 mm long, leaves 1-3 cm long, pinnatifid, the divisions ca. 1 mm broad, entire or few-toothed, the lower petiolate, the upper broader-based and sessile, but not auriculate ; racemes loosely 5-20-flowered, 2-5 cm long, densely puberulent ; pedicels subequal to or shorter than silicles, broadly wing-margined and somewhat flattened, pubescent ; sepal ca. 1 mm long, sparsely pubescent, persistent until fruits are nearly mature in size ; petals lacking (linear vestiges ?) ; stamens 2 ; glands 4, linear-lanceolate, ca. 0,3 mm long ; silicles ovate, 3,5-4 mm long, very indistinctly veined, glabrous or very sparsely short scabrous-ciliate, the apices somewhat winged, sinus open, ca. $^1/_{10}$ length of silicles ;

styles obsolete; seeds ca. 1,6 mm long; cotyledons incumbent.

The type collection is a mixed one; one sheet of the material at U.S. and the one at MBG represent *L. depressum* Thell.

This may possibly be the same as *L. Raimondii* Schulz, *Notizbl. Bot. Gard. Berl.* **10**: 727. 1929, but is fewer-flowered and smaller-fruited than that species was said to be. It most closely resembles *pubescens* and *Rahmeri,* but has longer glands, more tardily caducous sepals, and more deeply divided leaves than the latter, and smaller, less sharply toothed leaves, less deeply emarginate fruit, and longer-persistent sepals than the former.

30. **L. Raimondii** O. E. Schulz

Schulz, *Notizbl. Bot. Gard. Berl.* **10**: 727. 1929.

Annual, branched from base, to 15 cm tall, densely short pilose; upper cauline leaves pinnatisect, lobes linear, entire or denticulate, broadly sessile, not auriculate; racemes elongate, densely 30-60-flowered; pedicels 2-4 mm long; silicles suborbicular, 4-5 mm long, 4 mm broad, base rotund, deeply emarginate; styles very short; seeds 1-2 mm long, outer margin narrowly winged.

Type: Dept. Cajamarca, Prov. Contumazá, Cascas, Cerro de Catache, Perú, Raimondi 7538 (was at Berlin).

I have seen no pinnatifid-leaved annual with such large silicles, but believe this species to be a valid one.

31. **L. pubescens** Desv.

Fig. 35.

Desvaux, *Journ. Bot.* **3**: 165, 180. 1814, but not of Thellung, *op. cit.* 247 or Hitchc., *Madroño* **3**: 272. 1936.

Annuals, stems slender, simple to branched, 1-2,5 dm tall, rather densely pubescent-strigillose; basal leaves not seen, but cauline leaves pinnatifid, not auriculate, the rachis 1-3 mm broad, the divisions 1-2 mm broad, usually again sharply few-toothed; racemes few-flowered, open, 3-8 cm long, pubescent-strigillose; pedicels shorter than silicles, distinctly flattened and

very narrowly wing-margined, puberulent; sepals ca. 1 mm long, glabrous or sparsely pubescent, caducous; petals usually wanting, or but tiny linear vestiges; stamens 2; glandes 4, linear-lanceolate, 0,2-0,3 mm long; silicles ovate-rotund, 4-4,5 mm long, indistinctly reticulate, margins coarsely ciliate with few short thick hairs, the apices acute, porrect, sinus open, $^1/_5$-$^1/_6$ length of fruit; seeds 1,5 mm long; styles almost obsolete (0,05-0,15 mm long); cotyledons incumbent.

Material seen. — Perú: Para, Domby, photo of type (F, Kr, W); San Bartolomé, Lima-Oroyo R. R., Apr. 1910, Webenbauer 5310, (F, G, US); between Ambar and Huacho, Lima, Cajatambo, Stork 11472.

There surely can be no question but that the Weberbauer and Stork collections are conspecific with the plant on which Desvaux based his species.

It seems remarkable that the identity of this species has remained uncertain so long. The large, pubescent-margined silicles and sharply toothed leaves are to be matched in no other American species. Dr. Harold St. John examined the type at Paris and assured me that it was distinct from all specimens from North America which I had given him to compare with it (an accurate observation). The material which Thellung and I called *L. pubescens* (= *L. strictum)* differs among other ways in having very prominently reticulate and much smaller fruits, longer glands, persistent sepals, and different leaves.

32. **L. Danielsii** sp. nov.

Fig. 37.

Annuum, 2-3,5 dm altium, dense adpresso-strigillosum; foliis basi laciniatis vel serratis, foliis caulium oblanceolatis, 1-2,5 (4) cm longis, 3-5 (7) mm latis, serratis vel dentatis, prope glabris, petiolatis, racemis multis, (3) 5-10 cm longis, dense adpresso-strigillosis; pedicellis brevioribus quam fructibus (sub-aequalibus), patentibus, compressissimis, 2-3-plo latioribus quam crassioribus, facie inferiore glabra, facie superiore pubescenti, marginibus parce alatis; sepalis ca. 1 mm longis, leviter pubescentibus, caducis, petalis absentibus (semper ?); staminibus 2; glandulis 4, ca. 0,1 mm

longis, ovatis ; siliculis (3,5) 4,5-5 mm longis, ovatis, glabris, reticulatis sine discrimine, sinibus fructibus $^1/_5$-$^1/_8$ *aequalibus, acuto-alatis ; stylis 0,1-0,2 mm longis ; seminibus ca. 2 mm longis ; cotyledonibus incumbentibus ?*

Type : Medellín, Antioquia, Colombia, August, 1933, H. Daniels (NY).

Annual, ca. 2-3,5 dm tall, rather thickly strigillose, the hairs appressed; basal leaves laciniate to serrate, cauline leaves mostly oblanceolate, 1-2,5 (4) cm long, 3-5 (7) mm broad, serrate to dentate, nearly glabrous, short to long-petiolate; racemes rather numerous, (3) 5-10 cm long, rather densely appressed-strigillose; pedicels shorter than (or equal to ?) fruits, spreading, flattened and 2-3 times as broad as thick, glabrous on lower surface, finely strigillose on upper surface, very slightly wing-margined; sepals ca. 1 mm long, lightly pubescent on back, caducous with stamens; petals wanting (possibly sometimes present); stamens 2; glands 4, ca. 0,1 mm long, ovate; silicles (3,5) 4,5-5 mm long, broadly ovate, glabrous, indistinctly veined, sinus $^1/_5$-$^1/_8$ length of fruit, V-shaped, the silicles acutely winged to base of sinus; styles 0,1-0,2 mm long; seeds ca. 2 mm long, cotyledons incumbent ?

This one plant is totally unlike any other *Lepidium* I have seen. Of the American especies it is perhaps most closely approached by *L. pubescens* of Perú, a species with pinnatifid leaves and pubescent fruits.

Other collections from Colombia, e. g. between El Roble and Tona, Santander, Killip and Smith 19409 (G, US); without locality Mutis in 1760-1808 (US); «Balsa de Pastor, Carrieles», A. Figueroa P. 905 (US); Medellín, Antioquia, Archer 673, in part (US), seem to belong here — if they are not conspecific with the type then they, too, must be accorded specific status. They differ from the type collection chiefly in fruit size, the silicles being about 3,5-4,5 mm in length as compared with a length of nearly 5 mm in the type.

33. **L. filisegmentum** sp. nov.

Fig. 36.

Annuum; caulibus multis, sparse pubescentibus, 2-6 (10?) cm altis; foliis in basi 2-5 cm longis, longioribus quam racemis vel subaequilongis, longe petiolatis, pinnatifidis, segmentibus 9-13, linearibus, 0,15 mm longis, 0,5-1 mm latis, integerrimis vel 1-3-dentatis, foliis caulium minoribus, non auriculatis, glabris vel sparse strigilloso-pubescentibus; racemis 5-15 (30)-floribus, laxis, 1-5 cm longis, quam foliis brevioribus; pedicellis gracilibus, quam siliculis 1-2-plo longioribus, leviter compressis, marginibus angusto-alatis; sepalis ca. 0,8 mm longis, sparse pubescentibus vel glabris, persistentibus; petalis absentibus vel linearibus et $^1/_4$ *longitudinis sepalorum; staminibus 2; glandulis 4, ovalibus, ca. 0,1 mm longis; siliculis ellipticis, ca. 3 mm longis, ca. 2 mm latis, glabris, reticulatis sine discrimine; sinibus ca.* $^1/_{15}$ *siliculorum longitudinis aequalibus; stylis absentibus; seminibus ignotis.*

Type: Caleta Olivia, Santa Cruz, Argentina, Dec. 12, 1929, at 200 m., Donat 185 (G). Isotypes at C, F, MBG, and NY.

Annual, several-stemmed from base, the stems 2-6 (10?) cm tall, sparsely pubescent; basal leaves 2-5 cm long, surpassing many of the racemes, long-petiolate, pinnatifid into 9-13 linear segments 5-10 mm long and no more than 1 mm broad, these entire to 1-3 toothed, cauline leaves similar but smaller, not auriculate, all glabrous or sparsely strigillose-pubescent; racemes 5-15 (30)-flowered, loose, 1-5 cm long, nearly concealed by leaves; pedicels slender, 1-2 times as long as silicles, narrowly wing-margined and slightly flattened; sepals ca. 0,8 mm long, sparsely hairy or glabrous, persistent until fruits are mature in size; petals tiny linear vestiges $^1/_4$ length of calyx, or wanting; stamens 2; glands 4, oval, ca. 0,1 mm long; silicles elliptic, ca. 3 mm long and 2 mm broad, glabrous, fairly prominently veined, sinus ca. $^1/_{15}$ length of fruit, styles obsolete; seeds not seen.

This little annual is represented by perhaps 25 plants, all of which appear to have been depauperate. The long, finely dissected leaves with filiform segments, small elliptic fruits, tiny petals and glands, and persistent sepals constitute a combination

of character not to be found in any other species of which I know.

Although the silicles are rather prominently reliculate, they are not nearly so heavily veined as in *L. strictum* and *L. inclusum.*

34. **L. inclusum** Schulz

Fig. 40.

Schulz, Fedde, *Rep. Spec. Nov.* **33**: 189. 1933.

Annuals, branched from base, the stems 5-20 cm long, spreading or ascending, rather densely strigillose-hirsute with hairs 0,5-0,8 mm long; basal leaves to 10 cm in lenght, strigillose, bi- or tri-pinnatifid into segments 1-2 mm broad, cauline leaves similar but reduced and usually less compounded, not auriculate; racemes 2-5 (7) cm long; pedicels mostly somewhat longer than fruits, mostly recurved, hirsutulous, slightly flattened and distinctly wing-margined; sepals ca. 1 mm long, with few short hairs on back, promptly deciduous; petals linear, shorter than sepals; stamens 2; glands 4, triangular, 0,1-0,2 mm long; silicles 2,5-3 mm long, at least at broad, semi-cordate-ovate, glabrous very distinctly reticulate, slightly inflated, sinus $^1/_8$-$^1/_6$ length of fruits, relatively open; styles obsolete; cotyledons incumbent.

Material seen. — ARGENTINA: In litore, Eberhardt, Southern Patagonia, 10, 3, 1899, O. Borge, (NY, US); R. Bueno, Magallanes, Patagonia, Hicken 361, in part only (NY) and 349 (F, G, NY).

The three collections cited have been named *bipinnatifidum, spicatum,* and *auriculatum,* respectively, and indeed the second collection is a mixed collection, containing a few plants of *L. spicatum. L. inclusum* differs from each of these three species in fruit character, having totally differently shaped, more prominently reticulate silicles. It lacks the auriculate leaves of *bipinnatifidum,* and the persistent sepals of *auriculatum,* and has more compounded leaves than *spicatum.*

This is the only plant with prominently reticulate fruits which occurs in Argentina, the reticulations being more evi-

dent than in any other American species except *L. strictum*. The silicles are, because of their venation and shape, suggestive of the fruits of *Coronopus*. Although I have not seen Schulz's type, his description fits this entity well enough that I feel confident this is his species, even though the leaves of the material I have seen are larger than he specified for his material.

35. **L. strictum** (Wats.) Rattan

Fig. 38.

Rattan, *Anal. Key* **25**, 1888.

L. oxycarpum var. (?) *strictum* Wats. *Bot. Calif.* **1** : 46. 1876.

L. reticulatum Howell, *Fl. Northwest Amer.* **11** : 64. 1897, but not of Thellung, *op. cit.* 253.

L. pubescens Desv. apud Thell., *op. cit.* 247 and Hitchc., *op. cit.*, 272, but not of Desv., *Journ. Bot.* **3** : 165, 180. 1814.

Annuals, prostrate to ascending, to 15 cm tall; branches and leaves moderately pubescent with short straight hairs; basal leaves 3-7 cm long, mostly bipinnatifid into linear segments 1-2 mm broad, the cauline reduced, often merely laciniate or even entire, not auriculate; racemes many, 3-6 (10) cm long, many-flowered and crowded, axis and pedicels short pubescent with straight hairs; pedicels usually shorter than silicles, erect or ascending, markedly flattened and very noticeably wing-margined; sepals ca. 1 mm long, pubescent on back, persistent until fruit is mature in size; petals usually linear vestiges shorter than sepals; stamens 2; glands 4, linear, about 0,5 mm long; silicles mostly 2,5-3 mm long, ovate to ovate-rotund, very prominently reticulate, margins usually with few short hairs, apices acute, porrect, somewhat winged, sinus $^1/_5$-$^1/_6$ length of silicle, open; styles lacking; cotyledons incumbent.

Type : Near Placerville, California, United States, Rattan.

Material seen. — CHILE: without definite locality, O. Kuntze in 1892 (NY); near Santiago, Hastings 385 (C, NY, US), Claude-Joseph 538, 1367, and 2884 (US); Cerro San Cristóbal, Santiago, Grandjot in 1936 (MBG); Valparaíso, Buchtien in 1895 (US); Marga Marga, 40 km of Valparaíso, Jaffuel 834 (G), and Jaffuel and Pirion 3059 and 3103B (G); Pangal, Valparaíso,

Looser in 1925 (G); Limache, Looser 1435 (G); Caldera, Atacama, Gigoux (G).

The Chilean material has all been identified as *L. pubescens* Desv., *L. bipinnatifidum* Desv., *L. auriculatum* R. and K., or *L. araucanum* Phil.

It differs from each of these several species as follows:

Lepidium pubescens has fruits as described by Dr. H. St. John (in a private letter) as, «*Silicles 4-4,5 mm long, thick (glandular?) puberulent on the margins, not visibly reticulate — style distinctly visible.* A photograph of the type substantiates these points. *L. pubescens* then, a species to be found in Perú, is an entirely different entity from this one. *L. bipinnatifidum* differs in having auriculate leaves, much shorter glands and very indistinctly reticulated fruits; *L. auriculatum* has a more obovate fruit with less sharply pointed apices, shorter broader glands, and indistinctly reticulated fruits, the margins of which are non-ciliate; lastly *L. araucanum*, judged from the original description, has larger (4 mm), more nearly obovate silicles and taller stems (to 30 cm) *L. strictum* has the longest glands of any of our species. In fact, it is one of the very few species in which the glands are sufficiently unusual to be of diagnostic value. The very prominent venation of the silicles is also distinctive, and sets it apart from all our *Lepidia* except the Patagonian *inclusum*.

The species appears to be a rather recent introduction in North America as it is found chiefly near habitations. It is possible that Philippi described the plant, but I have been unable to find a description of his that approximates it. Since I can find no previous name for the entity, I find it necessary to use that given it by Watson and Rattan.

36. **L. nitidum** Nutt. ex Torr. and Gray

Fig. 43.

Torrey and Gray, *Fl.N. Amer.* **1**: 116. 1838; C. L. Hitchc., *op. cit.* 291.

L. chilense Kunze ex. Walpers in *Nov. Act. Nat. Cur.* **19**, suppl. 1: 250. 1843; Thellung, *op. cit.* 264, including synonyms.

L. spicatum var. *chilense* (Kuntze) Reiche, *Anal. Un. Chile* **90**: 93. 1895.

L. tenuifolium Phil., *Anal. Univ. Sant.* **89** : 333. 1893.
L. tenuissimum Steudel, *Nomen. Bot.* part 2 : 28. 1841.
L. bipinnatifidum var. *tenuifolium* (Phil.) Reiche, *Anal. Univ. Chile* **90** : 95. 1895.
L. curicoanum Phil., *Anal. Univ. Chile* **81** : 334. 1892.
L. bipinnatifidum var. *curicoanum* (Phil.) Reiche, *Anal. Univ. Chile* **90** : 95. 1895.

Annual, 0,5-4 dm tall; basal leaves deeply pinnatifid, segments linear, cauline leaves mostly linear and entire; pedicels very greatly flattened, 2-6 times as broad as thick; sepals caducous; petals from 1,5 mm long to minute or wanting; stamens most commonly 4, frequently 2, less frequently 6; glands 4 or 6, 0,1-0,2 mm long; silicles ovate to orbicular, 3-5 mm long; margins usually upturned; styles obsolete.

Material seen. – CHILE: without definite locality, Meyen, photo (F, Kr), Poeppig in 1828, photo (F, Kr); Talca, Joseph 4322 and 4411 (US); Valparaíso, 8/15/95, Buchtien (G, US) Bertero 1081, type collection *L. tenuissimum* (F, G, NY); Valle de Marga, Marga, Aconcagua, Jaffuel and Pirion 3103 (G); Casa Blanca, May 1856, Harvey (G).

I can see no reason for maintaining *L. chilense* as a species distinct from *L. nitidum*. Most of the differences between the two which Thellung enumerated are not dependable, although much of the North American material is smaller-fruited than any I have seen from Chile. Such a plant as Jaffuel and Pirion 3103 (Chile) it just as large in all particulars as the average plant of *nitidum*. In so far as I have been able to judge, all Chilean plants have 2 stamens per flower, whereas 2-4, or 6 stamens may be found in the North American material.

I have seen no material that Philippi called *L. curicoanum* so can only tentatively refer his species here on the basis of the description (annual, pinnatipart-leaved, lobes linear; petals $^1/_2$ as long as sepals; silicles suborbicular, 3 mm in diameter).

37. **L. curicoanum** Phil.

Philippi, *Anal. Uuiv. Chile* **81** : 334. 1892.

Glabrous, annuals to 9 cm in height; basal leaves 40 mm long, pinnatipart, lobes and rachis entire, lobes to 6 mm long and

0,75 mm broad; racemes elongate; flowers minute, sepals scarcely 1 mm long; petals half again as long as sepals; stigma sessile; silicles longer than pedicels, suborbicular, 3 mm in diameter, not winged, emarginate.

The type, from Curico, Talca, in 1891, Manuel Vidal, has not been seen. However, judged from the description, this plant might well be *L. chilense* Kunze (= *L. nitidum* Nutt.).

38. **L. virginicum** L.

Fig. 41.

Linnaeus, *Sp. Pl.* 645. 1753.

Annuals or biennials, to 7 dm tall, the branches sparsely pubescent; basal leaves 5-15 cm long, 1-5 cm broad, usually pinnatifid, the pinnae lobed to incised, cauline leaves smaller, usually lobed, toothed, or serrate; pedicels slender, spreading, terete to somewhat flattened (rarely twice as broad as thick), usually glabrous on lower side; sepals ca. 1 mm long, caducous; petals mostly 1-3 times as long as sepals, sometimes shorter than they, or even wanting; stamens 2 (4 or 6); glands 4, 0,1 (0,2) mm long, broader than long; silicles 2,5-4 mm long, elliptic-rotund or semi-orbicular to broadly ovate-elliptic, the lower half usually at least as broad as upper half, indistinctly veined, very slightly winged, glabrous, sinus scarcely $^1/_{10}$ length of fruit, open; style barely evident, ca. 0,1 mm long; seeds ca. 1,5 mm long; cotyledons accumbent (oblique or incumbent).

Although *L. virginicum* is predominantly a North American species the following collections from South America have been seen.

Material seen. — VENEZUELA: Caracas, Pittier 12404, with some doubt (US); Mérida, Gehriger 189*a* also with some uncertainty (US); Tovar, Fendler (MBG).

DUTCH GUIANA: Groningen, Surinam, Samuels 121 (F, G, NY).

BRAZIL: Between Alto de Serra and Meio de Serra, Rio de Janeiro, Smith 1550 (G); Campinas, São Paulo, Santoro 482 (US), Carvalho 189 (US).

A number of collections from Venezuela, i. e. Fendler 24 (G), near Caracas, Pittier 7227 and 7293 (G, US); Colonia Tovar,

Aragua, Pittier 9295 (G, NY, US); Pto. Escondido, Pittier 13443 (US); El Avila, Vogl 47 (F); Barquisimeto, Saer 589 (F); and La Guiara, Potter 5064 (G), do not quite seem to belong here, as they have pedicels even more flattened than those characteristic of *L. virginicum* var. *centrali-americanum,* in nearly all cases the pedicels being *at least* twice as broad as thick. They have all been identified as *virginicum,* but cannot be the var. *typicum.* They might, with considerable reason, be accorded rank as a separate entity on a level with the North American *L. virginicum* var. *pubescens.*

They may be the same as the material Thellung named *L. virginicum* var. *Pavonianum,* but they have incumbent cotyledons — however, it is doubted that Thellung examined seeds of the one collection he cited under *Pavonianum.* In any event, it is believed that additional collections and study will prove this plant to be genetically distinct from the more northern var. *pubescens.*

There have been two collections from the Galapagos Islands that have also been shelved under the name of *L. virginicum,* namely, San Cristóbal, Schimpff 157 (MBG, NY) and Wreck Bay, Chatham Is., Stewart 1538 (G, US). The latter collection is apetallous, the former has large petals. Neither plant has fruits exactly characteristic of *virginicum,* they being more nearly oval-elliptic than oval. In some respects the plants resemble the N. American *L. lasiocarpum.* Stewart noted on his label that the plants were « probably introduced »; if they were, they are probably *L. virginicum* var. *pubescens.* I am not satisfied that they are not a distinct species of the Galapagos Islands, and if the Schimpff collection were identical with the Stewart collection, I would so name it, but the latter collection is much the more *virginicum*-like. There is a strong possibility that the two collections may include plants conspecific with *L. Horstii* Johow, from the Island of San Ambrosio, 800 km off the coast Chile.

39. **L. Horstii** Johow

Johow, *Goteb. K. Vetensk.-Vitterh. Samh. Handl. V,* **6** : 33. 1937.

Annual, short hirsute, to 15 cm tall; cauline leaves 1-2,3 cm long, 2-5 mm broad, mostly entire (1-toothed); racemes 4-9 cm

long; pedicels ca. 2,5 mm long, spreading to reflexed; sepals 0,7-0,9 mm long; petals none (?); stamens 2; glands filiform, ca. 0,3 mm long; style lacking; silicles orbicular, 2,5-2,7 mm long, emarginate, carinate, glabrous (but young ovaries pubescent); seeds 1-4 mm long.

Type: San Ambrosio Is., Chile, Oct. 7, 1896, collected by Johow.

Although Johow stated that his species had no petals, but had filiform glands, I strongly suspect that he mistook petals for glands and overlooked the glands entirely and his illustration would indicate that such was the case. I believe the species to be a valid one if the sepals are persistent, a point not mentioned by the author. It looks much like material I have seen from the Galapagos Islands which I have referred to *L. virginicum*.

40. **L. costaricense** Thell.

Fig. 39.

Thellung, *Bull. Herb. Boiss.* II, **4**: 713. 1904, *Monog. Lepid.* 251. 1906.

Annual (biennial), 5-40 cm tall, stem strigillose; leaves all divided or pinnatifid, the basal to 10 cm long, mostly twice pinnatifid and again lobed or incised, the ultimate divisions mostly 1-2,5 (3) mm broad, sparsely strigillose on lower side, cauline leaves more reduced but mostly pinnatifid or deeply incised, occasionally but few-toothed; racemes mostly 4-10 cm long, often scarcely exceeding leaves; pedicels subequal to fruits, slightly flattened and very slightly wing-margined, pubescent on upper surface, usually glabrous on lower surface, ascending but spreading just below fruits, the racemes to 1,5 cm in diameter; sepals 1-1,5 mm long, lightly pubescent on back, caducous; petals lacking or linear vestiges from $^1/_3$ as long to as long as sepals; stamens 2; glands 4, oblong-lanceolate, 0,1-0,2 mm long; silicles (3,5) 4-4,5 (5) mm long, broadly elliptic or obovate, margins usually glabrous less commonly, scabrous-ciliolate, the tips usually alate, the sinus V-shaped, acute, $^1/_6$ ($^1/_4$-$^1/_8$) length of fruits; styles but 0,1-0,2 mm long, the stigmas nearly sessile; seeds 1,5-2 mm long; cotyledons incumbent to oblique.

Although *L. costaricense* is almost exclusively North American, one collection from Colombia, namely Medellin, Antioquia, Archer 35 (US) and 673, in part, apparently must be referred here.

41. **L. ruderale** L.

Fig. 42.

Linnaeus, *Sp. Pl.* 645. 1753; Spegazzini, *Pl. Patag. Austr.* 494. 1897 and *Nov, Add. Fl. Patag.* 227. 1902?; C. L. Hitchc., *op. cit.* 275.

L. myrianthum Phil., *Anal. Mus. Nac. Chil.* **8**: 5. 1891.

L. ruderale L. var. *myrianthum* (Phil.) Reiche, *Anal. Mus. Nac. Chile* **90**: 96. 1895 and *Flora Chile* **1**: 66. 1896.

Foetid, pubescent or puberulent, freely branched annual or biennial to 5 dm in height; basal leaves once to twice pinnatifid, the cauline entire and linear, at least above; racemes rather loose and open, mostly 3-8 cm long, usually not markedly compounded; pedicel terete or slightly flattened, usually exceeding fruits; sepals scarcely 1 mm long, caducous; petals absent or tiny vestiges; stamens 2; glands 4, ca. 0,1 mm long; silicles ovate-elliptic to ovate, mostly 2-2,5 (3) mm long, glabrous, the sinus $^1/_6$-$^1/_8$ length of fruit; styles obsolete; cotyledons incumbent.

Two collections from Argentina, namely, vicinity of General Roca, Rio Negro, Fischer 37 (F, G, MBG, NY, US) and Cobuncó, Neuquén, Ammann 49 (F), are referrable to this species. The Fischer collection contains 2 types of plants, spindly ones which have been named as a new form of *L. spicatum*, and larger plants named simply *L. spicatum* Desv. I feel certain they are introduced plants of *L. ruderale* rather than *L. spicatum*. Thellung (*op. cit.* 139) referred the plants Spegazzini (*loc. cit.*) called *L. ruderale* to *L. spicatum* Desv. If Spegazzini, as suspected, had plants of the same nature as Fischer 37, is would seem that Thellung erred in referring them to a species other than *ruderale*.

The photograph of the type collection of *L. myrianthum* (Tarapaca, Philipi) leaves little doubt that that plant was but a chance weed of this species. It is thought improbable that it will prove varietally distinct from the old world *ruderale*.

42. L. sativum L.

Fig. 44.

Linnaeus, *Sp. Pl.* 644. 1753 ; C. L. Hitchc., *op. cit.* 271.

Erect, strict annuals; leaves all pinnatisect; pedicels terete; sepals caducous; petals ca. 2 mm long; stamens 6; glands 6, ca. 0,1 mm long; silicles oblong-ovate, 5-6 mm long, glabrous; styles ca. 0,3 mm long; cotyledons dissected, incumbent.

An occasional escape in South America, e. g. British Guiana, Jenm 6917 (NY); prope Sta. María, Chile (G); Mesetas Altas, Santa Cruz, Argentina, Donat 272 (C, F, G, MBG, NY).

Status Uncertain

L. angustifolium Rusby, *Descr. New Sp. S. Am. Pl.* **23.** 1920 ; « petals white and purplish... 4 mm long... annual... pedicels 5-6 mm long ». Not a *Lepidium !*

L. lanatum Barn, in Gay, *Fl. Chil.* **1** : 167. 1845 — definitely not a *Lepidium,* but I am not sure of its proper classification.

L. mendocinum Phil., *Anal. Univ. Chile* **36**: 160. 1870 — the description of this plant is too meagre to impart a true picture of the species in the absence of authentic material. It could well be conspecific with *L. bonariense* L.

L. pubescens Desv. var. *salinicola* Speg., *Anal. Univ. Nac. Buenos Aires* **7** : 226. 1902.

L. pubescens Desv. var. *typica* Speg., *op. cit.*

L. pubescens Desv. var. *austro-americana* Thell., *Bull. Herb. Boiss.* sér. 2, **8**: 914. 1908.

L. Pubescens Desv. var. *fallax* Thell., *loc. cit.* 913.

L. pubescens Desv. var. *Gayi* Thell., *loc. cit.* 914.

L. reticulatum Howell var. *austro-americanum* Thell., *Bull. Herb. Boiss. II,* **8**: 913. 1908. Although I suspect that this plant will prove to be a variant of *L. aletes* or *L. bonariensis,* I cannot be sure of its identity. I doubt, however, that it is closely enough related to *L. reticulatum* (= *L. oblongum* a North American species) to be considered a variety there of.

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ILUSTRACIONES

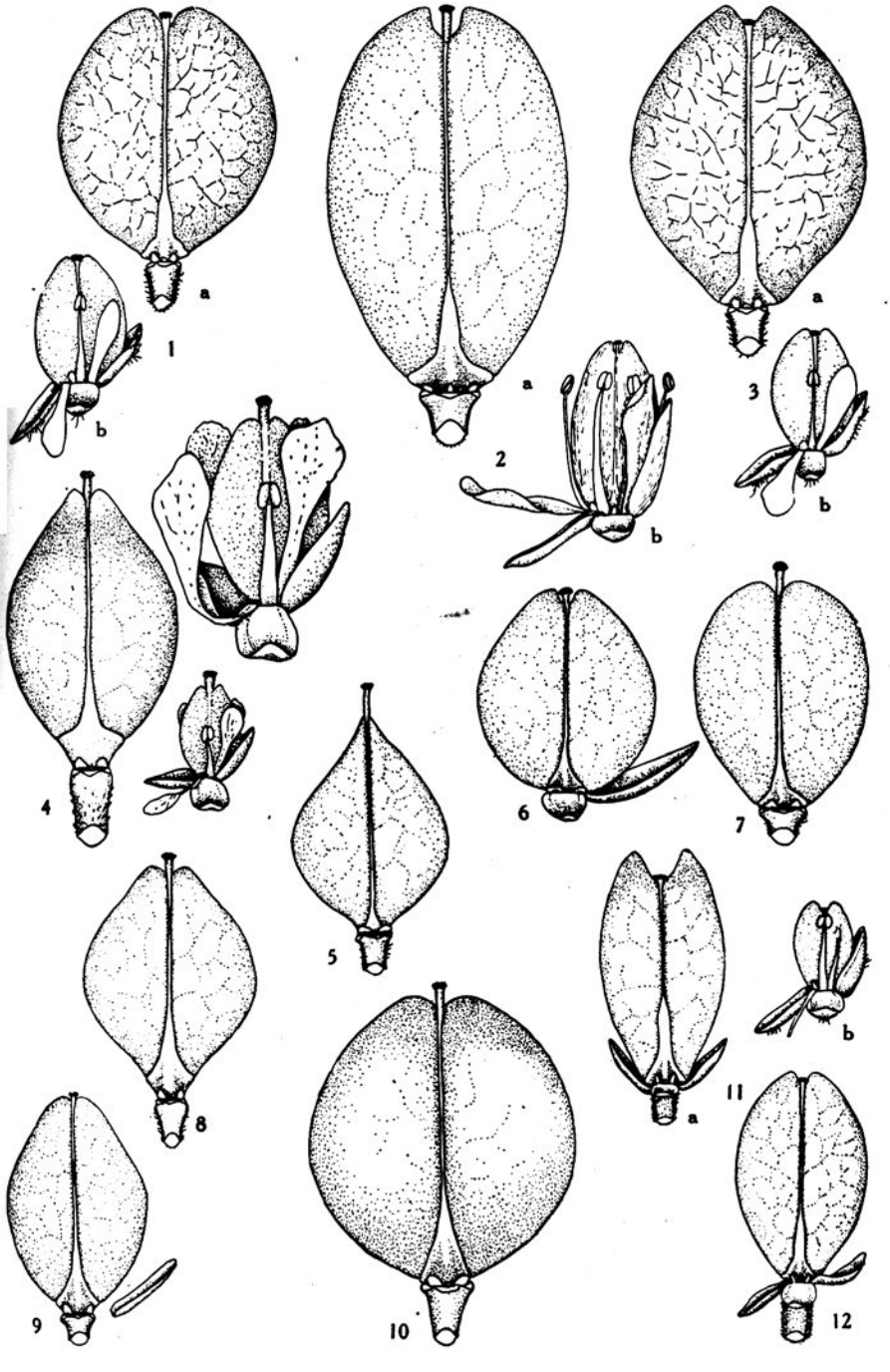
1. *L. Parodii* (from Parodi 6540).
2. *L. grandifructum* (from type).
3. *L. Cumingianum* (from Bertero 1082).
4. *L. Meyeni* (from Jörgensen 1836).
5. Id. (from Hammerlund 103).

6-7. Id. (from Cárdenas 396).

8-9. Id. (from Macbride 3022).

10. Id. (from Mandon 931).
11. *L. abrotanifolium* (from Hitchcock 22032).
12. *L. depressum* (from Buchtien 3973).

All × 8.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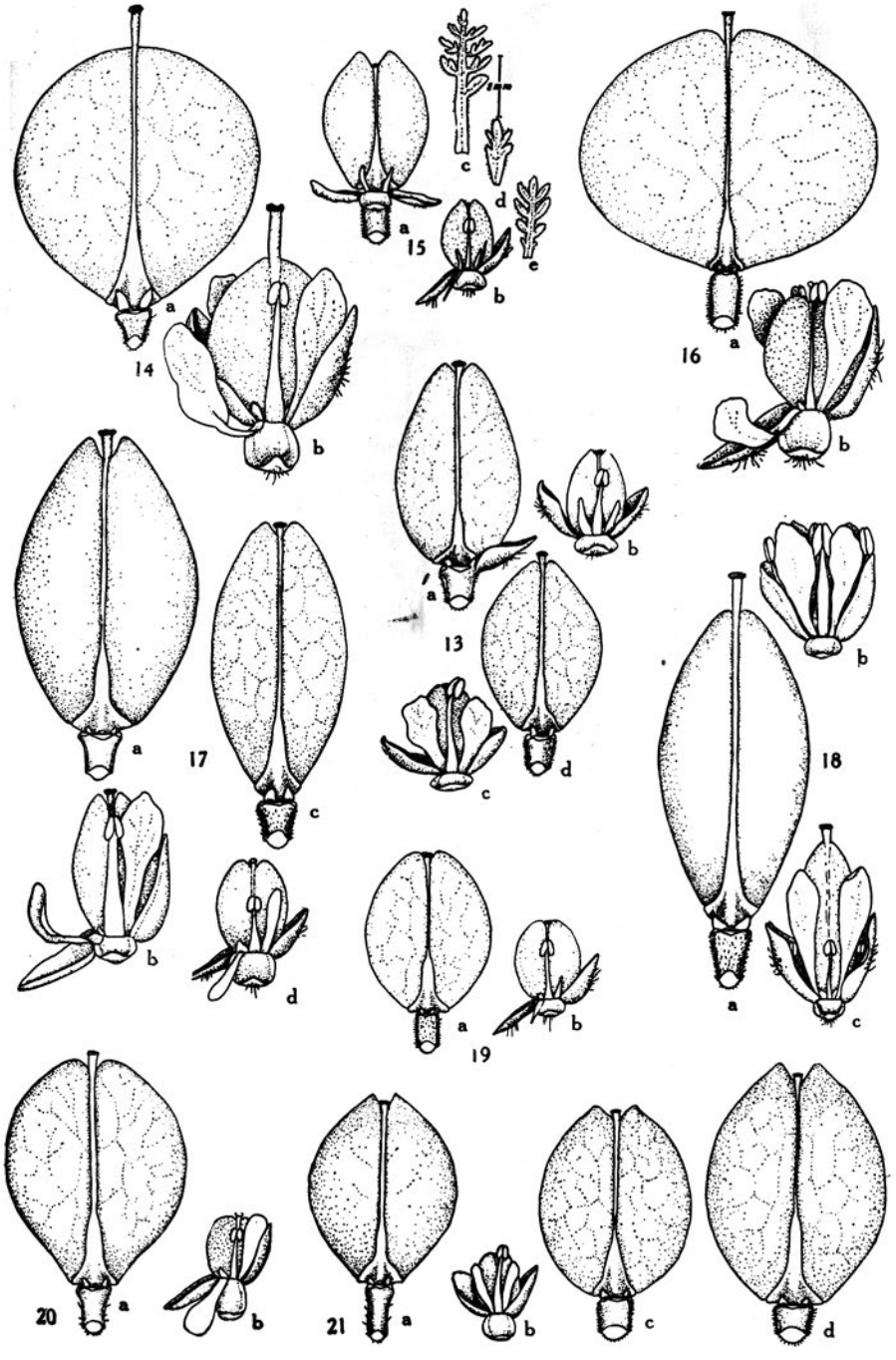
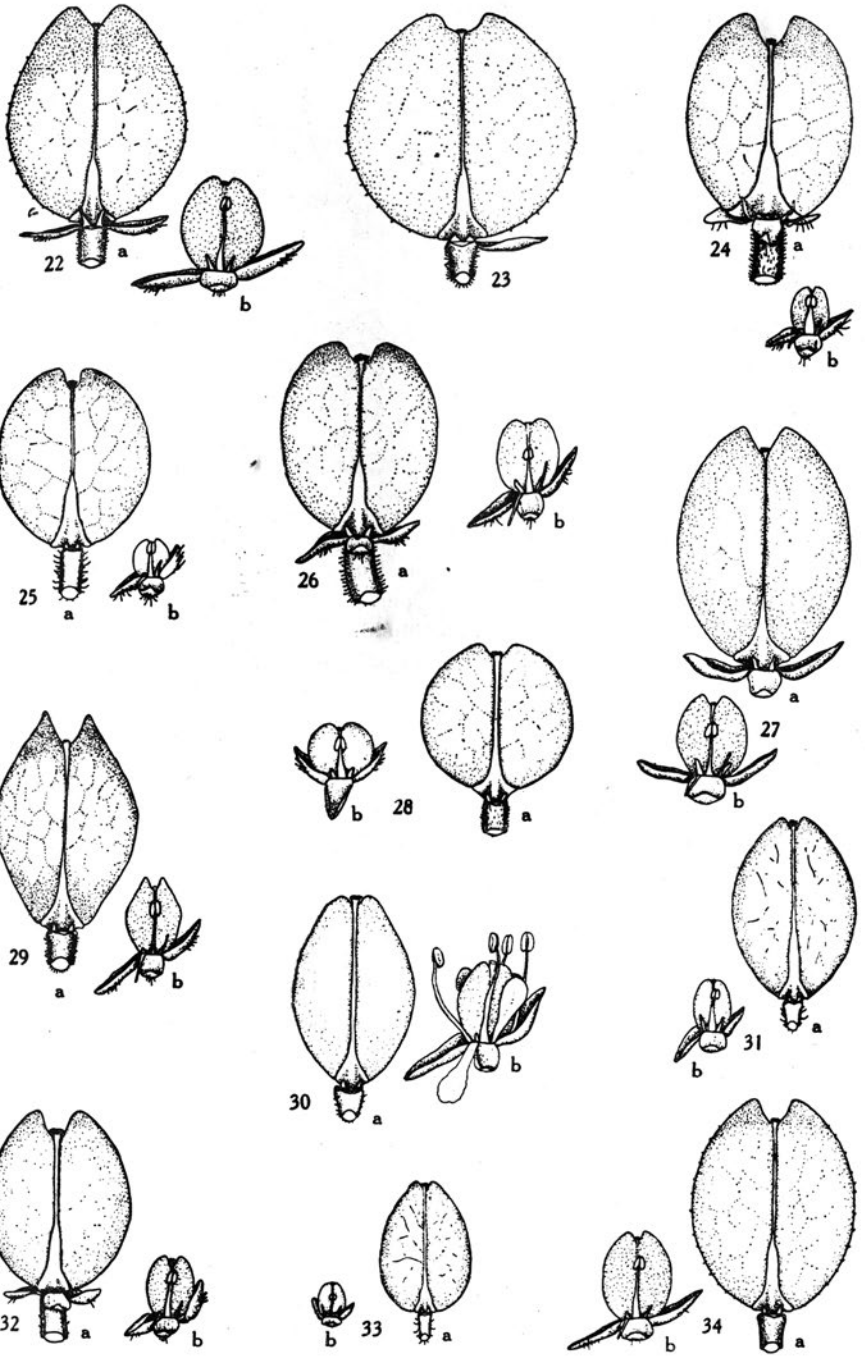
13. *L. depressum* (*a, b,* from Buchtien 3973) ; (*c, d,* from Buchtien 4475).
14. *L. cyclocarpum* var. *crassius* (from type) × 8.
15. *L. Kalenbornii* (from type) : *c,* basal ; *e,* middle cauline ; *d,* upper cauline leaf. Enlarged as shown.
16. *L. spathulatum* (from Johnston 5514) × 8.
17. *L. Weddellii* (*a, b,* from Penell 13396 ; *c, d,* from Kalenborn 132) × 8.
18. *L. Philippianum* (from Grandjot) : *b,* staminate ; *c,* pistillate flower, × 8.
19. *L. spicatum* (from Lechler 1114) × 8.
20. *L. Trianae* (from type) × 8.
21. *L. chichicara* (*a, b,* from Bang 15) ; (*c, d,* from Buchtien) × 8.


14
a
b
15
a
b
c
d
e
16
a
b
13
a
b
c
d
17
a
b
c
d
18
a
b
c
19
a
b
20
a
b
21
a
b
c
d

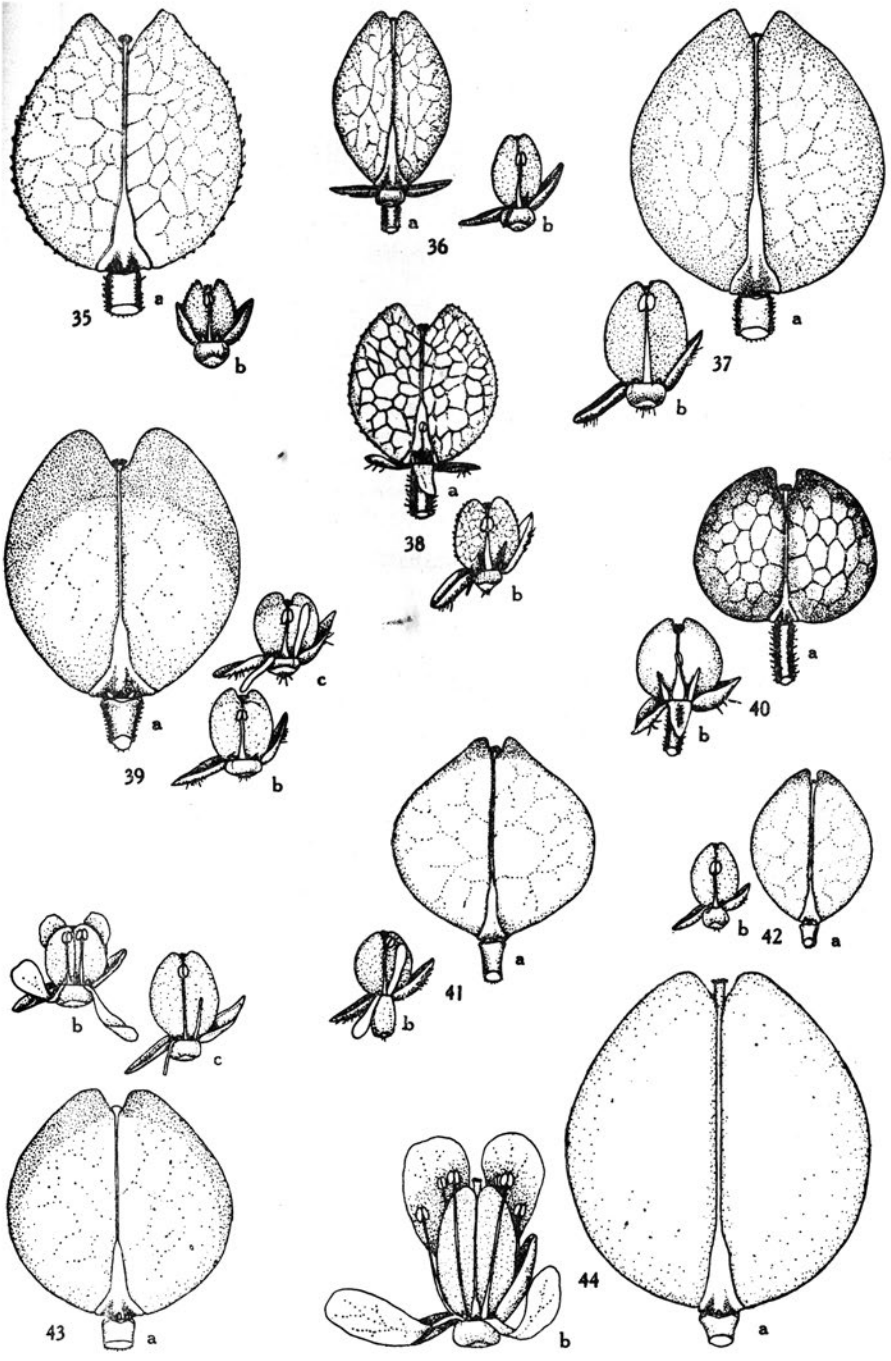
22. *L. demissum* (from type).
23. *L. Rahmeri* (from Asplund 6204).
24. *L. aletes* (from Fiebrig 296).
25. *L. bonariense* (from Buenos Aires, Commerson).
26. *L. auriculatum* (from Valdivia, Buchtien).
27. *L. subvaginatum* (from Claude-Joseph 4324).
28. *L. Johnstonnii* (from type).
29. *L. argentinum* (from Parodi 7783).
30. *L. quitense* (from Jameson 892).
31. *L. Morrisonii* (from type).
32. *L. bipinnatifidum* (from Triana).
33. *L. brevicaule* (from Johnston 5933).
34. *L. scabrifructum* (from Asplund 6205).

All $\times 8$.


22
a
b
23
24
a
b
25
a
b
26
a
b
27
a
b
28
b
a
29
a
b
30
a
b
31
b
a
32
a
b
33
b
a
34
b
a

35. *L. pubescens* (from Weberbauer 5310).
36. *L. filisegmentum* (from Donat 185).
37. *L. Danielsii* (from type).
38. *L. strictum* (from Jaffueld and Pirion 3059).
39. *L. costaricense* (from Cooper 5707).
40. *L. inclusum* (from Borge).
41. *L. virginicum*.
42. *L. ruderale*.
43. *L. nitidum*.
44. *L. sativum*.

All × 8.


35
a
b
36
a
b
37
a
b
38
a
b
39
a
c
b
40
a
b
41
a
b
42
b
a
b
c
43
a
44
b
a