

RANUNCULUS LAPPACEUS AND ALLIED SPECIES OF THE AUSTRALIAN
MAINLAND.

I. TAXONOMY.

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(Plate xv; Ninety-one Text-figures.)

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Synopsis.

The species of the *R. lappaceus* group which occur on the Australian mainland are considered in the light of morphological and experimental data. *R. colonorum* Endl., previously reduced to synonymy under *R. lappaceus* Sm., is recognized. The following taxa are described for the first time: *R. pachycarpus*, *R. eichleranus*, *R. victoriensis*, *R. muelleri* Benth. var. *brevicaulis*, *R. clivicola*, *R. niphophilus* and *R. productus*. The chromosome number has been determined for the majority of species; in all those studied $2n = 16$. Distribution maps are given for all species except those which have very restricted ranges. A key is provided to the Australian species of the group, including those limited to Tasmania.

INTRODUCTION.

In the treatment of *Ranunculus* in the *Flora Australiensis*, Bentham grouped together a number of previously described species. *R. colonorum* Endl. and *R. discolor* Steud. were placed in synonymy under *R. lappaceus* Sm. and a number of other species reduced to varietal rank. Melville (1955) considered that many of these taxa merit specific status. The species recognized by Melville include: *R. pimpinellifolius* Hook., *R. scapigerus* Hook., and *R. nanus* Hook. which had been reduced by Bentham to varietal rank under *R. lappaceus*; *R. pascuinus* (Hook. f.) Melville which was originally described as a variety of *R. lappaceus*; *R. triplodontus* (Hook. f.) Melville which Bentham had equated to *R. lappaceus* var. *nanus* Benth; and also *R. concinnus* (Hook. f.) Melville and *R. decurvus* (Hook. f.) Melville which are based on varieties of *R. scapigerus* Hook. Many of these species are limited to Tasmania and are not dealt with in the present study. Melville also clarified problems of typification and gave detailed descriptions of other species of the group.

There remain a number of described species not included in Melville's study and several undefined taxa which are described here for the first time.

This taxonomic study has been carried out in conjunction with a study of hybridization between many species of the group. The results of the latter study will be reported separately; however, in all cases where such information was available these results have been considered in determining the taxonomic policy adopted.

The abbreviations used for the names of Herbaria are those recommended by Lanjouw and Stafleu (1956).

In the descriptions mean values are given for highly variable dimensions and are placed in brackets between the figures indicating the extreme values observed.

The shape of the achenes is indicated by three measurements of the body of the achene, excluding the beak. The terms used are indicated in Fig. 16.

Illustrations: Except where otherwise stated, the following magnifications have been used: leaves $\times 1$; sepals $\times 5$; petals $\times 4$; nectaries $\times 9$; achenes $\times 9$.

Characteristics of the R. lappaceus group: The members of the *R. lappaceus* group differ from most of those of the *R. sessiliflorus* group (Melville, 1956; Eichler, 1957) in lacking tubercles or bristles on the achenes, and also in having simple or branched flowering-stems arising from a rootstock or from stolons, not from an erect leafy stem. *R. rivularis* Banks et Sol. and allied species (Melville, 1955, described as species 14-19)

differ from those of the *R. lappaceus* group in having elliptical petals and long stolons. These features are not found together in any of the species of the *R. lappaceus* group. In addition most of the species allied to *R. rivularis* may be distinguished by achenes with a slender incurved beak, a form rarely found in members of the *R. lappaceus* group. *R. anemoneus* F. v. Muell. and *R. gunnianus* Hook. are distinguished by their thick creeping rootstocks and their distinctive leaf-shapes, *R. anemoneus* having orbicular laminae with numerous overlapping lobes, whereas *R. gunnianus* has laminae pinnately divided into terete segments.

The members of the group appear to be closely allied, but definition of the systematic status of the group must be left until a more complete treatment of the genus is provided.

Key to the Australian Species of the Ranunculus lappaceus Group.

The species described in the present study are numbered in sequence; the remaining Tasmanian species are described by Melville (1955).

1. Sepals reflexed.
2. Achene beak less than 1 mm. long, strongly recurved *R. plebeius* (5).
- 2.* Achene beak more than 1 mm. long, straight or arching with a recurved tip.
3. Petals obovate-cuneate, achenes compressed and more than 2 mm. dorsiventrally
..... *R. colonorum* (4).
- 3.* Petals elliptic to obovate, achenes lenticular and less than 2 mm. dorsiventrally
..... *R. scapigerus* (6).
- 1.* Sepals spreading.
4. Achenes almost globular *R. pachycarpus* (2).
- 4* Achenes lenticular.
5. Nectary-lobe cuneate or obovate.
6. Achene beak slender, erect or arching, recoiled at the tip; achenes more than 1.5 mm. long; roots fibrous *R. lappaceus* (1).
- 6* Achene beak stout and strongly recurved; achenes less than 1.5 mm. long; roots \pm tuberosous *R. robertsonii* (3).
- 5* Nectary-lobe semi-orbicular, oblong, triangular or absent.
7. Petals obovate-cuneate or broad-obovate.
8. Petals white; spreading by stolons *R. millanii* (16).
- 8* Petals yellow; no stolons developed.
9. Achenes compressed, stems mostly branching, with 2-4 flowers *R. clivicola* (13).
- 9* Achenes lenticular, flowering stems mostly simple.
10. Petals 6-(10)-14; lamina divided into linear-lanceolate lobes; leaves hirsute with spreading hairs *R. dissectifolius* (12).
- 10* Petals 5, rarely 6-8; leaf segments broad or if linear-lanceolate covered with appressed hairs.
11. Nectary-lobe oblong or semi-orbicular.
12. Petioles covered with spreading hairs *R. graniticolus* (8).
- 12.* Petioles covered with short appressed hairs.
13. Leaves ternate with segments ternately or biternately-lobed, lobes linear-lanceolate *R. eichleranus* (9).
- 13* Leaves simple or divided into elliptic or lanceolate lobes.
14. Leaves simple with deep incisions near the apex, or ternately or biternately dissected or lobed, lobes lanceolate to broad lanceolate *R. victoriensis* (10).
- 14.* Leaves simple and entire or deeply incised near the base, or pinnately dissected with the lateral lobes elliptic and entire *R. pascuinus*.
- 11.* Nectary-lobe triangular or absent.
15. Leaves simple and entire or dentate, the laminae hirsute on the upper surface
..... *R. muelleri* (11).
16. Hairs on margins of laminae appressed, flowering stems exceeding leaves, laminae shorter than petioles *R. muelleri* var. *muelleri*.
- 16.* Hairs on margins and upper surfaces of laminae spreading, flowering stems usually shorter than leaves and petioles shorter than laminae
..... *R. muelleri* var. *brevicaulis*.
- 15* Leaves ternately or pinnately dissected.
17. Leaf segments deeply divided into lanceolate lobes; carpels 30-80
..... *R. niphophilus* (14).
- 17* Leaf segments entire or trilobed; carpels 15-20 *R. nanus*.
- 7* Petals elliptic to narrow-obovate.
18. Leaves linear or divided into linear segments *R. setaceus*.
- 18* Leaves or leaf segments elliptic to ovate.
19. Leaves simple or ternately dissected or lobed.

20. Petals obovate-oblong, pale yellow starch-free zone c. $\frac{1}{2}$ of petal length . . . *R. nanus*.
 20* Petals tapering to a claw below, pale yellow starch-free zone c. $\frac{2}{3}$ of petal length
 *R. triplodontus*.
 19* Leaves pinnate.
 21. Nectary with a distinct lobe.
 22. Nectary-lobe triangular; petals golden-yellow *R. pimpinellifolius* (7).
 22* Nectary-lobe semi-orbicular; petals pale yellow *R. productus* (15).
 21* Nectary with a thickened bracket but no distinct lobe.
 23. Lateral leaf segments overlapping terminal segment; petals elliptic . . . *R. concinnus*.
 23* Lateral leaf segments distant from terminal segment; petals linear to narrow-
 elliptic *R. decurvus*.

DESCRIPTION OF SPECIES.

(1) *RANUNCULUS LAPPACEUS* Sm. in Rees Cycl., 29 (no. 61), 1819. (Text-figs. 1, 5-10.)

Perennial herb with fibrous roots. *Flowering stems* simple or branched with 2-10 flowers, 4-(35)-70 cm. tall, hirsute with hairs long and spreading below but short and appressed above, or the whole stem with either spreading or appressed hairs. *Leaves* mostly basal, hirsute; petioles with appressed or spreading hairs, laminae with appressed hairs: basal leaves with petioles 2-(10)-30 cm. long, basally flattened, membranous toward the margin at the base; laminae ovate to deltoid in outline 12-(45)-80 mm. long and about as broad, ternately or biternately dissected or lobed with dentate segments, when ternate the terminal petiolules to 3 cm. long and the lateral ones to 1 cm. long, lobes lanceolate and usually acute: lower cauline leaves similar to basal leaves; upper cauline leaves sessile or petiolate and usually ternately lobed, approaching the uppermost lobed or entire and linear sessile bracts. *Flowers* 15-(30)-40 mm. diam. *Sepals* 5, green, spreading, concave, elliptic, 4-(7)-10 mm. long, 2-5 mm. broad, apex obtuse and hooded, 3 primary veins forking from the base, abaxial surface hirsute with spreading hairs, usually membranous and glabrous toward the margin. *Petals* 5, golden-yellow, obovate-cuneate, 7-(12)-17 mm. long, 6-(10)-13 mm. broad, obtuse or truncate, starch-free zone $\frac{1}{4}$ - $\frac{1}{3}$ petal length, 3 primary veins forking from the base; nectary 0.5-2.5 mm. from base; nectary lobe cuneate, 0.7-(1.2)-2.4 mm. long and usually slightly broader, attached laterally to petal for $\frac{1}{3}$ - $\frac{2}{3}$ of its length. *Stamens* 40-(70)-110. *Carpels* 20-(30)-50, flat, ovate; style 1-1.5 mm. long, straight, with a recoiled tip. *Achenes* in a globular head 6-9 mm. diam.; lenticular, obovate-cuneate, 1.7-3.5 mm. long, 1.3-2.8 mm. dorsiventrally, 0.7-1.2 mm. laterally, margin narrowly ridged, lateral faces smooth or dimpled, shouldered and slightly rugose below the beak; beak slender, 0.8-(1.2)-1.8 mm. long, arched with a recoiled tip. *Fruiting receptacle* 3-5 mm. long, 0.7-1.2 mm. diam., staminal zone glabrous, achene zone elliptic and hirsute.

Chromosome number: $2n=16$. Voucher specimens: Snowy Mountains Highway, 6 ml. S.E. of Yarrangobilly Village, B. G. Briggs, 20.2.1957 (SYD); Oakdale, B. G. Briggs, II.1957 (SYD). Also Curtis (1948).

Range: Eastern Australia, including Tasmania; New Zealand.

Ecological distribution: Grassland and sclerophyll forest up to 5,000 ft. altitude.

Holotype: Port Jackson, Dr. White. Smith's Herbarium (LINN.).

Unrecognized varieties: The following varieties are not recognized as they are based on minor characters and lie within the continuous variation range of the species:

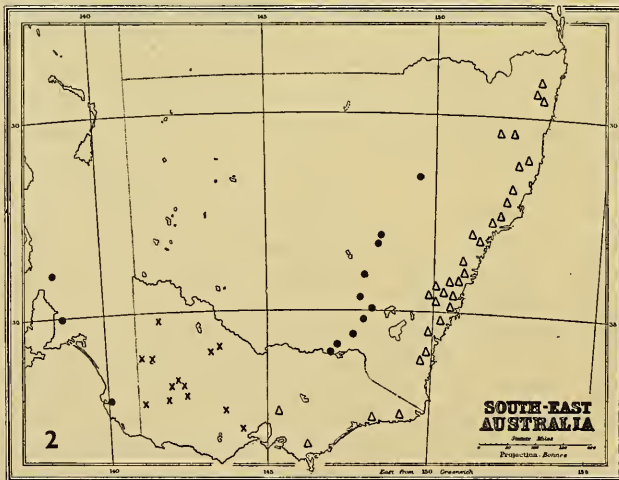
R. lappaceus Sm. var. β *obtusatus* DC. *Regni Vegetabilis*, 1: 286. *Holotype*: Port Jackson, Mus. de Paris (P, Photo SYD.). There is some uncertainty as the specimen at Paris was originally labelled by De Candolle as "*R. australis* var β DC" and the label has since been altered, possibly by Desfontaines, to "*R. lappaceus* var β DC et Spach".

R. lappaceus Sm. var. *pubescens* DC. *Regni Vegetabilis*, 1: 286. *Holotype*: New Holland 1821. Mus. de Paris (G-DC, Photo SYD).

R. lappaceus Sm. var. β *latilobus* Hook. f. *Fl. Tas.* 1: 6. 1855. *Holotype*: Woolnorth, Tas. Gunn. no. 633 (K. Photo CANB!). No type is specified for the variety, but Gunn numbers 90 and 633 are cited after the specific description. Melville (1955) concludes that no. 633 belongs to this variety.

Specimens examined:

QUEENSLAND: Strathdichie North, Proserpine, K. Macpherson, no. 2 (BRI 001135); Strathdichie, nr. Proserpine, Rev. N. Michael, no. 1117 (BRI 001134); Dalrymple Heights, M. S. Clemens, 1947 (BRI 010093, BRI 001136); Top of the Bersaker Ra., Rockhampton, Baniman (MEL); Gympie, Dr. F. H. Kenny, 5.1.1907 (BRI 001172); Kumbia Rd., Kingaroy, Rev. N. Michael, 23.11.1947 (BRI 010100); Plains of the Condamine, L. Leichhardt (NSW 44872); Bunya Mountains, C. T. White, October 1919 (BRI 001133); Burpengary, S. L. Everist and L. Pedley, 31.9.50 (BRI 001168); near Brisbane, Hernie (MEL); Sunnybank Cemetery Reserve, Brisbane, C. E. Hubbard, 11.7.1930, no. 3304 (BRI 001137); Laidley Creek, L. Watkins (BRI 001174); Eight-Mile Plains near Brisbane, C. T. White, 19 October, 1918



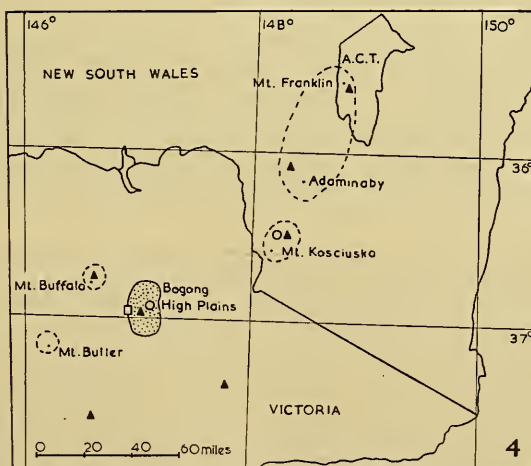
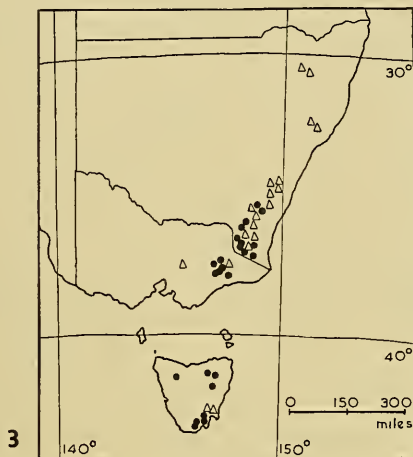
Text-fig. 1.—Distribution of *R. lappaceus* Sm. ● and *R. colonorum* Hügel in End. ×.

Text-fig. 2.—Distribution of *R. pachycarpus* B. G. Briggs ●, *R. robertsonii* Benth. × and *R. plebeius* R.Br. ex DC. Δ.

(NSW 44871); Base of Mt. Gravatt, C. T. White, 11.7.1930, no. 6855 (BRI 001170); Ramsay Downs, Mrs. J. Marquis (BRI 001176); Ramsay Downs, F. M. Bailey (NSW 44873); Warrill View, I. F. Swan, Aug. 1955 (BRI 010002); Oxenford, C. E. Hubbard, 17.8.30, no. 3671 (BRI 001166); Cunningham's Gap, C. T. White, 19.7.1930, no. 6898 (BRI 001171); Canungra, C. T. White, May 1917 (BRI 001129); between Booningbar and Burleigh Heads, C. T. White, Sept. 1912 (BRI 001102); Bapaume-Poziers Rd., K. N. Shea, 23 October, 1956, no. S43 (BRI 005786); Stanthorpe, H. Wright, Nov. 1916 (BRI 001128).

NEW SOUTH WALES: The divisions of the State are those of Anderson (1932).

North Coast: Lismore district, A. E. Fiford, 17.10.1950 (NSW 44914); Girard State Forest, 3 ml. W. of Drake, E. F. Constable, 28 Apr. 1956 (NSW 38472); Watts Crk. Dalmorton, E. F. Constable, 28.10.1952 (NSW 24353); Macleay R., Dr. B. (MEL); Hastings R., Dr. B.K.C. (MEL); Kendall, F. M. Bailey, Sept. 1932 (NSW 27089); Taree, B. G. Briggs, 23.10.1956 (SYD); Gloucester Buckets, J. H. Maiden, 9.1897 (NSW 44917); 20 ml. S. of Gloucester, B. G. Briggs, 25.10.1956 (SYD); Mayer's Flat to Bungwahl, L. A. S. Johnson, 13.X.1953 (NSW 26415); Buladelah, B. G. Briggs, 24.10.1956 (SYD); Wallsend, J. L. Boorman, 10.1899 (NSW 44920); Newcastle, L. Leichhardt (NSW 44921); Putty, B. G. Briggs, 25.10.1956 (SYD).



Text-fig. 3.—South-east Australia showing distribution of *R. scapigerus* Hook. ● and *R. pimpinellifolius* Hook. △.

Text-fig. 4.—Southern New South Wales and Eastern Victoria showing distribution of *R. graniticolus* Melville (dotted lines), *R. eichleranus* B. G. Briggs □, *R. victoriensis* B. G. Briggs (stippled) and *R. millanii* F. v. Muell. ▲.

Central Coast: Wyongah, 6 ml. N. of Wyong, E. F. Constable, 13th Sep. 1954 (NSW 30965); Hawkesbury Agricultural College, Richmond, W. M. Carne, 20.10.1911 (NSW 44961); Galston, J. H. Maiden and J. L. Boorman, 6.1905 (NSW 44958); Wahoonga, W. A. Dixon, Nov. 03, no. 47 (NSW 44954); Port Jackson, Rev. Dr. Woolfs (MEL); Concord West, O. D. Evans, 1929 (SYD); Ashfield, J. H. Maiden, 18.9.91 (NSW 44955); Rookwood, E. Cheel, 27.8.1898 (NSW 44963); Hurstville, J. H. Camfield, 10.99 (NSW 27087); Penhurst, E. Cheel, Oct. 1900 (NSW 44964); Penhurst, J. H. Camfield, 10.1895 (NSW 44962); Kogarah dist., J. H. Camfield, 8.1960 (NSW 27088); near Oatley's, E. Bêche, 2.9.1886 (NSW 44960); Macquarie Fields, Georges R., J. L. Boorman, 8.1914 (NSW 44957).

South Coast: Island off Cabbage Tree Point Jervis Bay, F. A. Rodway, Oct. 1920, no. 55 (NSW 44927); Huskisson Jervis Bay, F. A. Rodway, Sept. 25 (NSW 44929), 28.8.1930 (NSW 44928); Conjola, W. Heron 1898, no. 57 (NSW 44926); 6 ml. N. of Bateman's Bay, B. G. Briggs, 3.2.1956 (SYD); Bega, J. J. Fletcher, No. 88 (NSW 44930); Twofold Bay, Sept. '60 (MEL).

Northern Tablelands: Wallangarra, J. L. Boorman, 11.1906 (NSW 27079); 10 ml. N. of Tenterfield, B. G. Briggs, 18.10.1956 (SYD); Tenterfield, B. G. Briggs, 18.10.1956 (SYD); Emmaville, J. L. Boorman, 10.01 (NSW 44850); Glen Innes, F. H. Kenny, Nov. 1901 (BRI 001173); Inverell Rd. and Frasers Creek, J. L. Boorman, 9.1901 (NSW 27078); Ben Lomond, J. H. Maiden, 12.99 (NSW 44849); Coryah Gap, Nandewar Ranges, L. A. S. Johnson and E. F. Constable, 6 Nov. 1954 (NSW 44846); Biscuit Creek, c. 7 ml. N.W. of Ebor on Guyra Rd., J. Vickery, 10.1.1958 (NSW 44845); Guy Fawkes near Ebor, B. G. Briggs, 20.10.1956 (SYD); Bundarra-Uralla Road, G. L. Davis, 13.11.49, Herb. F. A. Rodway, no. 15116 (NSW 44847); New England, C.W.L. (MEL); Armidale, Perrot, 1871 (MEL); University (Armidale), G. L. Davis, 19.10.1954 (AD 95809048); Thomas' Lagoon near Armidale, G. L. Davis, 28.12.1953 (AD 95809049), 11 ml. S.W. of Armidale, B. G. Briggs, 19.10.1956 (SYD); Walcha Road, E. Betche, 26.10.1886 (NSW 44841); Yarrowitch, nr. Walcha, B. G. Briggs, 22.10.1956 (SYD); Walcha Road, E. Betche, 26.10.1886 (NSW 44841); Goonoo Forest, G. W. Althofer, 1947 (NSW 44953); Barrington Tops, 5100 ft. alt., J. L. Boorman, 12.1915 (NSW 44848); Barrington Tops, L. Fraser and J. Vickery, 7.1.1934 (NSW 44844); Barrington Tops, R. Carolin, 13.4.58, no. 493 (SYD); Allyn River to Barrington Tops, Mary Fuller, 1.1928 (SYD).

Central Tablelands: Orange, P. Althofer, 5.1946, no. 78 (NSW 44857); Perth, near Eathurst, J. L. Boorman, 3.1901 (NSW 44856); Blayney, J. L. Boorman, 12.1907 (NSW 44858); Mt. Coricudgy, 25 ml. E. of Rylstone, L. A. S. Johnson, 28.10.1951 (NSW 44860); Ilford, near Mudgee, B. G. Briggs, 18.10.1956 (SYD); 10 ml. N. of Oberon on Tarana road, J. Garden, 10.11.1952 (NSW 4486); S. of Hampton, J. Garden, 12.11.1952 (NSW 27081); Oberon, J. Garden, 10.11.1952 (NSW 27080); Jenolan Caves, W. F. Blakely, 10.99 (NSW 44854); Abercrombie Caves, K. Mair, 20.10.1951 (NSW 17861); Mt. Werong, L. A. S. Johnson and E. Constable, 23.10.1951 (NSW 44859); Mt. Werong-Ruby Creek, L. A. S. Johnson and E. Constable, 23.10.1951 (NSW 17680); Alpine, near Bargo, B. G. Briggs, 6.10.1957 (SYD); Mittagong, L. A. S. Johnson, 15.11.1949 (NSW 44853); 3 ml. from Bowral on Kangaloon Road, L. A. S. Johnson, 15.4.1951 (NSW 27082); Burrawang, J. J. Fletcher, 11 Nov. 88 (NSW 44855).

Southern Tablelands: Hoskingtown-Braidwood, C. W. E. Moore, 19.11.1952, no. 2089 (NSW 27084); Captains Flat to Braidwood, C. W. E. Moore, 4.11.1952, no. 1980 (NSW 44868); Mt. Franklin, A.C.T., B. G. Briggs, 10.1957 (SYD); near Mt. Gingera, A.C.T., B. G. Briggs, 10.1957 (SYD); 14 ml. N. of Kiandra, B. G. Briggs, 20.2.1957 (SYD); Laurel Hill, north of Tumberumba, E. J. McBarron, 27.12.1948, no. 2851 (NSW 44864); 7½ ml. N. of Tumberumba, B. Briggs, 1.1956 (NSW 44865); Tumberumba, W. Bull (MEL); T₂ track, Tumut R. valley near Cabramurra, M. Mueller, 25.11.55, no. 3039A (NSW 44862); Upper Tumut R., J. C. Newman, 19.12.1952 (NSW 44863); Kancoban, B. G. Briggs, 20.12.1955 (SYD); Thredbo River, Mt. Kosciusko, J. H. Maiden and W. Forsyth, January 1899 (NSW 27083).

Western Slopes: Mt. Russell, E. Breakwell, Nov. 1914 (NSW 44936); Inverell, Adelaide Chapman, Sept. 1912 (SYD); Howell, J. H. Maiden and J. L. Boorman, 8.1905 (NSW 44940); Head of Gwydir River (MEL); Tamworth, J. L. Boorman, 9.1907 (NSW 44938); Warrumbungle ranges, W. Forsyth, Oct. 1901, no. 10 (NSW 44939); 3 ml. N. of Wallabadah, R. H. Goode, 11.11.1954, no. 101 (NSW 44937); Blandford nr. Murrurundi, H. M. R. Rupp, 2.10.1944 (NSW 44919), 10.1947 (NSW 44918); Woolooma, Mt. Buttress, Scone, A. L. White, 11.1904 (NSW 44946); Gulgong, J. H. Maiden and J. L. Boorman, April 1901 (NSW 44950); Gulgong, J. L. Boorman, 9.1916 (NSW 44951); Cedar Creek, Widdin Valley, S. of Widdin, E.F., 2 Sept. 1957 (NSW 44793); Euchareena, G. W. Althofer, 1917 (NSW 44945); Molong, J. L. Boorman, 11.1906 (BRI 001131); Bowman Park near Cudal, W. F. Blakely, 10.1906 (NSW 44949); Cowra, J. Beattie, 6.11.1915, no. 48 (NSW 44944); Rockview Station, Old Junee, A. Chislett, 13.11.1942 (NSW 27091); between Uriarra and Taemar, C. W. E. Moore, 3.11.1952, no. 1967 (NSW 27086).

Plains: Euabalong, J. L. Boorman, 5.1906 (NSW 27090); Yanco, H. Wenzholz, 8.12 (NSW 44941); Bara, via Hay, Miss E. Officer, 1.1904 (NSW 44942).

VICTORIA: Wimmera, Dallachy (MEL); Upper Murray, C. F. French Jr., 1886 (MEL); Wangaratta (MEL); Tamleigh, Goulburn Valley, J. Minchin, 1886 (MEL); Mitta Mitta, S. F. Clinton, Oct. 1916 (MEL); Wedderburn, W.W.W., no. 1257 c. 10.1918 (MEL); Feathertop (MEL); nr. Dibbins Hut, Mt. Hotham, B. G. Briggs, 28.12.1955 (SYD); Dinner Plain to Hotham-Omeo Road, B. Briggs, 1.1956 (NSW 44904, SYD); Peacock Spur, Mansfield to Whitfield Rd., B. Briggs, 1.1956 (NSW 44903); Cobboras Mountains (MEL); near Seymour, Mrs. F. M. Reader, 9.11.1902 (MEL); along Silverband Rd., Grampians, T. and J. White, 2.11.1953 (NSW 44897); Kilmore, Rev. J. W. Dwyer, 10.1918 (NSW 44892); Dalesford, R. Wallace, 6.1879 (MEL); Creswick, Whan, no. 191 (MEL); Victoria Valley, Grampians,

R. Melville, 28.10.1952, no. 1819 (AD 95724028, NSW 44902); Dunkeld, S. Fisher, 1871 (MEL); Upper Yarra, C. Walter, Aug. 1892 (NSW 44891); Shipton, Rev. Wm. T. Whan (NSW 44894, 44895, 44896), 1863 (NSW 44890); Werribee, Fullager (MEL); You Yangs, C. Walker, 8.1900, pro parte (MEL); Hawkesdale, H. B. Williamson, Nov. 1901 (NSW 44893); Mouth of Gleneel R., W. Allitt (MEL).

SOUTH AUSTRALIA: Sevenhills, Flinder's Ranges, Herb. J. M. Black, 22.11.1933 (AD 95729049); Montacute, J. B. Cleland, 21.10.44 (AD 95828051); Mt. Lofty Ranges, creek 1 mile above Magil, J. B. Cleland, Herb. J. M. Black, 15.11.1943 (AD 95729050); Horsnell's Gully, J. B. Cleland, 13.11.43 (AD 95828055); Mt. Lofty Ra., near Summertown, E. S. Booth, 20.10.1956, no. 25 (AD 95729052); National Park, Belair, Herb. J. M. Black, 15.12.16 (AD 95729047); Mt. Lofty, J. B. Cleland, 18.9.20 (AD 95828054); Mt. Lofty Ranges, J. Addison (BRI 001103); Macclesfield, Blandourky, 1850 (MEL); Back Valley off Inman Valley, J. B. Cleland, 25.10.36 (AD 95729053), ex. Herb. J. M. Black (AD 95729048); Lucindale S.E., E. H. Ising, 29 Oct. 1934 (AD 95729054); Pt. Douglas, north of Cape Northumberland, J. B. Cleland, 12.41 (AD 95828052).

TASMANIA: Launceston, near Hobart Town Rd., ex herb. S. C. Hannaford, November 1865 (NSW 44885); Perth, 97 (MEL); Waratah, A. H. S. Lucas, Dec. 1924 (NSW 44880); St. Marys, E. Rees, Oct. 1929 (HO); 11 ml. S. of Breona, B. G. Briggs, 16.1.1958 (SYD); Penstock, A. V. Giblin, Xmas 1929 (HO); 62 ml. from Queenstown on Lyell Highway, B. G. Briggs, 17.1.1958 (SYD); 1 ml. W. of Dee R., Lyell Highway, L. A. S. Johnson, 19.1.1949 (NSW 44882); Victoria Valley, F. A. Rodway, 12.1917 (NSW 44875); R. Jordan, F. A. Rodway, Nov. '98, no. 51 (NSW 44877); Hobart, A. H. S. Lucas, Nov. 1923 (NSW 44879); Hobart Town, Hannaford no. 3 (MEL); near Hobart Town, Dr. Mueller, Xmas 1870 (NSW 27061); Hobart Waterworks, F. A. Rodway, Oct. '98 no. 50 (NSW 44876); Sandy Bay, Hobart, F. A. Rodway, Nov. '98 no. 38 (NSW 44878); Blackman's Bay, N. of Murdunna, R. Melville, 17.12.1952, no. 2447 (AD 95724037, BRI 100003, MEL, NSW 44887); Mt. Nelson, E. Rodway, December 1929 (HO).

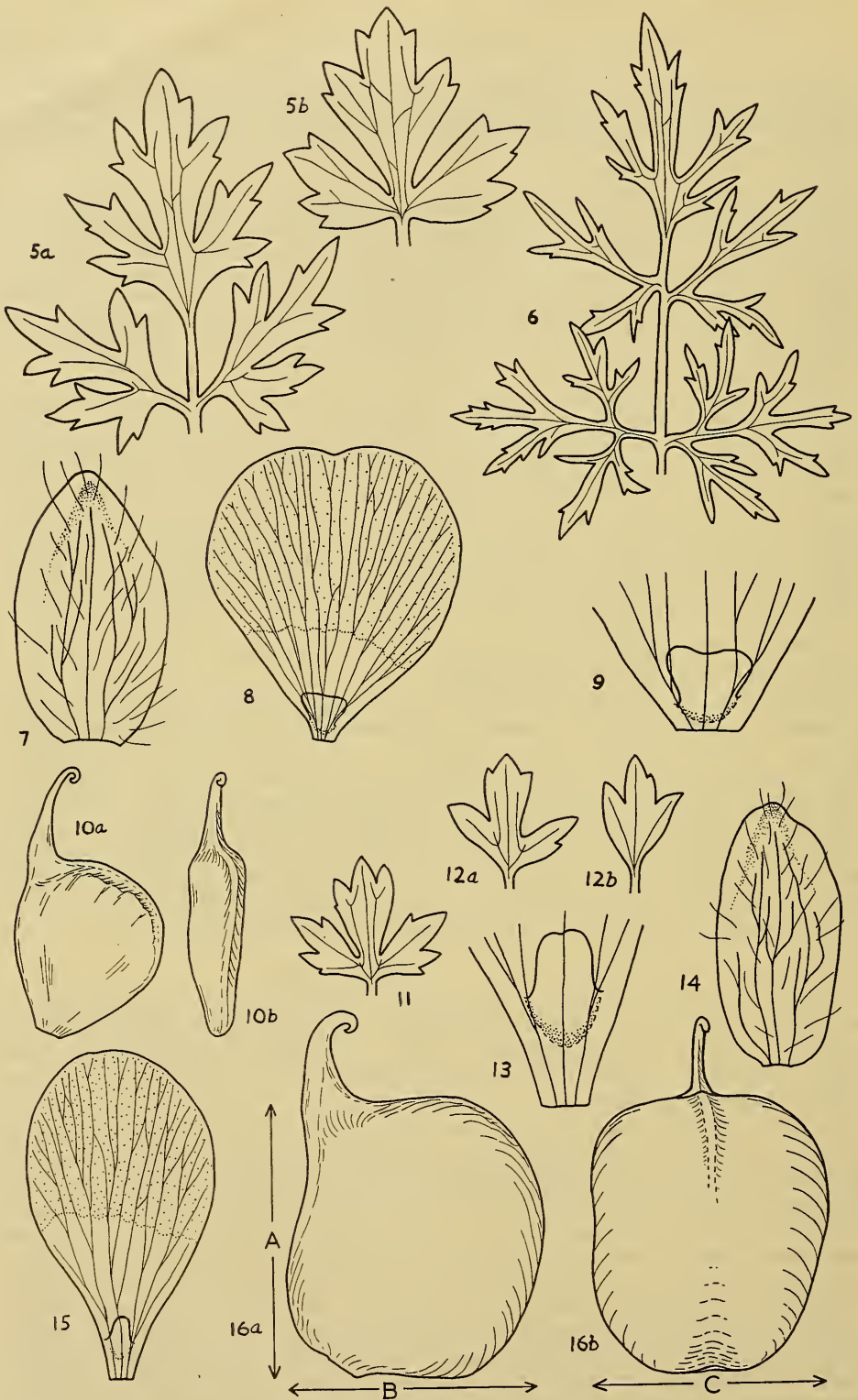
New Zealand specimens differ from the typical Australian material and several named varieties are limited to New Zealand.

Within Australia there is considerable variation between local populations in leaf-dissection, indumentum and degree of branching of flowering stems. This variation shows no distinct correlation with habitat trends. Plants from Tenterfield to Ebor on the Northern Tablelands of New South Wales, from Corryong to Omeo in the Victorian Alps and from Tasmania usually have leaves ternately-lobed rather than ternate. The most finely dissected leaves were found from Taree to Buladelah on the North Coast, N.S.W., and from Tumut to Mansfield on the tableland tract of Southern New South Wales and Victoria. The plants from the last-mentioned region also show slightly tuberous roots and a low average carpel number. None of these variants appear to merit taxonomic recognition as all intergrade fully with the typical form.

(2) *RANUNCULUS PACHYCARPUS*, sp. nov. (Text-fig. 2, 11-16.)

Herbae pilis longis plerumque sub-appressis obtectae. Caules floriferi simplices vel ramosi et plerumque foliati. Folia radicalia vel simplicia et dentata vel ternolobata vel ternata. Sepala patentia. Petala aureo-flava, obovato-cuneata. Lobi nectariorum cuneati. Achenia glabra prope globosa rostris tenuibus rectis sed prope apicibus recurvatis praedita.

Herb with slightly tuberous roots. *Flowering stems* 6-(15)-40 cm. tall, simple or branched with up to 5 flowers; covered with long spreading hairs below, but short appressed ones above. *Leaves* mainly basal, hirsute with soft sub-appressed hairs 1-2 mm. long: basal leaves with petioles 1-(4)-12 cm. long, basally flattened, membranous toward the margin at the base; laminae ovate to elliptic in outline, 8-(17)-45 mm. long with breadth approximately equal to length, coarsely dentate with 3-7 teeth or ternately dissected or lobed with segments lobed or dentate, lobes broad to narrow lanceolate and acute, when ternate the terminal petiolule to 1 cm. long and the lateral ones to 5 mm. long; cauline leaves usually present; lower cauline leaves usually petiolate and similar in form to the basal leaves; upper leaves sessile, approaching the uppermost sessile and lobed or entire bracts. *Flowers* 13-28 mm. diam. *Sepals* 5, concave, spreading ovate-cuneate, 2.5-7 mm. long, 1.5-4 mm. broad, hooded at the apex with a thickened subterminal beak, 3-5 primary veins usually forking from the base, abaxial surface covered with long spreading hairs, glabrous and membranous towards the margin.



Text-figs. 5-10.—*R. lappaceus* Sm. 5-6, Leaves; 7, Sepal; 8, Petal; 9, Nectary; 10a, b, Achene, lateral and dorsal views. 5a, 5b, 7-10 from Putty, N.S.W., 6 from Buladelah, N.S.W.

Text-figs. 11-16.—*R. pachycarpus* B. G. Briggs. 11-12, Leaves; 13, Nectary; 14, Sepal; 15, Petal; 16a, b, Achene $\times 6$, lateral and dorsal views. 11, 13-16 from isotypes, 12 from Bumberry, N.S.W. Achene measurements, fig. 16: A = length, B = dorsiventral measurement, C = lateral measurement.

Petals 5, golden-yellow, obovate-cuneate, 6–15 mm. long, 3–10 mm. broad, obtuse or truncate or emarginate, starch-free zone $\frac{1}{4}$ – $\frac{1}{2}$ of petal length, 3 primary veins usually branching from base; nectary 0.2–1.0 mm. from base, nectary-lobe oblong or cuneate, 1–2 mm. long, 0.7–1.3 mm. broad, truncate or emarginate, attached laterally to petal for c. $\frac{1}{2}$ of its length. *Stamens* 25–45. *Carpels* 15–30; glabrous, ovate; style slender 1–2 mm. long, straight with a recurved tip. *Achenes* in a globular or elliptic head 7–11 mm. long; globular or obovate-cuneate and plump, pericarp very thick, 2.5–5 mm. long, 2–3.5 mm. dorsiventrally, 2–3.5 mm. laterally, lateral faces smooth, often with a shallow dorsal groove; beak 1.5–2 mm. long, recurved or straight with a recurved tip. *Fruiting receptacle* 5–8 mm. long, 0.8–1 mm. diam.; staminal zone glabrous, achene zone elliptical to terete and hirsute with short fine hairs.

Range: Western slopes of New South Wales, eastern South Australia.

Holotype: Northern slopes of Mt. Brown, c. 22 km. east of Pt. Augusta, South Australia. Growing among rocks. P. G. Wilson, 20.x.1958, no. 622 (AD 95912009). *Isotypes*: AD, NSW, K, P, US.

Specimens examined:

NEW SOUTH WALES: Goonoo forest, also Harvey Ra., G. W. Althofer, 1947 (NSW 44953); Bumberry, E. F. Constable, 4.10.1951 (NSW 44947); Cookamidgera, E. F. Constable, 22.9.1947 (NSW 4906); Mirool, G. V. Scamell, 24.8.27 (SYD); Temora, Rev. J. W. Dwyer, 8.1915, no. 540 (NSW 44948); Junee, Rev. J. W. Dwyer, 9.1915, no. 595 (NSW 44931); Wagga, R. Helms, 6.1900 (NSW 27092); Holbrook, E. J. McBarron, 28.9.47, no. 1095 (SYD); Culcairn, E. J. McBarron, 1.9.1949, no. 3503 (SYD); Albury, Monument Hill, E. J. McBarron, 4.9.48, no. 1948 (SYD).

SOUTH AUSTRALIA: Burra Burra (MEL); Verfus Guichen Bay, Dec. 1848 (MEL); Third Creek, Jan. 10 1848, Dr. Mueller (MEL).

(3) *RANUNCULUS ROBERTSONII* Benth. *Fl. Aust.*, 1:10.1863. (Text-figs. 2, 17–21.)

Perennial herb. *Roots* tuberous, fleshy and 1–3 mm. diam. at base, usually tapering abruptly to filiform and 0.1–0.5 mm. diam. *Flowering stems* 1–(10)–25 cm. high, simple or branching with 2–3 flowers. *Leaves* mostly basal; petioles and lower surfaces of laminae densely covered with short antrorse-appressed hairs, upper surfaces of laminae with scattered hairs or rarely glabrous: basal leaves with petioles 1–(7)–9 cm. long, membranous towards the margin at the base; laminae ovate to deltoid in outline, 12–(15)–25 mm. long, 8–(15)–22 mm. broad, deeply ternately or biternately lobed or, more usually, pinnately dissected into 3–9 segments and the segments deeply lobed, terminal petiolules to 10 mm. long, lateral petiolules to 5 mm. long, lobes acute and lanceolate to narrow-linear: cauline leaves usually present; the lower ones sessile or petiolate with laminae similar to those of basal leaves; upper leaves sessile and trifid. *Flowers* 13–26 mm. diam. *Sepals* 5, green, spreading, concave, broad-lanceolate to ovate, 3–5.5 mm. long, 1.5–3 mm. broad, apex hooded, 3 primary veins forking from the base, abaxial surface hirsute with short hairs or rarely glabrous, margins membranous and glabrous. *Petals* 5, golden-yellow, ovate-cuneate, 8–14 mm. long, 4.5–8 mm. broad, usually emarginate or rarely obtuse or truncate, starch-free zone $\frac{1}{3}$ of petal length, 3 primary veins branching at or below the nectary; nectary 0.2–0.5 mm. above base of petal; nectary-lobe cuneate, 1.5–2 mm. long, 0.8–1.2 mm. broad, truncate or emarginate, attached laterally to petal for $\frac{1}{2}$ – $\frac{3}{4}$ of its length. *Stamens* 30–35. *Carpels* 15–35; glabrous, flat, ovate; style 0.8–1.2 mm. long, straight with a recurved tip. *Achenes* in a globular or elliptical head, 3–5 mm. long: lenticular, semi-orbicular, 1.1–1.5 mm. long, 1–1.3 mm. dorsiventrally, 0.6–0.9 mm. laterally, margins narrowly keeled, lateral faces irregularly dimpled; beak slender, 0.9–1.2 mm. long, straight with a recurved tip. *Fruiting receptacle* 2–3 mm. long, 0.5–0.7 mm. diam.; staminal zone glabrous, achene zone hirsute and terete to narrow elliptic.

Chromosome number: $2n=16$. Voucher specimen: Near Mirrantawa, Grampians, VIC. B. G. Briggs, 17.8.1958 (SYD).

Range: Western Victoria.

Ecological distribution: Grassland and forest areas.

Typification: Two collections were cited by Bentham: East Bank of the Glenelg River, Nangela Vale, Robertson (K, photo. CANB, SYD, duplicate MEL!); Forest land near Glenelg River, Robertson (K, photo. CANB, SYD, duplicate MEL!). Both collections agree fully with the original description. The material in the Kew Herbarium from Nangela Vale is chosen as the lectotype.

Lectotype: East bank of the Glenelg River, Nangela Vale, Robertson (K, isolectotype MEL).

Specimens examined:

VICTORIA: N.W. of L. Albacutya, C. French, 9.87 (MEL); Loddon (MEL); Charlton, W. W. Watts, 10.1917, no. 732 (NSW 44889); Donald, Dr. Curdie (MEL); 3 ml. W. of Kaniva, R. Melville, 15.9.1952, no. 870 (MEL, NSW 44901); Fyan's Lake, Bellellen nr. Stawell, R. Melville, 2.11.1952, no. 1942 (MEL, NSW 44900); Moora Moora Reservoir, Grampians, T. and J. Whaite, 26.10.1953, no. 1506 (NSW 44899); near Ararat, C. Green (MEL); Salt Creek, Poolaigelo nr. Dergholm, J. Willis, 8.9.1949 (MEL); Creswick, Whan, no. 190 (MEL); near Melton, F. M. Reader (MEL); You Yangs, C. Walter, 1900, pro parte (MEL).

The most finely dissected leaves are found on plants from the Grampians, Victoria. Elsewhere the leaves often have broad segments similar to those of *R. lappaceus* Sm. The small plump achenes of *R. robertsonii* seem to be the most reliable feature characterizing the species.

(4) RANUNCULUS COLONORUM Endl. *Enumeratio Plantarum*: 1.1837 (Text-figs. 1, 22-26.)

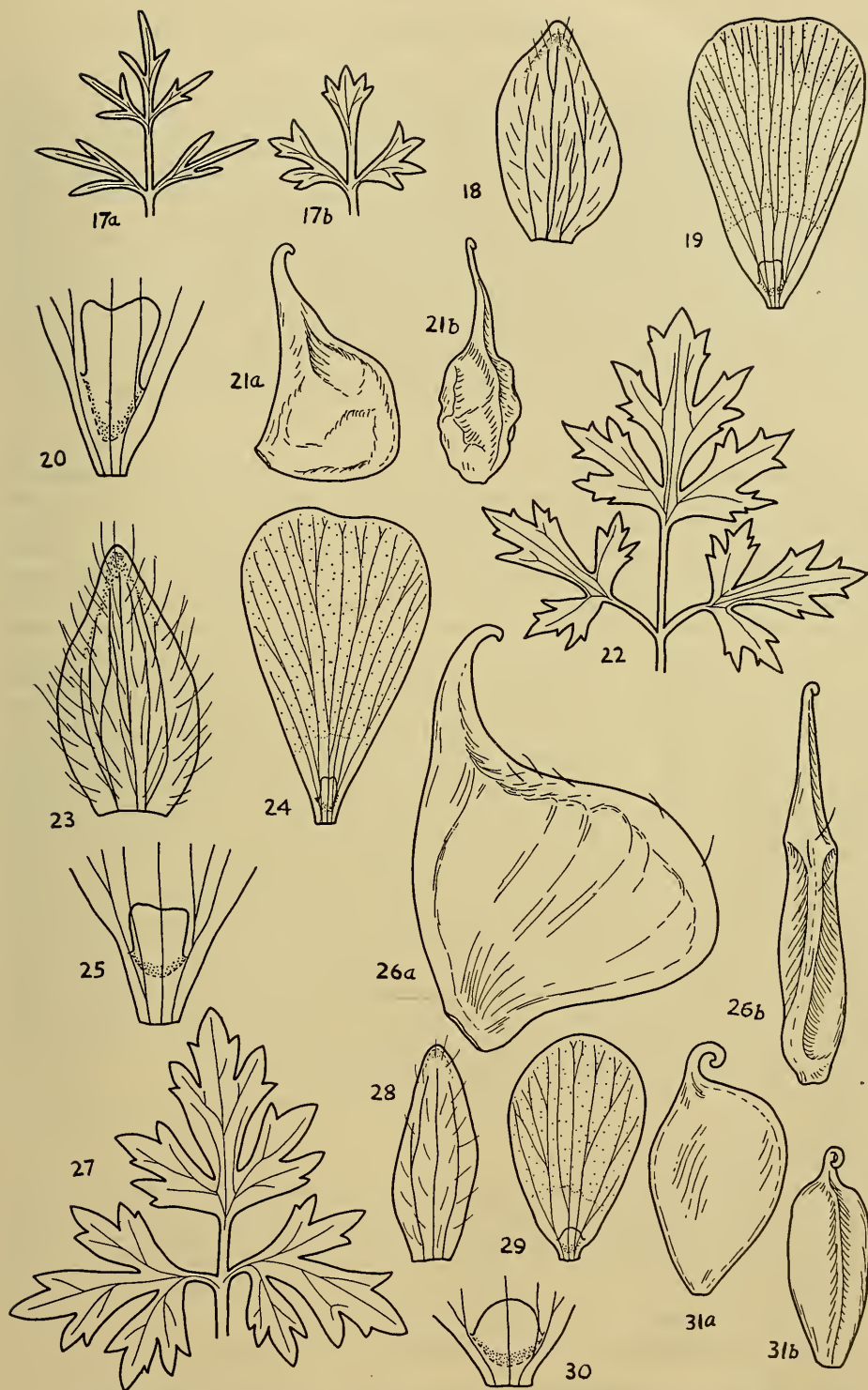
Synonym: *Ranunculus discolor* Steud. in Lehman *Plantae Preissianae*, 1:263.1844.

Perennial herb with fibrous roots. *Flowering stems* branched with 2-8 flowers, 20-60 cm. tall, covered with long spreading hairs below and short appressed ones above. *Leaves* hirsute; petioles with long spreading hairs, laminae with short appressed hairs on upper surface but spreading ones below: basal leaves with petioles 8-20 cm. long, basally flattened, membranous toward the margin at the base; laminae ovate in outline, 35-80 mm. long and about as broad, ternate with segments ternately-lobed and coarsely dentate, terminal petiolules 7-25 mm. long and lateral ones 2-14 mm. long; lower cauline leaves similar to basal leaves; upper cauline leaves sessile or petiolate, ternately lobed with dentate segments, approaching the uppermost lobed or entire and linear-lanceolate sessile bracts. *Flowers* 16-(22)-40 mm. diam. *Sepals* 5, becoming reflexed, ovate to ovate-cuneate, 2.5-5 mm. long, 1.5-2.5 mm. broad, 3 primary veins branching from near the base, abaxial surface covered with long spreading hairs, glabrous and membranous toward the margin. *Petals* 5, golden-yellow, obovate-cuneate, 9-(12)-20 mm. long and 5-14 mm. broad, obtuse or truncate, starch-free zone $\frac{1}{4}$ of petal length, 3 primary veins forking from the base; nectary 0.3-0.5 mm. from base; nectary lobe cuneate or oblong, 0.7-1.5 mm. long, attached laterally to petal for $\frac{1}{4}$ to all of its length. *Stamens* 40-60. *Carpels* 20-45; flat, ovate, with a few fine hairs on dorsal ridge; style straight or arching with a recurved tip. *Achenes* in a globular head 6-11 mm. diam.; compressed, obovate to obovate-cuneate, 2-4 mm. dorsiventrally. 0.6-0.9 mm. laterally, marginal ridges prominent, lateral faces smooth or ridged over the position of the seed, shouldered and slightly rugose below the beak; beak slender, 1.5-(2.2)-3 mm. long, arched or recurved. *Fruiting receptacle* 3-4 mm. long, 0.8-1.5 mm. diam.; staminal zone glabrous, achene zone elliptic and hirsute with short fine hairs.

Range: Southern Western Australia.

Holotype: Swan River, Hügel. The specimen was in the Vienna Herbarium, but has been destroyed. Inquiries at the following herbaria, BR, CGE, K, MEL, have failed to locate any isotype material. The original description is clear and detailed, and it is therefore not considered necessary to erect a neotype at present.

The holotype of *R. discolor* Steud., in districtu Perth, Preiss no. 1347, 23rd Sept., 1839, has not been located. It was probably at Hamburg and was lost during the war. Isotype material (MEL!) agrees fully with the original description of *R. colonorum* Endl.



Text-figs. 17-21.—*R. robertsonii* Benth. 17, Leaves; 18, Sepal; 19, Petal; 20, Nectary; 21a, b, Achene, lateral and dorsal views. 17-20 from near Mirrantawa, Grampians, Vic., 21 from Charlton, Vic.

Text-figs. 22-26.—*R. colonorum* Endl. 22, Leaf; 23, Sepal; 24, Petal; 25, Nectary; 26a, b, Achene, lateral and dorsal views. 22 from Serpentine, W.A., 23-26 from Woodman's Point, nr. Cooger, W.A.

Text-figs. 27-31.—*R. plebeius* R.Br. ex DC. 27, Leaf; 28, Sepal; 29, Petal; 30, Nectary; 31a, b, Achene, lateral and dorsal views. From near Bemboka, N.S.W.

Specimens examined:

Millewa, J. Burton Cleland, 10.1908 (NSW 44909); Mundaring, Dr. J. Burton Cleland (NSW 44913); Greenmount, R. Helms, 23.9.1899 (NSW 44906); Greenmount, A. H. Hamilton, 20.9.1902, no. 193 (NSW 44908); Claremont, C. A. Gardner, 13 Sept. 1920, Herb. Forests Dept. no. 735 (PERTH); Swan River, F.v.M. Nov. 1877 (MEL); Swan River, Miss J. Sewell, 1858 (MEL); Swan River, 1888 (MEL); Swan River, A. Helmrich (MEL); Woodman's Point, nr. Cooger, C. A. Gardner, 26 Oct. 1942 (PERTH); Pinjarrah, S.W. Railway, R. Helms, 23.9.97 (PERTH); Busselton, A. and E. Pries, 1870 (MEL); Yallingup, J. H. Maiden, Oct. 1909 (N.S.W. 44907); Blackwood River, Mrs. McHard, 1893 (MEL); Blackwood R. 125 (MEL); Blackwood R., Hester, 1875 (MEL); near Karri Dale, P. Walcott, Dec. 1867 (MEL); Manjimup, R. D. Royce, 31 Oct. 1946, no. 1355 (MEL); Warren's River, Perrot Walcott, 1872 (MEL); Upper Hay River, Mary Warburton, 1870 (MEL); Lake Wagin, N. of King George's Sound, Miss M. Cronin, 1890 (MEL); K.G. Sound, J. R. Muir (MEL); W.A., P. Walcott (MEL); W.A. Forest Dept., 2.1901 (NSW 44911); Walcliff, Miss Russell (MEL); Serpentine, M. Fitzgerald, Sept. 1901 (NSW 44905); Jaradanup, Miss Knox-Peden, 3.1919, no. 43 (NSW 44910); Bow River, S. W. Jackson, 11.1912 (NSW 44912).

(5) RANUNCULUS PLEBEIUS R.Br. ex D.C. *Syst. Veg.*, I:288.1817. (Text-figs. 2, 27-31.)

Perennial herb with fibrous roots. *Flowering stems* 8-(30)-80 cm. high, branched with 2-(4)-16 flowers, hirsute, hairs long and spreading below, but short and appressed above. *Leaves* mainly basal, hirsute; hairs long and spreading on petioles, short and usually appressed on laminae: basal leaves with petioles 3-(12)-28 cm. long, basally flattened, glabrous and membranous towards the margin at the base; laminae ovate to deltoid in outline, 1-(4)-7 cm. long and often slightly broader, ternate or rarely ternately-lobed, segments ternately-lobed and acute, segments of ternate leaves ovate in outline with terminal petiolules to 10 mm. long and lateral ones to 8 mm. long: lower cauline leaves similar to basal leaves; upper leaves often sessile, ternately-lobed to entire, approaching the occasional uppermost entire and linear or dentate bracts. *Flowers* 7-(12)-16 mm. diam. *Sepals* 5, green, reflexed, ovate-cuneate to elliptic, 2.5-5 mm. long, 1-2 mm. broad, obtuse with a subterminal thickened beak, 3 principal veins forking above, hirsute on the abaxial surface with appressed or spreading hairs, membranous and usually glabrous toward the margin. *Petals* 5, golden-yellow, obovate to elliptic, 5-10 mm. long, 2.5-3.5 mm. broad, obtuse, starch-free zone $\frac{1}{2}$ - $\frac{1}{4}$ of petal length, 1-3 primary veins forking at or below nectary; nectary 0.3-0.7 mm. above base of petal; nectary-lobe ovate to elliptic, 0.5-1 mm. long, attached laterally to petal for $\frac{1}{2}$ of its length. *Stamens* 9-25. *Carpels* 25-(40)-60; flat, ovate, glabrous or with a few stout hairs on the dorsal ridge and lateral faces; style straight with a recoiled tip. *Achenes* in a globular head 6-8 mm. diam.; lenticular obovate to obovate-cuneate, 1.8-2.8 mm. long, 1.3-2 mm. dorsiventrally, 0.7-1 mm. laterally, slightly shouldered and rugose below the beak, margins narrowly ridged, lateral faces smooth; beak slender, strongly recurved, 0.7-1 mm. long. *Fruiting receptacle* 4-5 mm. long, 0.7-2 mm. diam.; staminal zone glabrous, achene zone elliptic and sparingly hirsute.

Chromosome number: $2n=16$. Voucher specimen: Bemboka, B. G. Briggs, 2.2.1956 (SYD).

Range: Eastern Australia.

Ecological distribution: Damp situations in forest areas on coast and tablelands, usually below 3,000 ft. altitude.

Holotype: In paludos prope Kingstown, R. Brown, Oct.-Nov., 1804, no. 5253 (BM, photo. SYD!).

Specimens examined:

QUEENSLAND: Condamine 403 (MEL); Mr. Archer's waterholes, Dr. Leichhardt, 23rd Nov. 43 (NSW 44780).

NEW SOUTH WALES: Koreelah Peak to White Swamp, J. H. Maiden, 12.1907 (NSW 44770); Copmanhurst, Rev. Rupp, 11.09 (NSW 44782); Grafton, R. J. Flynn, 13.11.1953 (NSW 27070); New England, A. Norton (BRI 001140); Oara R., J. L. Boorman, 11.12 (NSW 27067); Beilsdown Creek, Dorrigo Forest Reserve, J. H. Maiden, 12.93 (NSW 44768); Stony Creek, Telegraph Point to Wauchope, H. and B. Gray (NSW 46149); Manning River, E. Cheel, 12.1899 (NSW 44769); Gloucester to Krumback, N. C. Ford, 7.1.1958 (NSW 44787); Cessnock,

Paton and Derricott, 4.3.1957 (NSW 44789); Avoca, J. Blackmore, 10.4.1950 (NSW 27069); Cattai Creek, O.D.E., 11.39 (SYD); Gordon, A. Hamilton, 12.2.1899 (NSW 44771); St. Marys, O. D. Evans, 12.25 (SYD); Rockdale, J. H. Camfield, 8.6.1901 (NSW 27073), 3.1.1903 (NSW 44774), 14.3.1903 (NSW 27068); Kogarah, J. H. Camfield, 11.99 (NSW 27074); Bulli, E.B., 12.1890 (NSW 44782); Bulli, L. Johnson, 1875 (MEL); Mittagong, W. A. Dixon, 2.18 (NSW 27071); Welby to Bowral, E. J. Strugnell, 23.3.1955 (NSW 44791); Kiama, J. H. Camfield, 12.99 (MEL, NSW 44773); Southern slopes of the Barren Ground, nr. Berry, H. Salasso, 8.3.1954 (NSW 27075); Paddy's River, Goulburn-Sydney Rd., E. F. Constable, 25 Jan. 1956 (NSW 36701); Barrengarry Pass, O. D. Evans, 3.6.1925 (SYD); Mt. Cambewarra, Nowra, E. F. Constable, 7.12.1950 (NSW 16320); Beaumont, Cambewarra Ra., F. A. Rodway, 7 Dec. 1933, no. 1220 (NSW 44775); Between Bomaderry and Cambewarra, H. Salasso, 12.3.1955, no. 1315 (NSW 44786); Tarago, J. L. Boorman, 11.1911 (NSW 44777); Monga or Sugar-loaf Mt., near Braidwood, J. L. Boorman, 3.1909 (NSW 44784); Termeil to Bateman's Bay, F. A. Rodway, 1.1924, no. 460 (NSW 44772); Snowball, 44 ml. S'th of Braidwood, F. A. Rodway, 3.2.1946 (NSW 44785); Hopping Joe Creek, E. of Cann River-Bombala Road, R. Melville, 13.1.1953, no. 2868 (BRI 010004, MEL, NSW 44788).

VICTORIA: Snowy River, Dr. M. (MEL); near Seymour, Mrs. F. M. Reader, 9.11.1902 (MEL); between Bemm and Combinbah Rivers, W. A. Sayer, 1887 (MEL); towards the Moe swamps, April 1853 (MEL).

In some of the plants from Narooma to Brown Mountain on the South Coast, N.S.W., the petals are replaced by sepal-like structures. These structures resemble the sepals in size and texture and are hirsute on the abaxial surface, but usually have only one primary vein branching from near the base. In all other features these plants are typical of the species. The following collections contain both normal plants and such aberrant individuals: Nunnock R., 5 m. W. of Bemboka, B. G. Briggs, 2.2.1956 (SYD); near Bega, B. G. Briggs, 2.2.1956 (SYD).

(6) *RANUNCULUS SCAPIGERUS* Hook. *Journ. Bot.*, 1:244.1834. (Text-figs. 3, 32-37.)

Synonym: *R. lappaceus* Sm. var. *scapigerus* Benth.

Perennial herb with fibrous roots. *Flowering stems* 2.5-(20)-60 cm. tall, simple or branched with 2-4 flowers, hirsute with hairs spreading below and appressed above. *Leaves* mostly basal, covered with long spreading hairs on the petioles and short appressed ones on the laminae: basal leaves with petioles 1-(8)-15 cm. long, basally flattened, membranous toward the margin at the base; laminae ovate in outline, 7-(25)-60 mm. long and as broad or slightly broader, usually ternately or biternately lobed, rarely ternate with terminal petiolule to 1 cm. long and lateral ones to 5 mm. long and the segments with obtuse lobes: cauline leaves often present; lower ones similar to basal leaves; upper ones often sessile, ternately lobed to entire, approaching the uppermost linear to lanceolate and usually sessile bracts. *Flowers* 8-(14)-16 mm. diam. *Sepals* 5, green, reflexed, elliptic, 5-7 mm. long, 2-3 mm. broad, obtuse, hooded at apex with a subterminal thickened beak, 3 principal veins forking above, abaxial surface hirsute with spreading hairs, usually membranous and glabrous toward the margin. *Petals* 5, golden-yellow, usually tinged with purple on abaxial surface, elliptic to obovate, 6-9 mm. long, 2-5 mm. broad, obtuse, starch-free zone $\frac{1}{3}$ - $\frac{1}{2}$ of length, 3 principal veins forking at nectary; nectary 0.3-0.7 mm. above base of petal; nectary-lobe ovate or broad-oblong, 0.3-1 m. long, 0.4-0.5 mm. broad, attached laterally to petal for $\frac{1}{3}$ - $\frac{2}{3}$ of its length. *Stamens* 15-35. *Carpels* 20-(30)-50; flat, ovate, usually with a few stiff hairs on the dorsal ridge and lateral faces; style straight with a recoiled tip. *Achenes* in a globular head 5-8 mm. diam.; obovate-cuneate, lenticular, 1.7-3 mm. long, 1.2-2 mm. dorsiventrally, 0.6-1 mm. laterally, rugose and slightly shouldered below the beak, marginal ridges distinct, lateral faces smooth; beak slender, 1.2-2 mm. long, straight with a recoiled tip. *Fruiting receptacle* 2-4 mm. long, 0.7-2 mm. diam.; staminal zone glabrous, achene zone hirsute and elliptic.

Chromosome number: $2n=16$. Voucher specimen: Daner's Gap, Mt. Kosciusko, B. G. Briggs, 5.1.1959 (SYD).

Range: Southern New South Wales, Victoria, Tasmania.

Ecological distribution: Grassland and forest areas. On the mainland it occurs mainly between 3,000 and 5,000 ft. altitude, but in Tasmania it extends to lower altitudes.

Holotype: Tasmania, Gunn, no. 229, 1833 (K, photo. CANB!).

Unrecognized variety: *R. scapigerus* Hook. var. *foliosus* Melville, Kew Bull 1955: 197. *Holotype*: On the grassy banks of a rivulet in a gully N. of Wilfred's Hill, Mt. Buffalo Plateau, R. Melville, 1.1.1953, no. 2684 (K, isotype MEL! NSW!).

This variety is characterized by branched flowering-stems with cauline leaves trifid, trilobed or ternate. Both varieties are common in Tasmania, but most mainland specimens which I have examined belong to var. *foliosus*. In Tasmanian material there is a complete gradation between the varieties and both are present in many collections. The nature of the cauline leaves and the extent of stem branching are closely related in development and can scarcely be considered as separate features. Considering the limited nature of the characters separating the varieties and the continuity of variation within the species, the maintenance of the two varieties does not seem justified.

Specimens examined:

NEW SOUTH WALES: N.W. of Cotter Trig, A.C.T., N. C. Ford, 16.1.1954 (NSW 27076); Coree-Queanbeyan, R. H. Cambage, 9.12.1911, no. 3280 (NSW 44776), 10.12.1911, no. 3239 (NSW 27077); 12 ml. N. of Rules Point, B. G. Briggs, 20.2.1957 (SYD); Snowy Mts. Highway, 6 ml. S.E. of Yarrangobilly Village, B. G. Briggs, 20.2.1957 (SYD); Happy Jack's Gorge near junction with Tumut River, M. Mueller, 28.11.54, no. 2587A (NSW 44767); Daner's Gap, Kosciusko area, B. G. Briggs, 5.1.1959 (SYD); Plains of Heaven track, Mt. Kosciusko area, J. Garden, 9.1.1956 (NSW 44790); Hannel's Spur, Kosciusko area, B. G. Briggs, 11.1.1959 (SYD); Thredbo Ski Village, nr. Mt. Kosciusko, B. G. Briggs, 7.1.1959 (SYD); The Pilot Lookout, Jindabyne-Geehi Rd., B. G. Briggs, 15.1.1956 (SYD); Top of Brown Mountain nr. Bega, B. G. Briggs, 2.2.1956 (SYD).

VICTORIA: Dividing Ranges, C. Walker, Nov. 1898 (NSW 44778); Hohman's Gap, Tawonga to Bogong Plains, B. G. Briggs, 24.12.1955 (SYD); Falls Creek, nr. Bogong High Plains, B. G. Briggs, 24.12.1955 (SYD); Mt. Lock nr. Mt. Hotham, B. G. Briggs, 31.xii.1952 (NSW 44898); Mt. Hotham, A. J. Tadge, Dec. 1914 (MEL); Mt. St. Bernard, nr. Mt. Hotham, B. G. Briggs, 2.1.1956 (SYD); Red Jacket Creek, Gargurevich, 1874 (MEL); Gippsland, Howitt, 1882 (MEL); Sources of the Brodribb R., E. Merrah, XI.1887 (MEL); Dandenong Ranges, C. Walker, Nov. 1897 (NSW 44779); Sherbrooke Forest, Dandenong Ranges, J. H. Willis, 10.1.1950 (MEL); Yarra, C. Walter (MEL).

TASMANIA: Herb. W. H. Archer (NSW 27060); H. and S. Hills no. 1066 (MEL); M^r Arthur, Sullivan and Contes, 1886, no. 85 (MEL); Mt. Barrow, H. M. Rupp, Jan. 1922, no. 88 (NSW 27062); Mt. Barrow, M. Tindale, 17.12.1954 (NSW 44678); Waratah, A. H. S. Lucas, Dec. 1924 (NSW 27065); ascent of St. Paul's Dome, Nov. 1849 (MEL); Mt. Wellington, A. H. S. Lucas, Jan. 1901 (NSW 27064); Mt. Wellington, L. Rodway, Dec. 97 (NSW 27063); Mt. Wellington, F. A. Rodway, Jan. 1901, no. 49 (NSW 27059), Dec. 98, no. 48 (NSW 27058); Mt. Wellington, E. Rodway, Dec. 1929 (HO); Mt. Wellington, R. Melville, 10.12.1952, no. 2270A (NSW 44679), no. 2270B (MEL, NSW 44680); Hobart, Herb. S. C. Hannaford, 12.1870 (NSW 27061); Hobart, F. A. Rodway, Dec. 98, no. 48 (NSW 27058); Lady's Bay nr. Southport, Dec. 1855 (MEL).

(7) RANUNCULUS PIMPINELLIFOLIUS. Hook. *Journ. Bot.*, I:243.1834. (Text-figs. 3, 38-42.)

Synonym: *Ranunculus lappaceus* Sm. var. *pimpinellifolius* Benth. *Fl. Aust.*, 1: 12.1863.

Perennial herb with fibrous roots. *Stems*: sometimes with short erect stems bearing a cluster of leaves and flowering stems; flowering stems erect or spreading, 2-(10)-25 cm. tall, simple or occasionally branched with 2-5 flowers, hirsute with long hairs spreading below and appressed above. *Leaves* mostly basal, hirsute with long spreading hairs, upper surface of laminae sometimes glabrous or nearly so; basal leaves with petioles 1-(8)-13 cm. long, basally flattened, membraneous towards the margin and almost glabrous at the base; laminae ovate or elliptic in outline, 5-(18)-30 mm. long, 5-(11)-25 mm. broad, pinnately divided into 3-5 segments, terminal segment ternately or biternately-lobed, lateral segments with petiolules 3-4 mm. long, segments ovate or obovate, ternately lobed and coarsely dentate: cauline leaves often present; lower cauline leaves similar to basal leaves; upper leaves sessile or shortly petiolate, ternately lobed or entire and linear-lanceolate. *Flowers* 5-(10)-15 mm. diam. *Sepals* 5, green, spreading, concave, elliptic to ovate, 2.5-6 mm. long, 1.5-2 mm. broad, hooded at apex with a subterminal thickened beak, 3 primary veins, forking from the base,



Text-figs. 32-37.—*R. scapigerus* Hook. 32-33, Leaves; 34, Sepal; 35, Petal; 36, Nectary; 37a, b, Achene, lateral and dorsal views. 32 from Mt. Wellington, Tas., 33-37 from Hannel's Spur, Kosciusko area, N.S.W.

Text-figs. 38-42.—*R. pimpinellifolius* Hook. 38, Leaf; 39, Sepal; 40, Petal $\times 5$; 41, Nectary; 42a, b, Achene, lateral and dorsal views. From Piper's Creek, Kosciusko area, N.S.W.

Text-figs. 43-49.—*R. graniticolus* Melville. 43-44, Leaves; 45, Sepal $\times 4$; 46, Petal; 47, Nectary; 48-49, Achenes. 43, 45-48 from Guthrie's Creek, Kosciusko area, N.S.W., 44 from Kiandra, N.S.W., 49 from Mt. Buller, Vic.

abaxial surface hirsute with spreading hairs, usually glabrous and membranous towards the margin. *Petals* 5—rarely 8, golden-yellow, elliptic to obovate-cuneate, 4–9 mm. long, 1.5–3.5 mm. broad, starch-free zone $\frac{1}{3}$ – $\frac{1}{2}$ of petal length, 3 primary veins forking from the base; nectary 1–2 mm. above base of petal in a shallow pocket terminating a thickened ridge; nectary-lobe triangular, to 0.5 mm. long. *Stamens* 20–35. *Carpels* 8–(25)–40; flat, semi-orbicular; style stout and straight with a recurved tip. *Achenes* in a globular head 4–6 mm. diam.; lenticular, semi-orbicular, 2–2.8 mm. long, 1.5–2 mm. dorsiventrally, 0.6–0.8 mm. laterally, marginal ridges obscure, lateral faces smooth, tapering gradually into a stout recurved beak 0.5–1 mm. long. *Fruiting receptacle* 1.5–4 mm. long, 0.5–1.5 mm. diam.; staminal zone hirsute or glabrous; achene zone hirsute and elliptic to ovate.

Chromosome number: $2n=16$. Voucher specimen: Piper's Gap, Mt. Kosciusko, B. G. Briggs, 10.1.1959 (SYD).

Range: Eastern New South Wales, Victoria, Tasmania.

Ecological distribution: Swamps and wet grassland in tableland and sub-alpine situations, usually from 2,500 to 6,000 ft. altitude.

Holotype: Growing with *R. lappaceus* (Gunn no. 90), R. Gunn (K).

Unrecognized varieties: *R. pimpinellifolius* var. *a glabrior* Hook. f. in *Hook. Journ. Bot.*, 2:401.1840. Based on the same type as the species. *R. pimpinellifolius* var. *vestitus* Hook., *Icones Plantarum*, 3: Pl. 260, 1839. Holotype: Abundant on the edge of a stream called Blackman's River near Hobart Town, Tas. R. Gunn. (K, photo., CANB!) This variety is not recognized as it differs from the type only in minor characters, which grade imperceptibly into those of the typical form.

J. D. Hooker at first (1840) recognized *R. pimpinellifolius*, but later (1855) reduced it to synonymy under *R. hirtus* Banks et Sol. ex DC.; Rodway (1903) equated it to *R. scapigerus*, to which he gave varietal rank under *R. lappaceus*.

Specimens examined:

NEW SOUTH WALES: Guy Fawkes, J. L. Boorman, 12.1909 (NSW 44749); Guy Fawkes Creek Gorge, R. Carolin, 17.11.57, no. 428 (SYD); Barwick R., Armidale-Pt. Lookout Rd., B. G. Briggs, 20.8.1956 (SYD); Barrington Tops, L. R. Fraser, J. W. Vickery, 7.1.1934 (SYD); Erumlow Creek, Barrington Tops, L. A. S. Johnson, 1.xii.1954 (NSW 44751); Oberon, J. Garden, 10.11.1952 (NSW 44753), 11.11.1952 (NSW 44754); Oberon district, J. Vickery, 6.10.1952 (NSW 44755); Jenolan Caves, W. F. Blakely, 11.99 (NSW 44757); Colong-Yerranderie, R. H. Cabbage, 5.12.1911, no. 3217 (NSW 44756); Taralga, E. Cheel, 12.12.1919 (NSW 44745); Mt. Gingera, C. W. E. Moore, 17.12.1953 (NSW 44746); Mt. Gingera, M. Tindale, 16.1.1954 (NSW 44747); Queanbeyan River, between Jerangle and Captains Flat, J. Garden, 12.1.1956 (NSW 44760); Kiandra, J. Thompson, 20.1.1958 (NSW 44744); Happy Jack's Plain, 15 ml. south of Kiandra, J. Thompson, 18.1.1958 (NSW 44742); Toolong Ra., 12 ml. south of Kiandra, J. Thompson, 20.1.1958 (NSW 44743); Kybean, R. H. Cabbage, no. 2122 (SYD), 5.11.1908, no. 2022 (NSW 44761); Lower slopes of Mt. Kosciusko, A. T. Hotchkiss, 1.1.1954 (NSW 44763); Rennix Gap, Kosciusko area, B. G. Briggs, 16.1.1957 (SYD); Plains of Heaven track, Mt. Kosciusko area, J. Garden, 9.1.1956 (NSW 44758); Junction of Wragge's and Piper's Creeks, Mt. Kosciusko, J. Garden, 9.1.1956 (NSW 44759); Piper's Creek, Kosciusko area, B. G. Briggs, 16.1.1957 (SYD); Piper's Gap, C. W. E. Moore, 2.2.1953, no. 2859 (NSW 44762); Perisher Gap, Kosciusko area, B. G. Briggs, 16.1.1957 (SYD); Between Charlotte Pass and Snowy River, Mt. Kosciusko, H. J. Eichler, 5.2.1957, no. 13653 (AD 5748012); Kosciusko 5000', J. McL. and A.H.K.P., 1.25 (SYD); Thredbo Ski Village, near Mt. Kosciusko, B. G. Briggs, 7.1.1959 (SYD).

VICTORIA: Strathbogie per H. B. Williamson, 1902, no. 980 (MEL, NSW 44748); Omeo, Dr. M., Dec. 54 (MEL).

TASMANIA: Pontville on the Jordan, W. W. Spicer, '18 (MEL); Blackman's River, Herb. Gunn, no. 635, pro parte (HO); Formosa, ex Herb. Gunn, no. 635 (HO, NSW 44764); ex Herb. W. H. Archer (NSW 44765, 44766).

(8) RANUNCULUS GRANITICOLUS Melville. *Kew Bull.*, 1955: 205–206. (Text-figs. 4, 43–49.)

Perennial herb with fibrous roots. *Flowering stems* 2–(12)–40 cm. long, usually simple, rarely branched with 2–3 flowers, hirsute with hairs spreading or sometimes appressed above. *Leaves* mostly basal, hirsute; petioles with long spreading hairs and

laminae with short appressed ones: basal leaves with petioles 1-(7)-25 cm. long, basally flattened, membranous toward the margin at the base; laminae ovate to elliptic in outline, 1-(3)-4 cm. long, length 1-3 times breadth, simple with the margin coarsely dentate, or ternately or biternately dissected or lobed with dentate segments, when ternate the segments ovate in outline with acute lanceolate lobes and with the terminal petiolule to 15 mm. long and the lateral ones to 5 mm. long; rarely a few inner leaves entire and linear-lanceolate: cauline leaves often present; sessile or petiolate, entire and linear-lanceolate or ternately dissected or lobed. Flowers 10-(15)-36 mm. diam. *Sepals* 5, green, spreading, concave, ovate-cuneate or elliptic, 3-7 mm. long, 1.5-4 mm. broad, usually hooded at apex, 3 to rarely 5 primary veins forking from the base, abaxial surface covered with spreading hairs, membranous and glabrous towards the margin. *Petals* 5 to rarely 8, golden yellow, abaxial surface sometimes tinged with purple, obovate-cuneate, 6-(10)-20 mm. long, 5-(7)-14 mm. broad, obtuse or truncate or emarginate, starch-free zone $\frac{1}{4}$ - $\frac{1}{2}$ of petal length, 3 primary veins branching at or below the nectary; nectary 0.2-0.5 mm. from base of petal; nectary-lobe oblong or tapering slightly toward apex, 0.2-1 mm. long, truncate or usually emarginate, attached to petal at base only or attached laterally for part or all of length. *Stamens* 30-70. *Carpels* 20-(35)-65; flat, ovate; style short, arching or recoiled, style and dorsal surface

TABLE 1.
Variation in R. graniticulus.

Locality.	Dissection of Lamina.	Length of Terminal Petiolule.	Number of Carpels.	Achene Beak.
Mt. Buffalo ..	Ternate to bi-ternate with segments lobed or dentate.	5-(10)-15 mm.	20-(30)-35	Stout, arching, recoiled at tip.
Mt. Buller ..	Ternate with segments ternately or biternately lobed and often dentate, or (rarely) deeply ternately lobed.	3-(5)-20 mm.	30-(40)-50	Usually slender, arching, recoiled at tip.
Mt. Kosciusko	Ternately dissected or lobed with segments lobed or dentate.	0-5 mm.	30-(45)-50	Stout, strongly recurved.
Mt. Franklin-Adaminaby.	Obovate and evenly 5-20 toothed, or ternately dissected or lobed with dentate segments.	0-2 mm.	20-(30)-45	Stout, recurved.

of achene often dark brown. *Achenes* in a globular head 6-9 mm. diam.; lenticular, obovate-cuneate to semi-orbicular, 2-3.5 mm. long, 1.7-2.5 mm. dorsiventrally, 0.7-1.0 mm. laterally, shouldered and slightly rugose near base of style, lateral faces smooth, margins narrowly ridged; style stout or rather slender, 0.7-1 mm. long, arching or strongly recurved, usually with a recoiled tip. *Fruiting receptacle* 3-5 mm. long, 0.7-3 mm. diam.; staminal zone glabrous; achene zone hirsute and elliptic to orbicular.

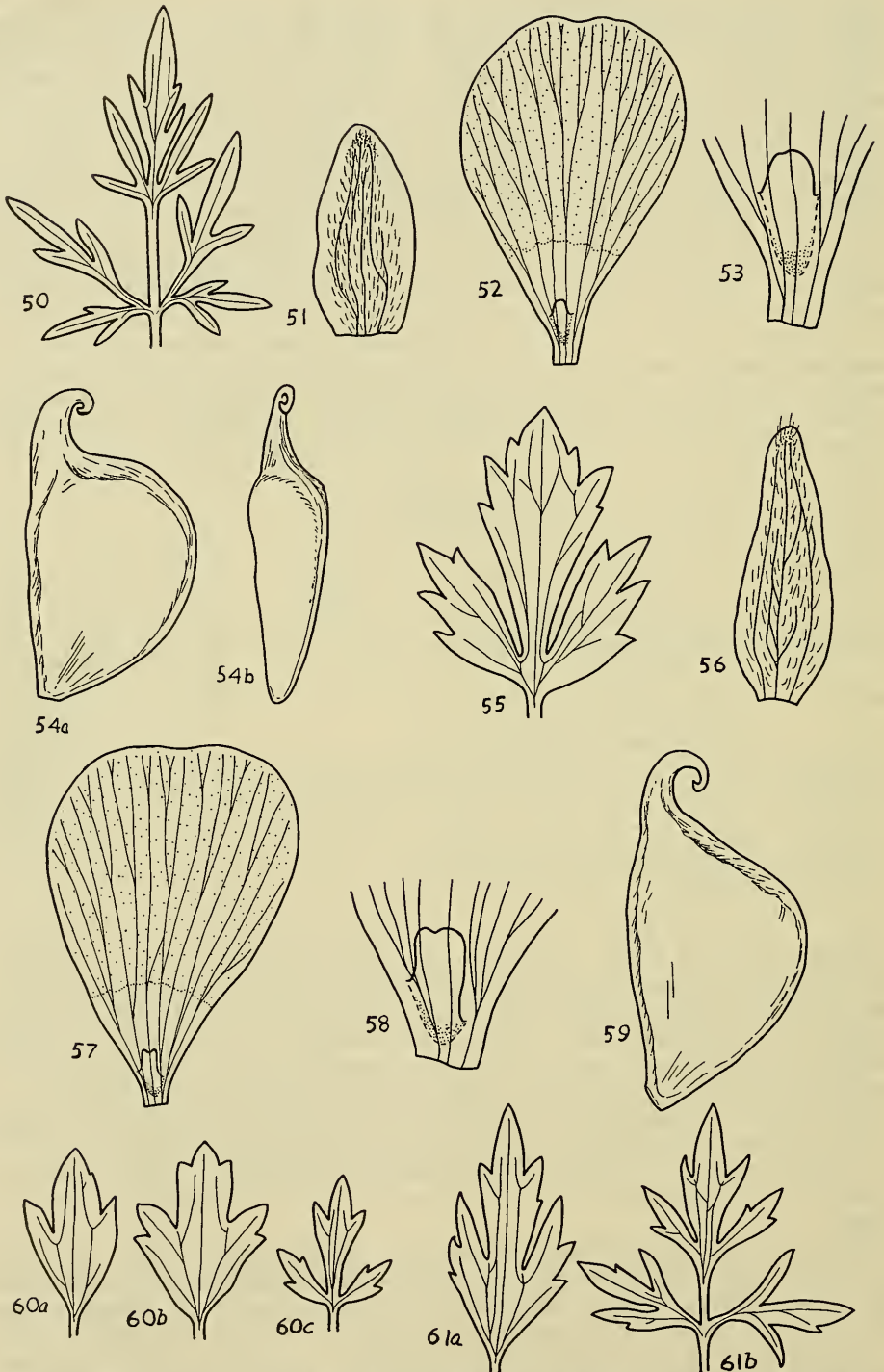
Chromosome number: $2n=16$. Voucher specimens: Guthrie's Creek, Mt. Kosciusko area, B. G. Briggs, 6.1.1959 (SYD); Kiandra, B. G. Briggs, 10.1.1959 (SYD).

Range: Mountains of southern New South Wales and eastern Victoria, from Mt. Franklin south to Mt. Buller; but absent from Mt. Hotham and the Bogong High Plains.

Ecological distribution: Sub-alpine grassland and sometimes swamps, 3,800-6,600 ft. altitude. On the Mt. Buffalo Plateau it occurs in sub-alpine grassland ranging from dry ridges to wetter sites on valley floors and is also plentiful in *Sphagnum* bogs. Elsewhere it is limited to dry grassland situations on well-drained slopes and ridges.

Holotype: Mt. Buffalo Plateau below Stonehenge, in sub-alpine pasture on granite, about 4,600 ft. altitude, R. Melville, 27.12.1952, no. 2579 (K, isotypes Mel! N.S.W.!).

In addition to the holotype a paratype was cited from the Kosciusko area, N.S.W. (N.S.W. 15884!). Mt. Buller in Victoria and the area from Mt. Franklin to Adaminaby



Text-figs. 50-54.—*R. eichleranus* B. G. Briggs. 50, Leaf; 51, Sepal $\times 4$; 52, Petal; 53, Nectary; 54a, b, Achene, lateral and dorsal views. From isotypes.

Text-figs. 55-61.—*R. victoriensis* B. G. Briggs. 55, 60-61, Leaves; 56, Sepal $\times 4$; 57, Petal; 58, Nectary; 59, Achene. 55-59 from isotypes, 60 from Pretty Valley, Bogong High Plains, Vic., 61 from Mt. Hotham, Vic.

in N.S.W. and A.C.T. also support plants which are similar to those from the type locality. The populations in these four areas differ from one another in features of leaf dissection and in other minor characters (see Table 1). The limits of variation in these features differ between regions, but no discontinuities could be distinguished sufficient for the establishment of varieties.

The study of a larger range of material has considerably widened the variation limits beyond those recorded in the original description.

Specimens examined:

NEW SOUTH WALES: Mt. Franklin, A.C.T., C. Rathgeber, 11.3.1956 (SYD); Mt. Ginni, nr. Mt. Franklin, B. G. Briggs, 10.1957 (SYD); Mt. Gingera, B. G. Briggs, 10.1957 (SYD); Mt. Gingera, A.C.T., M. Tindale, 16.1.1954 (NSW 44666); Mt. Gingera, A.C.T., C. W. E. Moore, 4.2.1953, no. 2272 (NSW 44655), no. 2313 (NSW 44656), no. 2314 (NSW 44657), no. 2315 (NSW 44654); Rules Point, N. of Kiandra, B. G. Briggs, 10.3.1956 (SYD); 1 ml. N. of Kiandra, B. G. Briggs, 3.1956 (NSW 44664); Kiandra distr., E. Betche, 2.1897 (NSW 44658); Kiandra, B. G. Briggs, 10.3.1956 (SYD), 5.12.1956 (SYD); Toolong Ra., 18 m. S.W. of Kiandra, J. Thompson, 20.1.1958 (NSW 44660); Happy Jack's Plain, nr. Kiandra, B. G. Briggs, 10.3.1956 (SYD), 5.12.1956 (SYD); Wilson's Valley, Kosciusko area, B. G. Briggs, 18.1.1957 (SYD); above Dainer's Gap, Plains of Heaven Track, Mt. Kosciusko area, J. Garden, 9.1.1956 (NSW 44653, 44668, 44669); Pretty Point, Mt. Kosciusko, J. H. Maiden and W. Forsyth, January, 1899 (NSW 44650); Hotel Kosciusko, B. G. Briggs, 18.2.1957 (SYD), Prussian Creek, Kosciusko area, B. G. Briggs, 16.1.1956 (SYD); nr. Smiggin Holes, Kosciusko area, B. G. Briggs, 16.1.1956 (SYD); Piper's Gap, Mt. Kosciusko, J. Garden, 9.1.1956 (NSW 44652); Guthrie's Creek, Kosciusko area, B. G. Briggs, 16.1.1956 (SYD), 6.1.1959 (SYD); Near Betts Creek south of the Paralyser, Hj. Eichler, 24.1.1957, no. 13463 (AD 95735041); Betts Creek, S. of Main Kosciusko Rd., J. Garden, 10.1.1956 (NSW 44651); Betts Camp, Mt. Kosciusko, J. H. Maiden, 16.2.1914 (NSW 44670); Betts Camp, Kosciusko area, B. G. Briggs, 14.1.1957 (SYD); Spencer's Creek, Mt. Kosciusko, Hj. Eichler, 25.1.1957, no. 13513 (AD 95742009), 4.2.1957, no. 13626 (AD 95746011); Near Spencer's Creek Camp, Kosciusko area, B. G. Briggs, 20.1.1957 (SYD); Spencer's Creek Bridge, Kosciusko area, B. G. Briggs, 3.2.1953 (SYD); Near Trapyard Creek, ca. 8 km. E.N.E. of Mt. Kosciusko, Hj. Eichler, 25.1.1957, no. 13489 (AD 95735046), no. 13490 (AD 95735045); Trapyard Creek, Kosciusko area, B. G. Briggs, 16.1.1956 (SYD); Top of Bett's Valley, nr. Thredbo Valley, Kosciusko area, B. G. Briggs, 19.1.1957 (SYD); Thredbo River Gorge, Mt. Kosciusko, L. A. S. Johnson and E. F. Constable, 19.1.1951 (NSW 15884); Snowy River, nr. Charlottes Pass, Kosciusko area, B. G. Briggs, 17.1.1956 (SYD); Seaman's Hut, Mt. Kosciusko, per J. Collins, 1952 (NSW 44649); near North Ramshead, Kosciusko area, B. G. Briggs, 18.1.1956 (SYD); Thredbo Ski Village, near Mt. Kosciusko, B. G. Briggs, 7.1.1959 (SYD); Mt. Kosciusko, 6,000' (MEL); Kosciusko, N. C. Beadle, 5.2.1952 (SYD); Kosciusko, J. McLuckie and A. H. K. Petrie, 1.1924 (SYD); Mt. Kosciusko, Miss T. Harris (NSW 44671, 44662), 10.1.1930 (NSW 44647); Mt. Kosciusko, A. T. Hotchkiss, 31.12.1953 (NSW 27085); Mt. Kosciusko, 5,500 ft. to sum., J. H. Maiden, '93 (NSW 44661); Mungyang Mountains, F.v.M. (MEL).

VICTORIA: Alps, C. French, Jr., 12.1904, pro parte (MEL); Summit Buffalo Mts., C. Walter (MEL), Jan. 1899 (NSW 44645); Mt. Buffalo, R. H. Cambage, 19.1.1913, no. 3757 (NSW 44646); Lake Catani, Mt. Buffalo, B. G. Briggs, 1.1956 (NSW 44640); Reservoir, Mt. Buffalo, B. G. Briggs, 1.1956 (SYD); Mt. Dunn, Mt. Buffalo Plateau, B. G. Briggs, 1.1956 (SYD); Eagle Point, Mt. Buffalo, B. G. Briggs, 1.1956 (SYD); near Leviathan, Mt. Buffalo, B. G. Briggs, 1.1956 (SYD); Blackfellow's Plain, Mt. Buffalo, B. G. Briggs, 1.1956 (SYD); near the Hump, Mt. Buffalo, B. G. Briggs, 1.1956 (SYD); Mt. Buller, near Ski Village, B. G. Briggs, 1.1956 (SYD); C.S.I.R.O. Ski Hut, Mt. Buller, B. G. Briggs, 1.1956 (SYD); Mt. Buller Summit, B. G. Briggs, 1.1956 (SYD).

(9) *RANUNCULUS EICHLERANUS*, sp. nov. (Text-figs. 4, 50-54.)

Herbae perennes pilis brevibus appressisque instructae. Caules floriferi simplices. Folia plerumque radicalia segmentis terno- vel biterno-lobatis ternata, lobis linearilanceolatis. Sepala patentia. Petala aureo-flava et obovato-cuneata. Lobi nectariorum oblongi. Achenia lenticularia glabraeque rostris recurvatis praedita.

Perennial herb with fibrous roots. *Flowering stems* 5-(15)-24 cm. tall, simple, densely covered with short antrorse-appressed hairs. *Leaves* mostly basal, with short appressed hairs, 0.5-1 mm. long, densely covering petioles and lower surfaces of laminae but scattered on upper surfaces of laminae: basal leaves with petioles 2-(8)-15 cm. long, membranous toward the margin at the base; laminae ovate in outline, 15-(25)-40 mm. long, 12-(22)-35 mm. broad, ternate with segments ternately or biternately-lobed or with lateral segments bifid, lobes linear-lanceolate acute and sometimes dentate,

terminal petiolules 3-(10)-18 mm. long and lateral ones to 6 mm. long: cauline leaves often present, sessile or petiolate, simple and linear or orbicular and ternately-lobed or dissected. *Flowers* 16-20 mm. diam. *Sepals* 5, green, spreading, concave, elliptic to narrow-ovate 6-7.5 mm. long, 2.5-4 mm. broad, abaxial surface covered with short appressed hairs, membranous and glabrous toward the margin. *Petals* 5, golden-yellow, obovate-cuneate, 7-12 mm. long, 5-7 mm. broad, obtuse or emarginate, starch-free zone $\frac{1}{3}$ of petal length, 3 primary veins branching at nectary; nectary 0.5-1.5 mm. above base of petal; nectary-lobe oblong, 0.7-1.5 mm. long, emarginate or obtuse, attached laterally to petal for $\frac{1}{2}$ - $\frac{2}{3}$ of its length. *Stamens* 35-65. *Carpels* 35-65; flat, ovate; style short and straight with a recurved tip. *Achenes* in a globular head 7-9 mm. diam.; sublenticular, obovate-cuneate to semi-orbicular, 2.5-3.5 mm. long, 1.8-2.5 mm. dorsiventrally, 0.8-1.0 mm. laterally, slightly rugose and shouldered below the beak, margins narrowly ridged, lateral faces smooth; beak slender or rather stout, 0.8-1.5 mm. long, arching and recoiled at the tip. *Fruiting receptacle* 3-4 mm. long, 1.0-1.5 mm. diam., staminal zone glabrous, achene zone hirsute and elliptic.

Chromosome number: $2n = 16$. No voucher kept.

Range: Mt. Hotham, Victoria.

Ecological distribution: Sub-alpine grassland and woodland, mostly on sheltered slopes; about 5,000 ft. altitude.

Holotype: Top of Dibbin's Spur, nr. Mt. Hotham, B. G. Briggs, 28.12.1955 (NSW). *Isotypes*: AD, K, SYD.

The species is named after Dr. Hj. Eichler, Director of the State Herbarium of South Australia, a noted authority on the Ranunculaceae.

Specimens examined:

Near Mt. Loch, Mt. Hotham, B. G. Briggs, 29.12.1956 (SYD); Mt. Hotham, B. G. Briggs, 31.12.1956 (NSW 44644), 1.1956 (NSW 44642); Near Chalet, Mt. Hotham, B. G. Briggs, 1.1956 (SYD); C.R.B. Hut, Mt. Hotham, B. G. Briggs, 1.1956 (SYD); 4 ml. S.W. of Mt. Hotham, B. G. Briggs, 1.1.1956 (SYD); Alps, C. French, Jr., 12.1904, pro parte (MEL).

(10) RANUNCULUS VICTORIENSIS, sp. nov. (Text-figs. 4, 55-61.)

Herbae perennes pilis brevibus plerumque appressis sed in pagina superiore saepe subpatentibus obtectae. Caules floriferi simplices. Folia plerumque radicalia aut simplicia prope apicem utrinque profunde semel incisa pluridentatae aut lobis lanceolatis ternata biternatae. Sepala patentia. Petala aureo-flava, obovato-cuneata. Lobi nectariorum oblongi. Achenia lenticularia glabraque rostris rectis vel recurvatis praedita.

Perennial herb with fibrous roots. *Flowering stems* 5-(15)-28 cm. tall, simple, densely covered with short antrorse-appressed hairs. *Leaves* mostly basal; petioles and laminae densely covered with short appressed hairs 0.5-1 mm. long, upper surface of laminae with appressed or sub-erect hairs 0.5-2 mm. long; basal leaves with petioles 2-(8)-17 cm. long, membranous toward the margin at the base; laminae ovate in outline, 12-(25)-50 mm. long, length 1-2 times breadth, ternately or biternately dissected or lobed with dentate segments or simple with 2 deep incisions near the apex or with several shallow notches, when ternate the terminal petiolule to 1 cm. long and the lateral ones to 5 mm. long, lobes lanceolate to broad-lanceolate and acute: cauline leaves occasionally present, shortly petiolate, lanceolate, entire or ternately-lobed. *Flowers* 16-30 mm. diam. *Sepals* 5, green, spreading, concave, elliptic to ovate-cuneate, 5-7 mm. long, 2-4 mm. broad, abaxial surface covered with short appressed hairs, membranous and glabrous toward the margin. *Petals* 5, golden-yellow, obovate-cuneate, 8-14 mm. long, 6-8 mm. broad, obtuse or truncate, starch-free zone $\frac{1}{4}$ - $\frac{1}{3}$ of petal length, 3 primary veins branching at nectary; nectary 0.5-1.5 mm. above base of petal; nectary-lobe oblong, 0.7-1.5 mm. long, usually emarginate, attached at base only or attached laterally to petal for up to $\frac{1}{2}$ of length. *Stamens* 35-65. *Carpels* 30-60; flat, ovate; style short and straight with a recurved tip. *Achenes* in a globular head 7-9 mm. diam.; lenticular, obovate-cuneate to semi-orbicular, 2.5-3.5 mm. long, 2-3 mm. dorsiventrally,

0.7–1.2 mm. laterally, slightly rugose and shouldered below the beak, margins narrowly ridged, lateral faces smooth; beak stout, 0.8–1.5 mm. long, arching or straight with a recurved tip. *Fruiting receptacle* 3–5 mm. long, 1–1.5 mm. diam.; staminal zone sparsely hirsute, achene zone hirsute and elliptic.

Chromosome number: $2n=16$. No voucher kept.

Range: Bogong High Plains and Mt. Hotham, Victoria.

Ecological distribution: Sub-alpine grassland, above 5,000 ft. altitude.

Holotype: Near Wallace's Hut, Rocky Valley, Bogong High Plains, B. G. Briggs, 26.12.1955 (NSW). *Isotypes*: AD, B, BM, G, K, MEL, NY, P, SYD.

Specimens examined:

Bogong High Plains, Fall's Creek, Ski Village, Hj. Eichler, 31.1.1958, no. 14633 (AD 95829015), no. 14638 (AD 95829023), 2.2.1958, no. 14668 (AD 95829020); Fall's Creek Ski Village, B. G. Briggs, 28.12.1955 (SYD); Mt. McKay, Bogong High Plains, B. Briggs, 1.1956 (NSW 44641); Rocky Valley, Bogong High Plains, Hj. Eichler, 3.2.1958, no. 14638 (AD 95829008), no. 14708 (AD 95828070); Rocky Valley, Bogong High Plains, B. G. Briggs, 1.1956 (NSW 44643); Basalt Hill, Bogong High Plains, B. G. Briggs, 2.1.1956 (SYD); surroundings of Mt. Nelse, Bogong High Plains, Hj. Eichler, 13.2.1958, no. 14850 (AD 95826105); Bogong High Plains, Pretty Valley, Hj. Eichler, 4.2.1958, no. 14724 (AD 95829014), 5.2.1958, no. 14731 (AD 95829012); Pretty Valley, Bogong High Plains, B. G. Briggs, 1.1956 (SYD); Mt. Cope, Bogong High Plains, C. I. Skewes, 15.1.1954 (MEL); Mt. Hotham, B. G. Briggs, 1.1956 (NSW 44642, SYD).

This species appears to be a stabilized hybrid derivative of *R. eichleranus* and *R. muelleri* Benth. var. *muelleri*. Evidence for this view will be presented elsewhere. The species is very variable, but few plants approach closely the limits of variation found in stands of either putative parental species remote from opportunity for hybridization. Its range, more than one hundred square miles, includes most of the ecologically suitable area of the Bogong High Plains—Mt. Hotham mountain-block. Over most of this range it has completely replaced both parental species. The evolutionary future of this population is apparently not wholly dependent on that of the parental species.

(11) *RANUNCULUS MUELLERI* Benth. *Fl. Aust.*, 1:13.1863. (Text-figs. 4, 62–67.)

Perennial herb with fibrous roots. *Flowering stems* simple, 2.0–16 cm. long, densely covered with short antrorse-appressed hairs. *Leaves* usually all basal; petioles and lower surfaces of laminae densely covered with short appressed hairs, upper surfaces of laminae with rigid appressed or spreading hairs 2–4 mm. long arising from small tubercles: basal leaves with petioles 0.5–9 cm. long, grooved adaxially, basally flattened and often tinged with purple, membraneous toward the margin at the base; laminae elliptic to obovate and acute, 8–27 mm. long, breadth $\frac{1}{4}$ – $\frac{2}{3}$ of length, entire or with 1–2 shallow incisions near apex, base obtuse or cuneate; bracts occasionally present, sessile and linear, 1–1.5 mm. long. *Flowers* solitary, 15–(20)–35 mm. diam. *Sepals* 5, green, spreading, concave, elliptic to narrow ovate, 5–(8)–13 mm. long, 2–5 mm. broad, obtuse or truncate, usually hooded at apex, 3 primary veins forking from the base, abaxial surface covered with short appressed hairs, usually glabrous and membraneous towards the margin. *Petals* 5, golden-yellow, obovate-cuneate, 7–(10)–22 mm. long, 5–9 mm. broad, obtuse or truncate or emarginate, starch-free zone $\frac{1}{4}$ – $\frac{1}{3}$ of petal length, with 3 primary veins forking at or below the nectary; nectary 0.5–1.5 mm. above base of petal, in a shallow pocket with no distinct lobe or usually with a triangular lobe to 0.5 (rarely 2) mm. long. *Stamens* 15–(40)–70. *Carpels* 30–(50)–120; flat, elliptic, style straight with a recurved tip. *Achenes* in a globular head 7–14 mm. diam., lenticular, semi-elliptic to semi-orbicular, 2–3 mm. long, 1–2.2 mm. dorsiventrally, 0.8–1.2 mm. laterally, margins narrowly ridged, lateral faces smooth; tapering gradually into a stout beak 1–2.2 mm. long, straight and usually terminating in a short laterally-inclined hook. *Fruiting receptacle* 3–6 mm. long, 2–3.5 mm. diam.; staminal zone glabrous; achene zone elliptic or orbicular and sparsely hirsute.

Var. MUELLERI.

Flowering stems 2–(10)–16 cm. long. *Leaves* usually all basal; petioles 1–(6)–9 cm. long; laminae elliptic, 8–(20)–28 mm. long with breadth $\frac{1}{3}$ – $\frac{1}{2}$ of length, upper surface with rigid appressed or sub-erect hairs 2–3 mm. long, margins with appressed hairs. *Achenes* semi-elliptic to semi-orbicular, beak 1–1.5 mm. long.

Chromosome number: $2n=16$. Voucher specimen: Guthrie's Creek, Mt. Kosciusko area, B. G. Briggs, 10.1.1959 (SYD). Also Smith-White, unpublished.

Range: Kosciusko Plateau, New South Wales; Bogong High Plains, Victoria.

Ecological distribution: Alpine and sub-alpine grassland. Above 6,000 ft. altitude it extends throughout all grassland and herbfield communities, including those on dry slopes. Between 5,500 and 6,000 ft. the species is limited to wetter situations on valley floors.

Typification: The type collection cited by Bentham is "Summits of the Munyang mountains. F. Mueller". Material in the Kew Herbarium determined by Bentham is labelled "Summits of the Australian Alps. F. Mueller"; however, Melville considers (personal communication) that some of the specimens are an exact match for others in Melbourne Herbarium written up by Mueller as originating from the Munyang mountains. Both the names "*R. muelleri*" and "*R. lappaceus* var. *subsericeus*" appear on the Kew sheet; however, Melville considers that "the authorship of the words '*R. lappaceus* var. *subsericeus*' . . . is open to very grave doubts. The words '*R. lappaceus* var.' may be in Bentham's hand, but '*subsericeus*' is almost certainly not." The material appears to include two collections. A lectotype is erected to include only one collection, all plants of which clearly belong to var. *muelleri*. Accordingly the four specimens in the upper left corner are excluded from the lectotype.

Lectotype: Summits of the Australian Alps, F. Mueller (K), excluding the four specimens on the upper left of the sheet (see Plate xv).

Specimens examined:

NEW SOUTH WALES: Club Lake, Mt. Kosciusko, L. A. S. Johnson, 20.1.1951 (NSW 1878); Club Lake, Kosciusko area, B. G. Briggs, 17.1.1956 (SYD); Club Lake Creek, Kosciusko area, B. G. Briggs, 17.1.1956 (SYD); Bett's Creek, J. Garden, 10.1.1956 (NSW 44817); Spencer's Creek, Kosciusko area, B. G. Briggs, 3.2.1958 (SYD); Trapyard Creek, Kosciusko area, B. G. Briggs, 12.1.1956 (SYD); near Mt. Stillwell, Kosciusko area, B. G. Briggs, 14.1.1956 (SYD); Mt. Kosciusko, Rawson's Pass, A. T. Hotchkiss (NSW 44819); Upper Snowy R. area, Mt. Kosciusko, M. Mueller, 30.12.1953, no. 1723 (NSW 44818); Merritt's Creek, Kosciusko area, B. G. Briggs, 15.1.1956 (SYD), 8.3.1956 (SYD); below Lake Cootapatamba, Mt. Kosciusko, J. Garden, 7.1.1956 (NSW 44815); near North Ramshead, Kosciusko area, B. G. Briggs, 13.1.1956 (SYD); Tree Line to 7,000 ft., Mt. Kosciusko, J. H. Maiden and W. Forsyth, Jan. 1899 (NSW 27055); Kosciusko, 6,500 ft., N. C. Beadle, 5.2.1952 (SYD); Kosciusko, J. McL. and A.P., 1924 (SYD); Kosciusko, P. Brough, 2.1927 (SYD).

VICTORIA: Bogong Range, F. v. Mueller, 1854 (MEL); Flourbag, Bright-Omeo Rd., D. J. Paton, 20.11.1918 (MEL).

Var. BREVICAULIS, var. nov.

Caules floriferi 2–4 cm. longi quam folia vix longiores. *Petioles* 0.5–2.5 cm. longi. *Laminae* ellipticae vel obovatae plerumque quam petiolos in pagina superiore pilis longis patentibus obtectae.

Flowering stems 2–4 cm. long. *Leaves* all basal; petioles 0.5–2.5 cm. long; laminae elliptic to obovate, 9–(15)–28 mm. long with breadth $\frac{1}{3}$ – $\frac{2}{3}$ of length, margins and upper surface covered with rigid spreading hairs 3–4 mm. long. *Achenes* semi-orbicular, beak 1.2–2.2 mm. long.

Chromosome number: $2n=16$. Voucher specimen: Saddle between Mt. Lee and Carruther's Peak, Kosciusko area, B. G. Briggs, 3.1.1959 (SYD).

Range: Mt. Kosciusko Plateau, N.S.W.; main range from Mt. Twynam to Kosciusko summit.



Text-figs. 62, 64-67.—*R. muelleri* Benth. var. *muelleri*. 62, Habit; 64, Sepal $\times 4$; 65, Petal; 66a, b, Nectaries; 67a, b, Achene, lateral and dorsal views. From Merritt's Creek, Kosciusko area, N.S.W.

Text-fig. 63.—*R. muelleri* Benth. var. *brevicaulis* B. G. Briggs. Holotype $\times 1$.

Text-figs. 68-72.—*R. dissectifolius* F. v. Muell. ex Benth. 68, Leaf; 69, Sepal $\times 4$; 70, Nectary; 71, Petal; 72a, b, Achene, lateral and dorsal views. From Bett's Creek, Kosciusko area, N.S.W.

Ecological distribution: Fjeldmark communities on wind-swept ridges, above 6,700 ft. alt.

Holotype: Mt. Lee, Mt. Kosciusko area, B. G. Briggs, 3.1.1959 (NSW). *Isotypes:* AD, BM, K, SYD.

The morphological differences between the varieties are small and are largely quantitative in nature; however, they provide a discontinuity in the variation pattern within the species. Additional evidence supporting the recognition of the varieties will be presented in another paper. In brief, this evidence shows the restriction of the varieties to different habitats with intermediate forms common only in the narrow ecotone between the habitats; also the varietal differences have been shown to remain constant in transplants grown under uniform conditions and in seedlings raised in Sydney. The varieties must differ genotypically and not merely as a result of environmental modification of the phenotype.

Specimens examined:

Between Mt. Lee and Carruther's Peak, Kosciusko area, B. G. Briggs, 5.3.1956 (SYD): near L. Albina, Kosciusko, C. Skottsborg and A. B. Costin, 11.3.1949 (NSW 27057); Australian Alps, F. v. Mueller (NSW 27056).

(12) RANUNCULUS DISSECTIFOLIUS F. v. Muell. ex Benth. *Fl. Aust.*, 1:11.1863. (Text-figs. 68-72.)

Perennial herb with fibrous roots. *Flowering stems* simple, 6-(16)-25 cm. tall, hirsute with appressed or spreading hairs. *Leaves* mostly basal; hirsute; petioles and lower surfaces of laminae densely covered with long patent hairs, upper surfaces glabrous or sparsely hirsute: basal leaves with petioles 2-(8)-12 cm. long, basally flattened, membranous toward the margin at the base and often tinged with purple; laminae ovate to orbicular in outline, 10-(20)-45 mm. long and about as broad, ternate with terminal petiolules 5-(10)-22 mm. long and lateral ones 1-(5)-10 mm. long, segments ternate or once or twice ternately-lobed and sometimes dentate, lobes and teeth linear to linear-lanceolate and acute: cauline leaves occasionally present, shortly petiolate, ternate or ternately-lobed. *Flowers* solitary, 15-(24)-32 mm. diam. *Sepals* 5, green, spreading, concave, elliptic to obovate-cuneate, 5-9 mm. long, 2.5-4.5 mm. broad, hooded at apex, 3-rarely 5 primary veins forking from near base, abaxial surface densely hirsute with long spreading hairs, membranous and usually glabrous toward the margin. *Petals* 6-(10)-14, golden-yellow, narrow to broad obovate-cuneate, 7-(12)-16 mm. long, 3-7 mm. broad, truncate or emarginate, starch-free zone $\frac{3}{8}$ - $\frac{1}{2}$ of petal length, 3 primary veins forking at nectary; nectary 0.7-1.5 mm. above base of petal terminating a thickened ridge, gland in a small pocket with a triangular or oblong lobe 0.1-1 mm. long. *Stamens* 35-50. *Carpels* 40-(70)-100; flat, obovate; style straight with a recurved tip. *Achenes* in a globular head 8-10 mm. diam.; semicircular, lenticular, 2.0-2.5 mm. long, 1.3-1.8 mm. dorsiventrally, 1.0-1.2 mm. laterally, lateral faces smooth, marginal ridges obscure, tapering gradually into a stout straight or incurved beak 1.0-1.8 mm. long. *Fruiting receptacle* 4-7 mm. long; staminal zone glabrous; achene zone elliptic or conical and hirsute with long hairs.

Chromosome number: $2n = 16$. Voucher specimen: Bett's Creek, Mt. Kosciusko area, B. G. Briggs, 10.1.1959 (SYD).

Range: Mt. Kosciusko plateau, N.S.W.

Ecological distribution: *Sphagnum* bogs and wet grassland in alpine and sub-alpine areas, 5,700-6,600 ft. altitude.

Holotype: In wet alpine meadows of the Munyang Mountains, Vic., F. v. Mueller (K, photo. CANB, SYD, isotypes MEL! NSW!).

The locality of the holotype is recorded as Munyang Mountains, Vic. Munyang Mountains is an old name for the Mt. Kosciusko area, N.S.W. It appears that this record of the species in Victoria is an error and that it is limited to the Mt. Kosciusko area, N.S.W.

The holotype and the numerous isotypes at Melbourne show the characteristic form of the species. The isotypes at Sydney include a rootstock and several detached leaves representing the normal condition, and also a small plant with very narrow leaf segments which appears to be a hybrid *R. dissectifolius* F. v. Muell. ex Benth. \times *R. millanii* F. v. Muell.

Specimens examined:

Mount Kosciusko, Jan. 1855 (MEL); Kosciusko, 5,800 ft., N. C. Beadle, 5.2.1952 (SYD); Piper's Gap, Mt. Kosciusko, J. Garden, 9.1.1956 (NSW 44715); Piper's Gap, Kosciusko area, B. G. Briggs, 2.2.1958 (SYD); The Perisher, Mt. Kosciusko, A. B. Costin, 21.1.1951 (NSW 18423); Bett's Creek, S. of main Kosciusko Road, J. Garden, 10.1.1956 (NSW 44716); Bett's Creek, Kosciusko area, B. G. Briggs, 9.1.1959 (SYD); Bett's Camp, Kosciusko area, B. G. Briggs, 4.3.1956 (SYD); Spencer's Creek, Kosciusko area, B. G. Briggs, 3.2.1958 (SYD); Trapyard Creek, Kosciusko area, B. G. Briggs, 3.2.1958 (SYD); Charlotte Pass, Mt. Kosciusko, A. T. Hotchkiss, 4.1.1954 (NSW 44714, SYD); near Trapyard Creek, ca. 8 km. ENE of Mt. Kosciusko, H. J. Eichler, 25.1.1957, no. 13488 (AD 95735047); Upper Snowy River, Mt. Kosciusko, M. Mueller, 30.12.1953, no. 1731 (NSW 44712).

(13) *RANUNCULUS CLIVICOLA*, sp. nov. (Text-figs. 73-77.)

Herbae perennes pilis brevibus plerumque patentibus obtectae. Caules floriferi foliati et plerumque ramosi et 2-4 flores ferentes. Folia radicalia 3-5 segmentis vel terno-vel biterno-lobatis pinnatisecta. Sepala patentia. Petala aureo-flava, obovato-cuneata. Lobi nectariorum oblongi. Achenia sublenticularia glabraque rostris longis et saltem prope apicibus recurvatis praedita.

Perennial herb with fibrous roots. *Flowering stems* 12-(20)-50 cm. tall, branched with 2-4 flowers or rarely simple, sparsely covered with short hairs patent below but appressed above. *Leaves* mostly basal, sparsely or densely covered with short patent hairs; basal leaves with petioles 2.5-(12)-25 cm. long, basally flattened, membranous toward the margin at the base; laminae orbicular to deltoid in outline, 1-(2.5)-6.5 cm. long, and about as broad, pinnately divided into 3-5 segments with the terminal petiolule 1-(10)-30 mm. long and lateral petiolules 1-8 mm. long, segments ternately or biternately-lobed and often dentate; lower cauline leaves similar to basal leaves; upper leaves often sessile, usually ternately lobed and dentate, approaching the uppermost entire and linear or lanceolate bracts. *Flowers* 18-(24)-35 mm. diam. *Sepals* 5, green, spreading, concave, elliptic or ovate, 4-7 mm. long, 2-4 mm. broad, apex hooded, often with a subterminal thickened beak, 3 principal veins forking above, abaxial surface sparsely hirsute with spreading hairs or rarely glabrous, margins hyaline and glabrous. *Petals* 5-8, golden-yellow, obovate-cuneate, 8-14 mm. long, 5-9 mm. broad, obtuse or truncate, starch-free zone $\frac{1}{4}$ - $\frac{1}{3}$ of petal length, three principal veins branching at nectary; nectary 0.7-1.5 mm. above base of petal; nectary lobe oblong, 0.5-1.2 mm. long, 0.3-0.6 mm. broad, attached at base only or attached laterally to petal for part or all of its length. *Stamens* 30-45. *Carpels*: 40-70; glabrous, flat, ovate; style arching, 1-1.5 mm. long. *Achenes* in a globular head 7-10 mm. diam.; compressed, ovate to ovate-cuneate, 3-4.5 mm. long, 2.5-3 mm. dorsiventrally, 0.5-1.2 mm. laterally, marginal ridges prominent, lateral faces smooth or with a broad ridge over position of seed; beak 1.8-(2.5)-3 mm. long, straight or arching with a recurved tip. *Fruiting receptacle* 3-6 mm. long, 1.5-2 mm. diam.; staminal zone glabrous or sparsely hirsute, achene zone hirsute and globular or ovoid.

Chromosome number: $2n = 16$. Voucher specimen: Spencer's Creek, downstream from road bridge, Mt. Kosciusko area, B. G. Briggs, 9.1.1959 (SYD).

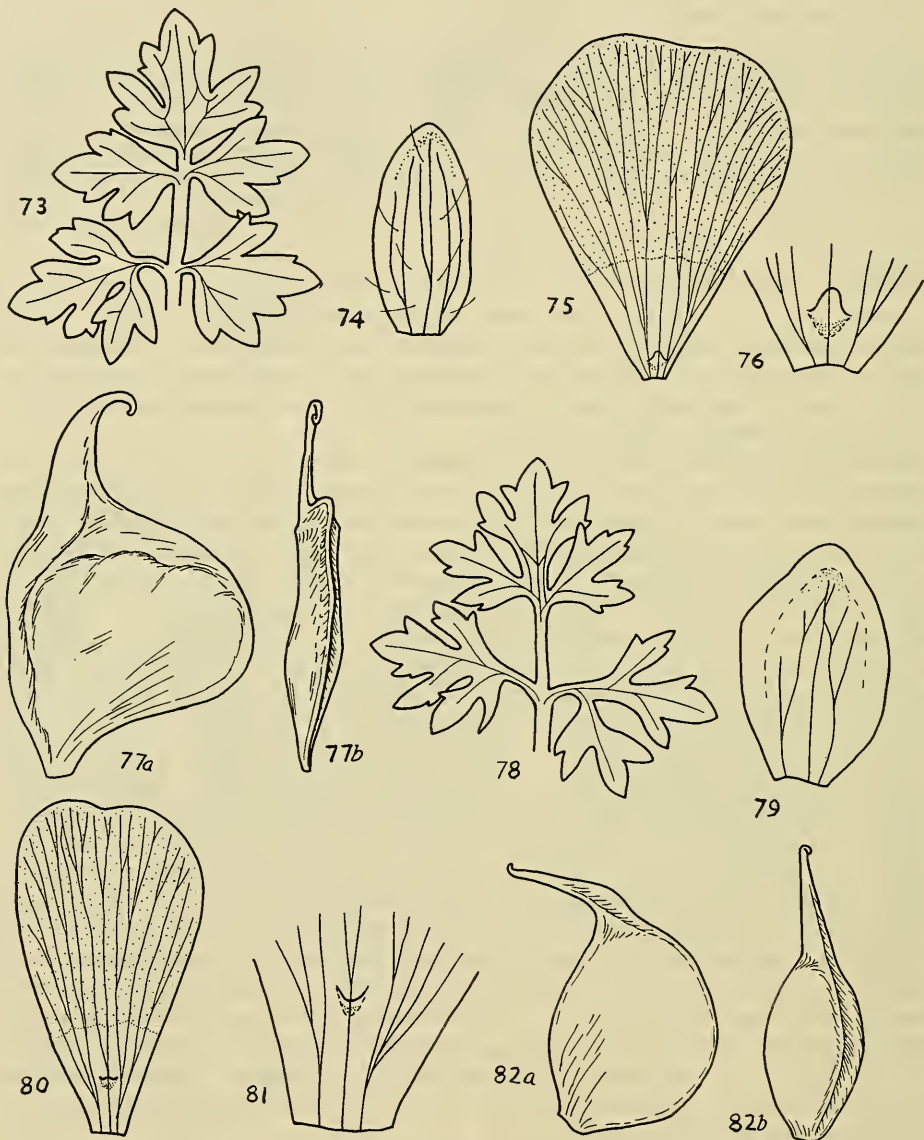
Range: Mt. Kosciusko plateau, N.S.W.

Ecological distribution: Wet situations below semi-permanent snow-patches in the sub-alpine tract, 5,500-6,200 ft. altitude.

Holotype: Spencer's Creek, downstream from road bridge, Mt. Kosciusko area, B. G. Briggs, 3.2.1958 (NSW). *Isotypes*: AD, B, BM, G, K, MEL, NY, P, SYD.

Specimens examined:

Mt. Kosciusko, 5,500 ft. to summit, J. H. Maiden, 1.1898 (NSW 4478); Guthega R., nr. junction with Snowy R. Mt. Kosciusko area, B. G. Briggs, 1.1956 (SYD); The Paralyser, Mt. Kosciusko, J. Garden, 10.1.1956 (NSW 44719); Spencer's Creek, Mt. Kosciusko, H. Eichler, 4.2.1957, no. 13621 (AD 95746003), no. 13625 (AD 95746010); Thredbo River Gorge, Mt.



Text-figs. 73-77.—*R. clivicola* B. G. Briggs. 73, Leaf; 74, Sepal $\times 4$; 75, Petal; 76, Nectary; 77a, b, Achene, lateral and dorsal views. 73-76 from isotypes, 77 from Merritt's Spur, Kosciusko area, N.S.W.

Text-figs. 78-82.—*R. niphophilus* B. G. Briggs. 78, Leaf; 79, Sepal $\times 4$; 80, Petal; 81, Nectary; 82a, b, Achene, lateral and dorsal views. From isotypes.

Kosciusko, L. A. S. Johnson and E. F. Constable, 19.1.1951 (NSW 15773); Saddle from Betts Creek to Thredbo R. Valley, B. Briggs, 6.2.1957 (AD 95748022, SYD); Merritt's Spur, Mt. Kosciusko, B. Briggs, III.1956 (NSW 44707, SYD); Thredbo Gorge near North Ramshead,

Mt. Kosciusko area, B. G. Briggs, 4.2.1956 (SYD); Ski Lift, Thredbo Village, nr. Mt. Kosciusko, B. G. Briggs, 7.1.1959 (SYD).

(14) *RANUNCULUS NIPHOPHILUS*, sp. nov. (Text-figs. 78-82.)

Herbae perennes glabrae vel pilis sparsis longis et patentibus obtectae. Caules floriferi simplices. Folia plerumque radicalia ternata vel biternata. Sepala patentia. Petala aureo-flava, obovato-cuneata. Nectaria sine lobis in fovea posita. Achenia lenticularia glabraque rostris tenuibus incurvis vel recurvatis praedita.

Perennial herb with fibrous roots. *Flowering stems* simple, 1.5-(8)-15 cm. long, glabrous or sparsely hirsute. *Leaves* mostly basal, glabrous or sparsely covered with long spreading hairs; petioles 0.8-(6)-16 cm. long, basally flattened, membranous toward the margin at the base, laminae orbicular or deltoid in outline, 6-(20)-45 mm. long and about as broad, ternate or biternate with the terminal petiolule 3-(8)-16 mm. long and the lateral ones 1-8 mm. long, segments acute and usually lobed and dentate: cauline leaves occasionally present; shortly petiolate and similar in form to the basal leaves or sessile entire and lanceolate. *Flowers* 12-(25)-30 mm. diam. *Sepals* 5 to rarely 7, green, spreading, concave, elliptic to ovate, 5-8 mm. long, 2-4 mm. broad, obtuse with 3 primary veins forking above, abaxial surface glabrous or sparsely covered with long spreading hairs. *Petals* 5 to rarely 7, golden-yellow, obovate-cuneate, 7-14 mm. long, 4.5-9 mm. broad, truncate or emarginate, starch-free zone $\frac{1}{3}$ of petal length, 3 primary veins forking from the base; nectary 1-2 mm. above base of petal, the gland in a small pit with no distinct lobe. *Stamens* 30-55. *Carpels* 30-(45)-80; flat ovate; style stout and straight. *Achenes* in a globular or conical head 8-12 mm. diam.: lenticular, ovate to elliptic, 2.4-2.8 mm. long, 1.2-1.7 mm. dorsiventrally, 0.8-1.2 mm. laterally, margins narrowly ridged, lateral faces smooth or slightly dimpled; style slender, 1-1.7 mm. long, straight or incurved or arching. *Fruiting receptacle* 3-5 mm. long, 1-3 mm. diam., hirsute with sparse short hairs; achene zone elliptic.

Chromosome number: $2n=16$. Voucher specimen: Club Lake, Mt. Kosciusko area, B. G. Briggs, 20.1.1959 (SYD).

Range: Mt. Kosciusko Plateau, N.S.W.

Ecological distribution: Wet situations below semi-permanent snow patches mainly in the alpine tract, above 5,500 ft. altitude.

Holotype: Club Lake, Mt. Kosciusko area, B. G. Briggs, 17.1.1956 (NSW). *Isotypes*: AD, B, BM, G, K, MEL, NY, P, SYD.

Specimens examined:

Blue Lake, ca. 6.5 km. north of Mt. Kosciusko, Hj. Eichler, 5.2.1957, no. 13667 (AD 95748021); Blue Lake, Kosciusko area, B. G. Briggs, 20.1.1955 (SYD); Club Lake, Mt. Kosciusko, L. A. S. Johnson and E. F. Constable, 20.1.1951 (NSW 15759); Lake Albina, Mt. Kosciusko, C. Skottsberg and A. B. Costin, 11.3.1949 (NSW 44838); Mt. Kosciusko area, Lake Albina, Hj. Eichler, 1.2.1957, no. 13581 (AD 95745018), no. 13586 (AD 95745013); Mt. Kosciusko area, top of Wilkinson's Valley, Hj. Eichler, 29.1.1957, no. 13565 (AD 95748047); Mt. Kosciusko area, Mt. Townsend, saddle north-east of summit, Hj. Eichler, 29.1.1957, no. 13568 (AD 95748048); North east of Summit, Mt. Kosciusko, N. C. Ford, 17.1.1954 (NSW 44837); Kosciusko, Dr. F. Mueller, Jan. '55 (MEL); Mt. Kosciusko, 6,000 ft., E. Gauba, 7.1.1950 (AD); Mt. Kosciusko, R. Helms, 2.1892 (NSW 44839); Kosciusko, J. McL. and A.H.K.P., 1.1924 (SYD), 1.1925 (SYD), Herb. Rodway, no. 12700 (NSW 44840); Mt. Kosciusko, J. H. Maiden and W. Forsyth, 1.1899 (NSW 44836), pro parte (NSW 44841); Kosciusko, N. C. Beadle, 5.2.1952 (NSW 44835, SYD); nr. Mt. Stillwell, Kosciusko area, B. G. Briggs, 15.1.1956 (SYD); Mt. Kosciusko area: tributary of Snowy River running from Etheridge Range near Rawson Pass to Lake Cootapatamba, Hj. Eichler, 26.1.1957, no. 13528 (AD 95745027); above Lake Cootapatamba, Mt. Kosciusko, J. Garden, 7.1.1956 (NSW 44842); Near top of Merritt's Spur, Kosciusko area, B. G. Briggs, 15.1.1956 (SYD); Thredbo Gorge, S. of North Ramshead, Kosciusko area, B. G. Briggs, 15.1.1956 (SYD).

(15) *RANUNCULUS PRODUCTUS*, sp. nov. (Text-figs. 83-86.)

Herbae perennes pilis brevibus appressisque instructae. Caules floriferi plerumque simplices post florendum producti. Folia plerumque radicalia, pinnatisecta segmentis ovatis trilobatisque. Sepala patentia. Petala pallido-flava elliptica 1.5-2.5 mm. longa.

Lobi nectariorum semi-orbiculati. Achenia lenticularia glabraque rostris brevibus tenuibus recurvatis praedita.

Perennial herb with fibrous roots. *Flowering stems* usually simple, rarely branching near the base, 1-(3)-rarely 20 cm. long at flowering, elongating to 7-(20)-45 cm. at fruiting; at first very densely covered with short antrorse-appressed hairs, after elongation the hairs dense immediately under the flower but scattered below. *Leaves* mostly basal, densely covered with short antrorse-appressed hairs: basal leaves with petioles 5-8.5 cm. long, membranous towards the margin at the base; laminae ovate in outline 7-(14)-35 mm. long, 7-(12)-20 mm. broad, pinnately divided into 3-7 ovate segments, lateral petiolules 1-(4)-13 mm. long, segments ternately lobed, with the terminal lobe entire or tridentate and the lateral lobes often bifid: cauline leaves occasionally present, shortly petiolate, laminae similar to those of basal leaves or tridentate or entire and linear-lanceolate. *Flowers* 3-4 mm. diam. *Sepals* 5, green, spreading or rarely slightly reflexed, concave, ovate or elliptic, 2-2.5 mm. long, 1-2 mm. broad, hooded at apex with a subterminal thickened beak, 1-3 principal veins forking above, abaxial surface covered with short spreading hairs, margins membranous and glabrous. *Petals* 5, pale yellow, elliptic to broad-lanceolate, 1.5-2.5 mm. long, 0.8-1 mm. broad, no starch present, 3 principal veins simple or branching above the nectary; nectary 0.2-0.5 mm. above base of petal; nectary-lobe semi-orbicular, almost as broad as the petal, obtuse or truncate, attached to petal at base only. *Stamens* 15-20. *Carpels* 25-45; flat, ovate, with short recurved styles. *Achenes* in a globular head 4-6 mm. diam.; lenticular, elliptic to semi-orbicular, 1.5-2.2 mm. long, 1.0-1.6 mm. dorsiventrally, 0.5-0.7 mm. laterally, shouldered below the beak, margin narrowly ridged, lateral faces smooth; beak slender, strongly recurved, 0.3-0.8 mm. long. *Fruiting receptacle* 1.5-3.5 mm. long, 0.6-1.2 mm. diam.; staminal zone glabrous or nearly so, achene zone hirsute and elliptic or globular.

Chromosome number: $2n = 16$. Voucher specimen: Isotype (SYD).

Range: Mt. Kosciusko plateau, N.S.W.

Ecological distribution: Wet grassland situations on sloping ground, 4,600-5,600 ft. altitude.

Holotype: Daner's Gap, Mt. Kosciusko area, B. G. Briggs, 5.1.1959 (NSW). *Isotypes:* AD, B, BM, G, K, MEL, NY, P, SYD.

Specimens examined:

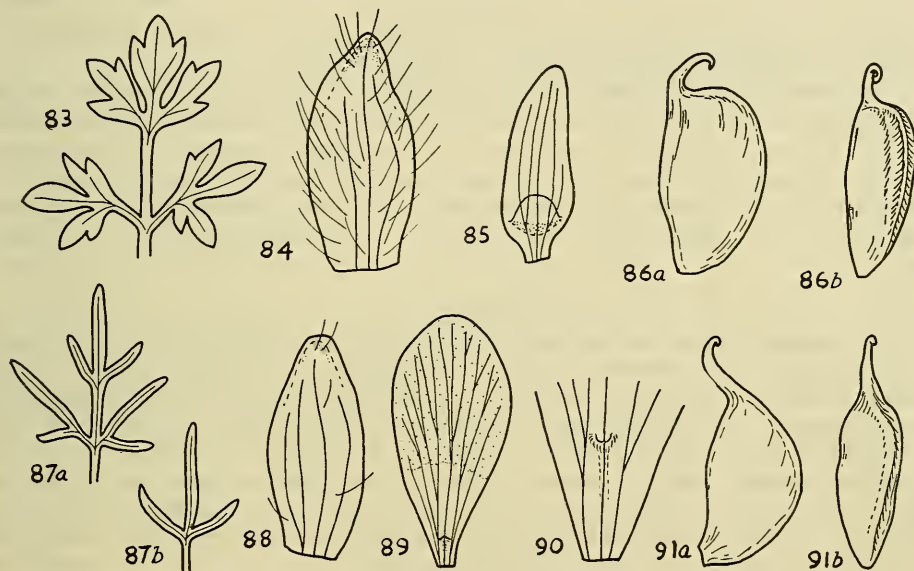
Diggers Creek, Mt. Kosciusko, L. A. S. Johnson and E. F. Constable, 23.1.1951 (NSW 44638); Diggers Creek, Mt. Kosciusko, B. G. Briggs, 3.3.1956 (SYD); Hotel Kosciusko, B. Briggs, III.1956 (NSW 44636, SYD), 5.1.1959 (SYD); Wragges Creek, Kosciusko area, B. G. Briggs, 2.3.1956 (SYD); Prussian Creek, Mt. Kosciusko, B. Briggs, III.1956 (NSW 44635, SYD); Piper's Creek, Kosciusko area, B. G. Briggs, 2.3.1956 (SYD); Smiggins Holes, Mt. Kosciusko, A. T. Hotchkiss, 1.1.1954 (NSW 44637, SYD); Perisher Gap, Kosciusko area, 3.3.1956 (SYD); Friday Flat, upper Thredbo R., near Mt. Kosciusko, B. G. Briggs, 7.1.1959 (SYD).

(16) RANUNCULUS MILLANII F. v. Muell. in Hook. *Kew Journ.*, 7:358.1855. F. v. Muell., *The Plants indigenous to the Colony of Victoria*, 1:6.1860. (Text-figs. 4, 87-91.)

Perennial herb with fibrous roots, spreading by stolons. *Stolons* 1-3 cm. long, sometimes becoming erect and terminating in a cluster of leaves and flowering stems. *Flowering stems* simple, 5-(15)-80 mm. long, sparsely covered with long spreading hairs. *Leaves* usually all basal, glabrous or sparsely covered with long spreading hairs: basal leaves with petioles 5-(12)-80 mm. long, basally flattened, membranous toward the margin at the base; laminae 4-(12)-20 mm. long and about as broad, pinnately divided into 3-5 linear segments 0.5-2 mm. broad, lateral segments often bi- or tri-fid; cauline leaves occasionally present, sessile and linear. *Flowers* 6-(12)-17 mm. diam. *Sepals* 5 to rarely 6, green, spreading, concave, elliptic or oblong, 2-4.5 mm. long, and about half as broad, sometimes hooded at apex, 2-3 primary veins usually forking from the base, abaxial surface glabrous or sparsely hirsute, hyaline toward the margin.

Petals 5, rarely to 12, white, not glossy, obovate or obovate-cuneate, 3.5-(6)-8 mm. long, 2-4 mm. broad, obtuse or emarginate, starch-free zone $\frac{1}{3}$ - $\frac{1}{2}$ of petal length, three primary veins forking from the base; nectary 0.8-2 mm. from base of petal, in a small pocket terminating a projecting ridge, the gland in a small pit with no distinct lobe or rarely with a small triangular lobe to 0.2 mm. long, sometimes with rudimentary or well-developed nectaries above several veins. *Stamens* 8-(22)-35. *Carpels* 9-(12)-25; flat, ovate; style stout and straight with a recurved tip. *Achenes* in a globular head 4-6 mm. diam., lenticular, elliptic to ovate, 2-2.4 mm. long, 1.2-1.8 mm. dorsiventrally, 0.5-0.8 mm. laterally, slightly rugose near base of style, lateral faces smooth, margins narrowly ridged; style 0.5-1 mm. long, erect or incurved and often with a recoiled tip. *Fruiting receptacle* 1-1.5 mm. long; staminal zone glabrous; achene zone elliptic and hirsute.

Chromosome number: $2n=16$. Voucher specimen: Bett's Creek, Mt. Kosciusko area, B. G. Briggs, 9.1.1959 (SYD). Also Smith-White, unpublished.



Text-figs. 83-86.—*R. productus* B. G. Briggs. 83, Leaf; 84, Sepal $\times 8$; 85, Petal $\times 8$; 86a, b, Achene, lateral and dorsal views. From isotypes.

Text-figs. 87-91.—*R. millanii*. F. v. Muell. 87, Leaves $\times 1.3$; 88, Sepal; 89, Petal; 90, Nectary; 91a, b, Achene, lateral and dorsal views. From Merritt's Creek, Kosciusko area, N.S.W.

Range: High mountain areas of southern New South Wales and eastern Victoria, from Mt. Gingera south to Mt. Wellington.

Ecological distribution: Swamp and fen situations, particularly depressions subject to flooding, above 4,500 ft. altitude.

Syntypes: Summit of Mt. Wellington, Gippsland, F. v. Mueller (MEL!). The collection is mounted on two herbarium sheets.

Specimens examined:

NEW SOUTH WALES: Mt. Gingera, C. W. E. Moore, 19.2.1954, no. 2876 (NSW 44701); 5 ml. S. of Rules Point, B. G. Briggs, 20.2.1957 (SYD); Kiandra district, W. Forsyth, 12.01 (NSW 44687); Happy Jack's Plain, ca. 15 ml. S. of Kiandra, J. Thompson, 18.1.1958 (NSW 44702); Plains of Heaven track, Mt. Kosciusko area, J. Garden, 9.1.1956 (NSW 44689, 44691); Mt. Kosciusko, Pretty Point, R. Helms, 2.93 (NSW 44686); below Club Lake, Mt. Kosciusko, L. A. S. Johnson, 20.1.1951 (NSW 15877); Bett's Creek, S. of main Kosciusko Rd., J. Garden, 10.1.1956 (NSW 44688); along Snowy River, Charlottes Pass, Mt. Kosciusko, A. T. Hotchkiss, January 4, 1954, no. 238 (SYD); Upper Snowy R. area, M. Mueller, 30.12.1953, no. 1721 (NSW 44698); Merritt's Creek, Kosciusko area, B. G. Briggs, 4.1.1959 (SYD); below Lake

Cootapatamba, Mt. Kosciusko, J. Garden, 7.1.1956 (NSW 44690); Mt. Kosciusko, Tree Line to 7,000 ft., J. H. Maiden and W. Forsyth, January 1899 (NSW 44693); Mt. Kosciusko, 5,500-6,500 ft., Baron von Mueller (NSW 44704); Mt. Kosciusko, F. v. Mueller, 1875 (MEL); Mt. Kosciusko, 7,300 ft., D. Sullivan (?), Jan. 1884 (MEL); Mt. Kosciusko, M. and F., Feb. '99 (NSW 44692); Mt. Kosciusko, Miss T. Harris, 12.1924 (NSW 44696); Kosciusko, N. C. W. Beadle, 5.2.1952 (SYD); Kosciusko district, per J. Collins, 1952 (NSW 44694); Mt. Kosciusko, A. T. Hotchkiss, 4.1.1954 (NSW 44697, SYD); Mt. Kosciusko, A. C. Taylor, 16.3.1954 (NSW 44695); Munyang Mountains, 6-7,000 ft., F. v. Mueller, Jan. 1874 (MEL); Summit of the Australian Alps, F. v. Mueller ex Herb. Sonder (MEL);

VICTORIA: Mt. Buffalo Plateau, H. C. E. Stewart, 6.1.1950 (MEL); Valley E. of the Horn, Mt. Buffalo, R. Melville, 27.12.1952, no. 2584 (NSW 44700); Bogong Ranges, Dr. F. v. Mueller, Dec. 54 (MEL); Bentley's Plain, Mt. Nugong, R. Melville, 26.1.1953, no. 3123 (MEL, NSW 44699); Highest summits of Alps, D. Sullivan, Jan. 1884 (MEL).

PUTATIVE NATURAL HYBRIDS.

Morphological intermediates are found suggesting hybridization between many of these species. Studies on hybridization within the group will be reported separately. Due to these intermediates the true limits of some species are difficult to define. Collections apparently contaminated by hybridization have, as far as possible, been excluded when determining the variation limits of the species.

The probable hybrid origin of *R. victoriensis* has already been mentioned. In all other cases the hybrids are limited to zones of contact between stands of the putative parental species and cannot be considered as independent populations. Therefore it does not appear appropriate to give them formal recognition by the application of names. For this reason *R. ligulatus* Melville has not been included in the taxonomic treatment as it is considered to be a hybrid, *R. graniticulus* Melville × *R. millanii* Benth.

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EXPLANATION OF PLATE XV.

Sheet bearing lectotype of *R. muelleri* Benth. var. *muelleri*. 1. Lectotype of *R. muelleri* var. *muelleri*. 2. Specimens excluded from lectotype.