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THE UMBELLIFERAE OF THE NETHERLANDS INDIES

by

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Besides the *Umbelliferae* of the Netherlands Indies proper, also those of the Malay Peninsula and the non-Dutch parts of Borneo and New Guinea have been taken up in this revision. The materials examined belong to the following Herbaria:

(B) = the Herbarium of the Botanic Garden, Buitenzorg.
(BD) = the Herbarium of the Botanical Museum, Berlin—Dahlem.
(BM) = the Herbarium of the British Museum of Natural History, London.
(E) = the Herbarium of the Botanic Garden, Edinburgh.
(G) = the Herbarium of the University, Groningen.
(K) = the Herbarium of the Botanic Gardens, Kew.
(L) = the National Herbarium (Rijksherbarium), Leiden.
(NY) = the Herbarium of the Botanic Garden, New York.
(Pa) = the Herbarium of the Java Sugar Experiment Station, Pasoeroean.
(S) = the Herbarium of the Botanic Gardens, Singapore.
(Sa) = the Herbarium of the Sarawak Museum, Kuching.
(U) = the Herbarium of the University, Utrecht.

Most of the herbarium materials were sent to Groningen to be examined there. Moreover I had the opportunity to work a few weeks in the Kew Herbarium and in that of the British Museum of Natural History in London.

I render my best thanks to the Directors and Keepers of all these Herbaria for their kind assistance.

Umbelliferae.

For the delimitation and arrangement of the genera this paper follows, without criticism, DRUDE's system as given in Die Natürlichen Pflanzenfamilien, III, 8. Therefore it appeared useless to recount the characters of the genera. For those who prefer to determine the genera in the most correct way, *viz.* with help of the anatomy of the fruit, I must refer to DRUDE's excellent key *l. c.* p. 114—115. As none of the

genera has its centre of development in the Malay Archipelago, the lists of synonyms and literature are restricted to the most necessary data.

As a result of this revision, 43 species, belonging to 22 genera, appear to occur in the area considered. Of these species, 16 are cultivated, *viz.* those of *Chaerefolium, Coriandrum, Cuminum, Apium, Petroselinum, Trachyspermum, Cryptotaenia, Carum, Foeniculum, Anethum, Pastinaca,* and *Daucus,* moreover *Trachymene caerulea* and *Pimpinella Anisum.* Of all these species only *Foeniculum vulgare* and *Daucus Carota* appear to be naturalised in few localities in Java. *Eryngium foetidum* is a weed introduced from America, but is entirely naturalized now. The case of *Torilis japonica* is doubtful. Perhaps it has been introduced from temperate regions, perhaps its area of distribution is entirely natural and reaches from temperate Asia, over a part of tropical Asia, as far as Java. The remaining genera are really indigenous, *viz. Hydrocotyle,* with 3 species; *Centella,* with 1 species; *Trachymene,* with 13 species; *Sanicula,* with 1 species; *Oreomyrrhis,* with 3 species; *Pimpinella,* with 2 species; *Oenanthe,* with 1 species; *Heracleum,* with 1 species, together 25 species. They may, after their total area of distribution, be divided into three groups. The first group is that of *Hydrocotyle* and *Centella,* widely spread north and south of the Malay Archipelago and occurring at low as well as at high elevations. The second group is that of the genera of Asiatic origin. They are chiefly mountain plants of the western parts of the Malay Archipelago, *viz. Sanicula,* spread in eastern direction as far as Timor and Séran; *Pimpinella,* only found in Java and Bali; *Heracleum,* found in Sumatra on one mountain only; moreover *Oenanthe,* spread throughout the area, and even occurring in Queensland. The third group is that of *Oreomyrrhis* and *Trachymene,* having their centre of development in Australia, but protruding far northward, *Oreomyrrhis* as far as Mt. Kinabalu in Borneo, *Trachymene* as far as the island of Mindoro in the Philippines. They are mountain plants, chiefly of the eastern parts of the Malay Archipelago.

Key to the genera.

1 Flowers in simple umbels or heads that often are united in more compound inflorescences, but not in compound umbels 2
Flowers in compound umbels that sometimes are united in more compound inflorescences 7
2 Leaves and involucres prickly. Flowers in heads. . . . . 5. **Eryngium**
Leaves and involucres not prickly. Flowers in umbels 3

3 Fruit with uncinate bristles . . . . . 4. **Sanicula**
Fruit not with uncinate bristles 4
4 Fruit laterally flattened, not longer than broad 5
Fruit not laterally flattened, more than twice as long as broad 9. **Oreomyrrhis**
5 Mericarps 3-ribbed 6
Mericarps 7—9-ribbed, with connecting veins between the ribs 2. **Centella**
6 Leaves without sheaths, but with distinct, entire stipules. Corolla valvate 1. **Hydrocotyle**
Leaves with sheaths, with or without lacerate stipule-like appendages. Corolla imbricate . . . . . 3. **Trachymene**
7 Mericarps winged at the margins 8
Mericarps not winged at the margins 10
8 Fruit strongly dorsally flattened, not longer than broad. Leaves pennate to bipennate, the extreme segments oblong-ovate 9
Fruit not strongly dorsally flattened, more than twice as long as broad. Leaves tripennate, the extreme segments nearly filiformous . . 19. **Anethum** *)
9 Ovary hairy. Corolla white or reddish, radiating . . . . 21. **Heracleum**
Ovary glabrous. Corolla yellow, not radiating . . . . . 20. **Pastinaca**
10 Fruit laterally flattened. Leaves not compound, roundish in outline . . . 1. **Hydrocotyle**
Fruit not laterally flattened. Leaves usually compound 11
11 Fruit with a sterile neck or short beak, that is visible on the ovary as a dark-green ribbed neck . . . . . 6. **Chaerefolium**
Fruit without sterile neck or beak 12
12 Calyx teeth distinct 13
Calyx teeth not distinct 16
13 Ovary and fruit bristly 14
Ovary and fruit entirely glabrous 15
14 Fruit with uncinate bristles. Stems and leaves hairy. Leaf segments not very narrow. Flowers not radiating . . . . . 7. **Torilis**
Fruit with stellate hairs. Stems and leaves glabrous. Extreme leaf segments linear to filiformous. Flowers radiating . . . . . 10. **Cuminum**
15 Mericarps hollow at the inside. Primary ribs visible as undulate lines, secondary ribs somewhat more prominent. Flowers radiating . . 8. **Coriandrum**
Mericarps not hollow at the inside. Marginal ribs thicker than the lateral ones, secondary ribs none. Flowers not radiating . . . . 17. **Oenanthe**
16 Ovary and fruit entirely glabrous 17
Ovary and fruit bristly, hairy, or with scale-like trichomes 21
17 Leaves ternate. Umbels and umbellules few-rayed . . 14. **Cryptotaenia**
Leaves pennate or bipennate 18
18 Flowers yellow or yellowish-green 19
Flowers white or reddish 20
19 Involucels many-leaved. Leaves 3—4-pennate with nearly filiformous extreme segments . . . . . 18. **Foeniculum** *)
Involucels 0—2-leaved. Lower leaves tripennate with leaflets obovate or cuneate . . . . . 12. **Petroselinum**

20 Ripe fruit 1.5—2 mm long and broad, roundish when seen from aside. Carpophore entire or very shortly bifid at the apex . . . **11. Apium**
Ripe fruit 4—5 mm long and half as broad. Carpophore bifid to nearly two-thirds of its length. . . . . **15. Carum**
21 Involucral leaves pennatifid . . . . . **22. Daucus**
Involucral leaves not pennatifid 22
22 Leaves simple, or pennate with simple leaflets. Leaves and stems hairy . **16. Pimpinella**
Leaves pennate with divided leaflets. Leaves and stems glabrous . . . . **13. Trachyspermum**

*) *Foeniculum* and *Anethum* are very alike with exception of their fruit, which in *Anethum* are very distinctly winged, in *Foeniculum* not at all. When ripe fruit are not extant, *Foeniculum vulgare* and *Anethum graveolens* may be distinguished, besides by their characteristic odour, by slight differences of the stems and leaves: in *Foeniculum* the stems are finely puncticulate, the sheaths are longer and broader than in *Anethum*, the main leaflets are usually shortly petioluled. In *Anethum* the stems are not puncticulate, the sheaths are usually short in the lower leaves, the main leaflets are usually long-petioluled.

I. HYDROCOTYLE

LINN., Sp. pl., ed. 1, 1 (1753) p. 234; Gen. pl., ed. 5 (1754) p. 109; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 116, 117 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 951 (1925); *Hydrocotyle* sect. *Euhydrocotyle* BENTH., Fl. austr., 3, p. 337 (1866); BENTH. & HOOK.F., Gen. pl., 1, p. 872 (1867); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 667 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2, p. 613 (1890).

Key to the species.

1 Leaves peltate . . . . . **3. H. vulgaris**
Leaves not peltate 2
2 Leaves usually less than 3 cm in diameter. Stems creeping, sometimes with ascending extremities. Inflorescences single, sessile or short-peduncled along the creeping stems and the ascending tips. Fruit up to 15 in each inflorescence, yellow to dark-brown when ripe . . . **2. H. sibthorpioides**
Leaves usually more than 3 cm in diameter. Stems creeping, with ascending branches. Inflorescences single or in bundles, sessile to long-peduncled, along the ascending branches only. Fruit more than 15 in each inflorescence, blackish-brown when ripe . . . . . **1. H. javanica**

1. Hydrocotyle javanica THUNBERG — Herbaceous; stems creeping, with ascending flower-bearing branches, rarely entirely erect, 10—50 cm high, terete, glabrous or short-hairy. Leaves petiolate and stipulate; stipules 3—8 mm long, 4—6 mm broad, broadly ovate, rounded to acute, membranaceous, entire or sometimes fringed at the apex; petiole 2—20 cm long, shorter towards the extremities of the stems, short-hairy

with divaricate or more or less reflexed hairs; lamina 3—8 cm long and broad, smaller from the base to the tip of the stem, roundish to 5—8-angular in outline, cordate, 5—8-lobate, with more or less triangular lobes that are crenate to crenate-serrate, usually glabrous, rarely sparsely hairy on both sides. Inflorescences single or in groups opposite to the leaves, sometimes united to an umbel with an involucre of few small bracts, sometimes also terminal, but only originating from the ascending branches of the main stem; peduncle 1—7 cm long, rarely none, terete, glabrous or short-hairy; involucre with many bracts around and between the flowers that are nearly 1 mm long 0.75 mm broad, ovate, acute, sometimes with 2 small teeth at the base, often quite entire, the outer ones reflexed when fruit-bearing. Flowers sessile or upon pedicels up to 5 mm long, 15—50 in each inflorescence; calyx teeth none; petals nearly 1 mm long 0.5 mm broad, lanceolate, acute, valvate, styles nearly 0.5 mm long; mericarps 1—1.25 mm long, nearly 0.75 mm broad, red-brown to blackish when ripe, glabrous or short-hirsute, or even with short curved hairs, sometimes red-punctate when young, their lateral ribs not prominent.

Hydrocotyle javanica THUNBERG, Diss. Hydrocot. (1798) p. 3, no. 17, p. 6, t. 2; RICHARD, in Ann. Gén. Sc. Phys., 4, p. 65 (1820); D. C., Prodr., 4 (1830) p. 67; MORITZI, Syst. Verz. (1845—46) p. 41; MIQUEL, Fl. Ind. Bat., I, 1, p. 734 (1856); THWAITES, Enum. pl. Zeyl. (1859) p. 130; MIQUEL, Ill. Fl. Arch. Ind. (1871) p. 37; HIERN, in Fl. Trop. Afr., 3, p. 4 (1871); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 667 (1879) cum var. *podantha*; VIDAL, Phanerog. Cuming. Philipp. (1885) p. 19, 116; Rev. Pl. Vasc. Filip. (1886) p. 144; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 613; STAPF, in Transact. Linn. Soc., ser. 2, bot., 4 (1894) p. 120, 167; TRIMEN, Handb. Fl. Ceyl., 2 (1894) p. 275; DRUDE, in Engl. & Pr., Nat. Pflanzenfam., III, 8, p. 119 (1898); KING, Mater. Fl. Mal. Pen., 13 (1902) p. 598; MATSUMURA & HAYATA, Enum. pl. Formos., p. 170 (1906); HAYATA, Fl. mont. Formos., p. 101 (1908); ELMER, Leafl. Phil. Bot., 2, p. 629 (1909); HAYATA, Ic. Pl. Formos., 2, p. 50 (1912); GIBBS, in Journ. Linn. Soc., bot., 42, p. 24, 85 (1914); RIDLEY, in Transact. Linn. Soc., ser. 2, bot., IX, 1, p. 62 (1916); BOLDINGH, Zakfl. Landbouwstr. Java (1916) p. 174; HEYNE, Nutt. pl. Ned. Ind., ed. 1, 3 (1917) p. 394; RIDLEY, in Journ. F. M. S. Mus., VIII, 4 (1917) p. 42; GIBBS, Contr. Arfak Mts. (1917) p. 165; MERRILL, Bibl. enum. Born. pl. (1921) p. 458; RIDLEY, Fl. Mal. Pen., 1 (1922) p. 869, ic. 73; MERRILL, En. Phil. Fl. Pl., 3 (1923) p. 237; RIDLEY, in Journ. Mal. Br. Roy. As. Soc., 1, p. 63 (1923); HEYNE, Nutt. pl. Ned.

Ind., ed. 2 (1927) 2, p. 1210; VAN STEENIS, in Trop. Nat., 17 (1928) p. 200; DAKKUS, in Bull. Jard. Bot. Buitenzorg, sér. 3, suppl. 1 (1930) p. 164; CRAIB, Fl. siam. enum., 1, p. 786 (1931); FREY-WYSSLING, in Trop. Nat., 22 (1933) p. 5; BURKILL, Dict. Econ. Prod. Mal. Penins., 1 (1935) p. 1212; *Hydrocotyle hirta* R. BROWN, ex RICHARD, in Ann. Gén. Sc. Phys., 4, p. 64 (1820); BENTHAM, Fl. austr., 3 (1866) p. 339; FILET, Plantk. Woordenb. (1876) p. 255; BAILEY, Queensl. Fl., 2 (1900) p. 715; WOLFF, in SCHUM. & LAUTERB., Nachtr. Fl. deutsch. Schutzgeb. (1905) p. 333; BAILEY, Compr. Cat. Queensl. Pl. (1913) p. 228; EWART, Fl. Victoria (1930) p. 895; LAUTERBACH, in Bot. Jahrb., 63, p. 473 (1930); *Hydrocotyle nepalensis* HOOK., Exotic Fl., 1, t. 30 (1823); D. C., Prodr., 4 (1830) p. 65; MOLKENBOER, in MIQUEL, Pl. Junghuhn., p. 91 (1851); MIQUEL, Fl. Ind. Bat., I, 1, p. 735 (1856); Ill. Fl. Arch. Ind. (1871) p. 38 cum forma *zeylanica*; FILET, Plantk. Woordenb. (1876) p. 109; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 613; KOORDERS-SCHUMACHER, Syst. Verz., I, 1, fam. 228, p. 97 (1911); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 722; *Hydrocotyle sundaica* BLUME, Bijdr., 15 (1826) p. 883; D. C., Prodr., 4 (1830) p. 67; HASSKARL, Cat. pl. Hort. Bot. Bogor. (1844) p. 163; MOLKENBOER, in MIQUEL, Pl. Junghuhn., p. 93 (1851); ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848 (1854) p. 138; MIQUEL, Fl. Ind. Bat., I, 1, p. 734 (1856); TEYSM. & BINNEND., Cat. pl. Hort. Bot. Bogor. (1866) p. 165; FILET, Plantk. Woordenb. (1876) p. 77; DAKKUS, in Bull. Jard. Bot. Buitenz., sér. 3, suppl. 1 (1930) p. 164; *Hydrocotyle globata* BLUME, Bijdr., 15 (1826) p. 883; D. C., Prodr., 4 (1830) p. 67; ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848 (1854) p. 138; MIQUEL, Fl. Ind. Bat., I, 1, p. 735 (1856); *Hydrocotyle zeylanica* D. C., Prodr., 4 (1830) p. 67; WIGHT & ARN., Prodr. Fl. Pen. Ind. Or. (1834) p. 366; MIQUEL, Fl. Ind. Bat., I, 1, p. 734 (1856); suppl. Sum. (1860) p. 134; *Hydrocotyle podantha* MOLKENB., in MIQUEL, Pl. Junghuhn., p. 89 (1851); MIQUEL, Fl. Ind. Bat., I, 1, p. 732 (1856); JUNGHUHN, Java, ed. HASSKARL, 1, p. 432 (1857); MIQUEL, Ill. Fl. Arch. Ind. (1871) p. 37; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 613; DE CLERCQ, Plantk. Woordenb. (1909) p. 258; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 721; *Hydrocotyle rotundifolia* (non D. C., 1830) WARBURG, in Bot. Jahrb., 13, p. 397 (1891); SCHUMANN & LAUTERB., Fl. deutsch. Schutzgeb. (1901) p. 487; KOORDERS, Versl. Dienstr. Minah. (1898) p. 488; *Hydrocotyle novo-guinensis* WARBURG, in Bot. Jahrb., 16, p. 24 (1892); SCHUMANN & LAUTERB., Fl. deutsch. Schutzgeb. (1901) p. 487; *Hydrocotyle Versteegii* HEMSLEY, in Kew Bull. (1909) p. 259.

Hydrocotyle javanica is spread over the whole area dealt with in

this paper, and is found from 30 to 3800 m elevation. It is, as a rule, well-distinguished from *H. sibthorpioides,* though for small forms of *H. javanica* it is often difficult to indicate exactly the differences with *H. sibthorpioides.* Those small forms, however, are nearly restricted to the higher parts of mountains, where large forms of *H. sibthorpioides* hardly occur, and if they do, are easily distinguished by their more roundish leaves and the arrangement of the inflorescences.

WARBURG distinguishes *H. novo-guinensis,* from New Guinea, based on the occurrence of curved hairs of the fruit, but agreeing, for the rest, with *H. javanica.* Of most materials from New Guinea, however, the fruit show such hairs, and now and then haired and glabrous fruit occur together on the same plant. Moreover, in the closely allied *H. sibthorpioides* specimens with hairy fruit occur as well as such with glabrous fruit, whereas it is impossible to trace a sharp limit between these two varieties.

H. Versteegii is mainly based on its peculiar leaf-shape. The same leaf-shape, however, we meet with in plants from Sumatra and Java, especially in forms of high mountains, and there we find all intermediary stages between such forms and the common ones.

The other species names listed here as synonyms, represent forms since long rightly united with *H. nepalensis* by former authors. Among them, *H. podantha,* or the var. *podantha,* with long-pedicelled flowers, is very striking in its extremes, but is connected with the more common form, with sessile or nearly sessile flowers, by a complete series of intermediates. The other varieties mentioned are less important.

MALAY PENINSULA. Kelantan, Kuala Sameh, NUR & FOXWORTHY s.n. (S); Kuala Pertang, NUR & FOXWORTHY 10283 (S); Gua Ninik, HENDERSON 19548 (B, S), v.n.: *pegaga gajah*; Perak, SCORTECHINI 1186 (BD); Temango, RIDLEY 14618 (S); Maxwell's Hill, 1100 m el., BURKILL & HANIFF 12912 (S); Gunong Pondok, north side, BURKILL 13902 (S); near the cottage, 1500—1800 m el., CURTIS 2086 (S), RIDLEY s.n. (S); Gunong Kerbau, Sungei Siput, HANIFF 4005, 4026 (S); upper Batang Padang valley, 600 m el., WRAY 1458 (S); Tapoh, CURTIS s.n. (S), v.n.: *pegaga gajah*; Goping district, 90—120 m el., KING's coll. 8197 (B); Pahang, Telom, RIDLEY 13541 (S); Lubok Tamang, 1050 m el., HENDERSON 11029 (S); Cameron's Highlands, Tanah Rata clearing, 1440 m el., HENDERSON 17931 (B, S); Fraser Hill, Tras valley, 1080 m el., HOLTTUM s.n. (S); south ridge, 1140 m el., NUR 11413 (S); base Gunong Senyum, low. el., HENDERSON 22217 (S); Kuala Tahan, 105 m el., SEIMUND 37 (S); Selangor, Ulu Gombak, HUME 8813 (S).

SUMATRA. Atjèh, above Takingeun, 1260 m el., VAN STEENIS 5974 (B); Lant Toepandji, 1900 m el., VAN STEENIS 6541 (B); Gajo Loeëus, Kota Lawe Sagoe, PRINGGO ATMODJO (exp. VAN DAALEN) 396 (B, L); Kota Lintang, PRINGGO ATMODJO (exp. VAN DAALEN) 215 (B, L); Tandjoeng Morawa, 30 m el., LÖRZING 4033 (B); Badjalinggi, s. of Tebingtinggi, 100 m el., LÖRZING 7463 (B); Sibolangit, 400 m el.,

DOCTERS VAN LEEUWEN 12714 (B); 450 m el., KARTA 15 (B, S); Botanic Garden, 400—500 m el., LÖRZING 3867 (B); Boekit Keloeang, NUR 7423 (B, S); Berastagi, BURKILL 73 (S); G. Sinaboeng, n. slope, 1450 m el., LÖRZING 8226 (B); Karo Plateau, n. of Berastagi, 1425 m el., LÖRZING 6786 (B, L); Siberaja, Laoe Biang valley, 1150 m el., LÖRZING 9526 (B, L); Toba, Oeloean, 900 m el., OUWEHAND 142 (B); Batak regions, prob. southern part, JUNGHUHN s.n. (L), originals of *Hydrocotyle nepalensis*, forma *seylanica* MIQUEL; Sumatra's Westkust, KORTHALS s.n. (L); Balang Paloepoeh, 900 m el., KLEINHOONTE 648 (B); Padang, Airmantjoer, 360 m el., BECCARI P.S. 623 (L); Bt. Nantigi, nr. G. Malintang, 1150 m el., BÜNNEMEIJER 3778 (B, BD, L, S, U), v.n.: *pigagoh*; G. Marapi, 1850 m el., BÜNNEMEIJER 4575 (B, L, U), v.n.: *mangi-mangi*; G. Talang, Laras Talang, 1500 m el., BÜNNEMEIJER 5162 (B, L), v.n.: *pingago*; G. Kerintji, 2400 m el., BÜNNEMEIJER 10411 (B); Sandaran Agong, 735 m el., ROBINSON & KLOSS s.n. (S); Pondok Boenga, 2800 m el., between Kajoe Aroe and the summit, 1400—3805 m el., FREY-WYSSLING 145 (B); 2900 m el., BÜNNEMEIJER 10001 (B, L, S); Batang Soengai Manau, 200 m el., POSTHUMUS 948 (B, S, U), v.n.: *lalat*; between Moearadoewa & Martapoera, DE VOOGD 35 (B); n. of Sepatoehoe, n. side of Danau Rana, 700 m el., VAN STEENIS 3860 (B); G. Raja, nr. Danau Rana, 1300 m el., VAN STEENIS 3574 (B); G. Raté Telanggaran, 400 m el., IBOET 27 (B, L), v.n.: *pegagan*; G. Tanggamoes, 1400 m el., DE VOOGD 171, 172 (B); estate Wai Rilau, 20 km east of Tandjoeng Karang, 50 m el., agronomist S. Sumatra s.n. (B).

BORNEO. Mt. Kinabalu, Dallas, 900 m el., CLEMENS 26382 (B); bed of Dahombang, 900 m el., HAVILAND 1273 (Sa); Panataran River basin, 1050—1200 m el., CLEMENS 32597 & s.n. (B); Colombon River basin, 2700—2850 m el., CLEMENS 33729 (B); Penibukan, Dahobang, 1200 m el., CLEMENS 30684 (B); Penibukan, 1200—1500 m el., CLEMENS s.n. (B); between Mensangau and Renagong, 600 m el., GIBBS 3038 (BM); Central Borneo, Boekit Tjihan, AMDJAH (Exp. NIEUWENHUIS) 289 (B); Oeloe Bloeöe, Mahakam Region, AMDJAH (Exp. NIEUWENHUIS) 278 (B); 20 km w. of Bontang, 100 m el., RUTTEN 468 (B, U); S.E. Borneo, KORTHALS s.n. (L); between Batoe Babi & Loemawia, HUBERT WINKLER 2869 (B, BD, L, S); West Koetai, Long Temelen, 200 m el., ENDERT 2890 (B); Long Petah, 450 m el., ENDERT 3256 (B); W. Koetai, Kong Kemoel, 1700 m el., ENDERT 4539 (B).

JAVA. Without exact locality: REINWARDT s.n. (L); ZIPPELIUS s.n. (L); ZOLLINGER 127 (BM); BLUME s.n. (L), v.n. *doelan sentak*; KORTHALS s.n. (L); JUNGHUHN s.n. (L), partly authentic of *Hydrocotyle podantha* MOLKENBOER; NAGEL 259 (BD); WAITZ s.n. (L); HASSKARL 131? (B); v.n. *doelan sontak*; „Doekoetan", 1150 m el., MOUSSET 647 (B); Kapadoengan, VAN HASSELT s.n. (L); G. Karang, above Pandeglang, 500 m el., BACKER 7365 (B); Bodjongmanik, KOORDERS 40769 β (B); G. Paniis, s. of Djasinga, 450 m el., BACKER 10421 (B, L); Nirmala, 1500 m el., BACKER 10695 (B, L); Salak (?), BLUME s.n. (L), authentic of *Hydrocotyle sundaica* BLUME; Soekamantri, above Buitenzorg, 550 m el., BAKHUIZEN VAN DEN BRINK 3658 (B, L, U), v.n. *doelang sontak*; Salak, n. slope nr. Waroengloa, 650 m el., DANSER 6628 (G); Kotabatoe nr. Tjiomas, BOERLAGE s.n. (L), v.n. *daoen sentak, doelang sontak*; 350 m el., DE MONCHY s.n. (B, L); Buitenzorg, 235 m el., HALLIER s.n., 129a (B, L), v.n. *doelang sontak*; 250 m el., VAN STEENIS 1524 (B); Goea si Gadjah, 250 m el., BACKER 31180 (B); Kalapa Noenggal, 300—500 m el., BACKER 23422, 5940 (B); Pasir Karet, above Gadok, 800 m el., BACKER 31919 (B); Poentjak, Eurad, 1200 m el., WISSE 1001 (B); Boerangrang, Wanajasa, s.e. of Poerwakarta, 1000 m el.,

BAKHUIZEN VAN DEN BRINK 4659 (B, L); Sindanglaja, PLOEM s.n. (L); Lemak Goenting, nr. Bandoeng, DOCTERS VAN LEEUWEN s.n. (B); Tjibeureum, nr. Bandoeng, 1550 m el., SMITH & RANT 40 (B); Boekit Toengoel, 1200—1650 m el., ZOLLINGER 2008 (BD), „*Hydrocotyle globata*. BL., ZOLL., Cat. 139"; Palaboehanratoe, PLOEM s.n. (L); KOORDERS 33176 β (B), v.n. *dolong sontok*; Tjikidang nr. Paloeboehanratoe, 540 m el., BAKHUIZEN VAN DEN BRINK 271 (B, L); Tjiëmas, 500 m el., BACKER 25595 (B); Tjitjoeroeg, Tjitjibo, Tjidadap, Tjibeber, 800 m el., BAKHUIZEN VAN DEN BRINK, 2830 (B, L, U); Tjidadap nr. Tjibeber, 900—1000 m el., BACKER 22379 (B); Tjisokan valley, nr. Tjibeber, 750 m el., BAKHUIZEN VAN DEN BRINK 826 (B); G. Tjikoekoer, nr. Telaga Patengan, 1450 m el., LÖRZING 1431 (B); G. Patoeha, Tjiwidej, 1750 m el., COSTER 99 (B); s. slope, 2000 m el., LÖRZING 1341 (B); 2400 m el., BACKER 12767 (B); G. Malabar, WICHURA 2138 (BD); DOCTERS VAN LEEUWEN s.n. (B); Tjisoeroeli, 1320 m el., FORBES 936 (BD, BM, L), v.n.: *daoon sentok, doelang sentok*: 1400—2000 m el., DENKER 92 (B); 1500 m el., PULLE 3154 (U); Tjinjiroean, RANT s.n. (B); 1550 m el., RANT & SMITH 133 (B); Taloen, s. of Bandoeng, 1600 m el., REYNVAAN s.n. (B); 1700 m el., PULLE 3091 (U); 2100 m el., VAN DER PIJL 258 (B); G. Wajang, nr. Pengalengan, WARBURG 11243 (BD); G. Kentjana, s. slope, 1800 m el., VAN DER PIJL 401 (B); Kendeng G. Oeroeg, 2000 m el., SMITH & RANT 356 (B); G. Papandajan, s.w. slope, 1500 m el., BACKER 5491 (B); Tegal Pandjang, 2045 m el., VAN STEENIS 4340 (B); Garoet, BURCK s.n. (L); G. Goentoer, forest nr. Kawah Manoek, 1550 m el., DANSER 6806 (B); G. Kratjak, BURCK 510 (B), v.n.: *djoelang sontok*; G. Poetri nr. Garoet, 900 m el., KOENS 116 (B); G. Djaja, 1460 m el., LAM 197 (B); G. Telagabodas, above Pangentjongan, 1200 m el., BACKER 31918 (B, L); Bivouac Denoe on the Tji Patoedja, 400 m el., BACKER 8927 (B, L); G. Tjeremai, BLUME l.c.; G. Slamet, above Batoe Raden, 700 m el., BACKER 433 (B); Petoengkriana, 1600 m el., BACKER 15892 (B); Josoredjo, 1400—1600 m el., BACKER 16111 (B); Diëng, JUNGHUHN s.n. (L), authentic of *Hydrocotyle podantha* MOLKENBOER; G. Oengaran, slope of Soerolaja, 700 m el., DE VISSER SMITS s.n. (B); Oengaran, 900—1200 m el., Medini, JUNGHUHN s.n. (L), v.n.: *goepogatel*; 1500 m el., n. slope, DOCTERS VAN LEEUWEN s.n. (B); G. Telamaja, KOORDERS 28052 β (B), v.n.: *poeser boemi*; Pringombo, KOORDERS 27126 β (B), v.n.: *semonggen*; Serajoe valley, Mangli, 700 m el., BRINKMAN 321 (B); G. Soembing, Potorono Mts., 800 m el., LÖRZING 106 (B, BD); Djiwa, n. of G. Merbaboe, 1500 m el., DOCTERS VAN LEEUWEN 1137 (B); G. Lawoe, above Djagaraga, 600 m el., BACKER 6745 (B, L); G. Wilis, above Kediri, 1250 m el., BACKER 11362 (B); G. Andjasmoro, estate Pengandjaran, HOEDT s.n. (B); n. of Poedjon, 1300 m el., ARENS s.n. (B); G. Ardjoeno, Trètès, 800 m el., BREMEKAMP s.n. (B); G. Kawi, G. Keloed, Tapoh Walo, WARBURG 4228 (BD); G. Kawi above desa Printji, 2100 m el., ARENS s.n. (B); n.w. of Poenten, 1100 m el., VAN STEENIS 2500 (B); Bantaran, Proefstation Malang 1 (B); G. Tengger, northern slope nr. desa Ngepoeh, 1100 m el., VAN HARREVELD-LAKO 25 (B); Nangkadjadjar, 1200 m el., WISSE 546 (B); 1250 m el., JESWIET 569 (B); G. Tengger, 1200 m el., BUYSMAN 403 (U); w. slope, 1200 m el. & higher, MOUSSET 248 (B, BD); G. Seméroe, s.w. slope, 1000 m el., BACKER 3634 (B, L); between Smeroe-hoeve & Sendoera, 1300 m el., VAN STEENIS 7342 (B); Soerabaja, 800 m el., hot spring at Patjet, AITMAN 64 (B); G. Argapoera, n.w. slope, 1200 m el., BACKER 13225 (B); Katjep, OTTOLANDER 343 (B), v.n.: *ramboan*; G. Idjen, Pantjoer, 1000 m el., OTTOLANDER 286 (B), v.n.: *mankok, telpok*; way to Idjen Highlands, 1300 m el., RANT s.n. (B); G. Kendeng above Kajoe-

mas, 1100 m el., BACKER 30732 (B); 1400 m el., BACKER 24909 (B); G. Idjen, w. slope, 1400 m el., BACKER 25375 (B); Gendingwaloeh, 1450 m el., KOORDERS 43159β (B); Kendeng, forest Pantjoer-Idjen, KOORDERS 28557β (B); 1400 m el., KOORDERS 21378 β (B); 1450 m el., KOORDERS 32668β v.n.: *koes-ti-koesan* (B); G. Raoeng, s.w. slope, 2000 m el., VAN DER PIJL 128 (B); 1300 m el., CLASON 164 (G).

MADOERA. SAULIÈRE 135 (BD).

SELEBES. G. Klabat, 1300—1600 m el., KOORDERS 19036 β (B); Tondano, 690 m el., WISSE 40 (B); nr. Kajoewatoe, KOORDERS 19032 β (B), v.n.: *kaki koeda rinteh, doelang sontok*; Ratahan, KOORDERS 19035 (B), v.n.: *lalampang kawajoe, kaki koeda*; Bojong, WARBURG 15174 (BD); Lokon, SARASIN 466 (BD); Tjamba, TEYSMANN 12363 H.B. (B, L); Raoelo, 900 m el., BÜNNEMEIJER 12586 (B, L); Lombasang, 950 m el., BÜNNEMEIJER 10990 (B, L, U); G. Bantaèng, 1800 m el., BÜNNEMEIJER 12372 (B); Todjamboe, 800 m el., KJELLBERG 1697 (B).

SERAN. Mahoeala Ina, 200—300 m el., KORNASSI 731 (B, L, U).

JAPEN. 300 m el., STEIN 38 (BD).

NEW GUINEA. Arfak Mts., Angi Lakes, nr. Woman Lake, 2100 m el., GIBBS 5650 (BM); Nassau Mts., 1200 m el., DOCTERS VAN LEEUWEN 10790 (B); Cyclope Mts., MAYR 547 (B, BD); Alkmaar, VERSTEEG 1497 (B), original of *Hydrocotyle Versteegi* HEMSLEY; Kloof Bivouac, PULLE 157 (B); Oroh Valley, PULLE 1146 (B); Hellwig Mts., VON RÖMER 1189 (B); on the Noord-Rivier, VON RÖMER 375 (B); Utakwa Expedition, Camp VIc, 1650 m el., KLOSS s.n. (S); Kaiser Wilhelms Land, HELLWIG 633 (B); Hunsteinspitze, 1350 m el., LEDERMANN 10955 (BD); 1400 m el., LEDERMANN 11055a (BD); Schraderberg, 2070 m el., LEDERMANN 12064 (BD); Station Felsspitze, LEDERMANN 12391 (BD); Finisterre Mts., HELLWIG 357 (BD), cotype of *Hydrocotyle novoguinensis* WARBURG; 1200 m el., SCHLECHTER 18172 (BD); Sattelberg, WARBURG 20465 (BD); Junzaing, 800—1500 m el., MAYR 722 (BD); 800 m el., NYMAN 666 (BD); 850 m el, NYMAN 474 (BD); Saruwaged Mts., Ogeramnang, 1800 m el., MAYR 810 (BD); Bismarck Mts., SCHLECHTER 14050 (B); Mt. Tafa, 2400 m el., BRASS 5005 (NY).

Distribution: from the Himalaya, China and Formosa in the North to the Solomon Islands in the East and Australia and Tasmania in the South; also in tropical Africa.

2. Hydrocotyle sibthorpioides LAMARCK — Herb; stems long-creeping or with ascendent extremities, sometimes almost caespitose, terete, thin or almost filiformous, glabrous or sparsely hairy, rarely densely hairy. Leaves petiolate and stipulate; stipulae 0.5—1 mm long, nearly 1.5 mm broad, ovate to obovate, acute, membranous, ciliate almost fringed or entire; petiole 0.5—6 cm long, or even shorter in the uppermost leaves, filiformous, more or less hairy with spreading or more or less reflexed hairs; lamina 0.3—2.5 cm long and broad, roundish to 5-angular in outline, deeply cordate, 3—5-lobed to 3—5-partite, the segments crenate to serrate, both surfaces more or less pilose to hirsute. Inflorescences along the creeping stems, single; peduncle 0—3 cm long, filiformous, glabrous or short-hairy; involucre with 4—10 bracts, nearly 1 mm long 0.5 mm broad, around and between the flowers, ovate-lan-

ceolate, acute, with 2 acute teeth at the base up to 0.5 mm long, sometimes filiformous, the lower ones reflexed when fruit-bearing. Flowers sessile or very shortly pedicelled, usually 10—15 in each inflorescence; calyx teeth none; petals nearly 0.75 mm long, 0.5 mm broad, ovate, acute, valvate; styles nearly 0.5 mm long. Mericarps 1—1.25 mm long, 0.75 mm broad, yellow to brown, never black, glabrous or with short stiff hairs, sometimes red-punctate; marginal ribs more or less prominent.

For the distinction of this species from *H. javanica* cfr. the latter.

Hydrocotyle sibthorpioides LAMARCK, Enc. méth., bot., 3 (1789) p. 153; PERSOON, Synops., 1 (1805) p. 302; RICHARD, in Ann. Gén. Sc. Phys., 4 (1820) p. 56, ic. 54, pl. 8; D. C., Prodr., 4 (1830) p. 66; MIQUEL, Ill. Fl. Arch. Ind. (1871) p. 39; BAKER, Fl. Maurit. & Seych. (1877) p. 132; CLARKE, in HOOKER FIL., Fl. Br. Ind., 2, p. 669 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 613; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 119 (1898); HEYNE, Nutt. pl. Ned. Ind., ed. 1, 3 (1917) p. 394; MERRILL, En. Phil. Fl. Pl., 3, p. 237 (1923); BACKER & VAN SLOOTEN, Jav. Theeonkr. (1924) p. 184; OCHSE, Trop. groenten (1925) p. 190, cum ic.; JOCHEMS, in Trop. Nat., 15 (1926) p. 69; HEYNE, Nutt. pl. Ned. Ind., ed. 2 (1927) 2, p. 1210; VAN STEENIS, in Trop. Nat., 17 (1928) p. 200; SCHRÖTER & BACKER, in Festschr. Hans Schinz (1928) p. 579; VAN STEENIS, in Trop. Nat., 19 (1930) p. 84; DAKKUS, in Bull. Jard. Bot. Buitenz., sér. 3, suppl. 1 (1930) p. 164; ALSTON, in TRIMEN, Handb. Fl. Ceyl., 6 (1931) p. 137; CRAIB, Fl. siam. enum. 1, p. 787 (1931); OCHSE & BAKH., Ind. groenten (1931) p. 714, ic. 433; BACKER, Onkruidfl. Jav. Suikerrietgr., p. 473 (1931); BURKILL, Dict. Econ. Prod. Mal. Pen. (1935) 1, p. 1212; *Hydrocotyle nitidula* RICHARD, Ann. Gén. Sc. Phys., 4, p. 60, t. 63, fig. 33 (1820); J. W. HOOKER, Exot. Fl., 1 (1823) t. 29; D. C., Prodr., 4 (1830) p. 66; HASSKARL, Cat. pl. Hort. Bot. Bogor. (1844) p. 163; ZOLL. & MOR., in MORITZI, Syst. Verz. 1842—1844 (1845—46) p. 42; MOLKENB., in MIQUEL, Pl. Junghuhn., p. 92 (1851); ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848, p. 138 (1854); MIQUEL, Fl. Ind. Bat., I, 1, p. 735 (1856); THWAITES, Enum. pl. Zeyl. (1859) p. 130; MIQUEL, Fl. Ind. Bat., suppl. Sum. (1860) p. 134; HIERN, in Fl. Trop. Afr., 3, p. 5 (1871); FILET, Plantk. Woordenb. (1876) p. 19; DRUDE, in Engl. & Pr., Nat. Pflanzenfam., III, 8, p. 119 (1898); DE CLERCQ, Plantk. Woordenb. (1909) p. 258; *Hydrocotyle ranunculoides* var. *incisa* BLUME, Bijdr. Fl. Ned. Ind., 15 (1826) p. 884; HASSKARL, Cat. pl. Hort. Bot. Bogor. (1844) p. 163; *Hydrocotyle splendens* BLUME, Bijdr. Fl. Ned. Ind., 15 (1826) p. 884; D. C., Prodr., 4 (1830) p. 66; HASSKARL, Cat. pl. Hort. Bot.

Bogor. (1844) p. 163; Aanteek. Nut. (1845) p. 3, 59; MIQUEL, Fl. Ind. Bat., I, 1, p. 734 (1856); TEYSM. & BINNEND., Cat. Pl. Hort. Bot. Bogor. (1866) p. 165; FILET, Plantk. Woordenb. (1876) p. 19; DE CLERCQ, Plantk. Woordenb. (1909) p. 258; *Hydrocotyle hirsuta* var. *minuta* BLUME, Bijdr. Fl. Ned. Ind., 15 (1826) p. 884; RIDLEY, in Journ. Mal. Br. Roy. As. Soc., 1, p. 63 (1923); *Hydrocotyle rotundifolia* D. C., Prodr., 4 (1830) p. 64; ROXB., Fl. Ind., ed. 2, 2 (1832) p. 88; ed. 3 (1874) p. 270; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 668 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 613; TRIMEN, Handb. Fl. Ceyl., 2 (1894) p. 275; DRUDE, in Engl. & Pr., Nat. Pflanzenfam., III, 8, p. 119 (1898); MATS. & HAYATA, Enum. pl. Formos. (1906) p. 171; HAYATA, Fl. mont. Formos. (1908) p. 102; DE CLERCQ, Plantk. Woordenb. (1909) p. 258; ELMER, Leafl. Phil. Bot., 2, p. 629 (1909); KOORDERS-SCHUM., Syst. Verz., 1, fam. 228, p. 97 (1911); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 722; HAYATA, Ic. pl. Formos., 2 (1912) p. 50; VAN DONGEN, Overz. geneesmidd. Ned. Ind. (1913) p. 132; KOORD.-SCHUM., Syst. Verz., 3 (1914) p. 99; BOLDINGH, Zakfl. landbouwstr. Java (1916) p. 174; RIDLEY, in Journ. F. M. S. Mus., 8, IV (1917) p. 41; Fl. Mal. Pen., 1 (1922) p. 870; KOORDERS, Fl. Tjibodas, 2, p. 231 (1923); CHERMEZON, in LECOMTE, Fl. Indo-Ch., 2, p. 1137 (1923); *Hydrocotyle hirsuta* (non SW., nec. SPRENG.) D. C., Prodr., 4 (1830) p. 67; MOLKENBOER in MIQUEL, Pl. Jungh., p. 92 (1851); ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848, p. 138 (1854); MIQUEL, Fl. Ind. Bat., I, 1, p. 732 (1856) cum var. *glabrata*; Ill. Fl. Arch. Ind. (1871) p. 37; FILET, Plantk. Woordenb. (1876) p. 336; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 613; KOORDERS, in Nat. Tijdsch. Ned. Ind., 60 (1901) p. 370; DE CLERCQ, Plantk. Woordenb. (1909) p. 258; ERNST, Vegetationsbilder, 7. Reihe, 1—2 (1909) t. 9 & 10; VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 389 (1935); ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848, p. 138, 140 (1854); MIQUEL, Fl. Ind. Bat., I, 1, p. 733 (1856); FILET, Plantk. Woordenb. (1876) p. 268; DRUDE, in Engl. & Pr., Nat. Pflanzenfam., III, 8, p. 118 (1898); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 721; *Hydrocotyle Zollingeri* MOLKENBOER, in MIQUEL, Pl. Junghuhn., p. 91 (1851); ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848 (1854) p. 138; MIQUEL, Fl. Ind. Bat., I, 1, p. 733 (1856); suppl. Sum. (1860) p. 134; TEYSMANN & BINNEND., Cat. Pl. Hort. Bot. Bogor. (1866) p. 165; FILET, Plantk. Woordenb. (1876) p. 147; *Hydrocotyle puncticulata* MIQUEL, Fl. Ind. Bat., I, 1, p. 732 (1856); *Hydrocotyle benguetensis* & *H. delicata* ELMER, Leafl. Phil. Bot., 2, p. 628, 629 (1909); MERRILL, Enum. Phil. Fl. Pl., 3 (1923) p. 237.

Hydrocotyle sibthorpioides is spread throughout the area dealt with in this paper and is found from 0 to 3680 m elevation. It is very variable as to the shape of the leaves, the depth of the incisions, and the hairiness of all parts. Many of the forms have been described as separate species, but as these forms are connected by all kinds of intermediates I agree with those authors who keep them all together under one specific name.

MALAY PENINSULA. Penang, Penara Bukit, 300 m el., CURTIS 1752 (S), v.n.: *pegaga*; Perak, Maxwell's Hill, 1110 m el., BURKILL & HANIFF 12915 (S); Johore, Mt. Austin, VESTERDAL s.n. (S); Singapore, Botanic Garden, TASSIM DAUD s.n. (S), v.n.: *kara-kara*; RIDLEY s.n. (S).

BATOE ISLANDS. Pulau Pini, shore, RAAP 624 (B).

SUMATRA. Sibolangit, 500 m el., LÖRZING 5271 (B, L, U); Karo Plateau nr. Berastagi, 1350 m el., LÖRZING 6071 (B); Piso-Piso, 1400—1500 m el., LÖRZING 9367 (B); Seriboe Dolok, 1420 m el., LÖRZING 9808 (B); Toba above the Air Bongbong valley, RUTTNER 258 (B); Karo Plateau nr. Raja, 1275 m el., LÖRZING 4826 (B); nr. Lingga, 1225 m el., LÖRZING 6245 (B); nr. Deleng Siosar, 1350 m el., LÖRZING 8564 (B); Habinsaran Plateau, 1200—1300 m el., LÖRZING 6557 (B); Pangoeroeran (Samosir), 910 m el., LÖRZING 7660 (B); Loeboek Raja, nr. Padang Sidempoean, DE VOGEL s.n. (B); Padang, KORTHALS s.n. (L); Danau-di-Atas, RUTTNER 259 (B); Siolak Daras, 900 m el., RIDLEY l. c.

BORNEO. Sarawak, Upper Rejang River, Kapit, CLEMENS 21268 (B); Kuching, CLEMENS 22309 (Sa); S. Borneo, Bandjarmasin, MOTLEY 238 (K).

JAVA. Without exact locality: JAGOR 684 (BD); HORSFIELD s.n. (U), authentic of *Hydrocotyle puncticulata* MIQUEL; HILLEBRAND s.n. (BD); BLUME s.n. (L), authentic of *Hydrocotyle splendens* BLUME; JUNGHUHN s.n. (L); ZOLLINGER 834 (L), original of *Hydrocotyle Zollingeri* MOLKENBOER; HASSKARL 131 (B), v.n.: *antanan lumboet, kakatoen djaran*; „Kapandongan", VAN HASSELT s.n. (L); Pal Mérah nr. Batavia, 20 m el., BACKER 32151 (B); Salemba nr. Batavia, 15 m el., BACKER 32150 (B); Buitenzorg, 240—250 m el., HEYNE s.n. (B); BOERLAGE s.n. & 108 (L), v.n.: *roempoet tikoes*; HALLIER 128a, 128b, 128d (B), v.n.: *antanan lemboet*; DANSER 5405 (G); VAN STEENIS 483 (B); Tjiomas, HALLIER 128c (B); above Pasir Pogor, BAKHUIZEN VAN DEN BRINK 5549 (B, L), v.n.: *antanan beurit*; Parakansalak, WARBURG s.n. (BD); Tjibodas, 1350—1425 m el., BURKILL 8252 (S); KOORDERS 31695 β, 32086 β (B), v.n.: *koerawet galeng*; SAPIIN 2064 (B); HALLIER 146, 240 (B); VAN STEENIS 2064 (B); Sindanglaja, PLOEM 118 (BD); G. Boerangrang nr. Wanajasa, 700 m el., BACKER 14227 (B); G. Tangkoebanprahoe, Lembang, 1200 m el., VAN STEENIS 1657 (B); 1900 m el., DOCTERS VAN LEEUWEN 11454 (B); Tjiareuj nr. Tjibadak, 600 m el., BAKHUIZEN VAN DEN BRINK 272 (B, L), v.n.: *antanan beurit, koerawet galeng, antanan lemboet*; Palaboehanratoe, KOORDERS 33163 β (B); between Soekaboemi & Njalindoeng, 600 m el., BACKER 14566 (B); Tjidadap nr. Tjibeber, 900 m el., BAKHUIZEN VAN DEN BRINK 7010 (B), v.n.: *antanan beurit, koerawed galeng, antanan lemboet*; ibidem 1000 m el., WINCKEL 1131 β (B), 1134 β (B, L), v.n.: *antanan beurit*; BAKHUIZEN VAN DEN BRINK 7011, 6700 (B), v.n.: *antanan beurit*; Leuwimanggoe, nr. Tjibeber, 780 m el., SIKAJA s.n. (B), v.n.: *antanan leutik*; G. Patoeha, Telaga Patengan, WARBURG 3119 (BD); 1600 m el., BACKER 12815 (B); Tjinjiroean, 1600 m el., DOCTERS VAN LEEUWEN s.n. (B); G. Malabar, s. slope, 1585 m el., RANT s.n. (B), v.n.: *antanan*

beurit; Tjibeureum nr. Pengalengan, 1550 m el., SMITH & RANT 66 (B); G. Ipis, Tegal Primula, 2300 m el., DOCTERS VAN LEEUWEN 13337 (B); G. Papandajan, Tegal Kirinjoeh, 2060 m el., VAN DER PIJL 542 (B); Tegal Aloen-aloen, upper course Tji Paroegpoeg, 2350—2500 m el., VAN STEENIS 4066 (B); Tjisangiri, WERKMAN s.n. (B), v.n.: *antanan beurit*; between Garoet & Waspada, 850 m el., BACKER 5296 (B); nr. kota Garoet, KOORDERS 37090 β (B); Garoet, BURCK s.n. (B); Doro, 500 m el., DOCTERS VAN LEEUWEN 463 (B); Petoengkriana, 1600 m el., BACKER 15917 (B); Josoredjo, 1500 m el., BACKER 16118 (B); G. Slamet, above Batoeraden, 700 m el., BACKER 432 (B); Poerwokerto, 75 m el., BACKER 74 (B); Diëng Plateau, 1800—2500 m el., VAN SLOOTEN 416, 339, 394 (B); JUNGHUHN s.n. (L), v.n.: *rendeng*; TEYSMANN s.n. (B), v.n.: *oetjie-oetjie*; DOCTERS VAN LEEUWEN 2256 (B); BACKER 21697 (B), v.n.: *andem*; WIRJOSAPOETRO 25 (L), v.n.: *djarem*; Wanasaba, 800 m el., BRINKMAN 322 (B); Moentilan, 350 m el., VAN RIJCKEVORSEL 87 (B); Kalitrotjok, above Tjandiroto, 800 m el., LÖRZING 295 (B, BD); Temanggoeng, 550 m el., LÖRZING 248 (B, BD); G. Oengaran, above Padanglawas, Medini, 900—1200 m el., JUNGHUHN s.n. (L), v.n.: *soemoed kali, samangi goenong*, original of *Hydrocotyle Zollingeri* MOLKENBOER; G. Telamaja, KOORDERS 28051β (B), v.n.: *katèpan*; Sepakoeng, 1000 m el., KOORDERS 42610β (B), v.n.: *katepan*; G. Merapi, above Sèlo, WARBURG 4226 (BD); Prigi, 5 m el., BACKER 11881 (B); above Malang, 1100 m el., HOFSTEE 29 (B); G. Seméroe, between Kaliglidik & Ampelgading, 700—800 m el., BACKER 3566 (B); G. Seméroe, 1200—1500 m el., ZOLLINGER 2315 (B, BD); G. Tengger, KJELLBERG s.n. (B); nr. Goeboegklakah, 600—1500 m el., ZOLLINGER 2542 (B, BD), v.n.: *samangi*, original of *H. latiseota* ZOLL.; above Lawang, MOUSSET 116 (B); Bodo Gendro, 900 m el., MÜLLER, Herb. Jav. 110 leg. MOUSSET (L); Tosari, 1800—2500 m el., BACKER 8395 (B); KOBUS s.n. (B); WARBURG 4229 (BD); way to Penandjaan, 2000 m el., DOCTERS VAN LEEUWEN 4583 (B); Ngadisari, 2000 m el., KOORDERS 37877β (B); Moeroredjo, above 2000 m el., MOUSSET 332 (B); Ijang Plateau, Songi Kolboe, 2100 m el., KOORDERS 43460β (B); 43581β (B); 2200 m el., BACKER 9648 (B); Djember, 85 m el., ULTÉE 2 (B); Rawah Tapen Semboro, 28 m el., CLASON A69 (G); Bendo, OTTOLANDER 383 (B), v.n.: *pendjelongan* (jav.), *salatoen* (mad.); Idjen Plateau, nr. Djampit, 1500 m el., BACKER 25069 (B); above Oengoep, 1800—2400 m el., CLASON E20 (B, G); Kawah Idjen, 2000 m el., KOORDERS 43161β (B, L); G. Merapi, 1900—2200 m el., BACKER 25338 (B); 2600 m el., KOORDERS 43160β (B).

MADOERA. Pamekasan, VORDERMAN 119 (B), v.n.: *patèkan tjèna*.

KANGEAN ARCHIPELAGO. Sepandjang, 1 m el., BACKER 29186 (B).

SELEBES. Biroro nr. Lombasang, 850 m el., BÜNNEMEIJER 11639 (B); G. Bantaèng, 2500 m el., BÜNNEMEIJER 11910 (B, L); Rante Lemo, 1000—1200 m el., KJELLBERG 1424, 1432 (B); Todjamboe, 800 m el., KJELLBERG 1723 (B); B. Rante Mario, 2700 m el., KJELLBERG 3887 (B); Tawanga, B. Watoewila, 900 m el., KJELLBERG 1009 (B).

BOERÖE. Fakal, 1050 m el., L. J. TOXOPEUS 450 (B, L).

SERAN. Kaniki, 600 m el., KORNASSI 1392 (B, L).

AMBON. ROBINSON 1793 (B).

NEW GUINEA. Arfak Mts., 1800 m el., GJELLERUP 1039 (B); Mt. Tafa, 2400 m el., BRASS 4898 (NY); Wharton Range, Murray Pass, 2840 m el., BRASS 4670 (NY). Mt. Albert Edward, 3680 m el., BRASS 4475 (NY).

Distribution: thoughout tropical Asia, also in tropical Africa; South America (?).

3. **Hydrocotyle vulgaris** LINN. — Perennial herb; stem thin, creeping. Leaves petiolate, stipulate; petiole 1—9 cm long, with spreading hairs towards the limb; stipulae roundish, membranous; lamina orbicular, peltate, 0.7—3.5 cm in diameter, 8—13-nerved, coarsely crenate to slightly lobed. Inflorescences single or few together on the nodes; peduncle filiformous, 0.5—5 cm long, bearing 1—3 whorls of flowers in the apical portion, each flower with an ovate, membranous acute bract. Flowers sessile or shortly pedicelled; calyx teeth none; petals nearly 0.75 mm long, ovate, white or reddish. Fruit 1.75—2.5 mm broad, 1.5—2 mm long, transversely elliptical, densely beset with reddish small warts; stylopodium bipartite, the halves conical, bearing the styles on their apices. (Description after European and the under mentioned New Guinea plants.)

Hydrocotyle vulgaris Linn., Sp. pl., ed. 1 (1753) 1, p. 234; BENTHAM, Fl. austr., 3 (1866) p. 339; BAILEY, Queensl. Fl., 2 (1900) p. 715; SCHUMANN & LAUTERB., Fl. deutsch. Schutzgeb. (1901) p. 487; BAILEY, Compr. Catal. Queensl. Pl. (1913) p. 228; GIBBS, Contr. Arfak Mts. (1917) p. 165; HEGI, Ill. Fl. Mitteleur., V, 2, p. 952, ic. 2314a, 2316a, 2324—2328, tab. 190, fig. 5 (1925); EWART, Fl. Victoria (1930) p. 894.

NEW GUINEA. Arfak Mts., Angi Lakes, 2100 m el., GIBBS 5943 (BM, K), in open marsh, abundant in parts.

MARSHALL ISLANDS. SCHUMANN & LAUTERBACH, l. c.

Distribution: Europe, N. Africa, Australia, apparently not occurring on the Asiatic Continent.

II. CENTELLA.

Solandra LINN., Syst. nat., ed. 10 (1757) p. 1269; *Centella* LINN., Pl. afr. rar. (1760) p. 28; URBAN, in MART., Fl. bras., XI, 1, p. 286 (1879); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 119 (1898); DOMIN, in Bot. Jahrb., 41, p. 148 (1908); WOLFF, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. 3 (1908) p. 256; *Hydrocotyle* sect. *Centella* BENTHAM, Fl. austr., 3 (1866) p. 338; BENTH. & HOOK.F., Gen. pl., 1, p. 873 (1867); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 669 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 614.

Though the name *Solandra* is the oldest valid one for this genus, I accept the name *Centella,* as the latter has been proposed as a nomen conservandum, and probably will be accepted as such. Cfr. DOMIN, l. c., GREEN, in Kew Bull., 1935, p. 496.

Only species:

1. **Centella asiatica** (LINN.) URBAN — Perennial herb; stems creeping with long stolones, more or less puberulous in the young state. Leaves in rosettes; petiole 1—40 cm long, sometimes puberulous; lamina 1—7 cm in diameter, roundly-reniformous, crenate or crenate-dentate. Inflorescences umbellate, single or 2—5 together, in the axils of nearly 3 mm long bracts; peduncle 0.5—5 cm long, always shorter than the petioles; flowers usually 3, the middle one sessile, the lateral ones pedicellate; involucre 2-leaved, 3—4 mm long, nearly 1.5 mm broad, ovate. Calyx teeth none; petals 1—1.5 mm long, 0.75—1 mm broad, imbricate. Mericarps about 2 mm long, 1.5 mm broad, laterally compressed, often somewhat hairy in the young state, the ribs connected by transverse veins.

Hydrocotyle asiatica LINN., Sp. pl., ed. 1 (1753) 1, p. 234; BURMANN, Fl. ind. (1768) p. 74; HOUTTUYN, Nat. Hist., II, 8 (1777) p. 14; BLUME, Cat. (1823) p. 49; Bijdr. Fl. Ned. Ind., 15 (1826) p. 882, cum var. *subrepanda* & *lunata*; D. C., Prodr., 4 (1830) p. 62; WIGHT & ARN., Prodr. (1834) p. 366; HASSKARL, Cat. Pl. Hort. Bot. Bogor. (1844) p. 163, cum var. *glabriuscula* & *subrepanda*; Aant. Nut (1845) p. 3; ZOLLINGER, in Nat. & Geneesk. Arch. Ned. Ind., 2 (1845) p. 592; ZOLLINGER & MORITZI, in MOR., Syst. Verz. 1842—44 (1846) p. 42; MOLKENBOER, in MIQUEL, Pl. Junghuhn., p. 90 (1851); MIQUEL, Fl. Ind. Bat., I, 1, p. 731 (1856); suppl. Sumatra (1860) p. 134; BENTHAM, Fl. austr., 3 (1866) p. 346; TEYSM. & BINNEND., Cat. Pl. Hort. Bot. Bogor. (1866) p. 165; HIERN, in Fl. Trop. Afr., 3 (1871) p. 6; MIQUEL, Ill. Fl. Arch. Ind. (1871) p. 36; FILET, Plantk. Woordenb. (1876) p. 5; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 669 (1879); BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 204; SCHUMANN, in Bot. Jahrb., 9, p. 213 (1888); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 614; WARBURG, in Bot. Jahrb., 13, p. 397 (1891); GRESHOFF, Nutt. Pl. Ned. Ind. (1894) p. 29, cum ic.; SMITH, in Teysmannia, 6, p. 152 (1895); KOORDERS, Versl. Dienstr. Minah. (1898) p. 487; BAILEY, Queensl. Fl., 2 (1900) p. 716; KING, Mat. Fl. Mal. Pen., 13 (1902) p. 599; MATS. & HAYATA, Enum. pl. Formos. (1906) p. 169; VALETON, in Bull. Dép. Agr. Ind. Néerl., 10 (1907) p. 43; DE CLERCQ, Plantk. Woordenb. (1909) p. 257; VAN DONGEN, Overz. Geneesm. Ned. Ind. (1913) p. 131; RIDLEY, Fl. Mal. Pen., 1 (1922) p. 869; in Journ. Mal. Br. Roy. As. Soc., 1, p. 63 (1923); EWART, Fl. Victoria (1930) p. 896; BURKILL, Dict. Econ. Prod. Mal. Penins., 1, p. 1210 (1935); *Trisanthus cochinchinensis* LOUREIRO, Fl. cochinch., 1 (1790) p. 176; *Centella asiatica* URBAN, in MART., Fl. bras., XI, 1, p. 287, t. 78, fig. 1 (1879); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 119, ic. 47J

(1898); SCHUM. & LAUTERB., Fl. deutsch. Schutzgeb. (1901) p. 486; DOMIN, in Engl., Jahrb., 41, p. 158 (1908); KOORDERS-SCHUM., Syst. Verz., 1, fam. 228, p. 96 (1911); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 723; KOORDERS-SCHUM., Syst. Verz., 3 (1914) p. 100; BOLDINGH, Zakfl. Landbouwstr. Java (1916) p. 174; HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3 (1917) p. 395; GIBBS, Contr. Arfak Mts. (1917) p. 164; MERRILL, Interpr. Rumph. Herb. Amb. (1917) p. 411; DOCTERS VAN LEEUWEN, Hand. Eerste Ned. Ind. Natuurwet. Congres (1919) p. 60, 71; MERRILL, Bibl. Enum. Born. Pl. (1921) p. 458; DOCTERS VAN LEEUWEN, in Ann. Jard. Bot. Buitenz., 31, p. 130, 137 (1921); 32, p. 189 (1923); KOORDERS, Fl. Tjibod., 2, p. 231 (1923); MERRILL, Enum. Phil. Fl. Pl., 3 (1923) p. 238; CHERMEZON, in LECOMTE, Fl. Indo-Ch., 2, p. 1134, ic. 135, 1—3 (1923); NANNFELDT, in Svensk. Bot. Tidskr., 18, p. 422 (1924); BACKER & VAN SLOOTEN, Handb. Jav. Theeonkr. (1924) p. 185; BAKER FIL., in Journ. Bot., 62, suppl., p. 44 (1924); OCHSE, Trop. groenten (1925) p. 185, cum ic. p. 187; JOCHEMS, in Trop. Nat., 15 (1926) p. 69, ic. 5; HEYNE, Nutt. pl. Ned. Ind., ed. 2, 2 (1927) p. 1210; KOOPER, in Rec. trav. bot. néerl., 24, p. 60 (1927); DOCTERS VAN LEEUWEN, Fourth Pacif. Sc. Congr., Krakatoa (1928) p. 76; SCHRÖTER & BACKER, in Festschr. Hans Schinz (1928) p. 561, 571; JOCHEMS, in Meded. Deli Proefstat. ser. II, 59, p. 64, 68 (1928); LAUTERBACH, in Bot. Jahrb. 63, p. 18 (1929); DOCTERS VAN LEEUWEN, in Bull. Jard. Bot. Buitenz., sér. III, 11, p. 35 (1930); DAKKUS, in Bull. Jard. Bot. Buitenz., sér. 3, suppl. 1 (1930) p. 64; VAN STEENIS, in Trop. Nat., 19 (1930) p. 85; CRAIB, Fl. siam. enum., 1, p. 786 (1931); BACKER, Onkr. Suikerrietgr., p. 474 (1931); OCHSE & BAKHUIZEN, Ind. groenten (1931) p. 701, ic. 426; DOCTERS VAN LEEUWEN, in Ann. Jard. Bot. Buitenz. 46—47 (1936) p. 404; *Hydrocotyle hebecarpa* D. C., Prodr., 4 (1830) p. 63; *Hydrocotyle asiatica* var. *hebecarpa* HASSK., Pl. jav. rar. (1848) p. 459; ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848 (1854) p. 138; *Hydrocotyle asiatica* var. *pedunculata* Kuntze, Rev. gen. pl., 1 (1891) p. 268.

This pantropic species is rather uniformous. It appears to occur all over Malaysia, and is found there from sea level to 2450 m altitude. After the depth of the basal incisions of the leaves and the more or less developed indumentum, BLUME distinguished the var.s *subrepanda* and *lunata*. HASSKARL moreover distinguished (in Cat. Hort. Bog.) a var. *glabriuscula*. Also the species *Hydrocotyle hebecarpa* D. C. mainly based on the development of the indumentum of the peduncles and the fruit, was accepted later as a variety by HASSKARL. All these varieties, however, are so little prominent among the numerous slight variations of this species, that it appears useless to name them.

MALAY PENINSULA. Penang, Waterfall, CURTIS 1885 (S), v.n.: *pegaga*; Wellesley, Prai, NUR 6204 (B, S); Perak, Grik, BURKILL & HANIFF 12375, 13740 (S), v.n.: *pegaga*; Thaiping, WRAY 1765 (S); Tapah, BURKILL & HANIFF 13966 (S), v.n.: *daun pegaga*; Telok Anson, Durian Sabatang, HANIFF 15622 (S), v.n.: *daun pegaga*; Bagan Datoh, HANIFF 16265 (S), v.n.: *pegaga*; Pahang, Bintang, BURKILL & HANIFF 16799 (S), v.n.: *pegaga*; Temerloh, HOLTTUM 24585 (S); Selangor, Ginting Simpah, 540 m el., HUME 9436 (S); Sungei Lalang Kajang, SYMINGTON 22691 (S), v.n.: *pegaga*; Malacca, Gunong Lalang, 1140 m el., RIDLEY s.n. (S); Johore, Sungei Tukong estate, GORDON SPARE 877 (S); Singapore, WICHURA 657 (BD); JAGOR 34 (BD); Sungei Jorong, RIDLEY 342 (S); Twali, RIDLEY 343 (S); Bukit Mandai, RIDLEY 3779 (S), v.n.: *pegaga*; Botanic Gardens, RIDLEY 13022 (S).

SUMATRA. Atjèh, Baleg, 1000 m el., VAN STEENIS 6092 (B); Médan, 50 m el., LÖRZING 3082 (B); Gedongdjohore, 50 m el., LÖRZING 3509 (B); Bèngkalis, Beloekang, 5 m el., BEGUIN 313 (B, L), v.n.: *praga*; Sibolangit, Botanic Garden, 400—500 m el., LÖRZING 3859 (B); Seriboe Dolok, 1420 m el., LÖRZING 9775 (B); Karo Plateau near Lingga, 1225 m el., LÖRZING 6246 (B); nr. Raja, 1275 m el., LÖRZING 4976 (B); nr. Berastagi, 1350 m el., LÖRZING 6074 (B, L, U); estate Bah Biroeng Oeloe, nr. Pematang Siantar, BEUMÉE 6D (B); Habinsaran, 1100—1300 m el., LÖRZING 6528 (B); Moeara, 900 m el., OUWEHAND 52 (B); Hoeta Gindjang, RUTTNER 257 (B); Toba Plateau, Bahal Batoe nr. Siborongborong, 900 m el., HUITEMA 13 (B), v.n.: *ampa paga*; Dolok Mangoe, 1400 m el., POLAK 104 (B); Sumatra's Westkust, KORTHALS s.n. (L); Danau Biloeloek, nr. Soengai Nanam, Alahanpandjang, 1500 m el., JACOBSON 108 (B); Fort de Kock, JACOBSON 2057 (B), v.n.: *poegago, tapah, pegaga*; Danau-di-Atas, RUTTNER 256 (B); Koemantan Koerintji, 850 m el., BÜNNEMEIJER 8115 (B); Boekit Tebakar, Kerintji, 900 m el., BÜNNEMEIJER 7932 (B, L, S), v.n.: *roempoet pegambang*; estate Negara Ratoe (Lampongs), DE VOGEL s.n. (B).

ANAMBAS & NATOENA ISLANDS. Siantan, e. of Tarempa, 50 m el., VAN STEENIS 763 (B).

BORNEO. Sandakan and vicinity, RAMOS 1848 (B); Rejang, BARTLETT s.n. (S, Sa), v.n.: *pegaga*; Upper Rejang River, Kapit, CLEMENS 21269 (B, Sa); Kuching, HAVILAND, 2045 (Sa); S.E. Borneo, between Kumam and Slinau, HUBERT WINKLER 2930 (BD); Bandjermasin, KORTHALS s.n. (L).

KRAKATAU (DOCTERS VAN LEEUWEN, l.c.); Verlaten Eiland, Casuarina-forest, DOCTERS VAN LEEUWEN 3731 (B).

JAVA. Without exact locality: REINWARDT s.n. (L); BLUME s.n. (B, L); HILLEBRAND s.n. (BD); Bantam, REINWARDT s.n. (L), v.n.: *pagagan*; G. Kantjana, KOORDERS 41187 β (B), v.n.: *antanan*; between Moentjang & Sadjira, 125 m el., BACKER 1924 (B), between Pengawoengan & Bajah, 5—50 m el., BACKER 1622 (B); Batavia, KUHL & VAN HASSELT 1 (B); Pal Mérah, BACKER s.n.? (L); Weltevreden, 15 m el., BACKER 32083 (B); Kerendang, 5 m el., BACKER 32081 (B); Kebajoran, 30 m el., BACKER 32082 (B); Bidaratjina, 20—25 m el., EDELING s.n. (B); estate Tjikoempai, e. of Poerwakarta, 110 m el., HARMSEN 96 (B); Wanajasa, 700 m el., BACKER 14223 (B); Nirmala, 1200 m el., BACKER 11143 (B); s. of Djasinga, 250 m el., BACKER 10488 (B); Kotabatoe nr. Buitenzorg, DE MONCHY s.n. (B); Buitenzorg, 250 m el., BLUME s.n. (B); BOERLAGE s.n. (L); DANSER 5511 (G); VAN HARREVELD s.n. (G), v.n.: *daun kaki koeda*; BAKHUIZEN VAN DEN BRINK 422 (B); Tjiomas, 250 m el., BAKHUIZEN VAN DEN BRINK 266 (B), v.n.: *antanan*; dèsa Bondongan,

250 m el., HALLIER 127a, 127b (B), v.n.: *antanan*; Tjigombong, 500 m el., VAN STEENIS 58 (B); Tjiampèa, 150 m el., KOORDERS 30867β (B), v.n.: *antanan*; Priangan, WARBURG 11244 (BD); G. Pangranggo, VAN HASSELT s.n. (L); Tjipanas, BLUME or HASSKARL s.n. (B); Tjibodas, 1200 m el., KOORDERS 31844β (B), v.n.: *antanan*; 1425 m el., HALLIER 237 (B, L), v.n.: *antanan*; Tjibadak, 380 m el., BACKER 659 (B); Tjidadap, s. of Tjibeber, 900 m el., BAKHUIZEN VAN DEN BRINK 27 (B), 1802 (B, L), v.n.: *antanan*; 1000 m el, WINCKEL 1147β (B, L), v.n.: *antanan*; Leuwimanggoe, s. of Tjibeber, 1000 m el., SIKAJA s.n. (B); Tangkoebanprahoe, above Lèmbang, 1600 m el., BACKER 2456 (B); Bandoeng, Tjibeureum, DOCTERS VAN LEEUWEN s.n. (B); Tagogapoe, 650 m el., LÖRZING 1107 (B); G. Semboeng, nr. Bandoeng, 1300 m el., BACKER 12327 (B); G. Telagabodas, nr. Pangentjongan, 1000 m el., BACKER 32080 (B); Noesagedé, in the Pendjaloe Lake, 720 m el., KOORDERS 47889β (B), v.n.: *antanan wangi*; estate Halimoen, 250 m el., ANONYMUS 12 (B), v.n.: *antanan*; Tjibareno, nr. Palaboehanratoe, 100 m el., WINCKEL 1866 β (B); Tjitjoeroeg, Djampang Koelon, 300 m el., BACKER 17211 (B); Njalindoeng, nr. Soekaboemi, 900—1000 m el., BACKER 14591 (B, L); Bodjong Lopang, 530 m el., BACKER 16996 (B); Takokak, 1000 m el., KOORDERS 15518 β (B), v.n. *antanan*; Telaga Patengan, 1600 m el., BACKER 12824 (B); estate Soekahati, 1250 m el., LEEFMANS s.n. (B), v.n.: *antanan*; G. Patoeha, Rantja Oepas, 1750 m el., BACKER 12739 (B); nr. Rantjawalini, 1725 m el., BACKER 12543 (B); Pengalengan, nr. lake, 1350 m el., FORBES 673 (B, BD); Tjilaki, WARBURG 3120 (BD); Rantjagedé, nr. Pengalengan, 1600 m el., BACKER 26109 (B); G. Malabar, nr. Tjinjiroean, 1600 m el., RANT s.n. (B), v.n.: *antanan gedéh*; G. Goentoer, Kawah Kamodjan, 1300—1500 m el., KOENS 393 (B); G. Papandajan, BOERLAGE s.n. (L); SCHEFFER C15 (B), v.n.: *antanan*; Tegal Aloen-aloen & Tegal Boenkroeng, 2450 m el., VAN STEENIS 4158 (B); G. Mandalagiri, VAN VUUREN s.n. (B), v.n.: *antanan*; between Waspada and Tjisoeroepan, 1250 m el., BACKER 5471 (B); G. Tjikoerai, above Malèèr, 820 m el., BACKER 8667 (B); Tjisoeroepan, 1250 m el., BACKER 5590 (B); G. Tjerimai, between Linggardjati & Koeningan, 500 m el., BACKER 5042 (B); Tegal, Slawi, estate Doekoewringin, coll. estate manager no. 24 (B), v.n.: *oeles-oeles*; Pekalongan, Soebah, 200 m el., BEUMÉE 4300 (B), v.n.: *patjoel gowang, tapak djaran*; Petoengkriana, 1050 m el., BACKER 15932 (B); Madjenang, 30—100 m el., BACKER 18697 (B); Diëng, WARBURG 4225 (BD); 2000 m el., TEYSMANN s.n. (B), v.n.: *rindeng*; G. Prahoe Diëng, 2100 m el., VAN SLOOTEN 381 (B); G. Pangoran, 2000 m el., VAN SLOOTEN 379 (B), Diëng Plateau, 1900—2100 m el., BACKER 21621 (B); 1860 m el., JUNGHUHN s.n. (L), v.n.: *rendeng*; G. Panggonan Diëng, 2100 m el., BRINKMAN 278 (B); G. Soembing, 1800 m el., LÖRZING 835 (BD), v.n.: *rendeng*; G. Telamaja, KOORDERS 28039β (B), v.n.: *rendeng*; nr. Sepakoeng, KOOBDERS 29654β (B), v.n.: *gagan-gagan, panegowang, patjoel gowang*; 1400 m el., KOORDERS 36320β (B), v.n.: *gagan-gagan*; Salatiga, 570 m el., BACKER 30110 (B); DOCTERS VAN LEEUWEN s.n. (B); G. Merapi, above Bajalali, BEGUIN 73 (B); above Sèlo, WARBURG 4227 (BD); Kenanti, Ngarengan, KOORDERS 35653β (B); G. Kidoel, E. of Djepitoe, 200 m el., BACKER 2800 (B); Pasanggrahan Ngebel, 700 m el., KOORDERS 23237β (B), v.n.: *kerok batoh*; G. Willis, w. slope nr. Delapa, 150 m el., WISSE s.n. (B); G. Andjasmoro, w. slope, 900 m el., WINCKEL 127β (B), v.n.: *samboeng otot banjoe*; Lawang, MOUSSET 88 (B); between Singosari & Lawang, 450 m el., KOOPER l.c.; Poenten, 1100 m el., HOFSTEE 3 (B); Nangkadjadjar, 1200 m el., WISSE 619 (B); G. Tengger, BUYSMAN

98 (U); Ranoe Rani, KOBUS 250 (B); Ranoe Kembolo, 2450 m el., WURTH s.n. (B); Ngadisari, CLASON A70 (G); G. Seméroe, between Kali Glidik & Ampel Gading, 700 m el., BACKER 3786 (B); Djatiroto, 20 m el., BACKER 8117 (B, L); between Poeger & Amboelo, 10—20 m el., BACKER 18200 (B); Poeger, KOORDERS 21379β (B), v.n.: *gagan-gagan*; Djember, 85 m el., ULTÉE 1 (B); Idjen, 1500 m el., ZOLLINGER 632 (BD, L); Pantjoer, OTTOLANDER 315 (B), v.n.: *gangagan, koeste-koesan*.

BALI. ZOLLINGER l. c.

TIMOR. D. C., l. c.; ex Mus. Paris, coll.? (BD, L); ZIPPELIUS s.n. (L).

SELEBES. Kota Manado, 0 m el., KOORDERS 19033β (B), v.n.: *daon kaki koeda, pamgowang*; Kajoewatoe, 200 m el., KOORDERS 19034β (B), v.n.: *kaki koeda, tispo*; Manado, KOORDERS 19037β (B), v.n.: *kaki koeda*; Tondano, WARBURG 15173 (BD); Maros, WARBURG 16132 (BD); Piek van Maros, Bikeroe Lawa, WARBURG 16133 (BD); T. Manipi, WARBURG 16134 (B); Sangona, 100 m el., KJELLBERG 1153 (B); Aboeki Asinoea, 200 m el., KJELLBERG 916 (B); Rante Lemo, 1100 m el., KJELLBERG 1425 (B).

TERNATE. Lagoena, 350 m el., BEGUIN 625 (B), v.n.: *kolotide manora*.

BATJAN. WARBURG 18115 (BD), v.n.: *daun kaki kuda*.

AMBON. Karang Pandjang, RANT 270 (B); C. B. ROBINSON, Pl. Rumph. Amb. 326 (B).

AROE ISLANDS. Dobo, JENSEN 229 (B, L).

NEW GUINEA. Without exact locality: NYMAN 204 (BD); Rouffaer River, 125 m el., DOCTERS VAN LEEUWEN 9744 (B); Hollandia, GJELLERUP 76 (B); Merauke, KOCH s.n. (B, L), v.n.: *dogouke, gogouke, andanan*; nr. Kampong Kabatiel, BRANDERHORST 251 (B); Bismarck Plain, LAUTERBACH 2838 (BD); Constantinhafen, LAUTERBACH 1275 (BD); Finschhafen, WARBURG 20464 (BD); Bumi River, WEINLAND 372 (B, BD); Astrolabe Plain, LAUTERBACH l. c.

Distribution: tropical and subtropical regions of the whole world.

III. TRACHYMENE

RUDGE, in Transact. Linn. Soc. London, ser. I, 10, p. 300 (1811); BENTHAM, Fl. austr., 3 (1866) p. 347; BENTHAM & HOOKER FIL., Gen. pl., 1, p. 873 (1867); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 614; *Didiscus* D. C., in Curt. Bot. Mag., 55, t. 2875 (1828); Mém. Ombell. (1829) p. 28, t. 4; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 120 (1898); DOMIN, in Sitzungsber. Böhm. Gesellsch. Wissensch. (1908) p. 2.

Though the mode of growth of the *Trachymene* species described in the following is indicated in the descriptions separately, it might be useful to spend a few words on it here.

Trachymene caerulea, introduced from Australia as a garden plant, is entirely different from the other species, which all are indigenous plants from mountain summits. *Tr. caerulea* is an annual herb, with a well-developed primary root with fibrous branches, without well-

developed rosettes, and with one erect stem branched in the upper portion only, the umbels forming a terminal corymb.

Of the other species, *Tr. saniculaefolia, Tr. novoguineensis, Tr. koebrensis, Tr. rigida, Tr. acrotricha,* and *Tr. erodioides* mainly agree in mode of growth. They are certainly perennials. *Tr. saniculaefolia* may be regarded as the type of this group, as more abundant and more polymorphic materials of it are available. It has a branched caudex, bearing rosettes at the extremities. From these rosettes may develop in the first place lateral rosettes, taking their origin from the axils of the upper leaves; after the dying off of the parent rosette, its persistent axis continues the caudex. In the second place the rosettes may give rise to either a single terminal umbel, or to a terminal stem bearing a number of leaves and a terminal umbel. These leafy stems usually are not erect but more or less spread, and may develop rosettes in the axils of the leaves, one or two of these forming again terminal umbels, or again leafy stems, in the latter case continuing the stem in a sympodic way.

Tr. novoguineensis is like *Tr. saniculaefolia,* but prolongated leafy stems bearing axillary rosettes are unknown hitherto.

Tr. rigida and *Tr. koebrensis* mainly agree with *Tr. saniculaefolia.* In *Tr. acrotricha* real rosettes are unknown; all stems are prolongated and leafy and the caudex probably is continued by the persistent bases of the leafy stems. Of *Tr. erodioides* the lower portions of the stems are unknown, but the sympodic stems bearing few-leaved axillary rosettes justify the supposition that its mode of growth chiefly agrees with that of *Tr. saniculaefolia.*

A second group of species is formed by *Tr. celebica* and *Tr. Sarasinorum,* not much differing, however, in mode of growth from the preceding. The structure of the caudex and of the basal rosettes is the same, but the leafy stems, developing from the rosettes, never bear axillary rosettes and always a terminal corymbiform dichasium of umbels.

A third group is formed by *Tr. acerifolia, Tr. arfakensis, Tr. papillosa* and *Tr. adenodes.* The subterranean parts of these plants are not adequately known in any of these species, hence it is unknown, whether the plants are annual or perennial. The general habit of the stems suggests that they may be perennial, but the few roots present in the specimens of *Tr. acerifolia* and *Tr. arfakensis* appear not to be torn off from a caudex, and to be annual. The stems are more or less erect, and branched only towards the extremities, forming a leafy di-monochasium of umbels. Basal rosettes are either entirely lacking, as in

Tr. acerifolia, Tr. papillosa and *Tr. adenodes,* or are weekly developed, as is the case in *Tr. arfakensis.*

Tr. rosulans is entirely different from all other species described in this paper. From the roots present in the herbarium specimens, it is not evident whether the plant is annual or perennial. As the root system is weekly developed, one might consider the plant to be annual, but the main stem developing stolones, it may be possible that the plant is perennial.

The genus is chiefly Australian, but outside Australia it is spread to New Caledonia, the Fiji Islands, the Philippines, and, in the area considered in this paper, in New Guinea, Borneo, Selébes, Timor and Flores.

As to the question whether this genus has to be named *Trachymene* or *Didiscus,* I follow NORMAN in Journ. of Bot., 69, p. 287. See also DOMIN, l. c.

Key to the species.

1 Plant glandular-hairy 2
Plant not glandular-hairy 3
2 Ovary hairy. Ripe fruit roughly tuberculate with glandular hairs. Annual, erect, cultivated . . . . . 14. T. caerulea
Ovary glabrous. Ripe fruit smooth. Wild mountain species 11. T. adenodes
3 Leaves nearly triangular and somewhat hastate in outline, tripartite or ternate with the middle segment longer than the lateral ones 6. T. erodioides
Leaves never triangular-hastate, more roundish or cuneate in outline, if tripartite or ternate, than the middle segment hardly longer than the lateral ones 4
4 Leaves more long than broad, all of them cuneate to spathulate . . . 5
Leaves more broad than long, sometimes the upper ones cuneate, rarely also the lower ones broadly cuneate 8
5 Leaves coriaceous and stiff, the lamina at least 5 times as long as broad 4. T. rigida
Leaves not coriaceous and stiff, the lamina at most 3 times as long as broad 6
6 Petiole at least twice as long as the lamina. Prolongated leafy stems absent 2. T. novoguineënsis
Petiole as long as the lamina or shorter. Leafy stems present . . . 7
7 Peduncles longer than the leaves. Leaves cuneate, in rosettes at the bases of the stem and the branches . . . . . 3. T. koebrensis
Peduncles shorter than the leaves. Leaves subspathulate, not in rosettes, but somewhat crowded towards the extremities of the stems 13. T. rosulans
8 Stems procumbent. Leaves to 1 cm long and broad, their teeth with apical hairs . . . . . 5. T. acrotricha
Stems erect or adscendent, sometimes caespitose. Leaves more than 1 cm long and broad, their teeth not with apical hairs 9

9 Plants with rosettes at the bases of the stems, sometimes also in the upper leaf axils and at the bases of the branches 10
No rosettes at the base of the stems and the branches, or if small rosettes are present at the base of the stems, these rosettes have disappeared before flowering and the umbels do not form a terminal corymb 12
10 Umbels single from the rosettes, or moreover from the prostrate stems, but never forming a corymbiformous dichasium . . . . **1. T. saniculaefolia**
Umbels forming a corymbiform dichasium on more or less erect stems . 11
11 Calyx teeth at most 0.75 mm long. Leaves more or less divided, but not ternate **7. T. celebica**
Calyx teeth up to 2.5 mm long. Leaves ternate . . . **8. T. Sarasinorum**
12 Leaves to 2 cm long and broad. Surface of stems, sheaths, and petioles densely papillose. Fruit with knob-shaped trichomes . . . . **12. T. papillosa**
Leaves more than 2 cm long and broad. Stems, sheaths and petioles not papillose. Fruit smooth 13
13 Leaves not in rosettes, but more densely placed in the lower thicker portion of the stem, 3-fid to ternate, biserrate with acute teeth **9. T. acerifolia**
Probably small rosettes at the very base of the stem, the latter very slender in its lower portion. Leaves ternate with petiolulate leaflets, the latter serrate with broad, shortly acuminate teeth . . . **10. T. arfakensis**

1. Trachymene saniculaefolia STAPF — Perennial herb, with a caudex from which originate rosettes, and, from these rosettes, inflorescences or sympodic leafy stems, bearing terminal inflorescences and axillary rosettes, the latter flower-bearing or not. Leafy stems, if present, up to 2 mm thick, terete, striate, more or less hirsute with hairs up to 1 mm long, or glabrous. Leaves with sheats 5—10 mm long, 2—3 mm broad, densely hirsute with hairs up to 2 mm long to glabrous and always ciliate, tapering into the petiole; petiole 3—13 cm long, densely hirsute to glabrous; lamina hirsute on both surfaces to glabrous, very variable as to form and size, roundly-reniformous to broadly cuneate in outline, always broader than long, 0.7—4 cm long, 1—6 cm broad, trifid to tripartite or even ternate, with segments broadly rhomboid or narrower, sometimes divided again, the ultimate segments serrate to lobate in the apical portion. Umbels terminal in the rosettes or on elongated stems opposite to the leaves; peduncle 3—29 cm long, terete, striate, hirsute to glabrous; involucral bracts 7—25 in number, 5—15 mm long, 1—3 mm broad, lanceolate, acuminate, sometimes dentate, glabrous or hirsute, spreading during flowering, appressed later; pedicels 5 to more than 30 in each umbel, the outer ones 5—15 mm long, the inner ones gradually shorter, spreading when flower-bearing, usually incurved when fruit-bearing. Calyx teeth triangular, acute, 0.5—2 mm long, 1—1.5 mm broad at the base, equally developed or one of them larger; petals ovate to lanceolate, 2—2.5 mm long, 0.5—1.5 mm broad; styles 0.5—1.5 mm long. Mericarps

Fig. 1 — *Trachymene* (cf. p. 143, bottom).

1.5—3 mm long, 1—2 mm broad, glabrous, those of the same fruit equally developed; distance between the jugae intermediae and the jugae commissurales 0.5—1 mm; carpophore entire, 4-apiculate, though deeply grooved and sometimes translucent in the middle, only bipartite after weathering.

Trachymene saniculaefolia STAPF, in HOOKER, Ic. pl., 24, t. 2308 (1894); in Transact. Linn. Soc., ser. 2, bot., 4, p. 124, 167 (1894); *Didiscus saniculaefolius* MERRILL, in Phil. Journ. Sc., bot., 2, p. 255, 256, 292 (1907); DOMIN, in Sitzungsber. Böhm. Gesellsch. Wissensch., 1908, p. 65 (1908) quoad var.s *typicum, rupicolum, brachystylum*; MERRILL, in Ann. Jard. Bot. Buitenzorg, suppl. 3, part 1, p. 283, 287, 288, 293, 302 (1910); HALLIER, in ELBERT, Sunda-Exp., 2, p. 294 (1912); GIBBS, in Journ. Linn. Soc., bot., 42, p. 39, 43, 47, 85 (1914) cum var.s *typico* et *rupicola*; WOLFF, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. 4 (1915) p. 222; GIBBS, Contr. Arfak Mts. (1917) p. 166; MERRILL, Bibl. Enum. Born. Pl. (1921) p. 458; Enum. Phil. Fl. Pl., 3, p. 238 (1923); VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 255 (1934) excl. synon.; an DIELS, in Bot. Jahrb., 62, p. 486 (1929)?

Trachymene saniculaefolia is rather variable as to the dimensions of the different parts, the length of the stems, the hairiness, and the shape and incisions of the lamina. DOMIN describes 4 varieties, *viz.* the var.s *typicus,* and *rupicolus* from Borneo, and the var.s *novoguinensis* and *brachystylus* from New Guinea. The var. *novoguinensis* shows such sharp and constant differences with the typical form, that it appears better to distinguish it as a separate species. The var. *rupicolus,* of which I saw originals in the Kew Herbarium, only differs from the typical form by the smaller dimensions and the dense mode of growth and appears to be a form of high mountain summits. The var. *brachystylus,* of which I likewise saw originals in the Kew Herbarium, entirely agrees with the plants collected by BRASS in New Guinea, and is only little different from the var. *typicus* by smaller dimensions. According to DOMIN, it is an intermediate between his var. *typicus* and his var. *novoguinensis,* and it has the short styles of the latter. As to the leaf-shape this is not correct, and the length of the styles is rather variable as well in *Tr. novoguineënsis* as in *Tr. saniculaefolia,* and appears to have no value for the distinction of these two.

Fig. 1. — *a*: *Trachymene koebrensis,* after GIBBS 5606, $^2/_3$ ×; *b—d*: *Trachymene rigida,* after LAM 1645; *b—c*: flower-bearing stems, $^2/_3$ ×; *d*: mericarp, 4 ×; *e—f*: *Trachymene acrotricha,* after KJELLBERG 3884; *e*: plant, $^2/_3$ ×; *f*: mericarp, 4 ×; *g—h*: *Trachymene erodioides,* after KJELLBERG 3885; *g*: fruit-bearing stem fragment, $^2/_3$ ×; *h*: mericarp, 4 ×.

It is very remarkable that *Tr. saniculaefolia* proves to occur in Australia. The Australian plants agree very well with those collected on Mt. Kinabalu in Borneo.

PHILIPPINE ISLANDS. Mindoro, Mt. Halcon, MERRILL 6174 (BD, K, L).

BORNEO. Mt. Kinabalu, CLEMENS 30058 (B); 2175 m el., WHITEHEAD s.n. (BM); Temberungo, 2310 m el., HAVILAND 1162 (BM, K, S, Sa), petals white; Kemberanga, CLEMENS 10522, 10538 (B); 2400 m el., open shallow sand, GIBBS 4150 (BM, K); 2100—3300 m el., Marai Parai, above Kamburangan, under great wall, CLEMENS 33164 (B, BM), petals white, organs pinkish, fruit purplish, same colour as stem; 2400 m el., WHITEHEAD s.n. (BM); 2400—3000 m el., Ramburangat to Paka Batra, damp places, GIBBS 4221 (BM, K); 2700 m el., Colombon River basin, on base of wall at falls, CLEMENS 33735 (B, BM); 2100—3300 m el., LOWE s.n. (K); 3000 m el., BURBIDGE s.n. (K); NATIVE COLLECTOR 44 (E, Sa), flower white; 3300—3900 m el., WHITEHEAD s.n. (BM); 3600—3900 m el., granite cap, cracks in granite, GIBBS 4184 (BM); 3900 m el., summit, cracks in granite, GIBBS 4310 (BM); 3900 m el., in crevices of rock right to the top, HAVILAND 1130 (K, S, Sa); 3900 m el., granite cave, HOLTTUM s.n. (S); Paka Cave, CLEMENS 10563 (K); Paka Cave to Low's Peak, CLEMENS 10612 (B, K); Low's Peak, 4020 m el., granite crevices, CLEMENS 27098 (B), fruit reddish purple, Dusan medicine.

NEW GUINEA. S.E. part, Central Division, Wharton Range, Murray Pass, 2840 m el., BRASS 4671 (NY), common amongst grass near forest borders, sometimes as a weed on burnt over ground, indumentum red, petioles, peduncles and fruit red, flowers pink; Mt. Albert Edward, 3680 m el., BRASS 4244 (NY), common, forest glades, whole plant reddish, flowers dark pink; Mt. Scratchley, 3000—3900 m el., GIULIANETTI s.n. (K), originals of *Didiscus saniculifolius* var. *brachystylus* DOMIN.

AUSTRALIA. N.S. Wales, Jenolan Caves, BLAKELY s.n. (BM).

2. Trachymene novoguineënsis (DOMIN) BUWALDA, n. sp. — **Fig. 2a.** — Herba perennis, e caudice rosulas proferens vel e caulibus repentibus nonnihil prolongatis iterum rosulas formans. Foliorum vagina ad 2.5 mm longa et 3 mm lata, in petiolum attenuata, margine ciliata pilis ad 2 mm longis; petiolus longitudine variabili, 1—13 cm longus, lamina semper longior, glabra vel laminam versus pilis ad 2 mm longis hirsutus; lamina cuneata, 0.7—3 cm longa, 0.5—1.7 cm lata, triloba vel trifida, segmentis apice dentibus 2 vel 3 latis, nonnihil acuminatis, utrinque glabra vel pilis ad 2 mm longis adpresse hirsuta. Umbellae singulae e rosulis; pedunculus 3.5—37 cm longus, teres, striatus vel subsulcatus, glaber vel pilis ad 1.5 mm longis hirsutus; bracteae involucrantes 7—13, lanceolatae, acutae, 8—12 mm longae, 0.5—1.25 mm latae, glabrae vel margine ciliis nonnullis ad 1 mm longis, tempore florendi patentes, postea adpressae; pedicelli 12—30, florum exteriorum ad 5 mm longi, divergentes, florum interiorum gradatim breviores, post anthesin paulum aucti ad 14 mm longi, incurvati, omnino glabri. Calycis dentes anguste vel late triangulares,

Fig. 2. — *a*: *Trachymene novoguineënsis*, after PULLE 975, $^2/_3 \times$; *b*: *Trachymene arfakensis*, after GJELLERUP 1128, $^2/_3 \times$.

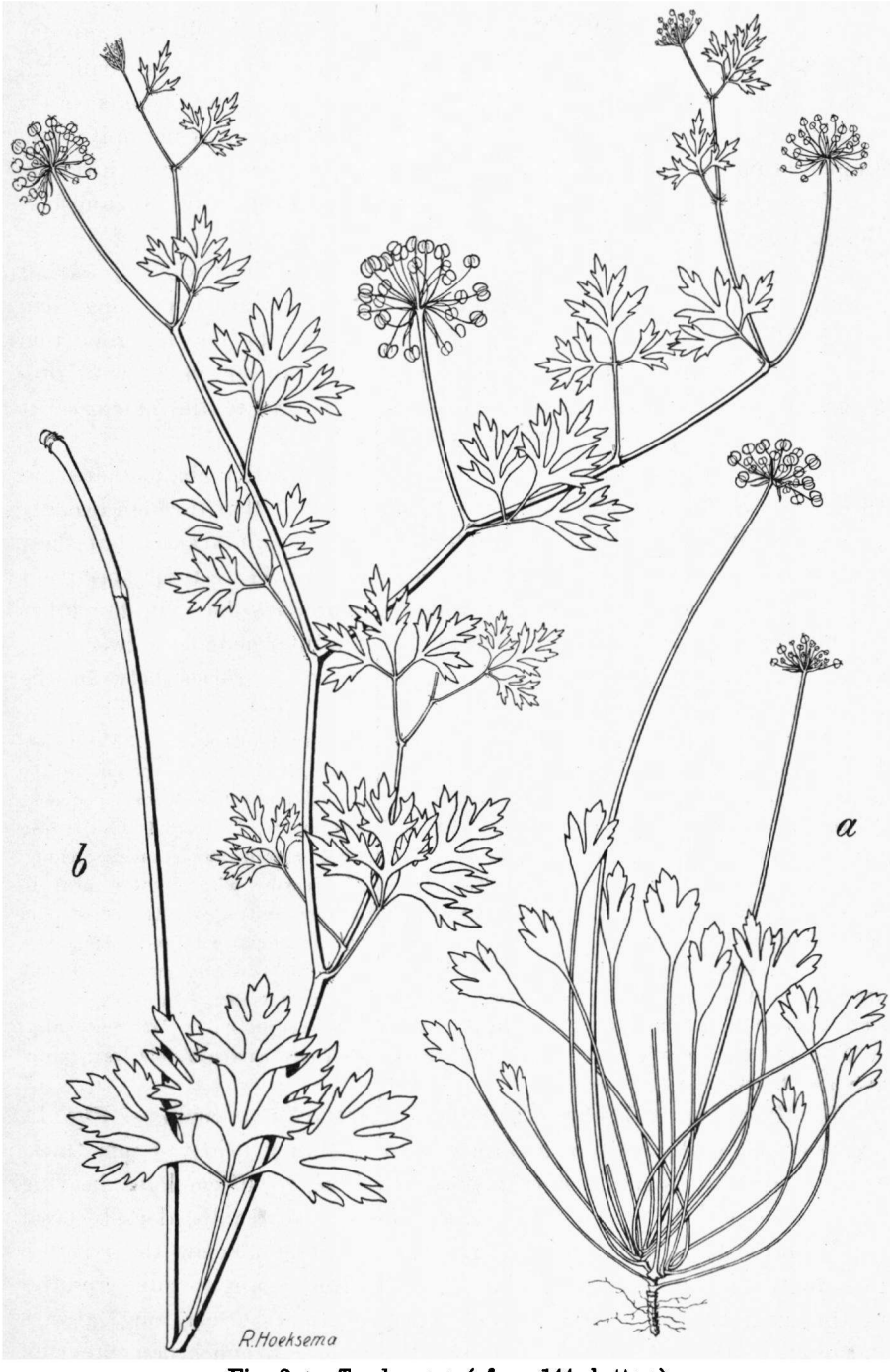

Fig. 2 — *Trachymene* **(cf. p. 144, bottom).**

0.25—0.5 mm longi, post anthesin paulum aucti; petala elliptica circiter 1.5 mm longa, 0.75 mm lata; styli ad 0.75 mm longi. Mericarpia ad 3 mm longa, 1.5 mm lata, glaberrima, aequaliter evoluta, jugis intermediis circiter 0.75 mm a commissura remota; carpophorum indivisum, 4-apiculatum, utrinque profunde sulcatum, statu vieto tantum bifidum.

Didiscus saniculifolius var. *novoguinensis* DOMIN, in Sitzungsber. Böhm. Gesellsch, Wissensch., 1908, p. 67.

Trachymene novoguineënsis is closely allied to *Tr. saniculaefolia* but differs constantly by cuneate laminae which always are more long than broad. Moreover the peduncles are always remarkably long in proportion to the leaves, it generally has a denser growth, and specimens with prolongated stems bearing rosettes are not known. As to the hairiness, it varies in the same way as *Tr. saniculaefolia.*

Among the materials of the latter from Mt. Kinabalu there are specimens (CLEMENS 10538 and NATIVE COLLECTOR 44) that through broadly cuneate laminae show an approach towards *Tr. novoguineënsis,* but these laminae are always more broad than long and for the rest the specimens are in no way different from typical *Tr. saniculaefolia.* On the other hand *Tr. novoguineënsis* is somewhat like an intermediate between *Tr. saniculaefolia* and *Tr. koebrensis,* but intermediate forms between the three are unknown.

NEW GUINEA. Foot of the Doorman Top, on peaty level ground, 3250 m el., LAM 1586 (B), common from 2900—3300 m el., all green parts exposed to the sunshine tinged with red, corolla light-pink, fruit dark-red on yellowish pedicels; Doorman Top, 3500 m el., steep slope with rock fragments, LAM 1659 (B), green parts exposed to the sunshine somewhat tinged with red, corolla and stamens creamy-white, fruit reddish-yellow; Doorman Top, in marshy ravine with grasses, near to the summit, 3500 m el., LAM 1692 (B), green parts somewhat tinged with red, corolla and stamens white or slightly violet, fruit brown-yellow or tinged with red; S.W. New Guinea, BRANDERHORST (!) 146 (B); Wichmann Mts., 3000 m el., summit, PULLE 975 (B), petioles, peduncles and flowers violet, fruit dark-violet; Hubrecht Valley, 3000 m el., VON RÖMER 1339 (B), fruit-bearing inflorescences only; Mt. Scratchley, 3660 m el., GIULIANETTI s.n. (K), originals of *Didiscus saniculifolius* var. *novoguinensis* DOMIN.

3. Trachymene koebrensis (GIBBS) BUWALDA, nov. comb. — **Fig. 1a.** — Perennial herb, entirely glabrous, with a caudex nearly 4 mm thick. Stems prostrate, nearly 2 mm thick at the base, to 40 cm long, bearing leaves over the whole length and rosettes in the leaf axils, densely beset with swollen bases of petioles in the basal part and below the rosettes, forming branches from the axillary rosettes and again forming rosettes in the axils of the leaves. Petiole with sheath 1—2 cm long, always shorter than the lamina; sheath nearly 2 mm long 3 mm broad, tapering

into the petiole; petiole canaliculate above; lamina cuneate, tapering into the petiole, 1—2 cm long, 0.5—1 cm broad below the apex, with 3—5 triangular acute teeth in the apical part, the middle teeth 4—7 mm long, 1.5—3 mm broad, the lateral ones smaller, 1.5—2 mm long, nearly 1 mm broad. Peduncle 6.5—8.5 cm long, terete, striate; involucral bracts 5—7, lanceolate, acute, nearly 6 mm long 0.5 mm broad; pedicels 15—30 in each umbel, the outer ones to 5 mm long, the inner ones shorter, spreading when flower-bearing, somewhat incurved when fruit-bearing. Calyx teeth narrowly triangular or subulate, 0.75—1.5 mm long, to 0.4 mm broad, sometimes somewhat unequally developed; petals obovate, nearly 1.25 mm long, 0.75 mm broad; styles nearly 1.25 mm long. Mericarps to 2.5 mm long, 1.5 mm broad, entirely glabrous; distance between the jugae intermediae and the commissure 0.5—0.75 mm.

Didiscus koebrensis GIBBS, Contr. Arfak Mts. (1917) p. 165.

Tr. koebrensis is somewhat an intermediate between *Tr. novoguineënsis* and *Tr. rigida*; as to the leaves it resembles more *Tr. novoguineënsis*, though the lamina is always longer than the petiole; as to the habit it is more like *Tr. rigida*.

NEW GUINEA. Arfak Mts., Mt. Koebré, abundant in open burnt summit plateau, 2700 m el., GIBBS 5606 (BM, type, K, L), stems spreading.

4. Trachymene rigida BUWALDA, n. sp. — **Fig. 1b—d.** — Herba perennis, omnino glabra. Caudex ramosus, rosulas et ex eis saepe caules prolongatos proferens; caules procumbentes, parte inferiore ad 2.5 mm crassi, angulati, sulcati, nodis incrassatis, primum umbellam singulam terminalem ferentes, deinde e nonnullis axillis superioribus rosulas paucifolias et ex eis caules proferentes umbella terminali unica, denique saepe eodem modo iterum ramificans. Folia vagina 1—3 mm longa et lata, utrinque appendicibus nonnullis subulatis rigide coriaceis ad 3 mm longis ciliata; petiolus ad 2 cm longus, 1 mm latus, difficile a lamina distinguendus; folium, petiolo incluso, 2—9 cm longum, lamina 4—7 mm lata, crasse et rigide coriacea, anguste cuneato-spathulata, prope apicem dentibus 1—5 plerumque 3 obtuse triangulis 1—2 mm latis ad 3 mm longis, margine ceterum integro, nonnihil recurvo. Pedunculus 5.5—11 cm longus, 0.5—1.5 mm crassus, angulosus, sulcatus; involucri bracteae 10—12, lanceolatae, 5—10 mm longae, 0.5—1.5 mm latae, acutae vel subobtusae; pedicelli 20 vel plures, 2—4 mm longi, floriferi paulum divaricati, fructiferi erecti. Calycis dentes 0.25—0.75 mm longi obtusi, persistentes; petala oblongo-ovata, 1.5—2 mm longa, 1 mm lata; styli 1.5—2 mm longi. Mericarpia ad 3 mm longa, 2.5 mm lata, aequalia, jugis intermediis 0.5—1 mm a commissura remotis.

Didiscus odontocoleus BUWALDA, ex VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 255 (1934), nomen.

Trachymene rigida differs from all other *Trachymene* species known, through its narrowly cuneiformous, thickly coriaceous leaves, but, as to its mode of growth, it entirely agrees with *Tr. koebrensis* and even with *Tr. saniculaefolia*. Its peculiar leaf-shape is connected with that of *Tr. saniculaefolia* by that of *Tr. koebrensis* and of *Tr. novoguineënsis*.

NEW GUINEA. Doorman Top, open slope between rocks, LAM 1645 (B), all parts exposed to the sunshine tinged with dark violet, corolla white inside, filaments pale green, anthers lilac, fruit dark-violet or brownish.

5. **Trachymene acrotricha** BUWALDA, n. sp. — **Fig. 1e—f.** — Herba perennis. Caudex ad 3 cm longus et 3 mm crassus, apicem versus rudimentis foliorum incrassatis dense vestitus. Caules ad 13 cm longi, basi circiter 2 mm crassi, prostrati, sulcati, parte inferiore glabri, parte superiore pilis divaricatis ad 1.5 mm longis in costis insertis densiuscule hirsuti. Folia sparsa (rosulae desunt); vagina ad 4 mm longa 2 mm lata, in petolium attenuata, margine pilis ad 3 mm longis ciliata; petiolus ad 7 mm longus, canaliculatus, pilis ad 2 mm longis dense hirsutus; lamina foliorum inferiorum circuitu reniformia, foliorum superiorum late rhomboidea, circiter 7 mm longa 10—15 mm lata, tripartita vel trifida, segmentis cuneatis parte apicali dentibus latis omnibus in pilum apicalem exeuntibus, subcoriacea, statu sicco involuta, palminervia, facie superiore glabra, inferiore nervis pilis 1—2 mm longis sparse hirsuta. Umbellae in parte superiore caulium foliis oppositae; pedunculus 0.5—2 cm longus, teres, incurvatus, pilis ad 1.5 mm longis dense hirsutus; bracteae involucrantes 8—10, lanceolatae acutae, 4 mm longae, circiter 1 mm latae, canaliculatae, glaberrimae, margine dentatae, dentibus et apice pilo terminali ornatae; pediçelli 10—22, exteriores ad 4 mm longi, interiores breviores, glaberrimae, apice nonnihil dilatatae. Calycis dentes 0.5—1 mm longi, basi 1 mm lati, triangulares acuti; petala elliptica, circiter 1.5 mm longa, 1 mm lata, apiculata; styli ad 0.75 mm longi. Mericarpia 2.25—3 mm longa, 1.5—2 mm lata, glaberrima, jugis indistinctis, carinalibus paulo distinctioribus quam suturalibus, intermediis 0.5—0.75 mm a commissura remotis; carpophorum 1.5 mm longum, filiforme, biapiculatum.

A peculiar small plant from stony localities on high mountain tops, agreeing with the foregoing species, especially *Tr. koebrensis*, by the mode of growth of its stems, but entirely different as to the shape of the leaves and the peculiar hairs on the tips of the leaf teeth.

SELEBES. B. Rante Mario, on mountain heath, 3100 m el., KJELLBERG 3884 (B), flowers white, plant reddish.

6. Trachymene erodioides BUWALDA, n. sp. — **Fig. 1g—h.** — Herba, ex fragmentis notis parva. Caules repentes, 0.5—1 mm crassi, teretes, nodis nonnihil incrassatis rudimenta foliorum incrassata ferentibus, pilis 1—2 mm longis magis vel minus hirsuti (probabiliter ramosi more specierum praecedentium). Folia singula et in rosulis paucifoliis axillaribus disposita; vagina c. 2 mm longa 1 mm lata, sensim in petiolum attenuata, extus dense pilosa, basi pilis ad 5 mm longis, dorso et margine pilis 1—3 mm longis; petiolus 1.5—4 cm longus, canaliculatus, pilosus, pilis 1—2 mm longis crispatulis divaricatis; lamina 1.5—2.5 cm longa, 1—2 mm lata, circuitu ovato-triangularis nonnihil hastata, utrinque parce pilosa pilis 1—2 mm longis crispulis, tripartita vel ternata, segmento terminali triangulari-rhomboideo, 1—2 cm longo, 0.5—1.5 cm lato, lateralibus 5—12 mm longis 5—7 mm latis, ovatis, omnibus basin versus pennatifidis, apicem versus crenatis, apicibus omnibus brevissime acuminatis. Umbellae terminales vel formatione rosularum axillarium laterales; pedunculus adscendens, 2.5—3.5 cm longus, tenuis, teres, striatus, densiuscule pilosus, pilis crispulis 1—2 mm longis; bracteae involucrantes 5—6, lanceolatae, 3—5 mm longae, glabrae vel parce ciliatae; pedicelli 12—15, exteriores ad 7 mm longi, interiores breviores, glaberrimi. Flores desunt; calycis dentes (in fructu) subnulli vel parvi ad 0.25 mm longi; styli c. 0.5 mm longi. Mericarpia 2.5—3 mm longa, c. 2 mm lata, glaberrima, aequalia vel subaequalia, jugis intermediis c. 0.75 mm a commissura remotis.

Didiscus erodioides BUWALDA, ex VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 255 (1934) nomen.

This peculiar new species is only known from rather small detached fruit-bearing stem fragments, but is entirely different from all other species of the genus by the peculiar leaf-shape. In mode of growth it probably agrees with the preceding species.

SELEBES. B. Poka Pindjang, mountain heath, 2700 m el., KJELLBERG 3885 (B), rare.

7. Trachymene celebica HEMSLEY — Perennial herb, with a caudex terminated by rosettes, from which originate erect flower-bearing stems and lateral rosettes either sessile, or on short stolones originating from the upper axils. Stems terminal in the rosettes (seemingly lateral when the rosette is dying off and new lateral rosettes have developed from it) erect or ascending, 20—50 cm high, nearly terete, more or less ribbed, 3—5 mm thick in the lower portion, more or less densely hirsute with 2—3 mm long spreading hairs, little-branched and few-leaved in the lower portion, not bearing rosettes in the axils, but terminated by a corymbiformous inflorescence of umbels. Rosette leaves with sheats 1—

2 cm long, 7—13 mm broad, glabrous outside in the basal portion, hirsute like the stem towards the apex, ciliate in the upper portion with 2—4 mm long hairs; petioles 5—15 cm long, hirsute like the stems; laminae roundish in outline, deeply cordate, 5—13 cm long, 7—14 cm broad, 3—7-palmatifid with obovate, 3-lobed, moreover biserrate, segments, more or less densely hirsute on both sides with nearly 1 mm long hairs; cauline leaves and bracts of the inflorescence gradually smaller and shorter-petioled, the uppermost ones nearly sessile, with less numerous and narrower segments and smaller sheaths. Umbels placed in a terminal corymbiformous dichasium of umbels; lower peduncles 2.5—6 cm long, upper ones gradually shorter, all of them angular, grooved, hirsute like the stems. Involucral bracts numerous, narrowly lanceolate, nearly 10 mm long, 1 mm broad, long-acuminate, with 0.5—1.5 mm long hairs at the margin and on the midrib, appressed to the pedicels. Flowers numerous (more than 50) in each umbel, the outer ones not fruiting; pedicels spreading when flower-bearing, incurved when fruit-bearing, the outer ones to 17 mm long, the inner ones gradually shorter. Calyx teeth acute, small; petals elliptic, acute, nearly 2.5 mm long, 1.5 mm broad; styles nearly 3 mm long. Mericarps nearly 4 mm long, 3 mm broad, with persistent calyx teeth and styles, the jugae intermedia 0.5—1.25 mm remote from the commissure; carpophore entire.

Trachymene celebica HEMSLEY, in Kew Bull., 1896, p. 37; in HOOKER, Ic. pl., 25, t. 2487 (1896); *Didiscus celebicus* SARASIN, Reisen in Celebes, 2 (1905) p. 337; DOMIN, in Sitzungsber. Böhm. Gesellsch. Wissensch. (1908) p. 68; WOLFF, in ENGL. & PR., Natürlich. Pflanzenfam., Nachtr. 4 (1915) p. 222; GIBBS, Contr. Arfak Mts. (1917) p. 166; VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 255 (1934); *Didiscus buginensis* WOLFF, in FEDDE, Repert., 17, p. 439 (1921).

This species, mainly known from one mountain summit, it little polymorphic. The form described by WOLFF as *Didiscus buginensis*, from another mountain, is different by its being less hairy in all parts and by the more acute leaf-segments, but these differences certainly are insufficient for specific distinction in this genus.

SELEBES. S.W. peninsula, Bowolangi, SARASIN 2155 (BD, type of *Didiscus buginensis* WOLFF); G. Bantaèng (= G. Lompobatang), N.W. slope, 2300 m el., BÜNNEMEIJER 11898 (B, BD, L, S, U), flowers white, fruit red, stems red near the base, the roots are eaten raw as a medicament against stomach-ache, v.n.: *kriongo edja*; 2600 m el., BÜNNEMEIJER 12170 (B, L), petioles red, flowers white, fruit red; 3000 m el., EVERETT 73 (S), 74 (S, K, type of *Trachymene celebica* HEMSLEY); 2700 m and higher, in crevices of rocks, SARASIN 1276 (BD), flowers white, stems and indumentum beautifully crimson, gathered by the natives for medicinal purposes;

Gowa, near top, 2700—2850 m el., VAN ZIJLL DE JONG 10 (B), v.n.: *djahé mérah*, stony, steep locality, bare volcanic rocks, rather common, flowers white, leaves green, petioles bright red.

8. **Trachymene Sarasinorum** (WOLFF) BUWALDA, nov. comb. — Mode of growth as in the preceding species. Stems erect, 30—40 cm high, terete, striate, sparingly hirsute, more densely at the nodes. Leaves nearly all in a rosette; sheats 3—6 mm long, 5—8 mm broad, with 1—2 mm long hairs on the back and at the margin, abruptly contracted into the petiole; petiole 6—8 cm long, hirsute with 1—2 mm long hairs, more densely hirsute towards the lamina; lamina roundish in outline, deeply cordate, 4—4.5 cm long, 6—7 cm broad, ternate, the middle leaflet rhomboid nearly 4 cm long, 3.5 cm broad, 3-partite with 2—3-lobed coarsely serrate segments, the lateral leaflets hardly smaller, obliquely trifid with 2—3-lobed, coarsely serrate segments, the whole lamina rather sparingly appressedly hirsute on both sides; cauline leaves smaller, shorter-petioled, the bracts of the dichasium nearly sessile. Peduncles of the umbels 3—4 cm long, terete, striate, shortly hirsute; involucral bracts numerous, 7—10 mm long, nearly 0.5 mm broad, narrowly lanceolate, acuminate, with few nearly 1 mm long hairs at the margins and on the midrib, spreading during flowering, appressed later; pedicels 7—11 mm long, nearly glabrous, spreading, somewhat erect when fruit-bearing. Calyx teeth nearly 2.5 mm long, subulate; petals ovate, 2—2.5 mm long, 1 mm broad; styles nearly 2 mm long. Mericarps nearly 4.5 mm long, 3.5 mm broad, entirely glabrous, usually equally developed or one somewhat smaller; carpophore entire.

Didiscus Sarasinorum WOLFF, in FEDDE, Repert., 17, p. 440 (1921); VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 255 (1934).

Trachymene Sarasinorum shows one important difference with *Tr. celebica, viz.* the long, nearly filiformous calyx teeth. For the rest it differs so little from it, that it could hardly be distinguished as a variety. The more acute leaf segments also occur in the specimen described by WOLFF as *Didiscus buginensis*, which is reckoned to *Tr. celebica* here.

SELEBES. Southern Peninsula, Piek van Maros (not „Pickumhardt"), 1100 m el., SARASIN 1122 (BD, type), flower white, the plant had to be killed with hot water before it could be dried, like Orchidaceae, Liliaceae, &c.

9. **Trachymene acerifolia** NORMAN — **Fig. 3.** — Stem herbaceous, 20—45 cm high, erect and terete in the lower portion, 3—8 mm thick near the base, terete or somewhat angular and gradually less thick upward, with spreading branches in the upper portion, the branches with inflorescences opposite to the leaves, all densely velvety hairy with

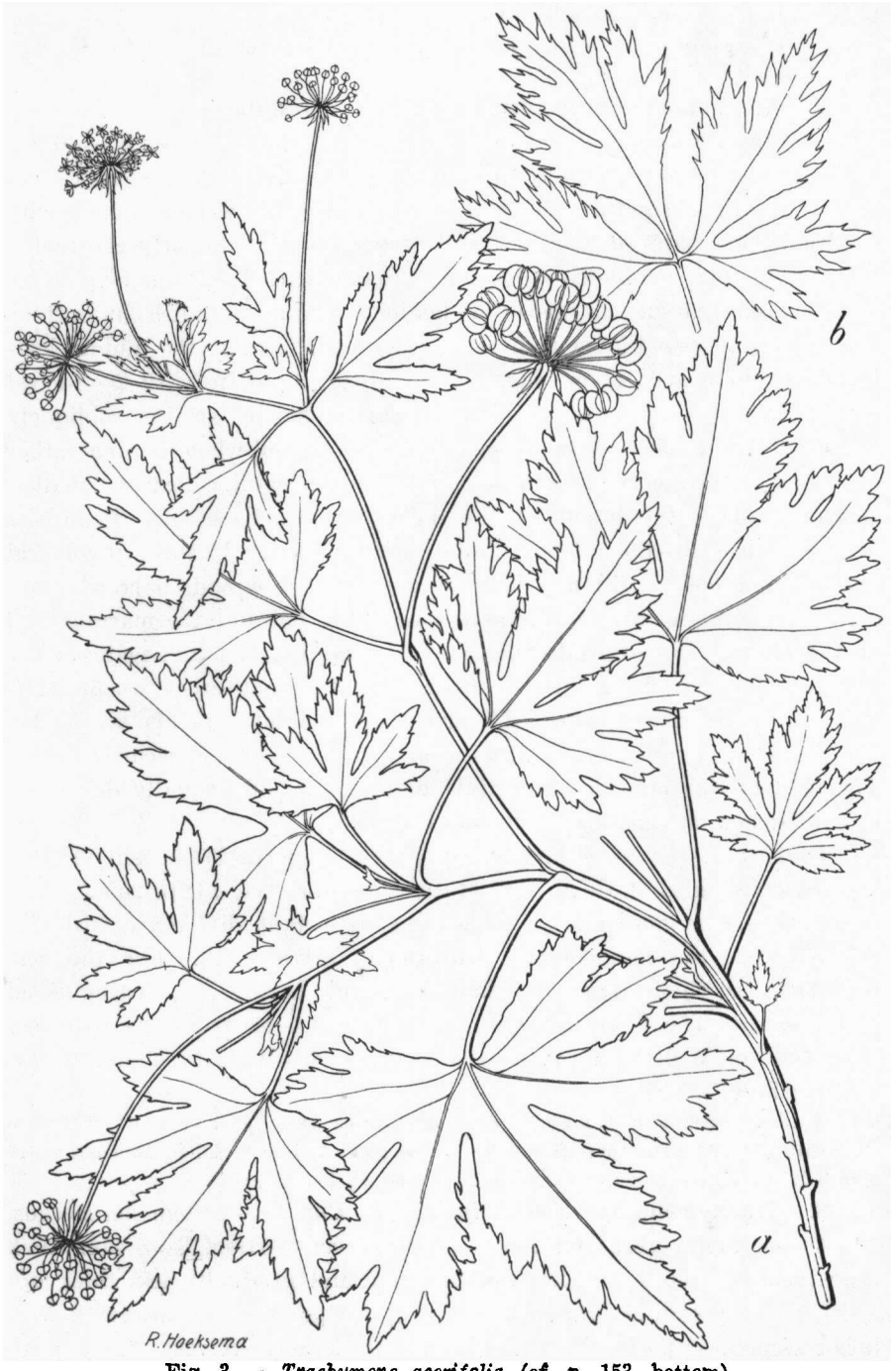

Fig. 3 — *Trachymene accrifolia* (cf. p. 153, bottom).

yellowish-brown indumentum to glabrous in the young state, glabrescent later. Leaves more or less hirsute to glabrous on both sides, rather densely placed in the lower portion of the main stem (but not forming rosettes) with distances of less than 1 cm, more remote in the upper part and along the branches; petioles of the lower leaves longer than the lamina, to 13.5 cm long, those of the upper leaves gradually shorter, those of the uppermost leaves nearly none, all of them slightly sheaty at the base, hairy like the stem; lamina palmatifid to ternate, with 3—5 rhomboid to obovate segments, the middle of which is 3-lobate to 3-fid, all of them moreover biserrate with acuminate teeth; lamina of the upper leaves smaller and more cuneate at the base. Umbels opposite to the leaves; peduncles 1—5 cm long when flowering, up to 7 cm long afterwards, terete, grooved, hairy like the stem; involucre with 7—10 bracts, shorter than or as long as the pedicels, lanceolate, up to 3 mm broad, hairy like the leaves; pedicels 25—40 in each umbel, spreading, the outer ones up to 7 mm long when flower-bearing, up to 15 mm long when fruit-bearing, the inner ones somewhat shorter. Calyx teeth to 0.5 mm long, acute or obtuse; petals elliptical, to 2 mm long and nearly 1 mm broad, acute; styles nearly 0.5 mm long in the flower, up to 1.5 mm long on the fruit. Mericarps to 6 mm long, 4 mm broad, equally developed, the distance between the jugae intermediae and the commissure 1.5—2 mm; carpophore entire or shortly bifid at the tip. (Description after the Timor and Flores plants).

Trachymene acerifolia NORMAN, in Journ. Bot., 69, p. 287 (1931); *Didiscus acerifolia* VAN STEENIS, in Bull. Jard. Bot. Buitenz., sér. III, 13, p. 255 (1934), p. 404 (1935).

This species has been based on specimens collected by Mrs. WALSH on Mt. Moetis, in Timor, and preserved in the herbarium of the British Museum. Other specimens of the same number extant in the Buitenzorg herbarium, and plants collected later by DE VOOGD on the same mountain, entirely agree with the type specimens. A somewhat different form has been collected later in the island of Flores; it differs in the very scarce indumentum and the thinner and deeper-divided ternate leaves. As there is, in my opinion, no doubt wether this form belongs to the same species, the above description has been made after all the Timor and Flores materials.

The specimens from Selébes, mentioned below, are more different

Fig. 3. — *Trachymene acerifolia*; *a*: stem of WALSH 345; *b*: leaf of POSTHUMUS 3236, both $^2/_3 \times$.

and do not belong with certainty to the same species, but the materials extant are too imperfect to base a new species upon them. They have stronger developed leaf sheats, and involucres composed of broader bracts and enclosing the flowers in the young state. The number HEINRICH 265 has thin, nearly glabrous leaves, cuneate to truncate at the base, the peduncles to 2.5 cm long, shorter than the petioles, and the flowers probably purple; it is indicated on the label as a shrub, semi-liane. The number KJELLBERG 3886 has the leaves deeply cordate, thicker, and sparsely hairy, the peduncles to 5 cm long, longer than the petioles, the flowers pink; it is indicated on the label as a shrub. Both specimens are detached extremities of flowering stems.

TIMOR. Goenoeng Moetis, summit, 2365 m el., WALSH 345 (B, BM, type), in one locality only, flowers cream coloured; G. Moetis, 2000 m el., DE VOOGD 2300 (B), very common.

FLORES. Goenoeng Kasteno, N.W. slope at 1800 m el., in primary forest, POSTHUMUS 3236 (B).

SELEBES. S.E. part, Mengkoka Mts., 2000 m el., HEINRICH 265 (BD), shrub; B. Poka Pindjang, 2600 m el., KJELLBERG 3886 (B), in damp valley, rare, shrub nearly 1 m high, semi-liane, flower pink.

10. Trachymene arfakensis (GIBBS) BUWALDA, nov. comb. — **Fig. 2b.** — Stems herbaceous, more or less erect, glabrous, long and slender, to 50 cm long, 3—6 mm thick and showing scars and remnants of leaf-sheats (of rosette leaves?) at the thickened base, unbranched and nearly 3 mm thick in the lower portion, terete, striate to slightly sulcate, several times dichotomously branched in the upper portion, the branches spreading and sympodic, their nodes alternately with and without umbel opposite to the leaf. Leaf sheats 2—7 mm long, 1.5—4 mm broad, tapering into the petiole, ciliate with hairs up to 2 mm long; petioles 2—7 cm long in the lower leaves, gradually shorter in the upper ones, canaliculate, glabrous or with few hairs up to 2 mm long towards the lamina; lamina roundish-cordate in outline, 2.5—7 cm long by 4—8 cm broad in the lower leaves, gradually smaller in the upper leaves, ternate, the leaflets with petiolules to 1.5 cm long, 2—3-fid to 2—3-partite, the segments 3-lobed and coarsely serrate, the teeth slightly acuminate and apiculate, the upper surface nearly glabrous, the lower surface sparingly hirsute, especially on the nerves, the base ciliate with hairs up to 2 mm long. Umbels opposite to each other leaf; peduncles 1.2—7 cm long, terete to sulcate; involucral bracts 5—10 in number, 5—10 mm long, linear to filiformous, the broadest ones with few filiformous teeth; pedicels 20—30 in number, the outer ones 5—8 mm long when flower-bearing, 10—15 mm long when fruit-bearing, spreading, the inner ones shorter. Calyx teeth

hardly any; petals 1—1.5 mm long, 0.75—1 m broad, ovate, acute; styles 1—1.5 mm long. Mericarps up to 5 mm long, 3 mm broad; carpophore entire, biapiculate with blunt tips; distance between the jugae intermediae and the commissure 0.5—1.5 mm.

Didiscus arfakensis GIBBS, Contrib. Arfak Mts. (1917) p. 166; VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 255 (1934).

This species is closely allied to *Tr. acerifolia,* but is different by its being more slender and smaller in all parts, *e. g.* by smaller flowers and fruit, by the main stem not bearing densely placed leaves in its lower portion, but perhaps bearing real rosettes at its base, by umbels not opposite to each leaf but to each other leaf of the branches, and by ternate leaves with petiolulate leaflets. Ternate leaves are also found in the Flores variety of *Tr. acerifolia,* but here the leaflets are not distinctly petiolulate and the teeth are longer and more acute.

SELEBES. Bohaa Mts., 1500—1700 m el., SARASIN 2072 (BD), herbaceous, to 2 m high, flowers white.

NEW GUINEA. Arfak Mts., S.W. ridge, Angi Lake, open spaces, 2400 m el., GIBBS 5513 (BM, type); near Angi Lake, 1900 m el., marshy banks, on muddy granite soil, GJELLERUP 1087 (B), herb, 0.75 m high, flowers white, stems brownish, leaves dull-green; ibidem, in peaty places of the bank, dry places in muddy humus on granite soil, GJELLERUP 1128 (B), herb, 0.5 m high, in groups, stems green with reddish hue especially at the nodes, flowers white.

11. Trachymene adenodes BUWALDA, n. sp. — **Fig. 4a—b.** — Caules herbacei, teretes, striati, ad 42 cm longi et ultra, parte inferiore adscendentes, simplices, 4 mm crassi, glabri, parte superiore ramosi ramis primum dichotomis deinde sympodicis, pilis ad 2 mm longis subdense hirsutis. Folia in caulis parte inferiore 0.3—1 cm, ceterum magis distantia; vagina 5—8 mm longa, 3—5 mm lata, semiamplexicaulis, sensim in petiolum attenuata, glabra, margine ciliis ad 3 mm longis, partim glanduliferis; petioli foliorum inferiorum quam lamina longiores, 7—17.5 cm longi, superiorum gradatim breviores, summorum subnulli, parte inferiore parce pilosi, versus laminam densius hirsuti pilis glanduliferis ad 3 mm longis; lamina foliorum inferiorum ad 4.5 cm longa, ad 6 cm lata, circuitu rotundato-cordata vel subreniformis, 3—5-partita segmentis rhomboido-ovatis, medio trifido partibus 2—3-lobis, omnibus apicem versus serratis dentibus latis nonnihil acuminatis subapiculatis, utrinque parce pilosa pilis adpressis ad 2 mm longis passim glanduliferis, margine praesertim in incisionibus ciliis ad 2 mm longis. Umbellae foliis oppositae et in bifurcationibus; pedunculi inferiores ad 10 cm longi, superiores breviores, omnes apicem versus pilis glanduliferis ad 1 mm longis hirsuti; involucrum ante anthesin floribus longius, alabastra in-

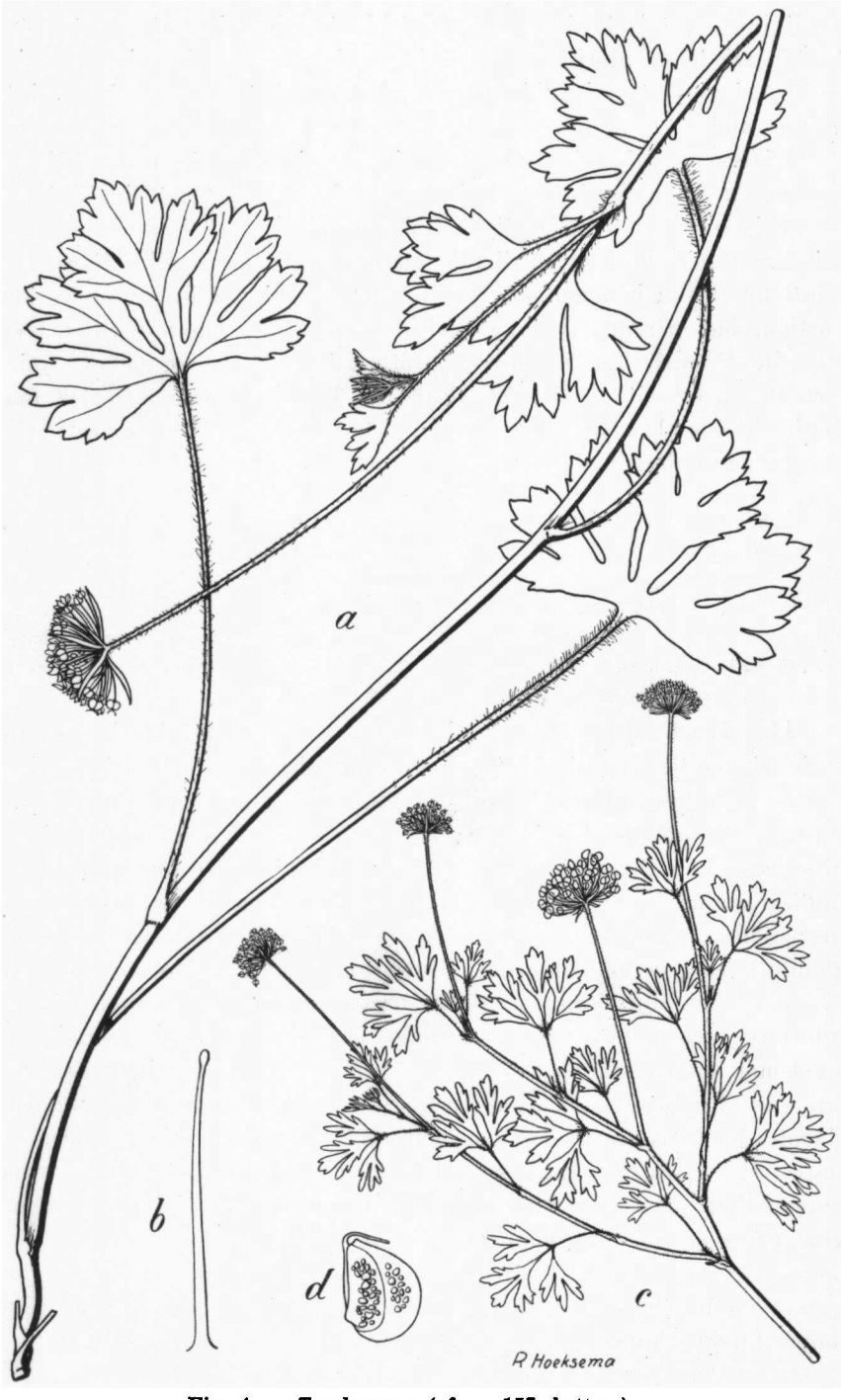

Fig. 4 — *Trachymene* (cf. p. 157, bottom).

cludens, bracteis 6—8 lanceolatis acutis 7—10 mm longis, 1—1.5 mm latis, glabris, pilis ad 1.5 mm longis ciliatis; pedicelli circiter 30, exteriores 7—9 mm longi, interiores breviores, glaberrimi. Calycis dentes c. 0.25 mm longi, late triangulares; petala obovata, circiter 1.5—2 mm longa, 1—1.5 mm lata; styli c. 1.5 mm longi. Fructus maturi desunt, submaturi ad 2 mm longi 3.25 mm lati, glaberrimi, jugis intermediis a commissura circiter 0.5 mm distantibus.

In general appearance this new species comes near to *Tr. arfakensis*, but it is more robust and also resembles *Tr. acerifolia*. From both it differs by its glandular indumentum of the petioles, stems, and peduncles.

NEW GUINEA. N.E. part, Saruwaged Mts., Bolan, 2400—3000 m el., KEYSSER s.n. (BM).

12. Trachymene papillosa BUWALDA, n. sp. — **Fig. 4c—d.** — Caules herbacei, probabiliter adscendentes, 20—40 cm longi, simplices vel in parte superiore ramosi, teretes, dense papillosi et superea pilis rigidis circiter 1 mm longis hirsuti. Folia sparsa (rosulae desunt); vagina 2—3 mm longa, 2 mm lata, semiamplexicaulis, in petiolum attenuata, papillosa ut caulis, superea ciliata pilis 1—2 mm longis; petiolus 0.5—2.5 cm longus, hirsutus et papillosus ut caulis; lamina circuitu orbiculari-reniformis, 1—2 cm longa, c. 3 cm lata, ternata, foliolis rhomboideis 1—2 cm longis 1—1.5 cm latis, basi valde attenuatis, 2—3-fidis vel 2—3-partitis, segmentis terminalibus saepe biserratis, versus basin papillosis, sparse hirsutis utrinque. Umbellae terminales ad apices caulium et ramorum, saepe foliis oppositae; pedunculus 3—6 cm longus, teres, striatus, hirsutus papillosusque ut caulis; bracteae involucrantes 6—12, lineari-lanceolatae, acutae, 4—5 mm longae, 0.5—1 mm latae, glabrae, pilis nonnullis ad 1.5 mm longis ciliatae; pedicelli 30—50, exteriores ad 5 mm longi, interiores breviores, glabri levesque, floriferi divaricati, fructiferi magis erecti. Calycis dentes 0.25—0.5 mm longi latique, triangulares, aequales; petala ovata, acuta, c. 1.5 mm longa; ovarium squamulis minimis; styli 1—1.5 mm longi. Mericarpia atra, ad 2 mm longa, ad 2 mm lata, aequalia, jugis intermediis 0.5—0.75 mm a commissura remotis, trichomatibus tuberculiformibus ornata, praesertim inter jugas intermedias et commissuram; carpophorum integrum, vix biapiculatum.

Didiscus scabriusculus BUWALDA, ex VAN STEENIS, in Bull. Jard. Bot. Buitenz., sér. III, 13, p. 255 (1934) nomen.

Fig. 4. — *a—b*: *Trachymene adenodes*, after KEYSSER s.n. (BM); *a*: flowering stem, $^2/_3$ ×; *b*: glandular hair of the petiole, 16 ×; *c—d*: *Trachymene papillosa*, after VERSTEEG 1221; *c*: branched upper portion of a stem, $^2/_3$ ×; *d*: mericarp, 4 ×.

This new species comes nearest to *Tr. arfakensis* by its mode of growth, but is different by its smaller dimensions, the papillose surface of its stems, sheaths and petioles, and the peculiar knob-shaped trichomes on the ripe fruit.

NEW GUINEA. S.W. part, probably Hellwig Mts., VERSTEEG 1221 (B, type), herb, flowers reddish-white; near Waterval Bivouac, 3300—3500 m el., VAN NOUHUYS 24 (U).

13. Trachymene rosulans (DANSER) BUWALDA — Perennial (or annual?) herb. Primary root fusiformous, branched. Main stem erect, to 13 cm long, to 2.5 mm thick at the base, almost covered with the thickened bases of leaf-sheaths in the lower portion, producing branches from the basal part, that are procumbent or adscendent, with scale-like leaves, to 14 cm long, and other branches from the upper portion that are like the upper portion of the main stem, the whole plant forming a semi-globose whole. Leaves scattered, more densely placed towards the extremities of the stems, somewhat forming terminal rosettes; sheath 2—12 mm long, to 3 mm broad, with a membranous margin, tapering into the lamina; lamina 8—18 mm long, 3—9 mm broad, spathulate, with 3 acute or obtuse teeth in the apical portion, the middle tooth to 2 mm long and 2.5 mm broad, the lateral teeth to 1 mm long and broad. Umbels opposite to the leaves; peduncle 5—12 mm long, terete, striate; involucral bracts 8—12 in number, lanceolate, 6—9 mm long, to 1.5 mm broad; pedicels 10—20 in number, the outer ones 4—7 mm long, the inner ones shorter, hardly longer after flowering. Calyx teeth to 0.75 mm long, triangular, acute; petals roundish-elliptical, nearly 1.5 mm long, 1 mm broad; styles nearly 1.25 mm long. Mericarps to 3.5 mm long, to 3 mm broad, entirely glabrous, the distance from the jugae intermediae to the commissure 0.75—1.25 mm; carpophore entire, bi-apiculate, 2—2.5 mm long.

Didiscus rosulans DANSER, in Brittonia, II, 2 (1936) p. 135, cum icone.

In the mode of growth this species is entirely different from all species of the genus described in this paper.

NEW GUINEA. S.E. part, Wharton Range, Murray Pass, burnt fringes of forest, BRASS 4513 (NY, L, type), common, leaves pale, fleshy, flowers pink; ibidem, grasslands, 2840 m el., BRASS 4177 (NY), common, leaves smooth and shining, pale green, flowers pale pink.

14. Trachymene caerulea (HOOKER) GRAHAM — Annual herb, erect, pilose and glandulose in nearly all parts. Primary root fusiformous, with fibrous branches. Stem single, erect, unbranched in the lower portion, with branches in the upper portion usually simple and not overtopping the main stem. Lower leaves petioled, the petiole 1.5—4 cm long, hardly

sheathy, the lamina roundish in outline, ternate, with bipennatifid to bipennatipartite leaflets, with narrow segments and subacute to subobtuse apiculate tips; upper leaves sessile or subsessile, less divided, the uppermost ones with only 3 narrow segments. Umbels terminal to the main stem and its branches, many-flowered; involucral bracts numerous, linear, nearly filiformous towards the tip, nearly as long as the flowers; pedicels of the outermost flowers 10—25 mm long, the interior gradually shorter, the innermost ones very short, spreading when flower-bearing, more erect later. Outermost flowers larger than the other ones, not fruit-bearing, probably male; calyx teeth subulate, very short; petals ovate to obovate, 2.75—3 mm long, 2—2.25 mm broad, shortly unguiculate at the base, with short glandular hairs at the outside; styles nearly 1 mm long; ovary glandular-hairy. Mericarps 3.25 mm long, up to 2.75 mm broad, roughly tuberculate with glandular hairs; distance between the jugae intermediae and the commissure 0.5 mm. (Description after Australian materials in the Leiden Herbarium.)

Didiscus caeruleus HOOKER, in Curt. Bot. Mag., 55, t. 2875 (1828); D. C., Prodr., 4 (1830) p. 72; DOMIN, in Sitzungsber. Böhm. Gesellsch. Wissensch. (1908) p. 43; WOLFF, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 222 (1915); *Trachymene caerulea* GRAHAM, in Edinb. New Phil. Journ., 5, p. 380 (1828); BENTHAM, Fl. austr., 3 (1866) p. 349; *Didiscus cyaneus* D. C., Mém. Ombellif. (1829) p. 28; *Huegelia caerulea* REICHENB., Iconogr. exot., t. 20 (1829).

JAVA. Pasoeroean, cultivated in gardens, BACKER s.n. (Pa).

Distribution: Australia.

IV. SANICULA

LINN., Sp. pl., ed. 1 (1753) 1, p. 235; Gen. pl., ed. 5 (1754) p. 109; BENTH. & HOOK.F., Gen. pl., 1, p. 880 (1867); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 670 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 615; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 137 (1898); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 61 (1913) p. 48; THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 957 (1925).

Only species:

1. Sanicula europaea LINN. — Perennial herb with more or less creeping rhizomes. Stems 15—75 cm high, slender, deeply grooved, glabrous or rarely, like the whole plant, hairy. Lower leaves with a petiole 3—20 cm long, and a tripartite to ternate lamina with incised moreover serrate-crenulate segments, the teeth mucronulate. Umbels in

a dichasium terminating in monochasia, sessile or on peduncles up to 1.5 cm long, and with 5—8-leaved involucre, 4—6-flowered, with 2—3 outer male flowers on pedicels 0.5—1 mm long and 2—4 female flowers sessile or on pedicels up to 0.5 mm long. Calyx teeth distinct 1—1.5 mm long, 0.25 mm broad, oblong, acute; petals nearly 1.25 mm long, 0.5 mm broad, with exception of the inflexed tip. Mericarps nearly 2 mm long, 1 mm broad, densely covered with about 1.5 mm long uncinate bristles.

Sanicula europaea LINN., Sp. pl., ed. 1 (1753) 1, p. 235; D. C. Prodr., 4 (1830) p. 84; THWAITES, Enum. pl. Zeyl. (1859) p. 130; HIERN, in Fl. Trop. Afr., 3 (1871) p. 8; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 670 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 616; TRIMEN, Handb. Fl. Ceyl., 2 (1894) p. 276; DRUDE, in ENGL. & PR., Nat. Pflanzenfam. III, 8, p. 137, ic. 56A (1898); KOORDERS-SCHUM., Syst. Verz., I, 1, fam. 228, p. 97 (1911); HALLIER, in Meded. Rijks Herb. Leiden, 12 (1912) p. 11; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 724; WOLFF, in ENGLER, Pflanzenr., IV, 228, Heft 61 (1913) p. 61; RANT, in Trop. Nat., 3 (1914) p. 2; WOLFF, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. 4 (1915) p. 224; BOLDINGH, Zakfl. Landbouwstr. Java (1916) p. 174; MERRILL, Bibl. Enum. Born. Pl. (1921) p. 458; RIDLEY, Fl. Mal. Pen., 1 (1922) p. 871; in Journ. Mal. Br. Roy. As. Soc., 1, p. 63 (1923); KOORDERS, Fl. Tjibodas, 2, p. 232 (1923); DOCTERS VAN LEEUWEN, in Flora, 118—119, p. 84 (1925); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 957, ic. 2329, t. 191, fig. 1 (1925); SENN, in Journ. Manch. Geogr. Soc., 41—42 (1925—1926) p. 4; SCHMUCKER, in Beih. Bot. Centralbl., 43, 2, p. 51, 66 (1927); DOCTERS VAN LEEUWEN, in Trop. Nat., 16 (1927) p. 118, ic. 26; 17 (1928) p. 104, 172; SCHRÖTER & BACKER, in Festschr. Hans Schinz (1928) p. 595; DE VOOGD, in Trop. Nat., 18 (1929) p. 194; RANT, in Nat. Tijdschr. Ned. Ind., 89, p. 451 (1929); VAN STEENIS, in Trop. Nat., 19 (1930) p. 89; DOCTERS VAN LEEUWEN, in Bull. Jard. Bot. Buitenzorg, sér. III, 11, p. 35, 49 (1930); DAKKUS, in Bull. Jard. Bot. Buitenzorg, sér. III, suppl. 1 (1930) p. 258; RIDLEY, Dispers. Pl. (1930) p. 591; DOCTERS VAN LEEUWEN, in Verh. Akad. Wetensch. Amsterdam, afd. Natuurk., sect. 2, XXXI (1933) p. 13, 17, 52, 68, 87, 124, 138, 196, 197, 218, ic. 41, tab. 18; FREY-WYSSLING, in Trop. Nat., 22 (1933) p. 5; VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 15, 16, 50 (1933), p. 256 (1934); *Sanicula elata* D. DON, Prodr. Fl. Nep. (1825) p. 183; D. C., Prodr., 4 (1830) p. 85; WIGHT & ARN., Prodr. Fl. Pen. Ind. Or. (1834) p. 367; MIQUEL, Ill. Fl. Arch. Ind. (1871) p. 40; BECCARI, Malesia, 1 (1877) p. 219; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 137 (1898); CHERMEZON, in LECOMTE, Fl. Indo-Ch., 2, p. 1141

(1923); *Sanicula javanica* BLUME, Bijdr. Fl. Ned. Ind., 15 (1826) p. 882; D. C., Prodr., 4 (1830) p. 85; HASSKARL, Cat. Pl. Hort. Bot. Bogor. (1844) p. 163; ZOLL. & MOR., in MORITZI, Syst. Verz. 1842—1844 (1846) p. 41; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 137 (1898); RIDLEY, in Journ. F. M. S. Museums, VIII, 4 (1917) p. 41; BAKER, in Journ. Bot., 62, suppl. (1924) p. 44; *Sanicula montana* BLUME, Catal. (1823) p. 54, nomen; Bijdr. Fl. Ned. Ind., 15 (1826) p. 882; D. C., Prodr., 4 (1830) p. 85; JUNGHUHN, in Nat. & Geneesk. Arch. Ned. Ind., 2 (1845) p. 29; ZOLL. & MOR., in MORITZI, Syst. Verz. 1842—1844 (1846) p. 41; MOLKENBOER, in MIQ., Pl. Jungh., p. 93 (1851) cum var. *genuina, javanica, divaricata*; MIQUEL, Fl. Ind. Bat., I, 1, p. 736 (1856) cum var. *genuina, javanica, divaricata*; suppl. Sum. (1860) p. 134; TEYSMANN & BINNEND., Cat. pl. Hort. Bot. Bogor. (1866) p. 165; FILET, Plantk. Woordenb. (1876) p. 95; BECCARI, Malesia, 1 (1877) p. 219; in Bot. Jahrb., 1 (1881) p. 29; MOHNIKE, Blicke Pflanz. & Tierleben Ned. Malaienländern (1883) p. 268; WIGMAN in Teysmannia, 4, p. 742 (1893); MASSART, in Mém. Soc. Roy. Belg., 34, p. 222, 262, 265, 269, 338 (1895); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 137 (1898); KOORDERS, in Nat. Tijdschr. Ned. Ind., 60, p. 371 (1901); WIGMAN, in Teysmannia, 15, p. 459 (1904); DE CLERCQ, Plantk. Woordenb. (1909) p. 321; ERNST, in Veg. Bild., 7 Reihe, Heft 1—2, Taf. 1—3 (1909); KOORDERS, in Bot. Jahrb., 50, suppl. (1914) p. 285; *Sanicula montana* var. *genuina* & var. *javanica* ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848 (1854) p. 138; *Sanicula elata* var. *normalis* & var. *partita* KUNTZE, Rev. gen. pl., 1 (1891) p. 269; *Sanicula europaea* var. *javanica* WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 61, p. 64 (1913); MERRILL, Enum. Phil. Fl. Pl., 3 (1923) p. 238.

The Malaysian *Sanicula europaea* is rather uniformous. BLUME distinguished a *Sanicula javanica* from a *S. montana,* the former with 5-lobed, the latter with ternate leaves. MOLKENBOER united the two under the name *S. montana,* but distinguished 3 varieties, *genuina, javanica,* and *divaricata,* mainly based on the length of the involucres and the development of the pedicels of the male and female flowers. MIQUEL (in Ill. Fl. Arch. Ind., p. 40) united this *S. montana* with *S. elata* D. DON, from the Himalaya. KUNTZE distinguished in this *S. elata* the varieties *normalis* and *partita,* the former with less, the latter with more strongly incised leaves. C. B. CLARKE rightly united all these forms with *S. europaea.*

The varieties distinguished by MOLKENBOER and KUNTZE are too slight to be named. The Malaysian form differs, however, more distinctly from the European form, by the umbels arranged in widely branched di-mono-

chasia, whereas the European form has more crowded inflorescences and the flowers consequently nearly arranged in a compound umbel.

The elevations on which *S. europaea* is found in Malaysia vary from 500—3060 m.

MALAY PENINSULA. Pahang, Telom valley, RIDLEY 13540 (S); Lubok Tamang, 1050 m el., HENDERSON 11033, 10953 (S).

SUMATRA. Above Takingeun, 1275 m el., VAN STEENIS 5981 (B); Berastagi, BURKILL 12 (S); Karo Plateau nr. Kabandjahé, 1200 m el., LÖRZING 6214 (B, L); nr. Siberaja, Laoebiang valley, 1150 m el., LÖRZING 9536 (B); Deleng Koetoe, 1250 & 1450 m el., LÖRZING 4951 (B); Toba Plateau, nr. Paranginom, 1300 m el., OUWEHAND 367 (B); central Habinsaran nr. Parsoboeran, ravine Aèk Gerat, 1000 m el., LÖRZING 7818 (B); Sumatra's Westkust, KORTHALS s.n. (L); G. Talakmau, plateau at 2800 m el., BÜNNEMEIJER 839 (B); G. Singgalang, BECCARI P.S. 331 (L); G. Singgalang, 1050 m el., MATTHEW s.n. (K); 1650 m el., BÜNNEMEIJER 2579 (B, L, S); 2500 m el., BÜNNEMEIJER 2659 (B, L, U); forest above 2000 m el., LEEFMANS 27 (B); G. Talang, 2200 m el., BÜNNEMEIJER 5544 (B); G. Marapi, 1850 m el., BÜNNEMEIJER 4586 (B, L, S, U); 2650 m el., BÜNNEMEIJER 5018 (B, BD, L, U); G. Malintang, 1100 m el., BÜNNEMEIJER 3562 (B, BD, L, S); Bt. Nantigo, 1250 m el., BÜNNEMEIJER 3790 (B); Sedarang Agong, 735 m el., RIDLEY l.c.; G. Kerintji, Sumatra Expedition 1877—1878 s.n. (L); 2190 m el., ROBINSON & KLOSS s.n. (S); Bt. Tebakar, 1200 m el., BÜNNEMEIJER 8186 (B, L, S); G. Kerintji, 1550—2900 m el., BÜNNEMEIJER 8794, 9112, 10166, 10414, 10526, 9664, 9202, 9783, 9960, 9986, 9987, 9988 (B); 2500—2800 m el., STOUTJESDIJK 2 (B); 3000 m el., MATTHEW s.n. (K); between Kajoe Aro and the summit, Pondok Boenga, 3000 m el., FREY-WYSSLING 129 (B); Balalau, 900 m el., FORBES 1952 (L); G. Kaba, 1500 m el., DE VOOGD 506 (B); G. Dempo, 1400 m el., AJOEB (exp. JACOBSON) 439 (B); 2220 m el., FORBES 2402 (BD, L); G. Raja, 1000—1643 m el., VAN STEENIS 3566 (B); Bengkoeloe, Liwa, 900 m el., DE VOOGD 41 (B); G. Tanggamoes, 2000 m el., LIEFTINCK 22 (B).

BORNEO. Mt. Kinabalu, CLEMENS s.n. (B); Lobang, CLEMENS 10330 (B); Silau Basin, 1650 m el., CLEMENS 29725 (B); Colombon River basin, 1200 m el., CLEMENS 34031 (B); Penibukan, under Dahobang falls, 1200 m el., CLEMENS 30682 (B).

JAVA. Without exact locality: BLUME s.n. (L, U); ZIPPELIUS s.n. (L); KORTHALS 202 & s.n. (L); JUNGHUHN s.n. (L); WAITZ s.n. (L), v.n.: *daun katepan*; JAGOR s.n. (BD); HILLEBRAND s.n. (BD); „Harriang" VAN HASSELT 54 (L); „Gondang Banteng" WICHURA 2137 (BD); G. Karang, above Pandeglang, 600 m el., BACKER 7379 (B, L); Nirmala, s.w. of Buitenzorg, ravine of the Tjikaniki, 1100 m el., BACKER 10872 (B); Tjiapoes, HALLIER s.n. (B, L); G. Pangrango, HASSKARL 131 (B), original of *Sanicula javanica* BLUME; „Tjicoppo" on G. Gedé nr. Poentjak, BOERLAGE s.n. (L); Tjibodas, 1400—1500 m el., SCHEFFER s.n. (B, L); DE MONCHY s.n. (B, L) HALLIER 72 (L, B), 438 (B); KOORDERS 31679 β (B); VOLKENS 178 (BD); PULLE 4030 (U); VAN HARREVELD s.n. (G); BURKILL 8156 (S); SAPEI 448 (S); DANSER 5720 (G); VAN STEENIS 1851 (B); Tjibeureum, 1650 m el., WICHURA 2136 (BD); between Tjibeureum & Kandang Badak, WARBURG 3124 (BD); below Kandang Badak, 2000—2400 m el., DANSER 6145 (G); 2400 m el., KOORDERS 31800 β (B); REYNVAAN 45 (B); 2400—

2700 m, BACKER 31295 (B); crater Pangrango, 3000 m, REYNVAAN 193 (B); summit, 3060 m el., VAN HASSELT 534 (L); POSTHUMUS 157 (B); G. Gedé, eastern slope, 1420 m, BACKER 3208 (B); 2400 m, BACKER 3252 (B); southern slope, 1800 m el., BACKER 14715 (B); Geger Bintang, 1600 m el., DEN BERGER 596 (B); Sindanglaja, PLOEM s.n. (B); HULLET s.n. (S); Tjireunghas, nr. Soekaboemi, 900—1000 m el., BACKER 14939 (B); forest Takokak, 1000 m el., KOORDERS 15057 β (B), v.n.: *kundje*; 15244 β (B), v.n.: *tespong*; Tjadasmalang nr. Tjibeber, 1000 m el., BACKER 22374 (B); BAKHUIZEN VAN DEN BRINK 1867, 2138, 2056 (B), 2421 (B, L), v.n.: *tetespongan*; G. Malang, s. of Tjireunghas, 1000 m el., BACKER 31916 (B); G. Boerangrang, n. slope, 900 m, BACKER 14124 (B); Wanajasa, s. of Poerwakarta, BAKHUIZEN VAN DEN BRINK 4661 (B, L); Pasir Limoes, 1000 m el., BAKHUIZEN VAN DEN BRINK 4359 (B, L); G. Tangkoebanprahoe, s. slope, 1600 m el., BACKER 2421 (B); 1800 m el., BACKER 30895 (B); Lèmbang, VAN WELSEN 22 (B); G. Semboeng, s.w. of Bandoeng, 1300 m el., BACKER 12205 (B); Kendeng nr. Bandoeng, DOCTERS VAN LEEUWEN s.n. (B); Rawa Tjangkoan, SCHEFFER s.n. (B), v.n.: *antanan*; G. Malabar, WARBURG 11242 (BD); 1800 m el., FORBES 820 (B); 1800—2100 m el., JAGOR 379 (BD); 2300 m el., VAN SLOOTEN 299 (B); 1400—2000 m el., DENKER 79 (B); Tjinjiroean, 2000 m el., KEUCHENIUS s.n. (B); RANT s.n. (B); Pengalengan, 600 m el., FORBES 1020 (BD, L, S); between Tjikakoeripan & G. Patoeha, WARBURG 3123 (BD); estate Soekahati, 1200 m el., LEEFMANS s.n. (B); G. Patoeha, 2000 m el., LÖRZING 1343 (B, L, S); G. Wajang, between Soemadra & Taloen, 1250 m el., BACKER 5640 (B); G. Papandajan, KORTHALS s.n. (L); Tegal Pandjang, 2041 m el., VAN STEENIS 4337 (B); crater margin, 2450 m el., VAN DER PIJL 465 (B); above the ravine of the Tjiparoegpoeg, 2500 m el., VAN STEENIS 4129 (B); G. Telagabodas, BURCK 532 (B, L); BOERLAGE s.n. (L); 1300—1600 m el., KOENS 282, 253 (B); nr. pasanggrahan Pangentjongan, 1400—1600 m el., KOORDERS 26530 β, 40561 β (B); above Pangentjongan, 1500 m el., BACKER 31917 (B, L); G. Djaja, 1470 m el., LAM 161 (B); G. Tjikoeraj, SCHEFFER D60 (B), v.n.: *doelang sontog*; above Waspada, 1700 m el., BACKER 5335 (B); G. Galoenggoeng, above Sigaparna, 800 m el., BACKER 8624 (B, L); G. Mandalagiri, Pamegatan, VAN RIJCKEVORSEL 47 (B); Noesa Gedé, in the Pendjaloe Lake, 720 m el., KOORDERS 47887 β (B); G. Goentoer, 1300—2000 m el., KOENS 367 (B); G. Tjerimai, ZIPPELIUS s.n. (L); BLUME s.n. (B, L); N.E. slope, 700 m el., BACKER 4819 (B, L); Petoengkriana, s. of Pekalongan, 1500 m el., BACKER 15906 (B, BD, L); G. Tjedana nr. Madjenang, 700 m el., BACKER 18658 (B); G. Slamet, above Batoe Raden, 700—800 m el., BACKER 178 (B, L), v.n.: *gletang warak*; 1800 m el., LAM 2122 (B); 2150—2440 m el., BACKER 436 (B); 2500 m el., BACKER 514 (B); forest Pringamba, KOORDERS 27125 β (B); 37466 β (B), v.n.: *kepotong*; Diëng, JUNGHUHN s.n. (L); HILLEBRAND s.n. (BD); WARBURG 4390 (BD); plateau, 2000 m el., BACKER 21601 (B); G. Prahoe Diëng, JUNGHUHN s.n. (L); 2000 m el., LÖRZING 317 (B); Wanasaba, 800 m el., BRINKMAN 268 (B); Garoeng nr. Wanasaba, 1100—1600 m el., BACKER 21976 (B); G. Pangonan, 2150 m el., VAN SLOOTEN 366 (B); Diëng-wètan, 2000 m el., WIRJOSAPOETRO 70 (L), v.n.: *pontjoboemi*; G. Soendara, 2500 m el., DOCTERS VAN LEEUWEN 8964 (B); G. Soembing, 2100 m el., LÖRZING 38 (B, BD), v.n.: *tjakar ajam, pulatjeng*; G. Oengaran, JUNGHUHN s.n. (U); 1000 m el., DOCTERS VAN LEEUWEN s.n. (B); nr. Medini, 900—1200 m el., JUNGHUHN s.n. (L), v.n.: *traseng*; WAITZ s.n. (L); slope Soerolaja, 700 m el., DE VISSER SMITS s.n. (B); G. Telamaja, KOORDERS 28050 β (B), v.n.: *oerek polo*; 1400 m el., KOORDERS 35976 β

(B); G. Merbaboe, e. slope, JUNGHUHN s.n. (L); 1900 m el., DE BEYER 93 (B), v.n.: *sledren*; above Salatiga, 2000—2400 m el., BACKER 30264 (B); G. Merapi, 1200 m el., JUNGHUHN s.n. (L); nr. Andong, 900 m el., JUNGHUHN s.n. (L); G. Plampangan, at foot of G. Merapi, 750 m el., BEUMÉE A120 (B); Wanasari, 1000 m el., MOUSSET 59 (L); G. Lawoe, above Djagaraga, 850 m el., BACKER 6729 (B, L); 1000 m el., BLOKHUIS s.n. (B); Sido Ramping, Gandong valley, 1300—1400 m el., ELBERT 301 (L); G. Wilis, 1200 m el., LÖRZING 819 (B); nr. pasanggrahan Ngebel, 1300—1400 m el., KOORDERS 23276β (B), v.n.: *seledren*; 1600 m el., DEN BERGER 702 (B); above Kediri, 1700—1800 m el., BACKER 11590 (B); G. Pitjis, KOORDERS 29477β (B); G. Ardjoena, Prigen, RANT s.n. (B); Trètès, 800 m el., BREMEKAMP s.n. (B); 2400 m el., ZOLLINGER 1915 (B, BD, S); G. Kawi, 1500 m el., WISSE 259 (B); Oro-oro plain, spring Sebaloe, 2690 m el., ARENS & WURTH s.n. (B); Tjamara Kandang, 2700 m el., DOCTERS VAN LEEUWEN 12274 (B); G. Tengger, Lawang, MOUSSET 59 (B); Poesoengsadjimah, s. of Malang, 850—1150 m el., VAN OOSTEN 13 (B); 1500—1800 m el., ZOLLINGER 1747 (BD, L); dèsa Ngepoeh, 1100—1600 m el., VAN HARREVELD-LAKO 24, 65 (B); Nangkadjadjar, 1200 m el., WISSE 654 (B); 1230 m el., BUYSMAN 3009 (U); Klètak, 1800 m el., DOCTERS VAN LEEUWEN 4540 (B); Ngadisari, 2200 m el., KOORDERS l. c.; G. Kembang, 2300 m el., KOORDERS 37887β (B, L), v.n.: *toembaran idjoe*; 2500 m el., BACKER s.n. (B); G. Seméroe, above Kaliglidik, 1300 m el., BACKER 3593 (B); G. Widadarèn, 1750 m el., BACKER 3610 (B, L); G. Argapoera, 800 m el., BACKER 13191 (G); G. Ijang, 1900 m el., CLASON G39 (B, G); Tjemaralantjang, 2100 m el., BACKER 9761 (B, L); G. Koekoesan, 2000 m el., JESWIET 479 (B); Ijang, on the plateau, 2100 m el., KOORDERS 43466β (B); Kajoemas, OTTOLANDER 356 (B, L), v.n.: *slerem*, *gali*; G. Idjen, 1200 m el., BACKER 25364 (B); Pantjoer Idjen, 1450 m el., KOORDERS 32561β (B); Gendingwaloeh, 1450 m el., KOORDERS 43162β (B); Kalibendo, 800 m el., KOORDERS 43163β (B); G. Raoeng, Soemberwringin, 1250 m el., CLASON 130 (B, G).

TIMOR. Goenoeng Moetis, 2000 m el., DE VOOGD 2299 (B).

SELEBES. Teloek Manipi, WARBURG 16131 (BD); G. Bantaèng, EVERETT 33 (S); Rante Lemo, 1400 m el., KJELLBERG 1541 (B).

SERAN. Hatoemete Pass, 500—700 m el., KORNASSI 620 (B).

Distribution: temperate and tropical parts of Europe, Africa, and Asia.

V. ERYNGIUM

LINN., Sp. pl., ed. 1 (1753) 1, p. 232; Gen. pl., ed. 5 (1754) p. 108; BENTHAM, Fl. austr., 3 (1866) p. 369; BENTH. & HOOK.F., Gen. pl., 1, p. 878 (1867); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 669 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 614; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 139; WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 61 (1913) p. 106; THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 974 (1925).

Only species:

1. Eryngium foetidum LINN., — Herb, 15—60 cm high. Main root fusiformous. Stem many times di-mono-chasially branched with spreading

branches, nearly glabrous, grooved. Leaves nearly all of them in a rosette, lanceolate-spathulate, 3—32 cm long, 1—4 cm broad, obtuse, sessile with more or less narrowed sheathy base and dentate margin, the teeth crowned by a stinging hair, glabrous. Bracts of the inflorescence palmatilobate to -partite, 1—6 cm long, with spiny apices and teeth, strongly nerved, the lowermost often more like normal leaves. Heads 5—10 mm long, cylindrical, on 1—10 mm long peduncles; involucral bracts 5—7 in number, spreading, nearly lanceolate, with few spiny teeth. Flowers sessile in the axils of narrow, membranous-margined, 1.25—1.5 mm long bracts. Calyx teeth distinct, nearly 0.75 mm long, lanceolate, acute, with narrow membranous margin; petals 0.5—0.75 mm long, nearly 0.25 mm broad, the inflexed tip excluded. Fruit with very indistinct ribs, densely warty, glabrous; mericarps 1—1.5 mm long, 0.5—0.75 mm broad.

Eryngium foetidum LINN., Sp. pl., ed. 1 (1753) 1, p. 232; D. C., Prodr., 4 (1830) p. 94; TEYSMANN & BINNENDIJK, Cat. Pl. Hort. Bot. Bogor. (1866) p. 165; EDELING, in Nat. Tijdschr. Ned. Ind., 31, p. 294 (1870); HIERN, in Fl. Trop. Afr., 3 (1871) p. 6; BOERLAGE, in Handel. Tweede Nat. & Geneesk. Congres (1889) p. 3; Handl. Fl. Ned. Ind., I, 2 (1890) p. 615; KUNTZE, Rev. gen. pl., 1 (1891) p. 267; WIGMAN, in Teysmannia, 4, p. 391, 392 (1893); MASSART, in Mém. Soc. Roy. Bot. Belg., 34, p. 181, 195, 329 (1895); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 142 (1898); KOORDERS, in Nat. Tijdschr. Ned. Ind., 60, p. 394 (1901); KING, Mat. Fl. Mal. Pen., 13 (1902) p. 599; BACKER, in Ann. Jard. Bot. Buitenz., suppl. 3, 1 (1910) p. 402; KOORDERS-SCHUM., Syst. Verz., I, 1, fam. 228, p. 98 (1911); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 724; WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 61 (1913) p. 203; BOLDINGH, Zakfl. landbouwstr. Java (1916) p. 174; HEYNE, Nutt. pl. Ned. Ind., ed. 1, 3 (1917) p. 396; RIDLEY, Fl. Mal. Pen., 1 (1922) p. 870; KOORDERS, Fl. Tjibod., 2, p. 233 (1923); CHERMEZON, in LECOMTE, Fl. Indo-Ch., 2, p. 1140 (1923); BACKER & VAN SLOOTEN, Handb. Jav. Theeonkr. (1924) p. 186, cum ic.; OCHSE, Trop. groenten (1925) p. 189, cum ic.; HEYNE, Nutt. pl. Ned. Ind., ed. 2 (1927) 2, p. 1211; DAKKUS, in Bull. Jard. Bot. Buitenz., sér. III, suppl. 1 (1930) p. 131; OCHSE & BAKHUIZEN, Ind. groenten (1931) p. 710, ic. 431; CRAIB, Fl. siam. enum., 1, p. 788 (1931); ALSTON, in TRIMEN, Handb. Fl. Ceyl., 6 (1931) p. 138; BACKER, Fl. Jav. Suikerrietgr., p. 475 (1931); BURKILL, Dict. Econ. Prod. Mal. Pen., 1 (1935) p. 944.

Eryngium foetidum has been introduced from Tropical America as a weed, but is entirely naturalized now in the Malay Peninsula, Sumatra, and Java. The oldest specimens seen from the Malay Peninsula have

been collected in Negri Sembilan in 1888, in Penang in 1889, in Pulau Butong in 1890, in Johore in 1894. The oldest ones from Java have been collected near Buitenzorg in 1893, near Takokak in 1894, near Ngebel in 1896, near Pringamba in 1897, on the Goenoeng Telamaja in 1897, near Sepakoeng in 1899. The oldest ones from Sumatra have been collected in 1915 near Moearadoea, and near Sibolangit in 1917.

From botanical literature we see that the species was observed as early as 1869 near Bidaratjina by EDELING (l. c.). KUNTZE (l. c.) mentions it as seen by him near Buitenzorg in 1875, BOERLAGE (l. c.) found it near Palaboehanratoe in 1888.

MALAY PENINSULA. Penang, CURTIS s.n. (S); nr. Chinese house, Batu Itam, CURTIS s.n. (S); Ginting ...? BURKILL 3051 (S); Pulau Boetong, CURTIS s.n. (S), v.n.: *kangkong kerbau*; Perak, Kuala Kendrong, Grik, BURKILL & HANIFF 12446 (S); Selangor, Ginting Sempak, HAMID 10259 (S), v.n.: *jeraju gunong*; HUME 8965 (S); Negri Sembilan, Bukit Tumiang, ALVINS 1612 (S), v.n.: *pokô kulumbar*; Pahang, Raub Track, MACHADO 11544 (S); Malacca, CANTLEY'S COLL., s.n. (S); Johore, Tanjong Kupang, RIDLEY s.n. (S); Singapore, Chan Chù Kang, RIDLEY s.n. (S); Bajau, RIDLEY s.n. (S); Kandang Kerbau, RIDLEY 10411 (S).

SUMATRA. Sibolangit, Botanic Garden, 500 m el., LÖRZING 5263 (B, L, U); G. Kerintji, Bt. Tebakar, 850 m el., BÜNNEMEIJER 7956 (B, L, S), v.n.: *oemboe palembang*; Moeara Doea, 600 m el., GRASHOFF 530 (B), v.n.: *ketoembor djawa*.

JAVA. Without exact locality: HILLEBRAND s.n. (BD); Bantam, Pasaoeran, 30 m el., BACKER 7265 (B); Rangkasbitoeng, 50 m el., BACKER 1074 (B), v.n.: *walang*; between Tjitorek & Moentjang, 400 m el., BACKER 1830 (B); between Tjilèlès & G. Kentjana, 200 m el., BACKER 1190 (B); between Bajah & G. Madoer, 25 m el., BACKER 1664 (B, L), v.n.: *walang*; Sadjira, 150—200 m el., BACKER 2039 (B); between G. Kentjana & G. Kendeng, 300 m el., BACKER 1289 (B); between Malingping & Pengawoengan, 5—25 m el., BACKER 1466 (B, L); Batavia, Tjempakapoetih, 5 m el., BACKER 32138 (B, L); G. Sahari, Sentiong, 5 m el., BACKER 32130 (B, L); Kerendang, 5 m el., BACKER 32135 (B); between Batavia & Meester Cornelis, 15 m el., BACKER 32137 (B); near Bidaratjina, anno 1869, EDELING l. c., first record; Tjigombong, 600 m el., KEUCHENIUS s.n. (B); Tjigombong, nr. Buitenzorg, 500 m el., VAN STEENIS 57 (B); between Djasinga & Pasir Madang, 100—500 m el., BACKER 10336 (B, L); Nirmala, 900 m el., BACKER 11116 (B, L, U); Tjidoedjoeng, n. of Buitenzorg, 150 m el., BACKER 22712 (B); between Buitenzorg & Batoetoelis, HALLIER 130a (B, L); Tjiomas, 250 m el., SOEGANDIREDJA 98 (B, L), v.n.: *walang*; G. Batoe nr. Tjianten, s. of Leuwiliang, 1000 m el., BACKER 25760 (B); Pasir Karèt nr. Buitenzorg, 800 m el., BACKER 32134 (B); Bondongan, HALLIER 130d (B); Buitenzorg, 250 m el., BOERLAGE s.n. (L); HALLIER 130b, 130c (B); KOORDERS 32613β (B), v.n.: *walang*; AXEL PREYER s.n. (BD), v.n.: *rumput walang*; WARBURG 11429 (BD); DANSER 5361, 6883 (G); G. Parang, 500 m el., BACKER 13943 (B); between Poerwakarta & Wanajasa, 300—650 m el., BACKER 14391 (B); Tjibadak, 380 m el., BACKER 592 (B); Paroengkoeda, 500 m el., A. M. DE VRIES 8 (B); between Soekaboemi & Njalindoeng, 500—700 m el., BACKER 14546 (B); G. Malang, s. of Tjireunghas, 1000 m el., BACKER 32132 (B); Leuwimanggoe, s. of Tjibeber, 1000 m el., SIKAJA

s.n. (B), v.n.: *katjoentjar walanda*; Tjidadap, s. of Tjibeber, 1000 m el., WINCKEL 1146β (B), v.n.: *katoentjar walanda, walang kendi*; BAKHUIZEN VAN DEN BRINK 4389 (B, L), v.n.: *katoentjar blanda, balang katoentjar, walang katoentjar, katoentjar walang, walang andjing, walang, walang geni, singadepa*; Tjiandjoer, 500 m el., BACKER 3090 (B, L); Kiara Pajoeng, 500—600 m el., ZWAARDEMAKER 105, v.n.: *walang* (B); 550—700 m el., BACKER 23629 (B); Takokak, 1000 m el., KOORDERS 15269β (B), v.n.: *katoentjar walanda*; KOORDERS 15135 β (B), v.n.: *kapoentjar*; G. Gedé above Tjiandjoer, 800 m el., BACKER 21569 (B); Tjibodas, 1200 m el., KOORDERS 31918 β (B), v.n.: *walang langit*; G. Tangkoebanprahoe, below Lèmbang, 1000 m el., BACKER 32136 (B); Dago, 800 m el., KOORDERS 44301 β (B); Togagapoe, w. of Bandoeng, 650 m el., LÖRZING 1111 (B, L), v.n.: *walang*; Tjilebak on the Tjitaroem, 660 m el., WISSE 905 (B); Palaboehanratoe, BOERLAGE s.n. (L), v.n.: *katoentjar walanda*: Bodjong Lopang, 500—600 m el., BACKER 16924 (B, L); Lengkong, 600 m el., BACKER 17073 (B), v.n.: *katoentjar, katoentjar walanda*; Pasawahan, 400 m el., BACKER 2224 (B); Tjiratjap, 25—100 m el., BACKER 17380 (B); Djampang Koelon, Tjitjoeroeg, 300 m el., BACKER 17230 (B); between Taloen & Tjinjiroean, 1600 m el., BACKER 5719 (B); G. Goentoer, s. slope, 1500—2000 m el., KOENS 105 (B); Tjisoeroepan nr. Garoet, 1200 m el., KOENS 493 (B); between Garoet & Tjipanas, 750 m el., BACKER 5169 (B); between Soekaradja & Singaparna, 350 m el., BACKER 8470 (B), v.n.: *walang*; G. Mandalagiri, 1350 m el., VAN VUUREN s.n. (B), v.n.: *walang*; bivouac Denoe, on the Tji Patoedjah, 300 m el., BACKER 9042 (B); Noesagedé in the Pendjaloe Lake, 720 m el., KOORDERS 47888 β (B); Tjiamis, 350 m el., BARENDS s.n. (B), v.n.: *walang*; Bantardawa nr. Bandjar, 50 m el., BACKER 32131 (B); Rawah Lakbok, s. Tjikawoeng, 20 m el., BACKER 4294 (B); between Tjerebon & Koeningan, 340—500 m el., BACKER 4768 (B); Tegal, forestry Margasari, 90 m el., NOLTÉE 2590 (B); Petoengkriana, 900 m el., BACKER 15960 (B); between Slawi & Balapoelang, 50—100 m el., BACKER 15364 (B, L); between Dara & Petoengkriana, 300 m el., BACKER 15726 (B); Dara, 100 m el., BACKER 15615 (B); Madjenang, 30—100 m el., BACKER 18428 bis (B); G. Slamet, Kalibakoeng, 360 m el., HAGEDOORN & JESWIET s.n. (B); G. Slamet, above Batoe Raden, 700—800 m el., BACKER 160 (B); Wadas Poempang nr. Patikradja, 200 m el., BEUMÉE 4809 (B); Poerwokerto 75 m el., BACKER 6 (B); 300 m el., BACKER 116 (B), v.n.: *moengsi*; Karanganjar, KOORDERS 26231 β (B), v.n.: *toembaran oenga*; Bandjarnegara, between Pringamba & Desa Sawal, KOORDERS 27118 β (B), v.n.: *djinten*; between Wanasaba & Garoeng, 800—1100 m el., BACKER 21989 (B); Temanggoeng, 600 m el., LÖRZING 350 (B, BD), v.n.: *toembaran, ketoembar landa*; Magelang, 380 m el., VAN OOSTEN 19 (B); Daroepana, 100 m el., BACKER 16447 (B); Oengaran, Garoong, 1200 m el., DOCTERS VAN LEEUWEN s.n. (B); G. Telamaja, KOORDERS 28011 β (B), v.n.: *toembaran*; Sepakoeng, 1000 m el., KOORDERS 35917 β (B), v.n.: *ketoel kebo*; Salatiga, DOCTERS VAN LEEUWEN s.n. (B); G. Kidoel, between Djepitoe & Kalak, 200 m el., BACKER 2841 (B), v.n.: *djintenan*; G. Lawoe nr. Girimoeljo, 600 m el., BACKER 6790 (B); G. Wilis, w. slope, 250 m el., WISSE s.n. (B), v.n.: *djintenan*; Ngebel, 900 m el., KOORDERS 23252 β (B), v.n.: *toembaran*; between Toelahan & Tegalombo, 500 m el., BACKER 2920 (B); between Sripit & Prigi, 150 m el., LÖRZING 1004 (B); Prigi, 8 m el., LÖRZING 1047 (B); Modjokerto, Dampak nr. Segoenoeng, 700 m el., WINCKEL s.n. (B); Poenten, 1100 m el., HOFSTEE 14 (B); Malang, 450 m el., WISSE 242 (B); Djember, 83 m el., ULTÉE 3 (B); 100 m el., BACKER 17719 (B, L).

Distribution: indigenous in tropical America, introduced in few parts of Tropical Africa and Asia.

VI. CHAEREFOLIUM

HALLER, Hist. Stirp. Helv., 1 (1768) p. 327; THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1014 (1926); *Anthriscus* PERSOON, Synops., 1 (1805) p. 320; BENTHAM & HOOKER FIL., Gen. pl., 1, p. 899 (1867); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 692 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 619; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 152 (1898).

Only species:

1. **Chaerefolium Cerefolium** (LINN.) SCHINZ & THELLUNG — Herb, somewhat hirsute. Stems 25—50 cm high, striate and grooved. Petioles of the lower leaves up to 7 cm long, with sheathy base, upper leaves with shorter petioles or sessile on the sheaths; laminae of the lower leaves triangular in outline, 4—11 cm long, 3—15 cm broad, bi- to tripennate, the primary leaflets ovate, obtuse, with 0.5—2.5 cm long petiolules, the secondary leaflets ovate, pennatipartite, with obtuse apices. Inflorescence a di-monochasium of sessile compound umbels; involucres none; involucels with 3—4 bracts nearly 2 mm long, 0.75 mm broad, lanceolate, acute, with narrow membranous margin; rays of the main umbel 3—5 in number, 5—25 mm long; pedicels 4—9 in number, 2—4 mm long, when flower-bearing, up to 5 mm long when fruit-bearing. Petals white, nearly 1—1.5 mm long, 0.5—1 mm broad, obcordate, with short inflexed tips. Mericarps 5—6 mm long, up to 1 mm broad, sometimes hirsute with antrorse hairs when unripe, black and finely granular when ripe, grooved at the inside, bearing a beak up to 2.5 mm long and nearly 0.5 mm broad; stylopodium flat. (Description after European materials.)

Scandix Cerefolium LINN., Sp. pl., ed. 1 (1753) p. 257; *Anthriscus Cerefolium* HOFFMANN, Gen. Pl. Umbellif. (1814) p. 41; D. C., Prodr., 4 (1830) p. 223; MIQUEL, Fl. Ind. Bat., I, 1, p. 744 (1856); BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 212; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 619; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 152 (1898); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 725; *Chaerefolium Cerefolium* SCHINZ & THELLUNG, in Vierteljahrsschr. Naturf. Gesellsch. Zürich, 53, p. 554 (1909); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1027, ic. 2384 (1926).

Java, cultivated according to MIQUEL, BOERLAGE, KOORDERS ll. cc.; no specimens seen.

Distribution: indigenous in S.E. Europe and W. Asia (THELLUNG, l.c.), cultivated and subspontaneous in all parts of the world.

VII. TORILIS

ADANSON, Fam. pl., 2 (1763) p. 99; MIQUEL, Fl. Ind. Bat., I, 1, p. 743 (1856); BENTHAM & HOOK.F., Gen. pl., 1, p. 928 (1867); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 625; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 155 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1048 (1926).

Only species:

1. **Torilis japonica** (HOUTTUYN) D. C. — Annual or perennial herb. Stem to more than 1 m high, finely striate, rough by appressed bristles. Leaves triangular in outline, acuminate, sparingly appressedly hirsute, pennate with leaflets pinnatipartite, the segments pinnatifid to serrate. Inflorescences terminal and axillary; peduncle 5—20 cm long; involucre 2—6-leaved; involucels with 3—7 nearly filiformous bracts; umbel-rays 0.5—3 cm long, 4—12 in number, antrorsely hirsute; pedicels 4—10 in each umbellule, 1—4 mm long, hirsute like the peduncle. Calyx teeth distinct, nearly 0.5 mm long, triangular-lanceolate, mucronulate; petals 0.5—1 mm long and broad, obcordate with inflexed tip, appressedly hairy outside. Mericarps about 4 mm long, 1.5 mm broad, oblong, with obtuse ribs, and with densely placed uncinate bristles in the grooves between the ribs. (Description after the materials under mentioned.)

Tordylium Anthriscus LINN., Sp. pl., ed. 1 (1753) 1, p. 240; *Caucalis Anthriscus* HUDSON, Fl. angl., ed. 1 (1762) p. 99; D. DON, Prodr. fl. nep. (1825) p. 183; CLARKE, in HOOK. FIL., Fl. Br. Ind., 2, p. 718 (1879); KUNTZE, Rev. gen. pl., 1 (1891) p. 266; *Caucalis japonica* HOUTTUYN, Nat. Hist., II, 8 (1777) p. 42, t. 45, 1; *Torilis Anthriscus* (non GAERTN. 1788) GMELIN, Fl. bad., 1 (1806) p. 615; D. C., Prodr., 4 (1830) p. 218; WIGHT & ARN., Prodr. (1834) p. 374; MIQUEL, Fl. Ind. Bat., suppl. Sum. (1860) p. 134, 336; TEYSMANN & BINNEND., Cat. pl. Hort. Bot. Bogor. (1866) p. 166; FILET, Plantk. Woordenb. (1876) p. 13; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 625; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 156, ic. 58L—N (1898); MATSUMURA & HAYATA, Enum. pl. Formos. (1906) p. 174; KOORDERS-SCHUM., Syst. Verz., I, 1, fam. 228, p. 98 (1911); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 725; HAYATA, Ic. pl. Formos., 2, p. 57 (1912); BOLDINGH, Zakfl. Landbouwstr. Java (1916) p. 175; CHERMEZON, in LEC., Fl. Indo-Ch., 2, p. 1157 (1923); RIDLEY, in Journ. Mal. Br. Roy. As. Soc., 1, p. 63 (1923); THELLUNG,

in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1051, ic. 2315a, 2393—2395, t. 193, 3 (1926); RANT, in Nat. Tijdschr. Ned. Ind., 89, p. 451 (1929); VAN STEENIS, in Bull. Jard. Bot. Buitenz., sér. III, 13, p. 256 (1934); *Torilis japonica* D. C., Prodr., 4 (1830) p. 219; *Torilis scabra* (non D. C., 1830) ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848 (1854) p. 139; MIQUEL, Fl. Ind. Bat., I, 1, p. 744 (1856); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 625; KOORDERS, in Teysmannia, 11, p. 244 (1901); in Nat. Tijdschr. Ned. Ind., 60, p. 371 (1901).

According to THELLUNG (l. c.) *Torilis japonica* is indigenous in Europe, N. Africa, and temperate Asia, but introduced in S. Asia and America. In the latter countries it is said to have been introduced with clover-seed. Also VAN STEENIS (l. c.) considers *T. japonica* as an alien in Sumatra and Java.

According to CLARKE (l. c.) this species occurs in the Himalaya from 900 to 2700 m elevation. As so many other Himalaya plants also occur in the mountains of Sumatra and Java, it looks quite possible to consider *T. japonica*, too, as a species spread from the Himalaya southward along the mountain ridges of the islands mentioned, in a quite natural way, be it with help of man or not.

The plants from Java and Sumatra appear to agree entirely with the European form.

SUMATRA. Karo Plateau, Berastagi, 1300—1350 m el., LÖRZING 5919 (B, L), 6716 (B); Dolok Singgalang, N. of Lake Toba, 1450 m el., LÖRZING 8844 (B); nr. Raja, 1300 m el., LÖRZING 4904 (B); nr. Lingga, 1225 m el., LÖRZING 6269 (B, L); Nagasariboe, HAGEN s.n. (B); Sumatra's Westkust, Lolo, TEYSMANN 1609 H.B. (B, U), v.n.: *ambo-ambo*.

JAVA. G. Tengger, ZOLLINGER 2515 (BD); way to the Sand-sea, RANT s.n. (B); Ngadisari, KOORDERS s.n. (L); between Tosari & Ngadiwono, 1700—1800 m el., MOUSSET 705 (B); Tosari, 1800—2500 m el., KOBUS s.n. (B); 2000 m el., BACKER 8358 bis (B); near Klètak, DOCTERS VAN LEEUWEN 4566 (B); Ider-Ider, KOBUS 258 (B); Widadarèn, Kedoenen, 2400 m el., KOORDERS 37888 β (B, L), v.n.: *toembaran alas*.

Distribution: see the discussion above.

VIII. CORIANDRUM

LINN., Sp. pl., ed. 1 (1753) 1, p. 256; Gen. pl., ed. 5 (1754) p. 124; BENTHAM & HOOK.F., Gen. pl., 1, p. 926 (1867); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 717 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 622; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 158 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1071 (1926).

Only species:

1. Coriandrum sativum LINN. — Annual herb, entirely glabrous. Stems terete, striate, up to 75 cm high. Laminae of the lower leaves palmatilobate to -partite, those of the middle leaves pennate, with segments gradually narrower, obtuse, those of the upper leaves pennate to bipennate wtih segments 0.5 mm broad. Inflorescences terminal or seemingly lateral; peduncle 2—10 cm long; involucre none or reduced to one leaf up to 5 mm long; involucels with 3—5 bracts, that are linear up to 5 mm long by 0.5 mm broad; umbel rays 3—5 in number, 1—2.5 cm long; pedicels 3—5 in each umbellule, 3—5 mm long. Calyx teeth triangular-lanceolate to oblong-lanceolate, somewhat radiating, the outer ones nearly 1 mm long, the inner ones shorter. Petals radiating, the outer ones of the inflorescence 3—4 mm long, the other ones shorter, all of them deeply bipartite with inflexed apex. Mericarps 4 mm long, 2 mm broad, hollow at the inside, together forming a nearly globose fruit; primary ribs not prominent, visible as undulated lines, secondary ribs somewhat prominent, filiformous. (Description after all the plants under mentioned.)

Coriandrum sativum LINN., Sp. pl., ed. 1 (1753) 1, p. 256; D. C., Prodr., 4 (1830) p. 250; HASSKARL, Cat. Pl. Hort. Bot. Bogor. (1844) p. 164; MOLKENBOER, in MIQUEL, Pl. Junghuhn., p. 98 (1851); ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848 (1854) p. 139; MIQUEL, Fl. Ind. Bat., I, 1, p. 744 (1856); TEYSMANN & BINNEND., Cat. Pl. Hort. Bot. Bogor. (1866) p. 166; BENTHAM, Fl. Austr., 3 (1866) p. 336; MIQUEL, Ill. Fl. Arch. Ind. (1871) p. 43; HIERN, in Fl. Trop. Afr., 3 (1871) p. 3; FILET, Plantk. Woordenb. (1876) p. 159; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 717 (1879); BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 213; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 622; MASSART, in Mém. Soc. Roy. Bot. Belg., 34, p. 203, 327 (1895); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 159, ic. 43D, 59A—D (1898); KOORDERS, Versl. Dienstr. Minah. (1898) p. 488; DE CLERCQ, Plantk. Woordenb. (1909) p. 210; KOORDERS-SCHUM., Syst. Verz., I, 1, fam. 228, p. 98 (1911); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 725; WIGMAN, in VAN GORKUM, O. Ind. Cult., 2, p. 882 (1913); VAN DONGEN, Overz. Geneesm. Ned. Ind. (1913) p. 130; BOLDINGH, Zakfl. Landbouwstr. Java (1916) p. 174; HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3 (1917) p. 396; RIDLEY, in Journ. F. M. S. Mus., 8, 4 (1917) p. 42; CHERMEZON, in LEC., Fl. Indo-Ch., 2, p. 1156 (1923); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1071, ic. 2312f—g, 2316c, 2319a, 2321d—e, t. 194, 2 (1926); HEYNE, Nutt. Pl. Ned. Ind., ed. 2, 2 (1927) p. 1212; DAKKUS, in Bull. Jard. Bot. Buitenz., sér. 3, suppl. 1 (1930) p. 82; OCHSE & BAKH., Ind. Groenten (1931)

p. 703, ic. 427; CRAIB, Fl. siam. enum., 1, p. 793 (1931); BURKILL, Dict. Econ. Prod. Mal. Pen., 1 (1935) p. 633.

SUMATRA. Atjèh, Gajo Loeëus, Panampakan, PRINGGO ATMODJO (exp. VAN DAALEN) 334 (B, L); Doerèn, PRINGGO ATMODJO (exp. VAN DAALEN) 343 (B, L); Palèmbang, Moearadoea, 650 m el., GRASHOFF 541 (B), v.n.: *ketoembor*; Sandaran Agong, 735 m el., RIDLEY l.c.; G. Pakiwang, N.W. of Danau Rana, 500 m el., VAN STEENIS 3770 (B).

JAVA. Without exact locality: ZOLLINGER 2757 (BD); Batavia, cultivated, SMITH s.n. (B, L), v.n.: *wansoei*; Ragoenan nr. Pasir Minggoe, OCHSE s.n. (B, S, U); between Batavia & Meester Cornelis, BACKER 34390 (B), cultivated; Buitenzorg, nr. veterinary school, BACKER 34391 (B); G. Gedé, e. slope, 1300 m el., BACKER 3180 (B); from Tjipatjèt nr. Sindanglaja, bought on the pasar at Buitenzorg, BAKHUIZEN VAN DEN BRINK 7412 (B), v.n.: *katoentjar*; Sindanglaja, 1075 m el., subspontaneous in a garden, BACKER 22793 (B, L, S); Lèmbang, cultivated, VAN WELSEM s.n. (B); Batoe, above Malang, 850 m el., ULTÉE 88 (B); Ngadisari, 2000—2200 m el., KOORDERS 38093 β (B), 37878 β (B, L), v.n.: *ketoembar*.

SELEBES. Tondano, FORSTEN s.n. (L).

Distribution: indigenous from Mediterranean region to Central Asia, cultivated and subspontaneous in nearly all parts of the world. (THELLUNG, l.c.)

IX. OREOMYRRHIS

ENDLICHER, Gen. pl., p. 787 (1839); HOOKER FIL., Fl. Nov. Zel., 1 (1853) p. 92; Handb. New. Zeal. Fl. (1864) p. 90; BENTHAM, Fl. austr., 3 (1866) p. 377; BENTHAM & HOOK.F., Gen. pl., 1, p. 897 (1867); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8 (1898) p. 163; CHEESEMAN, Man. N. Zeal. Fl. (1906) p. 205.

The genus *Oreomyrrhis* is spread in the mountains of Central and South America from Mexico to the Falkland Islands and moreover in those of Australia and New Zealand. The polymorphic *O. andicola* HOOKER F. covers the whole area of the genus, the other species are more local.

In the area dealt with in this paper 4 *Oreomyrrhis* forms have been collected. Two of these, from Borneo and New Guinea, have been taken up here as forms of *O. andicola*, two others, both from New Guinea, have been kept separated as distinct species.

Key to the species.

1 Leaves not compound, linear to narrowly spathulate . . . **3. O. linearis**
Leaves compound 2

2 Leaves pennate to bipennate, with the primary leaflets in several pairs . . **1. O. andicola**
Leaves subternate, with the lateral leaflets tripartite, the terminal leaflet ternate with tripartite segments . . . . . **2. O. papuana**

1. **Oreomyrrhis andicola** HOOKER FIL. — Perennial herb. Main root fusiformous, bearing a caudex with few erect branches and one or more rosettes. Leaves 0.8—16 cm long; sheath 0.3—3 cm long, 1—3.5 mm broad in the lower portion, gradually tapering into the petiole, membranaceous towards the margin, glabrous or short-hirsute on the back side, short-hirsute or sparingly pilose inside, rather densely ciliate; petiole 0.3—10 cm long, canaliculate, glabrous or short-hirsute; lamina triangular-ovate in outline, 0.5—4 cm long, 0.4—1.6 cm broad, pennate to bipennate with 5—11 primary leaflets of which the lower ones sometimes (in large leaves) pennate again with 3—5 secondary leaflets, usually all leaflets pennatifid to pennatipartite with lanceolate 1—2.5 mm long, 0.25—0.5 mm broad, thin coriaceous, glabrous or shortly hirsute, sometimes finely ciliate, sometimes mucronulate segments and with sometimes recurved margin, the small leaflets only dentate with acute, 0.75—1 mm long, nearly 0.25 mm broad triangular teeth. Inflorescences simple umbels, one to several in each rosette (terminal or lateral?); peduncles 0.7—8 cm long, terete, densely hairy with spreading somewhat silky hairs or shortly hirsute towards the apex, sometimes glabrescent; pedicels 1—9 in each umbel, 0—0.5 mm long, sometimes growing out to 3 mm long when fruit-bearing; involucre with 5—10 bracts, that are ovate-lanceolate with broad base, 2—4 mm long, densely sericeous or shortly hirsute outside, sometimes finely ciliate. Calyx teeth none; petals broad-elliptic-ovate, nearly 1 mm long, shortly ciliate at the base or glabrous, white or sometimes reddish. Fruit nearly 2.5—3.5 mm long, oblong-ovate, somewhat incurved, 0.75—1.5 mm thick, 0.75—1.25 mm broad, with prominent ribs, densely short-hirsute or glabrous; stylopodium conical, nearly 0.5 mm high, 0.4 mm thick at the base, with 2 recurved obtuse tips; carpophore split down to the base, sometimes hirsute at the margins. (Description after the materials under mentioned.)

Myrrhis andicola KUNTH, in HUMB. & BONPL., Nov. gen. et sp., 5, p. 13, t. 419 (1821); *Caldasia andicola* D. C., Mém. Ombell., p. 60 (1829); Prodr., 4, p. 229 (1830); *Oreomyrrhis andicola* HOOKER FIL., Fl. antarct., 2, p. 288, t. 101 (1844—47) n.v.; BENTHAM, Fl. austr., 3 (1866) p. 377; *Oreomyrrhis Colensoi* HOOKER FIL., Fl. Nov. Zel., 1 (1853—55) p. 92, n.v.; Handb. N. Zeal. Fl., p. 91 (1864), p. 729 (1867); *Oreomyrrhis Haastii* HOOKER FIL., Handb. N. Zeal. Fl., p. 91 (1864); *Oreomyrrhis borneënsis* MERRILL, in Amer. Journ. Bot., 5, p. 515, ic. 36 (1918); Bibl. Enum. Born. Pl. (1921) p. 459; VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 255 (1934); *Oreomyrrhis pumila* RIDLEY, in Trans-

act. Linn. Soc., ser. II, bot., 9, p. 63 (1916); VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 255 (1934).

According to MERRILL l. c. the Borneo plant, described by him as *Oreomyrrhis borneënsis* „approaches distinctly a New Zealand form from Awatere, distributed by H. A. Travers as *Oreomyrrhis andicola* Endl. forma *tenuifolia*. It differs radically from this form, however, in its very long petioles; in its peduncles being shorter than the petioles, the New Zealand form having the peduncles longer than the leaves; in its very short pedicels and its cinereous-hirsute, not glabrous fruit." From the materials of *O. andicola*, examined by me in the Kew Herbarium, appears that none of the distinctive characters enumerated by MERRILL for his *O. borneënsis* can be hold upright. There is a New Zealand form of *O. andicola*, described by HOOKER as *O. Colensoi*, entirely agreeing with *O. borneënsis*, with exception of the length of the pedicels and the indumentum of the fruit, and also in the Andes there occur forms (*e. g.* SPRUCE 5797) that have the peduncles shorter than the leaves and the petioles longer than the lamina. The other organs, on the characters of which are based *O. borneensis*, are so variable in *O. andicola*, that the former cannot be separated from the latter as a species. Hirsute fruit are found in specimens distributed by TRAVERS, s.n., from New Zealand, South Island, Mt. Torlesse, 900 and 1050 m el., moreover in the form described by HOOKER as *O. Haastii*, and in specimens from Bolivia and Tasmania that are entirely white-tomentose; but between tomentose and glabrous plants there are found all intermediates. Sessile or short-pedicelled fruit are found in the form described by HOOKER as *O. Haastii*. For all these reasons I must consider *O. borneënsis* as a form of *O. andicola*.

The plant described by RIDLEY as *O. pumila*, from New Guinea, I must consider as a dwarf form of *O. andicola*. It is 1.5—5 cm high, the leaves agree in shape with that of the Borneo plant, but are smaller and less deeply divided, whereas the pedicels grow out when fruit-bearing, and the fruit are glabrous.

As already remarked, *O. andicola* is very polymorphic. It is glabrous to white-tomentose. Its height varies from 1.5—50 cm. The rosettes are dense or loose and from them arise simple umbels or slightly branched stems with few leaves and several umbels, arranged again nearly in an umbel. The leaves are bi-tri-pennate, rarely simply pennate with pennately divided leaflets; their petiole is shorter or longer than the lamina.

BORNEO. Mt. Kinabalu, CLEMENS s.n. (B); among shrubs near the top at Donkey's Ears and foot of Victoria Peak, 3700—3900 m el., CLEMENS 29809 (B);

Paka Cave to Low's Peak, 4000 m el., in two crevices near the summit, CLEMENS 10622 (B, cotype of *Oreomyrrhis borneënsis* MERRILL); in crevices of ledges near the summit of Low's Peak, TOPPING 1687 (K).

NEW GUINEA. Wollaston Expedition, camps XIII—XIV, 3150—3750 m el., KLOSS s.n. (BM, type of *Oreomyrrhis pumila* RIDLEY).

2. Oreomyrrhis papuana BUWALDA, n. sp. — **Fig. 5.** — Herba, probabiliter perennis. Radix primaria fusiformis, caudice simplici vel ramis nonnullis erectis rosulas ferentibus. Folia ad 18 cm longa; vagina 1—4 cm longa, parte inferiore ad 5 mm lata, sensim in petiolum attenuata, margine vix membranacea, omnis glabra; petiolus 4—12 cm longus, canaliculatus, subglaber, prope laminam setis paucis subhirsutus; lamina circuitu rhomboideo-ovata, 1.5—2.5 cm longa, 8—20 mm lata, subternata, foliolo terminali ternato segmentis tripartitis, foliolis lateralibus tripartitis, segmentis omnibus lanceolato-cuneatis, crasse coriacea, margine crasso et nervorum facie inferiore setis antrorsis. Inflorescentiae umbellae simplices singulae; pedunculus 12—33 mm longus, teres, leviter sulcatus, c. 1 mm crassus, parte inferiore subglaber vel setulis minimis retrorsis scabriusculus, apicem versus setis retrorsis appressis dense vestitus, scaber; involucrum compositum e bracteis 6—9 oblongo-spathulatis, basi latis, 5—8 mm longis, 1—2 mm latis, textura et indumento ut in foliorum laciniis, primum erectis, postea reflexis; pedicelli 15—30, tempore florendi brevissimi, postea excrescentes, exteriores ad 5 mm longi, interiores breviores, setulis brevibus retrorsis appressis scabri. Calycis dentes nulli; petala 1—1.25 mm longa, c. 0.75 mm lata, oblongo-ovata vel oblongo-obovata; filamenta c. 0.5 mm longa, antherae c. 0.25 mm longae, 0.2 mm latae; styli c. 0.25 mm longi. Fructus ovato-oblongus, 4—6 mm longus, c. 0.75 mm latus, 1.25 mm crassus; mericarpia jugis 5 prominentibus obtusis, intus sulcata, glaberrima; stylopodium biconicum, basi bis 0.25 mm latum, 0.6 mm altum, apicibus 2 conicis obtusis paulum excurvatis; carpophorum

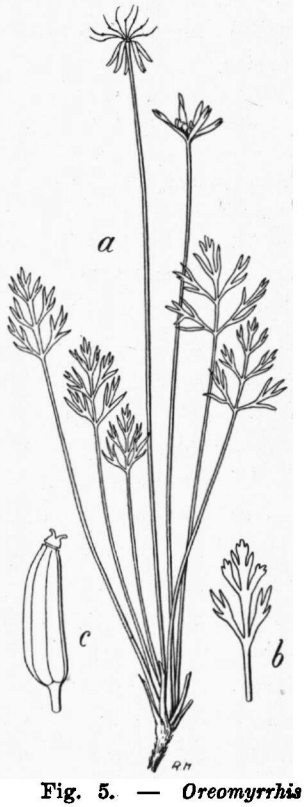

Fig. 5. — *Oreomyrrhis papuana*; *a*: plant, after LAM 1674, $^3/_4$ ×; *b*: leaf, after LAM 1694, $^3/_4$ ×; *c*: fruit, after LAM 1674, 4 ×.

integrum subulatum glaberrimum. (Description after the materials mentioned. In the remnants of fruit-bearing inflorescences of the last vegetation period, the carpophores are sometimes split at the tip and moreover appear hirsute, probably by a fungus.)

Oreomyrrhis papuana BUWALDA, ex VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 255 (1934) nomen.

Oreomyrrhis papuana is closely related to *O. andicola*, and the only differences are those in the leaf shape, mentioned in the determination key. As the leaf shape is extremely variable in *O. andicola*, it seems questionable whether *O. papuana* is not one of the forms of *O. andicola*. Among the materials of the Kew Herbarium I did not succeed, however, in finding any form showing a leaf shape similar to that of our new species.

NEW GUINEA. Doorman Top, 3500 m el., in an open swampy ravine near the summit, LAM 1694 (B, type, also alcohol materials), leaves green, petioles sometimes red towards the base, peduncle with green base and with violet hue towards the apex, involucre dark green, pedicels green, corolla dark violet, calyx green, somewhat violet, filaments violet, anthers brownish green, slightly violet, ovary green; foot of Doorman top, 3200 m el., LAM 1674 (B, alcohol materials only).

3. **Oreomyrrhis linearis** HEMSLEY — Perennial herb, cespitose. Roots probably numerous, 1—3 mm thick above, with fibrous branches. Caudex with numerous erect branches, very variable in length, up to 12 cm long, beset with fibrous leaf rudiments, bearing dense or lax rosettes at the extremities. Leaves 2—20 cm long, always with distinct sheath and petiole, with or without broader lamina; sheath 5—35 mm long, 1—4.5 mm broad, with a 0.5 mm broad yellowish margin, tapering into the petiole; petiole difficultly to be distinguished from the lamina, together with the latter forming a narrowly spathulate to entirely linear whole, the petiole 0.75—1 mm broad, if distinguishable, 0.5—7 cm long, the lamina as broad as the petiole or up to 5 mm broad below the dentate apical portion, in narrow leaves with one tooth on each side close to the apex, in broader leaves with 2—4 teeth on each side that are 1—4 mm long, up to 2 mm broad, the largest ones often with a lateral tooth; leaf margin thickened, in narrow leaves moreover revolute, usually finely retrorsely ciliate; upper and lower surface usually glabrous or the upper surface retrorsely appressedly hirsute; nervation pennate with strongly ascending lateral nerves in broader leaves, hardly visible above; main nerve and thickest lateral nerves strongly prominent beneath, finer nerves slightly prominent or indistinct. Peduncles one or several in each rosette, 6—30 cm long, erect or somewhat curved, leafless or rarely with one leaf, triangular with somewhat thickened angles, retrorsely hir-

sute towards the apex with appressed whitish bristles up to 0.5 mm long, often entirely glabrous later; involucral bracts 5—6 in number, lingulate, obtuse, 2—5 mm long, 0.5—1.25 mm broad, connate at the base, glabrous towards the apex, retrorsely hirsute towards the base; flowers 6—8 in each umbel, pedicels of the outer flowers to 1.5 mm long, the inner flowers sessile, lengthening later; fruit-bearing pedicels 2.5—10 mm long, densely retrorsely hirsute. Ovary nearly 1.75 mm long, 0.75 mm broad; calyx teeth none; petals triangular, 1.1—1.2 mm long, 0.8 mm broad, violet; filaments to 0.7 mm long, violet; anthers nearly 0.4 mm long, 0.25 mm broad, fixed in the middle, opening laterally; styles nearly 0.5 mm long, slightly curved outward. Fruit to 5 mm long, oblong-ovate, slightly curved, attenuate towards the apex, nearly 1 mm broad, 1.5 mm thick, the mericarps with 5 prominent, 0.2 mm high, obtuse ribs, grooved inside, entirely glabrous; stylopodium low-conical, 2-partite; carpophore split down to the base. (Description after the plants collected by BRASS.)

Oreomyrrhis linearis HEMSLEY, in HOOK., Ic. pl., 26, t. 2590 (1899); VAN STEENIS, in Bull. Jard. Bot. Buitenz., sér. III, 13, p. 255 (1934).

Oreomyrrhis linearis was only known, hitherto, from the originals collected by GIULIANETTI and described by HEMSLEY. The rather abundant materials, collected by BRASS, and upon which the above description is based, give a better idea of the polymorphy. There are small specimens (BRASS 4307) of which the caudices are short and crowded, the rosettes very many-leaved and dense, the leaves entirely linear from the sheath upwards, only 2.5—7 cm long, 1 mm broad, the two teeth so closely near the apex that the leaf appears quite entire at first sight, the peduncles nearly twice as long as the leaves. These specimens look like a form of open sunny locality, and indeed the label mentions their growing „amongst summit rocks". Other specimens (BRASS 4404) are partly like the above described, partly more slender, the leaves to 20 cm long, to 1.5 mm broad below the apical portion, the 3 teeth more distinct, the peduncles less than twice as long as the leaves, now and then even shorter than the leaves; they have been collected on „open grassland". The number BRASS 4358 has leaves not longer, but broader, to 4.5 mm broad under the apex, the teeth more numerous, to 3 on both sides, and more distinct, the lower ones to 3 mm long and 1.75 mm broad, here and there again bearing a tooth at the outside; these specimens are from „sheltered high mountain grassland". The number BRASS 4753 is like the preceding, but the plants are longer, the leaves to 18 cm, the peduncles to 30 cm long; it has been collected on „grassy creek banks

on open country". The number BRASS 5682 is one small plant with short but broad leaves, bearing to 4 teeth at each side, that often again bear a tooth; it has been collected on „open grassland". The originals collected by GIULIANETTI are between the numbers BRASS 4404 and 4358.

NEW GUINEA. S.E. part (Papua), Central Division, Mt. Albert Edward, 3680 m el., BRASS 4358 (NY), common, sheltered high mountain grasslands, leaves erect, flowers purple-red; BRASS 4404 (NY), tufted on open grasslands, common, flowers purple-red; BRASS 5682 (NY), open grasslands; 3986 m el., BRASS 4307 (NY), common amongst summit rocks, flowers and fruit purple; Wharton Range, Murray Pass, 2840 m el., BRASS 4753 (NY), common, grassy creek banks on open country; Mount Scratchley, 3000—3900 m el., GIULIANETTI s.n. (K); Wharton Range, 3330 m el., GIULIANETTI s.n. (K).

X. CUMINUM

LINN., Sp. pl., ed. 1 (1753) 1, p. 254; Gen. pl., ed. 5 (1754) p. 121; BENTHAM & HOOKER FIL., Gen. pl., 1, p. 926 (1867); CLARKE, in HOOK. FIL., Fl. Br. Ind., 2, p. 717 (1879); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 184 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1138 (1926).

Only species:

1. Cuminum Cyminum LINN. — Annual herb. Stem 15—50 cm high, erect, strongly branched from the base with divergent branches, terete, striate, entirely glabrous. Leaves short-petioled or sessile upon a sheath to 1 cm long and 0.5 mm broad, with a membranous white margin, auriculate at the apex or tapering into the petiole; lamina 3—10 cm long, bipennate, the segments linear, to 1.5 mm broad. Inflorescences compound umbels opposite to the leaves, or terminal; peduncle 2—4 cm long; involucral bracts 3 to 5 in number, 2—3.5 cm long, tripartite or twice tripartite, with filiformous segments, sessile upon a 0.5 cm long sheeth with membranous white margin; umbel rays 4 to 6 in number, 1—1.5 cm long; bracts of the involucels 2 to 4 in number, to 9 mm long, white-membranous at the margin; pedicels 3 to 7 in number, 4—5 mm long. Calyx teeth 1—1.5 mm long, linear to subulate, persistent; petals nearly 1 mm long by 0.5 mm broad, obcordate with inflexed tip. Mericarpia 5—7 mm long, nearly 3 mm broad, somewhat laterally flattened, with 5 filiformous bristly main ribs, and with a stellate-hairy line in the vallecules. (Description after plants from the Orient in the Kew Herbarium.)

Cuminum Cyminum LINN., Sp. pl., ed. 1 (1753) 1, p. 254; D. C., Prodr., 4 (1830) p. 201; ROXBURGH, Fl. Ind., ed. CAREY (1832) 2, p. 92;

WIGHT & ARN., Prodr. (1834) p. 373; HIERN, in Fl. Trop. Afr., 3 (1871) p. 3; ROXBURGH, Fl. ind., ed. 3 (1874) p. 271; FILET, Plantk. Woordenb. (1876) p. 89; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 718 (1879); BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 211; KOORDERS, Versl. Dienstr. Minah. (1898) p. 488; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 184 (1898); DE CLERCQ, Plantk. Woordenb. (1909) p. 213; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 726; WIGMAN, in VAN GORKUM, O.I. Cultures, 2, p. 883 (1913); VAN DONGEN, Overz. Geneesm. Ned. Ind. (1913) p. 130; HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3 (1917) p. 397; THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1138, ic. 2424, 2425 (1926); HEYNE, Nutt. Pl. Ned. Ind., ed. 2 (1927) 2, p. 1212; OCHSE & BAKHUIZEN, Ind. groenten (1931) p. 706, ic. 429; BURKILL, Dict. Econ. Prod. Mal. Pen. (1935) 1, p. 701.

JAVA, cultivated according to BISSCHOP GREVELINK, KOORDERS, WIGMAN, HEYNE, OCHSE, ll. cc.

Distribution: indigenous in Turkestan, cultivated in all parts of the world.

XI. APIUM.

LINN., Sp. pl., ed. 1 (1753) 1, p. 264; Gen. pl., ed. 5 (1754) p. 128; BENTHAM, Fl. austr., 3 (1866) p. 371; BENTHAM & HOOK.F., Gen. pl., 1, p. 888 (1867); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 678 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 616; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 184 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1139 (1926); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90, p. 26, 358 (1927).

Key to the species.

Leaves pennate, with broad 3-partite to 3-lobate petiolulate leaflets . . . **1. A. graveolens**

Leaves bi- to tripennate, with very narrow or filiformous segments . . . . **2. A. tenuifolium**

1. Apium graveolens LINN. — Annual or biennial herb. Primary root fusiformous or tuberiformous. Stems 25—90 cm high, angular, striate and grooved. Petioles rather long with a white-margined, rather short sheath up to 2 cm long in the lower leaves; lamina pennate with leaflets 2—2.5 cm long up to 3 cm broad, 3-lobate to 3-partite, petiolulate, in the upper leaves smaller, ternate to 3-partite. Compound umbels opposite to the leaves; peduncle 0—2 cm long; rays 10—15 in number, 1—3 cm long; pedicels 6—10 in number, 2—3 mm long; involucre and involucels none. Calyx teeth none; petals white or greenish, 0.5 mm long and broad, with inflexed tip. Mericarps 1 mm long, up to 0.75 mm

broad, with all ribs very narrowly winged; stylopodium nearly 0.25 mm high, the halves conical; carpophore emarginate at the tip.

Apium graveolens LINN., Sp. pl., ed. 1 (1753) 1, p. 264; D. C., Prodr., 4 (1830) p. 101; WIGHT & ARN., Prodr. (1834) p. 367; HASSKARL, Cat. Pl. Hort. Bot. Bogor. (1844) p. 163, cum var. *rapaceo*; MIQUEL, Fl. Ind. Bat., I, 1, p. 737 (1856); TEYSMANN & BINNEND., Cat. Pl. Hort. Bot. Bogor. (1866) p. 165; HIERN, in Fl. Trop. Afr., 3 (1871) p. 11; FILET, Plantk. Woordenb. (1876) p. 305; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 679 (1879); BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 206; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 617; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 185, ic. 64, D—E (1898); KOORDERS, Versl. Dienstr. Minah. (1898) p. 488; MATSUMURA & HAYATA, Enum. pl. Formos. (1906) p. 171; DE CLERCQ, Plantk. Woordenb. (1909) p. 170; KOORDERS-SCHUM., Syst. Verz., I, 1, fam. 228, p. 98 (1911); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 726; HAYATA, Ic. pl. Formos., 2 (1912) p. 52; WIGMAN, in VAN GORKUM, O.I. Cultures, 3 (1913) p. 691; HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3 (1917) p. 397; CHERMEZON, in LECOMTE, Fl. Indo-Ch., 2, p. 1143, ic. 135, 11—13 (1923); OCHSE, Trop. groenten (1925), p. 185 cum ic. p. 186; THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1142, ic. 2426—2428, 2430, i, 2434, g—i, t. 195, 5 (1926); WOLFF, in ENGLER, Pflanzenr., IV, 228, Heft 90, p. 28 (1927); HEYNE, Nutt. Pl. Ned. Ind., ed. 2 (1927) 2, p. 1213; DAKKUS, in Bull. Jard. Bot. Buitenz., sér. 3, suppl. 1 (1930) p. 24; EWART, Fl. Victoria (1930) p. 907; OCHSE & BAKHUIZEN, Ind. groenten (1931) p. 697, ic. 424; CRAIB, Fl. siam. enum., 1, p. 788 (1931); BURKILL, Diction. Econ. Prod. Mal. Pen., 1 (1935) p. 192.

SUMATRA. Cultivated at Berastagi and Pamatang Siantar, brought on the market at Médan and probably also exported to Penang and Singapore (after oral communication by Prof. J. KUYPER, Groningen); sold on the market at Palembang (MIQUEL, Fl. Ind. Bat., suppl. Sumatra, p. 52, 1860).

JAVA. Sold during the whole year by the Sundanese at Buitenzorg, from mountain cultures, now and then even planted in their gardens by the European (after oral communication by Prof. B. H. DANSER, Groningen); cultivated E. of Tjibodas, HEYNING, in Teysmannia, 13, p. 87 (1902); Tjipanas, Tjibodas, Tjimatjan, Tjihandjawar, up to 1500 m el., and even higher, Kandangsapi, Kemang, and other localities between Tjipanas and Tjibodas on G. Gedé, 1000—1400 m el., DE BIE, in Pemimpin Pengoesaha Tanah, I, 9—10, p. 60—67 (1915); Pengalengan, cultivated, WARBURG 3121 (BD); Semarang, from the mountains, MULLER, in Nat. & Geneesk. Arch. Ned. Ind., 2, p. 465 (1845); Diëng Plateau, 2100 m el., cultivated in a native garden, BACKER 21874 (B); Ngadisari, 2000 m el., KOORDERS 38092 β (B), cultivated, v.n.: *seledri*.

Distribution: indigenous in the temperate parts of Europe, Africa, and Asia, also in S. America, cultivated elsewhere (THELLUNG, WOLFF ll. cc.).

2. **Apium tenuifolium** (MOENCH) THELLUNG — Annual herb. Primary root fusiformous. Stems 40—50 cm high, striate, nearly glabrous. Leaves bi- to tri-pennate with nearly filiformous 0.5—1 mm broad segments. Inflorescences opposite to the leaves; peduncle 0—2 cm long; umbel rays 3—5 in number, 0.5—1 cm long; pedicels 5—10 in number, 2—4 cm long; involucre and involucels none. Calyx teeth none; petals white, nearly 0.4—0.6 mm long, 0.2 mm broad the strongly inflexed tip excluded. Mericarps nearly 1.5 mm long, 0.5 mm broad, with obtusely keeled ribs. Stylopodium finally bipartite, the halves small, conical; carpophore bipartite at the apex down to about one-seventh of its length. (Description after the materials under mentioned.)

Sison Ammi (non LINN. 1753) JACQUIN, Hort. Vindob., t. 200 (1773) excl. synon., ex THELL., in HEGI, l. c.; *Cnidium tenuifolium* MOENCH, Meth. (1794) p. 98, excl. synon; *Pimpinella leptophylla* PERSOON, Synops., 1 (1805) p. 324; *Helosciadium leptophyllum* D. C., Mem. Soc. Phys. Genève, 4, p. 493 (1828); Prodr., 4 (1830) p. 105; *Apium leptophyllum* BENTHAM, Fl. austr., 3 (1866) p. 372; BAILEY, Queensl. Fl., 2 (1900) p. 724; Compr. Cat. Queensl. Pl. (1913) p. 229; SPRAGUE, in Journ. Bot., 61 (1923) p. 129; ALSTON, in TRIMEN, Handb. Fl. Ceylon, 6 (1931) p. 138; *Apium Ammi* URBAN, in MART., Fl. bras., XI, 1, p. 341, t. 91 (1879); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 185 (1898); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 53, 361; EWART, Fl. Victoria (1930) p. 907; *Apium tenuifolium* THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1140 (1926).

MALAY PENINSULA. P. Pinang, Pinang Hill Garden, weed, RIDLEY 10248 (S); Government Hill, 750 m el., CURTIS 3407 (S) introduced; 720 m el., BURKILL 761 (S).

JAVA. Buitenzorg, WARBURG 1688, after WOLFF l. c.; Trètès, after communication by Dr. C. A. BACKER.

NEW GUINEA. WOLFF, l. c.

Distribution: Central & Southern America, Australia, New Zealand, cultivated or adventicious in Europe & Asia (THELLUNG, WOLFF, SPRAGUE, ll. cc.).

XII. PETROSELINUM

HILL, Brit. Herbal (1756) p. 424; HOFFMANN, Gen. pl. Umbellifer. (1814) p. 78, t. I, 7; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 186 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1154 (1926); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 63; *Carum* sect. *Petroselinum* BENTH. & HOOK.F., Gen. pl., 1, p. 891 (1879).

Only species:

1. Petroselinum vulgare HILL — Biennial herb. Stems 25—100 cm high, erect, grooved. Lower leaves to tripennate, with obovate to cuneate tripartite leaflets; upper leaves ternate. Inflorescences terminal and axillary; peduncle 2—12 cm long; umbel rays 5—10 in number, 1—3 cm long; pedicels 3—15 in each umbellule, 2—5 mm long; involucre 1—3-leaved, involucels 3—8-leaved. Calyx teeth none; petals greenish-yellow, nearly 1 mm long, 0.5 mm broad, with inflexed tip. Mericarps 2—2.5 mm long, nearly 1 mm broad, their ribs filiformous. (Description after European and Javan plants.)

Apium Petroselinum LINN., Sp. pl., ed. 1 (1753) 1, p. 264; HOUTTUYN, Nat. Hist., II, 8 (1777) p. 227; BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 206; *Petroselinum vulgare* HILL, Brit. Herbal (1756) p. 424, ic. p. 60; DRUCE, in Rep. Bot. Exch. Club Brit. Isl., 3, p. 439 (1913); OCHSE & BAKHUIZEN, Ind. groenten (1931) p. 717, ic. 435; BURKILL, Dict. Econ. Prod. Mal. Penins. (1935) 1, p. 1699; *Petroselinum hortense* HOFFMANN, Gen. pl. Umbellifer. (1814) p. 163, t. I, 7; THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1155, ic. 2433, 2434, a—f, 2435a—2437, t. 196, 2 (1926); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 63; *Petroselinum sativum* HOFFMANN, Gen. pl. Umbellifer. (1814) p. 177; D. C., Prodr., 4 (1830) p. 102; HASSKARL, Cat. Pl. Hort. Bot. Bogor. (1844) p. 163; MIQUEL, Fl. Ind. Bat., I, 1, p. 737 (1856); TEYSMANN & BINNEND., Cat. Pl. Hort. Bot. Bogor. (1866) p. 165; BENTHAM, Fl. austr. 3 (1866) p. 336; MASSART, in Mém. Soc. Roy. Bot. Belg., 34, p. 203, 335 (1895); KOORDERS, Versl. Dienstr. Minah. (1898) p. 488; DRUDE, in ENGLER & PRANTL, Nat. Pflanzenfam., III, 8, p. 186 (1898); KOORDERS-SCHUM., Syst. Verz., I, 1, fam. 228, p. 98 (1911); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 726; WIGMAN, in VAN GORKUM, O. Ind. Cult., 3, p. 685 (1913); HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3 (1917) p. 398; OCHSE, Trop. groenten (1925) p. 191, ic. p. 192; HEYNE, Nutt. Pl. Ned. Ind., ed. 2 (1927) 2, p. 1213; *Carum Petroselinum* BENTH. & HOOK.F., Gen. pl., 1, p. 891 (1867); EWART, Fl. Victoria (1930) p. 906; *Petroselinum Petroselinum* KARSTEN, Fl. Deutschl. 2, p. 394 (1895).

SUMATRA. Cultivated near Berastagi and Pamatang Siantar, brought on the market in Médan (after oral communication by Prof. J. KUYPER, Groningen).

JAVA. Batavia, cultivated, HEYNE s.n. (B, L); Meester Cornelis, 30 m el., cultivated, BACKER 21041 (B); Tjianten, S. of Leuwiliang, nr. Buitenzorg, 900 m el., cultivated, BACKER 25676 (B); Semarang, brought from the mountains (MULLER, in Nat. & Geneesk. Arch., 2, p. 465, 1845); Ngadisari, 2000 m el., KOORDERS 38091 β (B), cultivated, v.n.: *potroseli*.

Distribution: indigenous in South Europe and North Africa, cultivated and subspontaneous elsewhere (THELLUNG, WOLFF, ll. cc.).

XIII. TRACHYSPERMUM

LINK, Enum. Hort. Berol., 1 (1821) p. 267; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 188 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1167 (1926); WOLFF, in ENGLER, Pflanzenr., IV, 228, Heft 90, p. 87 (1927); *Carum* sect. *Trachyspermum* BENTH. & HOOK.F., Gen. pl., 1, p. 891 (1867).

Key to the species.

Leaves 2—3-pennatisect, the ultimate segments of the lower leaves to 1 mm broad. Calyx teeth distinct. Fruit with broad, roundish scale-like hairs **1. T. Ammi**

Leaves 2-pennatisect, ultimate segments of the lower leaves more than 2 mm broad. Calyx teeth obsolete. Fruit with narrow obtuse nipple-shaped hairs **2. T. Roxburghianum**

1. Trachyspermum Ammi (LINN.) SPRAGUE — Annual herb. Stems 25—45 cm high, striate, glabrous, usually strongly branched. Leaves 2—3-pennate, the ultimate segments narrow-oblong, to 1 mm broad. Inflorescences terminal or seemingly lateral; peduncle 1—6.5 cm long; umbel rays 5—9 in number, 0.5—1 cm long, to 2 cm long when fruit-bearing; pedicels 4—15 in number, 1—6 mm long; involucre with 3—5 oblong, sometimes divided bracts, involucels of 4—5 oblong bracts, the bracts of both very unequal in length, hirsute, with membranous margin. Calyx teeth distinct, nearly 0.2 mm long, thickly subulate. Petals 0.6—0.7 mm long and broad, obcordate, with inflexed tip. Fruit to 2 mm long, 1 mm broad, with broad scale-like hairs especially along the ribs. (Description after specimens in the Buitenzorg Herbarium, cultivated by Mr. HEYNE in his garden.)

Sison Ammi LINN., Sp. pl., ed. 1 (1753) p. 252; *Ammi copticum* LINN., Mantissa 1 (1767) p. 56; *Ligusticum ajouan* ROXBURGH, Hort. bengal. (1814) p. 21, nomen; *Ligusticum ajowan* ROXBURGH, Fl. ind., ed. CAREY, 2 (1832) p. 91; ed. 3 (1874) p. 271; *Trachyspermum copticum* LINK, Enum. Hort. Berol., 1 (1821) p. 267; THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1167 (1926); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 87, 364; *Ptychotis coptica* D. C., in Mém. Soc. Phys. Genève, 4, p. 496 (1828); Prodr., 4 (1830) p. 108; *Ptychotis Ajowan* D. C., in Mém. Soc. Phys. Genève, 4, p. 497 (1828); Prodr., 4 (1830) p. 109; WIGHT & ARN., Prodr. (1834) p. 368; WIGHT, Ic. pl., t. 566 (1843); MIQUEL, Fl. Ind. Bat., I, 1, p. 737 (1856); *Carum copticum* HIERN, in Fl. Trop. Afr., 3 (1871) p. 12; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 682 (1879) excl. syn.; BOERLAGE, Handl. Fl. Ned. Ind., I, 2

(1890) p. 618; TREUB, in Teysmannia, 10, p. 73, 74 (1900); VAN DONGEN, Overz. geneesm. Ned. Ind. (1913) p. 129; HEYNE, Nutt. pl. Ned. Ind., ed. 1, 3 (1917) p. 398; MERRILL, Interpr. Rumph. Herb. Amb. (1917) p. 411; Enum. Phil. Fl. Pl., 3, p. 238 (1923); HEYNE, Nutt. pl. Ned. Ind., ed. 2 (1927) 2, p. 1214; *Trachyspermum Ammi* SPRAGUE, in Kew. Bull. (1929) p. 228; BURKILL, Diction. Econ. Prod. Mal. Pen., 2, p. 2171 (1935).

JAVA, formerly cultivated, according to HEYNE l. c.

Distribution: indigenous and cultivated in Egypt, Abyssinia, S.W. Asia to E. India, subspontaneous in Europe (THELLUNG, WOLFF, ll. cc.).

2. Trachyspermum Roxburghianum (D. C.) CRAIB — Annual herb. Stems 15—90 cm high, striate, nearly glabrous, usually strongly branched. Leaves pennate with the leaflets pennatifid to pennatipartite, the extreme segments of the lower leaves to 3 mm broad, those of the upper leaves gradually narrower, those of the uppermost leaves very narrow, sometimes nearly filiformous. Inflorescences terminal and axillary; peduncle 2—8 cm long, rays 2—6 in number, 1—2.5 cm long; pedicels 5—15 in each umbellule, 2—6 mm long; involucres 2—5-leaved, involucels 5—8-leaved, both with very narrow and finely ciliate bracts. Calyx teeth indistinct, hardly 0.1 mm long; petals nearly 1.25 mm long, 0.75 mm broad, obcordate with inflexed tip. Mericarps oblong, nearly 2.5 mm long, 0.75 mm broad, whole fruit with very short obtuse spreading hairs. (Description after the materials under mentioned.)

Apium involucratum ROXBURGH, ex FLEM., Ind. Med. Pl., in As. Research, 11, p. 157 (1810); WIGHT, Ic. pl., II, t. 567 (1843); *Ptychotis Roxburghiana* D. C., Prodr., 4 (1830) p. 109; MIQUEL, Fl. Ind. Bat., I, 1, p. 737 (1856); *Ptychotis involucrata* ROYLE, Ill. bot. Himal., 1, p. 229 (1839); *Carum Roxburghianum* KURZ, in Journ. As. Soc. Beng., 46, II, p. 114 (1877); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 682 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 618; HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3, p. 399 (1917); CHERMEZON, in LEC., Fl. Indo-Ch., 2, p. 1144, ic. 135, 14—16 (1923); HEYNE, Nutt. Pl. Ned. Ind., ed. 2 (1927) 2, p. 1214; DAKKUS, in Bull. Jard. Bot. Buitenz., sér. III, suppl. 1 (1930) p. 59; *Carum involucratum* MERRILL, Enum. Phil. Fl. Pl., 3, p. 239 (1923); OCHSE & BAKH., Ind. groenten (1931) p. 700, ic. 425; *Trachyspermum involucratum* (non MAIRE 1922) WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 89; *Trachyspermum Roxburghianum* WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 129, errore; CRAIB, Fl. siam. enum., 1, p. 788 (1931); BURKILL, Diction. Econ. Prod. Mal. Pen., 2, p. 2172 (1935).

MALAY PENINSULA. Selangor, CANTLEY's coll. s.n. (S); Singapore, MIQUEL, l. c.

SUMATRA. Atjèh, Kong Boer, Gajoloeëus, PRINGGO ATMODJO (exp. VAN DAALEN) 199 (B, L), v.n.: *renggiroeng*; Sibolangit, 500 m el., LÖRZING 4216 (B), supspontaneous; G. Kerintji, Sumatra Expedition 1877—1878 (B); N. foot of G. Pakiwang, 500 m el., W. side Danau Rana, VAN STEENIS 3836 (B), cultivated in ladang; Moearadoea, 250 m el., GRASHOFF 395, 446 (B, L), v.n.: *adas, djintoa*.

JAVA. Batavia, E. of Loeloet, 400 m el., VAN SLOOTEN 600 (B); Buitenzorg, 250 m el., BAKHUIZEN VAN DEN BRINK 6801 (B, L, S, U) cultivated, v.n.: *soeragè*; Kalapanoenggal, nr. Buitenzorg, HEYNE s.n. (B, BD, L, S, U) cultivated; Tjileungsi and Kalapanoenggal, ex HEYNE l. c.; Si Boentoe nr. Kalapanoenggal, 200—300 m el., BACKER 5842 (B, L), cultivated, v.n.: *soeragé*; Tjibaroesa nr. Buitenzorg, VORDERMAN s.n. (B) cultivated; Tjiterep nr. Buitenzorg, ARSIN s.n. (B, L); Boerangrang, Wanajasa, 650 m el., BACKER 14239 (B), cultivated, v.n.: *parmesèli*; Tegal, 5 m el., BACKER 15447 (B) cultivated, v.n.: *pitersili, pletikapoe*; Bandjarnegara, 270 m el., BACKER 22042 (B) cultivated; Djogjakarta, JUNGHUHN s.n. (L), cultivated; Madioen, 60 m el., WISSE 64 (B); Pasoeroean, 4 m el., BACKER 24166 (B, L) and BACKER s.n. (Pa), cultivated; Bandawasa, 250 m el., BACKER 9495 (B).

MADOERA. Ketapangdaja, 1 m el., BACKER 19822 (B), cultivated, v.n.: *terseli*; Pamekasan, 15 m el., BACKER 20289 (B), v.n.: *perséli*.

LETI, nr. Timor. TREUB 466 (B, L).

HALMAHERA. Galèla, 10 m el., BEGUIN 1781 (B, L), v.n.: *sorowai*.

BATJAN. WARBURG 18114 (BD).

SERAN. Sannoeloe, sea level, KORNASSI 640 (B, L, U).

NEW GUINEA. Merauke, VERSTEEG 1847 (B).

Distribution: of unknown provenance, now cultivated and subspontaneous in tropical S.E. Asia (WOLFF l. c.).

XIV. CRYPTOTAENIA

D. C., Mém. Ombellif. (1829) p. 42; Prodr., 4 (1830) p. 118; BENTH. & HOOK.F., Gen. pl., 1, p. 896 (1867); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 189, 271 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1169 (1926); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 111.

Only species:

1. **Cryptotaenia canadensis** (LINN.) D. C. — Perennial herb. Rhizome 1—2 cm long, up to 1 cm thick, chambered. Stems erect, up to 90 cm high, terete, striate. Lower petioles up to 10 cm long, the upper ones gradually shorter, sheaths auriculate at the apex and with membranous margin; lamina ternate, with sessile or short-petiolulate ovate to rhomboidal irregularly biserrate to bidentate leaflets, the lateral ones often bifid to bipartite. Compound umbels terminal on the stems and the branches, united into leafy panicles; peduncles 1—8 cm long; rays 5—7 in number, 3—50 cm long, those of one umbel very different in

length; pedicels of each umbellule 6—10 in number, 1.5—15 mm long, those of one umbellule very different in length; involucres none or with one or two 4 mm long subulate leaves; involucels with 2—5 to 1 mm long subulate leaves. Calyx none during flowering, short on the fruit. Petals white, nearly 1 mm long, 0.5—0.75 mm broad, obcordate with inflexed apex. Mericarps 4—6 mm long, 1.5 mm broad, oblong-ellipsoidal, attenuate towards both ends, somewhat laterally compressed, distinctly ribbed; stylopodium coniformous, bipartite, the halves together with the styles forming nearly 0.75 mm long beaks on the mericarps. (Description after specimens cultivated in the Buitenzorg and Groningen Botanic Gardens.)

Sison canadense LINN., Sp. pl., ed. 1 (1753) 1, p. 252; *Cryptotaenia canadensis* D. C., Prodr., 4 (1830) p. 119; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 189 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1169, ic. 2442 (1926); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 111; DAKKUS, in Bull. Jard. Bot. Buitenz., sér. III, suppl. 1 (1930) p. 87; OCHSE & BAKHUIZEN, Ind. groenten (1931) p. 705, ic. 428; *Cryptotaenia japonica* HASSKARL, Retzia, 1, p. 113 (1855); TEYSMANN & BINNEND., Cat. Pl. Hort. Bot. Bogor. (1866) p. 166.

JAVA. Cultivated by the Japanese according to OCHSE and BAKHUIZEN l. c.

Distribution: indigenous in eastern N. America, China and Japan (THELLUNG and WOLFF, ll. cc.).

XV. CARUM

LINN., Sp. pl., ed. 1 (1753) 1, p. 263; Gen. pl., ed. 5 (1754) p. 127; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 617, p.p.; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 191 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1181 (1926); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 143; *Carum* sect. *Carvi* BENTH. & HOOK.F., Gen. pl., 1, p. 890 (1867).

Only species:

1. Carum Carvi LINN. — Biennial herb. Stems to 55 cm high, erect, terete, striate. Lower petioles to 13 cm long, upper ones gradually shorter, uppermost ones none, all of them with a sheath with membranous margin and auriculate apex; lamina oblong, to 13 cm long 5 cm broad, bipennate with divided segments. Compound umbels terminal to the stems and the branches; peduncles 1—11 cm long; involucres none or of one subulate leaf; involucels none; rays 5—8 in number, 0.5—2 cm long; pedicels 1.5—5 mm when flower-bearing, up to 9 mm when fruit-bearing, 6—14 in each umbellule. Calyx teeth none; petals white or

reddish, to 1.25 mm long, nearly 1 mm broad, obcordate with short inflexed tip. Mericarps 4—5 mm long, up to 1 mm broad, often falcate, with distinct yellowish ribs. Stylopodium bipartite, the halves low-conical. (Description after European materials.)

Carum Carvi LINN., Sp. pl., ed. 1 (1753) 1, p. 263; D. C., Prodr., 4 (1830) p. 115; MIQUEL, Fl. Ind. Bat., I, 1, p. 737 (1856); HIERN, in Fl. Trop. Afr., 3 (1871) p. 12; FILET, Plantk. Woordenb. (1876) p. 89; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 680 (1879); BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 206; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 618; KOORDERS, Versl. Dienstr. Minah. (1898) p. 488; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 192 (1898); DE CLERCQ, Plantk. Woordenb. (1909) p. 195; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 726; VAN DONGEN, Overz. Geneesm. Ned. Ind. (1913) p. 129; THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1182, ic. 2448—2449, t. 197, 1a—c (1926); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 145; BURKILL, Diction. Econ. Prod. Mal. Penins. (1935) 1, p. 468.

JAVA. Cultivated, according to MIQUEL and KOORDERS, ll. cc.; cultivated near Tosari after oral communication by Prof. J. KUYPER, Groningen.

Distribution: indigenous in Europe and temperate Asia, cultivated elsewhere. (THELLUNG, WOLFF, l. c.).

XVI. PIMPINELLA

LINN., Sp. pl., ed. 1 (1753) 1, p. 263; Gen. pl., ed. 5 (1754) p. 128; BENTH. & HOOK.F., Gen. pl., 1, p. 893 (1867); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 618; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 195 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1196 (1926); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 219; *Murrithia* & *Heterachaena* ZOLLINGER, in Nat. & Geneesk. Arch. Ned. Ind., 2, p. 576, 577 (1845); *Anisometros* HASSKARL, in Flora, 30, p. 602 (1847).

Key to the species.

1 Fruit densely warty. Involucre 3- to more-leaved. Lower leaves usually imparipennate . . . . . **3. P. pruatjan**
Fruit hairy. Involucre 1—2-leaved. Lower leaves mostly simple. . . . 2
2 Lower and middle leaves simple, with serrate margin, not lobed. Umbel rays 20—30 . . . . . **2. P. javana**
Lower leaves orbicular to reniformous, often crenate, sometimes lobate, middle leaves ternate to pennate with incised leaflets. Umbel rays 8—14 . . **1. P. Anisum**

1. Pimpinella Anisum LINN. — Annual herb. Stems erect, terete, grooved, pubescent. Lower leaves with petioles 4—10 cm long, upper ones with petioles gradually shorter, uppermost ones sessile, all with mem-

branous-margined sheath; lower laminae crenate to cordate, serrate, the following ones successively incised, ternate and nearly pennate with dentate to incised leaflets. Compound umbels terminal to the stem and its branches; peduncles 2.5—7 cm long; involucres none or of 2 narrow 3—4 mm long leaves; rays 8—14 in number, 4—25 mm long; pedicels 7—13 in each umbellule, 1—5 mm long; involucels none or of 1 or 2 subulate 1 mm long leaves. Calyx teeth indistinct; petals nearly 1 mm long, obcordate with inflexed tip. Mericarps up to 5 mm long, 2 mm broad, ellipsoidal, attenuate towards the apex, short-hairy with antrorse hairs and distinct ribs. Stylopodium bipartite, conical. (Description after European materials.)

Pimpinella Anisum LINN., Sp. pl., ed. 1 (1753) 1, p. 264; HOUTTUYN, Nat. Hist., II, 8 (1777) p. 224; D. C., Prodr., 4 (1830) p. 122; MIQUEL, Fl. Ind. Bat., I, 1, p. 740 (1856); FILET, Plantk. Woordenb. (1876) p. 1; BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 208; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 619; DRUDE, in ENGLER & PR., Nat. Pflanzenfam., III, 8, p. 196 (1898); KOORDERS, Versl. Dienstr. Minah. (1898) p. 488; DE CLERCQ, Plantk. Woordenb. (1909) p. 304; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 727; VAN DONGEN, Overz. Geneesm. Ned. Ind. (1913) p. 130; WIGMAN, in VAN GORKUM, O. Ind. Cult., 2 (1913) p. 883; THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1209, ic. 2310a, 2456 (1926); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 232, 374; EWART, Fl. Victoria (1930) p. 908; BURKILL Diction. Econ. Prod. Mal. Pen., 2, p. 1728 (1935).

JAVA, sometimes cultivated, according to MIQUEL, KOORDERS, WIGMAN, ll. cc.

Distribution: from unknown provenance, probably from the Orient, cultivated and subspontaneous throughout the world, especially in the Mediterranean Region and in Central Europe (THELLUNG, and WOLFF, ll. cc.).

2. **Pimpinella javana** D. C. — Perennial herb. Stems erect or adscendent, usually 50—150 cm high, terete, striate, shortly and densely hairy, almost tomentose in the youth, glabrescent later. Lowes leaves nearly in a rosette, with a petiole to 10 cm long of which the lower 3—6 cm sheathy, the lamina entire, ovate in outline, deeply cordate, to 12 cm long by 10 cm broad, subobtusely to acutely serrate; upper leaves gradually smaller and shorter-petioled, more acutely serrate or even dentate, the uppermost ones bearing branches in their axils, often tripartite, all of them more or less hairy above, white-tomentose below in the youth, glabrescent later. Compound umbels united to an oblong panicle, distinctly terminal to the stem and the branches or seemingly opposite the leaves; peduncles 4—15 cm long; rays 20—30 in number,

2—4 cm long; pedicels 12—16 in each umbel, 3—8 mm long; involucre 0—4-leaved, involucels 1—4-leaved, with bracts nearly filiformous and shorter than the outer pedicels. Calyx teeth none; petals nearly 1.5 mm long by 1 mm broad, with small inflexed tip. Mericarps nearly 2 mm long, 1 mm broad, densely hairy with short spreading hairs. (Description after the materials under mentioned.)

Pimpinella javana D. C., Prodr., 4 (1830) p. 122; MOLKENBOER, in MIQUEL, Pl. Junghuhn., p. 96 (1851) cum var.s *macrophylla, sylvestri, microphylla*; MIQUEL, Fl. Ind. Bat., I, 1, p. 738, t. 10 (1856) cum var.s *macrophylla, sylvestri, microphylla*; Ill. Fl. Arch. Ind. (1871) p. 40; FILET, Plantk. Woordenb. (1876) p. 94; BECCARI, Malesia, 1 (1877) p. 219; in Bot. Jahrb., 1, p. 29 (1881); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 618; KUNTZE, Rev. gen. pl., 1 (1891) p. 269; WIGMAN, in Teysmannia, 4, p. 740 (1893); KOORDERS, in Nat. Tijdschr. Ned. Ind., 60, p. 371 (1901); in Teysmannia, 11, p. 246 (1901); DE CLERCQ, Plantk. Woordenb. (1909) p. 304; KOORDERS-SCHUM., Syst. Verz., I, 1, fam. 228, p. 99 (1911); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 727; DOCTERS VAN LEEUWEN, in Ber. Deutsch. Bot. Gesellsch., 31, p. 152—156, t. 3 (1913); SCHMUCKER, in Beih. Bot. Centralbl., 43, 2, p. 49, 66 (1927); WOLFF, in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 267, 375, ic. 24; RANT, in Nat. Tijdschr. Ned. Ind., 89, p. 451 (1929); VAN STEENIS, in Trop. Nat., 19 (1930) p. 78, 89; DOCTERS v. L., in Verh. Kon. Akad. Wetensch. Amsterdam, afd. Natuurk., sect. 2, 31 (1933) p. 257; VAN STEENIS, in Bull. Jard. Bot. Buitenz., sér. III, 13, p. 256 (1934); *Murrithia cordata* ZOLLINGER, in Nat. & Geneesk. Arch. Ned. Ind., 2, p. 576 (1845); HASSKARL, in Flora, 30, p. 601 (1847); ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848 (1854) p. 139; TEYSMANN & BINNEND., Cat. pl. Hort. Bot. Bogor. (1866) p. 166; *Pimpinella javana* var. *microphylla* JUNGHUHN, Java, ed. HASSKARL, 1, p. 432 (1857).

Pimpinella javana is closely allied to *P. Candolleana* W. & A. from the Nilgherries, the Pullney Hills, Tengyueh and Yunnan, *P. Leschenaultii* CLARKE from the Nilgherries and Ceylon, *P. pulneyensis* GAMBLE from the Pullney Hills, *P. yunnanensis* WOLFF from Yunnan, *P. cambodgiana* DE BOISSIEU from Cambodgia and Yunnan, and *P. coriacea* DE BOISSIEU, from Yunnan.

According to MOLKENBOER l. c. and MIQUEL l. c., *P. javana* differs from *P. Candolleana* by the fruit, which in *P. javana* is hispid, and by the involucre, which in *P. javana* is few-leaved. According to CLARKE, the difference is, that *P. javana* has its upper leaves reduced and not pennatifid, and its fruit less strongly ribbed.

According to MIQUEL l. c. *P. javana* differs from *P. Leschenaultii* by the leaves, that are „rotundata obtusissima" in the latter, and by the stature that is „humilior".

From the materials of *P. Candolleana* and *P. Leschenaultii* seen by me in the Kew Herbarium, is evident that, between *P. javana* on the one hand and all other species above mentioned on the other hand, there is only one constant difference, *viz.* that the fruit of *P. javana* is densely hairy with short spreading hairs, whereas in all other species mentioned it is more or less covered with scale-like papillae. The latter species, however, are so little different that it would probably be better to unite them into one. The forms first described as *P. Candolleana* and *P. Leschenaultii* are, indeed, rather distinct, as the former has the lower leaves ovate-cordate, the latter cordate-orbicular, but intermediary forms are not absent, and looking over the whole group of allied forms mentioned in the above, it appears impossible to distinguish among it any well defined species.

As the peculiar fruit indumentum of *P. javana* was not met with by me among the rather polymorphic materials of this alliance, I prefer to keep provisorily *P. javana* apart as a species, though it seems questionable whether this difference is sufficient to justify such a separation.

MOLKENBOER and MIQUEL (ll. cc.) distinguish the varieties *macrophylla, sylvestris,* and *microphylla,* especially based on differences in the dimensions of stems and leaves. This variations are, however, too slight to be named as varieties.

Pimpinella javana is common in Java on the mountain summits from G. Soendara eastward, and moreover occurs in Bali. The elevations on which it is found vary between 1200 and 3125 m.

JAVA. G. Soendara, 2000 m el., LÖRZING 441 (B, BD); G. Oengaran, nr. Medini, JUNGHUHN s.n. (L) authentics of *Pimpinella javana* var. *macrophylla* MOLKENB.; G. Merbaboe, 2000 m el., BALLY s.n. (B); 2200 m el., BÜSGEN 201 (B); 2340 m el., JUNGHUHN s.n. (L), authentics of *Pimpinella javana* var. *microphylla* MOLKENB.; 2800 m el., DOCTERS VAN LEEUWEN s.n. (B); 2900 m el., DOCTERS VAN LEEUWEN s.n. (B); 3100 m el., DOCTERS VAN LEEUWEN 1166 and s.n. (B); summit, 3125 m el., DOCTERS VAN LEEUWEN s.n. (B); G. Merapi, JUNGHUHN s.n. (L); WARBURG 4281 (BD); 1200 m el., JUNGHUHN s.n. (L), authentics of *Pimpinella javana* var. *sylvestris* MOLKENB.; G. Lawoe, G. Sidoramping nr. Sarangan, 1800 m el., ALTMAN 192 (B); G. Wilis, TEYSMAN s.n. (B); WARBURG 4220 (BD); upper regions, JUNGHUHN s.n. (L), authentics of *Pimpinella javana* var. *macrophylla* MOLKENB.; above Kediri, 1700—1800 m el., BACKER 11589 (B, L); G. Walirang, ZOLLINGER 2202 (BD), original of *Murrithia cordata* ZOLL. & MOR.; G. Ardjoena, JUNGHUHN s.n. (L), authentics of *Pimpinella javana* var. *microphylla* MOLKENB.; summit Widadarèn, 2100 m el., KOORDERS 38251β (B, L); Lalidjiwo, WURTH s.n. (B); RANT s.n. (B); 2500 m el.,

KOORDERS 43853 β (B); above Lalidjiwo, 2800 m el., BREMEKAMP s.n. (B); DE VOOGD s.n. (B); G. Kawi, summit, JUNGHUHN s.n. (L), authentics of *Pimpinella javana* var. *microphylla* MOLKENB.; G. Boetak, 2500 m el., DOCTERS VAN LEEUWEN 12426 (B); 2650—2800 m el., DOCTERS VAN LEEUWEN 12456, 12209 (B); G. Tengger, KOORDERS 37883β (B); Casuarina forest, VAN SLOOTEN 2342 (B); above Tosari, RANT s.n. (B); ZEYLSTRA 6 (B); 1800 m el., POSTHUMUS s.n. (G); 2000—2400 m el., BACKER 8382 (B, L); 2200—2300 m el., BACKER & POSTHUMUS s.n. (B); Tjemara Poekoel, 2000 m el., DOCTERS VAN LEEUWEN 4562 (B); between Tosari and Ngadiwono, 2000—3000 m el., MOUSSET 337 (B, BD); between Tosari and Ngadisari, WENT s.n. (L); nr. Ngadisari, 2200 m el., KOORDERS 37879 β (B, L), v.n.: *kemboan*; G. Kembang, nr. Ngadisari, 2100 m el., KOORDERS 37880 β (B), v.n.: *kemboan*; between Tosari and the Penandjaan, 2400 m el., LEEFMANS 17 (B, L); Moenggal and Penandjaan, 2200—2500 m el., KOBUS s.n. (B, L), v.n.: *glongong, soempoengan*; Moenggal Pass, 2400 m el., WISSE 509 (B); JESWIET 598 (B); Bromo forest, JESWIET s.n. (B), v.n.: *kemboan*; G. Widadaren, nr. Kedoenen, 2300—2400 m el., KOORDERS 37881 β (B, L); 37882 β (B), v.n.: *gembokan*; G. Widadarèn, summit, JUNGHUHN s.n. (L), authentics of *P. javana* var. *microphylla* MOLKENB.; G. Seméroe, ZOLLINGER l. c.; G. Ijang, G. Krintjing, 2400—2700 m el., BREMEKAMP & BACKER 9824 (B); G. Idjen, ZOLLINGER l.c.

BALI. VAN STEENIS, after communication by letter of June 13, 1936.

3. Pimpinella pruatjan MOLKENBOER — Perennial herb. Stems several, ascending, 5—50 cm high, sometimes spread and rooting and forming rosettes, terete, striate, puberulous when young, later glabrescent. Leaves for the greater part in rosettes; petioles to 10 cm long with a sheath to 3 cm long; lamina imparipennate, with 3—11 leaflets (rarely only one), these leaflets sessile or subsessile, roundly-cordate, 1—2.5 cm long crenate-serrate to bicrenate-serrate, or slightly lobed, the upper leaves shorter-petioled and smaller, with leaflets less deeply incised and narrower more acute segments, all leaves sparingly hairy above, densely so below in the youth, glabrescent later. Inflorescences terminal to the stems and the branches, but often seemingly opposite to the leaves; peduncles 1—7 cm long; rays 4—8 in number, 7—25 mm long; pedicels 4—8 in each umbel, 1—4 mm long; involucres and involucels 3—6-leaved, the bracts nearly filiformous, those of the involucels shorter than the outer pedicels. Calyx teeth none; petals nearly 1.25 mm long by 1 mm broad, with inflexed tip. Mericarps nearly 2 mm long, 1 mm broad, warty. (Description after the materials under mentioned.)

Heterachaena alpina ZOLLINGER, in Nat. & Geneesk. Arch. Ned. Ind., 2, p. 577 (1845); *Anisometros alpina* HASSKARL, in Flora, 30, p. 602 (1847); ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848, p. 139 (1854); *Pimpinella pruatjan* MOLKENBOER, in MIQUEL, Pl. Junghuhn., p. 97 (1851) cum var. *depressa*; MIQUEL, Fl. Ind. Bat., I, 1, p. 739 (1856) cum var.s *depressa* & *polyphylla*; JUNGHUHN, Java, ed. HASSKARL, 1, p. 432 (1857); TEYSMANN & BINNEND., Cat. pl. Hort. Bot. Bogor. (1866) p. 166; MIQUEL,

Ill. Fl. Arch. Ind. (1871) p. 40; FILET, Plantk. Woordenb. (1876) p. 252; BECCARI, Malesia, 1 (1877) p. 219; in Bot. Jahrb., 1, p. 29 (1881); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 618; WIGMAN, in Teysmannia, 4, p. 740, 743 (1893); KOORDERS, in Nat. Tijdschr. Ned. Ind., 60, p. 371 (1901); DE CLERCQ, Plantk. Woordenb. (1909) p. 304; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 727; DOCTERS VAN LEEUWEN, in Verh. Kon. Akad. Wetensch. Amsterd., afd. Natuurk., sect. 2, 31 (1933) p. 124; VAN STEENIS, in Bull. Jard. Bot. Buitenz., sér. III, 13, p. 256 (1934); p. 390 (1935); *Pimpinella Panatjan* MIRB., ex ROSENTH., Syn. Pl. Diaphor., p. 533 (1862); *Carum Panatjan* BAILLON, Hist. Pl., 7 (1880) p. 178; *Pimpinella alpina* (non HOST 1827) KOORDERS-SCHUM., Syst. Verz., I, 1, fam. 228 (1911) p. 98; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 728; HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3 (1917) p. 399; WOLFF, in ENGLER, Pflanzenr., IV, 228, Heft 90 (1927) p. 272; HEYNE, Nutt. Pl. Ned. Ind., ed. 2 (1927) 2, p. 1214; RANT, in Nat. Tijdschr. Ned. Ind., 89, p. 451 (1929); VAN STEENIS, in Trop. Nat., 19 (1930) p. 77, 78, 83, 84, 89, 90; DOCTERS VAN LEEUWEN, in Verh. Kon. Akad. Wetensch. Amsterdam, afd. Natuurk., sect. 2, 31 (1933) p. 195; BURKILL, Diction. Econ. Prod. Mal. Pen., 2, p. 1728 (1935); *Pimpinella Leeuwenii* WOLFF, in FEDDE, Repert., 20, p. 159 (1924); in ENGL., Pflanzenr., IV, 228, Heft 90 (1927) p. 273; VAN STEENIS, in Trop. Nat., 19 (1930) p. 78; DOCTERS VAN LEEUWEN, in Verh. Kon. Akad. Wetensch. Amsterdam, afd. Natuurk., sect. 2, 31 (1933) p. 57, 68, 124, 195; *Pimpinella pruatjan* var. *prolifera* VAN STEENIS, in Bull. Jard. Bot. Buitenz., sér. III, 13, p. 349 (1935).

Pimpinella pruatjan is closely allied to *P. ascendens* DALZIELL, from Peninsular India. In *P. pruatjan* the leaves are often tripartite, usually pennate with 5 leaflets, rarely with up to 11 leaflets, the fruit granular-scaly. In *P. ascendens* the leaves are pennate with usually 7, rarely down to 3 leaflets, the leaflets are usually smaller and always sessile, the fruit are short-hairy. The leaf differences are certainly inadequate to distinguish the two as different species, and that in the indumentum of the fruit perhaps neither, though it is very remarkable.

Pimpinella pinetorum MERRILL, from the Philippines, is also closely allied; it has the fruit sparingly and shortly hairy, and for the rest strongly resembles *P. pruatjan*; therefore it is hardly specifically different from *P. pruatjan*, and certainly not from *P. ascendens*.

Pimpinella Leeuwenii, distinguished by WOLFF, certainly is not more than a variety of *P. pruatjan*, as VAN STEENIS remarked, who called it var. *prolifera* (l. c.). WOLFF enumerates as distinctive characters of *P.*

Leeuwenii: the lack of an erect flower bearing stem, the forming of long sympodic stolones bearing inflorescences opposite the leaves and forming rosettes, and the marked heterophylly. Indeed, such specimens occur, but between them and the typical *P. pruatjan* there are so many intermediate forms, that *P. Leeuwenii* cannot be maintained as a species and hardly as a distinct variety. The fruit of *P. Leeuwenii* is entirely like that of *P. pruatjan*, and shows the same differences with *P. ascendens*.

Pimpinella pruatjan occurs in the mountains of Java from 1800 to 3300 m elevation; its most western locality is on Mt. Pangranggo, its most eastern on Mt. Argapoera.

The species name *pruatjan* is the native name used by the Javanese in Mt. Diëng, according to JUNGHUHN; the correct form of the name probably is *poerwotjèng*, as given by TEYSMANN and WIRJOSAPOETRO.

JAVA. Without exact locality: JUNGHUHN s.n. (L); G. Pangranggo, 3000 m el., DOCTERS VAN LEEUWEN 5586 (B, L), 5729 (B, BD, type of *Pimpinella Leeuwenii* WOLFF); STOMPS s.n. (B); VAN STEENIS 4656 (B); G. Papandajan, summit, 2622 m el., VAN DER PIJL 208 (B); slope, and G. Saroni, VAN STEENIS 4121 (B, K); Tegal Pandjang, 2041 m el., VAN STEENIS 4230 (B, K, S); S. of G. Djaja, 2050 m el., ECOMA VERSTEGE s.n. (B), v.n.: *antanan kawat*; ravine Tjiparoegpoeg and Tegal Aloen-aloen, 2400—2600 m el., VAN STEENIS 4101 (B, K); ibidem, 2450—2500 m el., DOCTERS VAN LEEUWEN 13146 (B), 13171 (B, K), 13173 (B); 2650 m el., POLAK s.n. (B); G. Tjikoerai, summit, 2818 m el., SCHEFFER D33, D34 (B), v.n.: *kioerad, antanan goenoeng*; 2500—2800 m el., DOCTERS VAN LEEUWEN 8360 (B, BD, K, L), erroneously 3360 in several herbaria; G. Prahoe, HORSFIELD s.n. (K); Diëng, dèsa Diëngkoelon, 2000 m el., WIRJOSAPOETRO 59 (L), v.n.: *poerwotjeng*; TEYSMANN s.n. (B), v.n.: *poerwotjeng*; 1860 m el., JUNGHUHN s.n. (L), v.n.: *pruatjan*, authentics of *Pimpinella pruatjan* MOLKENB.; 2060 m el., BACKER 21741 (B); G. Oengaran nr. Medini, JUNGHUHN s.n. (L), authentics of *Pimpinella pruatjan* MOLKENB.; G. Merbaboe, above Sèlo, WARBURG 4221 (BD), v.n.: *tjoemboean*; G. Ardjoena, 2100—3300 m el., ZOLLINGER 2252 (B, BD), originals of *Heterachaena alpina* ZOLL. & MOR. = *Anisometros alpina* HASSKARL; 2400—3000 m el., KOORDERS 38252 β 43794 β (B); summit, way to Lalidjiwo, WURTH s.n. (B); above Lalidjiwo, 3000 m el., BREMEKAMP s.n. (B); G. Kawi, Ororo, 2600 m el., DOCTERS VAN LEEUWEN 12355 (B); G. Boetak, 2850 m el., DOCTERS VAN LEEUWEN 12217 (B); G. Tengger, 2400 m el., ZOLLINGER 2252 (B, L), originals of *Heterachaena alpina* ZOLL. & MOR. = *Anisometros alpina* HASSKARL; Tosari, 1800—2500 m el., KOBUS s.n. (B), v.n.: *ketoembar ales*; Moenggal Pass, Penandjaan, 2200—2500 m el., KOBUS s.n. (B); Moenggal Pass, RIDLEY s.n. (K); 2200—2400 m el., BACKER 1119 (B); way to Penandjaan, RANT s.n. (B); G. Batok, 2200 m el., KOORDERS 37886 β (B), v.n.: *roempoet dempoh*; G. Widadarèn, Kedoewan, Roedjah, 2300 m el., KOORDERS 37885 β (B), v.n.: *soeri pandok abong*; summit, JUNGHUHN l. c.; summit, 2400 m el., KOORDERS 37884 β (B, L), v.n.: *gebangan depok*; Penandjaan, 2650 m el., DOCTERS VAN LEEUWEN 4575 (B); G. Argapoera, 2500—2800 m el., BACKER 13331 (B); summit, 3020 m el., KOORDERS 43453 β (B, L).

XVII. OENANTHE

LINN., Sp. pl., ed. 1 (1753) 1, p. 254; Gen. pl., ed. 5 (1754) p. 122; BENTHAM & HOOK.F., Gen. pl., 1, p. 905 (1867); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 695 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 620; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 204 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1249 (1926); *Dasyloma* D. C., Prodr., 4 (1830) p. 140; *Sium* sect. *Drepanophyllum* BLUME, Bijdr. Fl. Ned. Ind., 15 (1826) p. 881.

Only species:

1. Oenanthe javanica (BL.) D. C. — Perennial herb, entirely glabrous. Stems 10—100 cm high, erect or ascending from a creeping base, terete, ramose. Leaves petioled and with sheath; petiole up to 10 cm long, often entirely sheathy; lamina pennate to bipennate with ovate serrate to narrowly oblong segments, or the segments divided again, this making the leaf 4—5-pennate. Inflorescences terminal and opposite to the leaves; peduncles 1—20 cm long, rarely none; umbel rays 0.5—3 cm long, 5—15 in number; pedicels 10—25 in each umbellule, 2—5 mm long; involucre none or one-leaved, involucels with 2—8 linear 2—4 mm long leaves. Calyx teeth distinct, acute, nearly 0.5 mm long; petals nearly 1 mm long, 0.75 mm broad, with a long inflexed tip. Mericarps 2—3 mm long, 0.5—1 mm broad, with swollen ribs, the marginal ones much more swollen than the dorsal ones, the latter, if strongly swollen often nearly entirely confluent.

Sium javanicum & *Sium laciniatum* BLUME, Bijdr. Fl. Ned. Ind., 15 (1826) p. 881; *Falcaria javanica* D. C., Prodr., 4 (1830) p. 110; HASSKARL, Aant. nut. (1845) p. 115; MOLKENBOER, in MIQUEL, Pl. Junghuhn., p. 95 (1851); *Falcaria laciniata* D. C., Prodr., 4 (1830) p. 110; MOLKENBOER, in MIQ., Pl. Junghuhn., p. 96 (1851); *Oenanthe stolonifera* D. C., Prodr., 4 (1830) p. 138; KURZ, in Journ. As. Soc. Beng., 46, p. 115 (1877); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 696 (1879); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 204 (1898); BAILEY, Queensl. Fl., 2 (1900) p. 726; KOORDERS, in Nat. Tijdschr. Ned. Ind., 60, p. 370 (1901); MATS. & HAYATA, Enum. pl. Formosa (1906) p. 172; DE CLERCQ, Plantk. Woordenb. (1909) p. 292; HOSSEUS, in Beih. Bot. Centralbl., 28, 2, p. 421 (1911); RIDLEY, in Transact. Linn. Soc., ser. II, bot., IX, 1 (1916) p. 63; in Journ. F. M. S. Mus., VIII, 4 (1917) p. 42; Fl. Mal. Pen., 1 (1922) p. 871; CHERMEZON, in LEC., Fl. Indo-Ch., 2, p. 1149 (1923); CRAIB, Fl. Siam. enum., 1, p. 790 (1931); *Oenanthe linearis* D. C., Prodr., 4 (1830) p. 138; CLARKE, in HOOK.F., Fl. Br.

Ind., 2, p. 696 (1879); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 204 (1898); CHERMEZON, in LEC., Fl. Indo-Ch., 2, p. 1149 (1923); *Oenanthe javanica* D. C., Prodr., 4 (1830) p. 138; HASSKARL, Cat. pl. Hort. Bot. Bogor. (1844) p. 163; ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848 (1854) p. 139; MIQUEL, Fl. Ind. Bat., I, 1, p. 740 (1856); TEYSMANN & BINNEND., Cat. pl. Hort. Bot. Bogor. (1866) p. 166; MIQUEL, Ill. Fl. Arch. Ind. (1871) p. 41; FILET, Plantk. Woordenb. (1876) p. 297; KOORDERS-SCHUM., Syst. Verz. I, 1, fam. 228 (1911) p. 99; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 729; HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3 (1917) p. 400; BÜNNEMEIJER, in Trop. Nat., 7 (1918) p. 70, ic. 7; OCHSE, Trop. groenten (1925) p. 190, ic. p. 191; HEYNE, Nutt. Pl. Ned. Ind., ed. 2 (1927) 2, p. 1215; VAN STEENIS, in Trop. Nat., 17 (1928) p. 205; LAM, in Nat. Tijdschr. Ned. Ind., 89, p. 351 (1929); DAKKUS, in Bull. Jard. Bot. Buitenzorg, sér. III, suppl. 1 (1930) p. 208; OCHSE & BAKH., Ind. groenten (1931) p. 715, ic. 434; VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 9, p. 168 (1932); BURKILL, Diction. Econ. Prod. Mal. Penins. (1935) 2, p. 1578; *Dasyloma benghalensis* D. C., Prodr., 4 (1830) p. 140; WIGHT, Ic. pl., t. 568 (1843); MIQUEL, Fl. Ind. Bat., I, 1, p. 742 (1856); *Phellandrium stoloniferum* ROXBURGH, Hort. Beng. (1814) p. 21, nomen; Fl. Ind., ed. CAREY, 2 (1832) p. 93; ed. CLARKE (1874) p. 271; *Oenanthe laciniata* ZOLLINGER, Syst. Verz. Ind. Arch. 1842—1848 (1854) p. 139; MIQUEL, Ill. Fl. Arch. Ind. (1871) p. 42; KOORDERS-SCHUM., Syst. Verz., I, 1, fam. 228 (1911) p. 99; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 728; MERRILL, Bibl. Enum. Born. Pl. (1921) p. 459; Enum. Phil. Fl. Pl., 3, p. 239 (1923); RIDLEY, in Journ. Mal. Br. Roy. As. Soc., 1, p. 63 (1923); *Dasyloma javanicum* & *Dasyloma laciniatum* MIQUEL, Fl. Ind. Bat., I, 1, p. 741 (1856); TEYSMANN & BINNEND., Cat. Pl. Hort. Bot. Bogor. (1866) p. 165; FILET, Plantk. Woordenb. (1876) p. 168, 239; *Dasyloma japonicum* & *D. subbipinnatum* MIQUEL, Ann. Mus. Bot. Lugd. Bat., 3 (1867) p. 59; *Oenanthe benghalensis* BENTH. & HOOK.F., Gen. pl., 1, p. 906 (1867); CLARKE, in HOOKER FIL., Fl. Br. Ind., 2, p. 696 (1879); KOORDERS, Versl. Dienstr. Minah. (1898) p. 488; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 204 (1898); MATSUMURA & HAYATA, Enum. Pl. Formos. (1906) p. 172; KOORDERS-SCHUM., Syst. Verz., III (1914) p. 100; CHERMEZON, in LEC., Fl. Indo-Chine, 2, p. 1148 (1923); CRAIB, Fl. siam. enum., 1, p. 790 (1931); ? *Oenanthe Thomsoni* CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 697 (1879); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 204 (1898); CHERMEZON, in LEC., Fl. Indo-Chine, 2, p. 1150 (1923); *Oenanthe stolonifera* var. *javanica* KUNTZE, Rev. gen. pl., 1 (1891) p. 269;

Oenanthe Schlechteri WOLFF, in SCHUM. & LAUTERB., Nachtr. Fl. deutsch. Schutzgeb. (1905) p. 333, t. 14; LANE-POOLE, For. res. Papua (1925) p. 130, 181.

Oenanthe javanica is very variable as to the dimensions of all its parts, the compoundness of its leaves, the length of its peduncles, the number of pedicels in its umbellules, and the dimensions of its fruit. The form with pennatifid to pennatipartite leaflets was originally distinguished as a distinct species, *Sium laciniatum*, from the less divided form *Sium javanicum*, but a complete series of intermediary forms proves that these strikingly different forms are only extreme varieties of one species.

Oenanthe stolonifera is, since long, recognized as synonymous with *Oe. javanica*, but the species name *javanica* has priority over that of *stolonifera*.

Oenanthe benghalensis is said by KOORDERS to be found by him in Selebes. According to CLARKE the real *Oe. benghalensis* is distinguished from *Oe. javanica* by peduncles very short or none, leaves strongly divided, and the fruit very short; to these differential characters CHERMEZON adds that the styles are shorter than half the length of the fruit, and that the calyx teeth are very short. The specimen collected by KOORDERS in the Minahassa has peduncles up to 7 cm long and for the rest does not show the differential characters mentioned. In the further material mentioned below there occur, however, specimens that in several respects agree with the descriptions as given by CLARKE and CHERMEZON, but there can be traced no limit between the forms that can be reckoned to *O. benghalensis* and those that can not. From the materials present in the Kew Herbarium appears that in British India *O. benghalensis* is distinctly different from *O. javanica*, and in these materials *O. benghalensis* is, besides by the characters mentioned above, characterised by the stems strongly branched from the base; however in the materials from China and Japan, in the same herbarium, the limits between *O. benghalensis* and *O. javanica* become quite undefined, as is the case in the Malay Archipelago. It is therefore that I prefer to consider *O. benghalensis* as a form of *O. javanica*.

In Sumatra there have been collected, moreover, two forms that, being strongly different as to the leaves, make the impression of being separate species.

The first of them is represented by the numbers OUWEHAND 157 and 345 (see below), and is remarkable by leaves pennate to bipennate, with segments up to 4 cm long and 1—4 mm broad, entire, or sometimes with 2 or 3 incisions in the apical part. These plants have been

labelled by C. A. BACKER as *Oenanthe linearis*, and indeed they agree with the descriptions of this species as given by DE CANDOLLE, CLARKE and CHERMEZON. When we compare it with the originals of *O. linearis* extant in the Kew Herbarium, we are struck by the fact, that the Sumatra plant is a more extreme form than these originals. Also in China there occur forms that are intermediates between the most typical form, as represented by OUWEHAND's plants, and common *O. javanica*. One of these has been described as *O. rivularis* by DUNN (in Journ. Linn. Soc., 35, p. 496); it is said to differ from *O. linearis* by the leaves long-petioled and with short sheath, and by „foliis tenuis dissectis", but it is apparently intermediate between *O. linearis* and *O. javanica*.

The second of them is represented by the number PRINGGO 170, with leaves 3—5-pennate and segments only 1—2 mm long, 0.5—1 mm broad. It has been labelled as *O. Thomsonii* by VALETON, and indeed agrees with the descriptions of this species, as given by CLARKE and CHERMEZON, as well as with the originals of *O. Thomsonii* in the Kew Herbarium. Yet I can not acknowledge it as a separate species, as between it and *O. javanica* there exist, among the materials mentioned, a complete series of intermediate forms.

Oenanthe Schlechteri, from New Guinea, is distinguished by WOLFF from *Oe. javanica* on account of its small fruit, of which only the marginal ribs are strongly swollen, the dorsal ribs, on the contrary, not at all, so that, after WOLFF, there might be good grounds to base upon *Oe. Schlechteri* a new section of the genus *Oenanthe*. That *Oe. Schlechteri* may hardly be considered as a slight variety of *O. javanica* is proved by the following facts. WOLFF describes the fruit of *Oe. Schlechteri* as 2 mm long, 1.5 mm broad (by typographical error 2 cm by 1.5 cm). Now the fruit of further materials of the species vary from 2 to 3 mm in length and from 0.5—1 mm in breadth, from which we see that *Oe. Schlechteri*, in this respect, is not even an extreme variation of *Oe. javanica*. As to the second difference we may remark the following. According WOLFF's own figure (Nachträge t. 14) the fruit of *Oe. Schlechteri* are normal *Oenanthe*-fruit, but with the dorsal ribs only slightly swollen. Such fruit, however, and fruit with the dorsal ribs swollen to the most different degrees, may be found among the materials of *Oe. javanica* enumerated below, and that not only as different varieties, but often on the same plant or even in the same inflorescence.

MALAY PENINSULA. Penang, cultivated at Ayer Stone, nr. sea level, HOLTTUM s.n. (K), v.n.: *selomor, shelum*; Dindings, Lumut, RIDLEY & CURTIS s.n. (S); Perak, Temanggo, RIDLEY 14604 (BM, S), v.n.: *lampong*.

SUMATRA. Atjèh, Lant Toepandji, 1900 m el., VAN STEENIS 6374 (B); Pakpak, Koeta Benö, PRINGGO ATMODJO (Exp. VAN DAALEN) 509 (B, L); Gajoeloeëus, Woihnikela, PRINGGO ATMODJO (Exp. VAN DAALEN) 170 & 181 (B, L); San Klewang valley, N.E. of Sibolangit, 350 m el., LÖRZING 4088 (B); Karo Plateau, foot of Daleng Koetoe, 1250 m el., LÖRZING 4912 (B); Berastagi, RIDLEY s.n. (K); BURKILL 104 (S); Berastagi, 1300 m el., LÖRZING 6737 (B); below G. Sibogal, 1200 m el., HOLTTUM 15456 (K, S); Petami valley, 1300 m el., LÖRZING 6015 (B, L, U); Lagoe Roti in Lake Toba, 900 m el., OUWEHAND 157 (B); Ranau Dolok, 1100 m el., OUWEHAND 345 (B); between Pisopiso and Tonggin, on Lake Toba, 1300 m el., LÖRZING 8114 (B); S. foot of Pisipiso, 1400 m el., LÖRZING 9379 (B); Pinto, summit, 2200 m el., LÖRZING 8281 (B, L); „Prubatua", HAGEN s.n. (B), v.n.: *batjarongi*; Toba plateau nr. Sidamanik, BEUMÉE A452 (B); G. Talang, 350 m el., BÜNNEMEIJER 5667 (B, L, U); G. Kerintji, Soengai Koembang, 1350 m el., ROBINSON & KLOSS 75 (BM) and s.n. (K, S); 1600—2020 m el., BÜNNEMEIJER 8723 (B, K, S), 8984, 9464, 9607, 9724 (B); Bèngkoeloe, Liwa, 800 m el., DE VOOGD 115 (B), v.n.: *rundji*; Bt. Daoen, 1300 m el., DE VOOGD 1407 (B); Moearadoea, 150 m el., GRASHOFF 472 (B), v.n.: *piopo*; Kp. Oedjoeng, e. of G. Pesagi, 1000 m el., VAN STEENIS 3716 (B).

POELAU LINGGA. S. Pangga, TEYSMANN s.n. (B).

ANAMBAS & NATOENA ISLANDS. Siantar, e. of Tarèmpa, 90—100 m el., HENDERSON 20247 (S), VAN STEENIS 996 (B, S).

BORNEO. Without exact locality (Bandjarmasin, ex MIQUEL), KORTHALS s.n. (L).

JAVA. Without exact locality: VAN HASSELT s.n. (L); BLUME s.n. (B, L), v.n.: *tespong*; KORTHALS s.n. (L); ZIPPELIUS s.n. (L); ZOLLINGER 2235 (BD, BM); HORSFIELD s.n. (K, S), 418 (K), v.n.: *pampoeng*; NAGEL 230 (BD); HILLEBRAND s.n. (BD); WAITZ s.n. (L); LAHAYS 43 (BM); „Tjisereh", KUHL & VAN HASSELT 748 (B); G. Megamendoeng, ZIPPELIUS s.n. (L); Nirmala, 1000 m el., BACKER 10822 (B); G. Perbakti, n.w. of Tjitjoeroeg, Tjikerang, 1500 m el., BAKHUIZEN VAN DEN BRINK 6605 (B), v.n.: *tespong*; G. Gedé, Tjibodas, REINWARDT 589? (L); Tjibodas, 1200 m el., KOORDERS 31731 β (B), v.n.: *tespong*; between Tjibodas and Tjibeureum, HALLIER 380, 439 (B), v.n.: *tespong*; Tjibeureum, 1600 m el., BOERLAGE s.n. (B, L); PULLE 4034 (U); REYNVAAN 28 (G); DEN BERGER 623 (B); DANSER 5953 (G); VAN STEENIS 1910 (B); SAPIIN s.n. (B), v.n.: *tespong*; above Tjibodas, 1600 m el., BACKER 13542, 31382 (B); Rarahan, 1400 m el., BACKER 13650 (B); Geger Bintang, BURCK 586 (B), v.n.: *tespong*; SAPIIN s.n. (B), v.n.: *tespong*; G. Semboeng, s.w. of Bandoeng, 1300 m el., BACKER 12277 (B, L); S. of Tjibeber, 950 m el., BACKER 22366 (B, L); 1000 m el., WINCKEL 1135 β (B), v.n.: *tespong*; BAKHUIZEN VAN DEN BRINK 1854 & 2611 (B), v.n.: *tespong, kitespong*; Tjadas Malang nr. Tjidadap, S. of Tjibeber, 1000 m el., WINCKEL 1360 β (B), v.n.: *tespong*; BAKHUIZEN VAN DEN BRINK 2497 (B), v.n.: *tespong*; Takokak, 1000 m el., KOORDERS 15036 β, 15246 β (B), v.n.: *tespong rawa*; Rantja Oepas nr. Telaga Patengan, 1750 m el., BACKER 12710 (B); G. Patocha nr. Rantjawalini, 1725 m el., LÖRZING 1312 (B); above Rawah Tjiwidej, 1900 m el., VAN STEENIS 6963 (B); G. Malabar, 1200—2100 m el., ANDERSON 190 (K); Pengalengan, WARBURG 3122 (BD); Rantja Gedé nr. Pengalengan, 1600 m el., BACKER 26093 (B); Taloen nr. Bandoeng, 1600 m el., REYNVAAN s.n. (B); G. Telagabodas, BOERLAGE s.n. (L); HASSKARL s.n. (B), v.n.: *tespon*; BURCK 127 (B), v.n.: *tespong*; KORTHALS s.n. (L); G. Galoenggoeng above

Singaparna, 600 m el., BACKER 8635 (B); Rawah Oepoe nr. Kali Poetjang, 10 m el., BACKER 4473 (B); G. Tjeremai, above Linggardjati, 560 m el., BACKER 4883 (B, K, L); Petoengkriana, 900 m el., BACKER 15958 (B); 1300—1600 m el., BACKER 15798 (B); between Dara & Petoengkriana, 1000—1200 m el., BACKER 15714 (B); G. Diëng, JUNGHUHN s.n. (L), v.n.: *pambong*; TEYSMANN s.n. (B), v.n.: *pampoeng*; WARBURG 4224 (BD); DOCTERS VAN LEEUWEN 2259 (B); Diëng Plateau, 2000 m el., BACKER 21691 (B), v.n.: *pampong alas*; Telaga Dringoe, 2000 m el., VAN SLOOTEN 420 (B); G. Boetak, E. of Tlerep, 1800 m el., LÖRZING 69 (B, BD), v.n.: *bampoeng*; Garoeng, 1100—1400 m el., BACKER 21909 (B); Bandongan, 1000 m el., KOOPER 39 (B); G. Soendara, nr. Kledoeng, 1600 m el., BLOKHUIS s.n. (B), Oengaran, Medini, JUNGHUHN s.n. (L), v.n.: *ketol*; G. Telemaja, KOORDERS 28045 β (B), v.n.: *pangpoeng*; 1300 m el., DOCTERS VAN LEEUWEN 198 (B); Sepakoeng, 1000 m el., KOORDERS 36318β (B), v.n.: *pampoeng*; Pager Goenoeng, S.W. of Semarang, 1000 m el., DOCTERS VAN LEEUWEN 175 (B); Pening, in the Rawah Pening, nr. Ambarawa, KOORDERS 29655β (B), v.n.: *pampoeng*; Banjoebiroe, Rawah Pening, KOORDERS 36236β (B), v.n.: *pangpoeng*; Salatiga, DOCTERS VAN LEEUWEN sn.. (B); G. Merapi, nr. Bedojo, 390 m el., JUNGHUHN s.n. (L); 1500—1800 m el., JUNGHUHN s.n. (L); G. Wilis, Ngebel, 700 m el., KOORDERS 23194β (B); Batoe, nr. Malang, RANT s.n. (B); G. Tengger, road to Poespo, RIDLEY s.n. (K); Tosari, RIDLEY s.n. (K); Ngadisari, 2000 m el., KOORDERS l. c., v.n.: *ketoembar*; Smeroe hoeve, 2100 m el., VAN STEENIS 7278 (B); G. Ijang, 2100 m el., CLASON G9 (G), v.n.: *matjen salade ajer*; Ijang Plateau, 2100 m el., KOORDERS 43432β (B), v.n.: *sladri gunung*; Kali Deloeang, 2200 m el., BACKER 9570 (B); Telaga Trata nr. Poeger, 5 m el., KOORDERS 21377β (B), v.n.: *seladren*; G. Idjen, swamp nr. temple, VAN DER PIJL 147 (B); Idjen Plateau, Rawah Simpol, 900 m el., KOORDERS 43164β (B); Sempol, 1100 m el., BACKER 25047 (B); Ragadjampi, ZOLLINGER 2588 (B, BM).

LESSER SUNDA ISLANDS. Without exact locality, DE VOOGD 1851 (B).

BALI. Batoeriti, Danau Bratan, RUTTNER 316 (B).

LOMBOK. Swela, 362 m el., RENSCH 76 (B).

SELEBES. Tomohon, SARASIN 540 (BD); REINWARDT 756 (L); between Tomohon and Tondano, 700 m el., KOORDERS 19031β (B); Tondano, FORSTEN 78 (L), v.n.: *roekoet telemmé*; Sidoa, forest above Napoe, adjunct veterinary surgeon of Donggala no. 97 (B); Sogori, FORSTEN 885 (BM).

BOEROE. Lake Rana, 800 m el., L. J. TOXOPEUS 228 (B, L).

NEW GUINEA. On the Rouffaer River, DOCTERS VAN LEEUWEN 9723 (B); 175 m el., DOCTERS VAN LEEUWEN 9904 (B); Nassau Mts., 1200 m el., DOCTERS VAN LEEUWEN 10735 (B); affluent of the Swart River, S. slope, 1250 m el., LAM 2076 (B), alcohol materials only; Utakwa Expedition, Camp III—IX, 900—1650 m el., KLOSS s.n. (BM); Camp VIc & VII—IX, KLOSS s.n. (K); Kloof Bivouac, 30 m el., PULLE 162a—g (B); Oroh valley, cultivated in native villages, 1300 m el., PULLE 1175 (B); Noord River, VON RÖMER 125 or 123 (B); Saruwaged Mts., Ogeramnang, 1800 m el., MAYR 826 (BD); Sepik River, bivouac 42, SCHULTZE 185 (BD); on the Waria, nr. Gobi, 350 m el., SCHLECHTER 19846 (BD); Schumann River, SCHLECHTER 13821 (B, BD, cotype of *Oenanthe Schlechteri* WOLFF); Finschhafen District, Nomi River, 1500 m el., and Kulentufu Ioangey, ex LANE POOLE l. c.; Mt. Tafa, 2100 m el., BRASS 4150 (NY); Mafulu, 1250 m el., BRASS 5334 (NY); Mt. Scratchley, Neneba, about 1200 m el., GIULIANETTI s.n. (K).

Distribution: British India, China, Japan, Siam, Formosa, Philippines, Queensland.

XVIII. FOENICULUM

ADANSON, Fam. pl., 2 (1763) p. 101; BENTH. & HOOK.F., Gen. pl., 1, p. 902 (1867); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 695 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 619; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 208 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1284 (1926).

Only species:

1. **Foeniculum vulgare** MILLER — Perennial herb, entirely glabrous. Stems erect, up to 2 m high. Leaves with membranous-margined sheath, in the lower leaves 4—12 cm long, shorter in the upper ones, and with cucullate-connate auricles at the top; lamina usually 3—4-pennate, with filiformous segments. Compound umbels terminal to the stem and the branches; peduncles 5—16 cm long; involucres and involucels none; umbel rays 30—70 in number, 5—7 cm long; pedicels 5—30 in each umbellule, 0.5—1 cm long. Calyx teeth none; petals yellow, strongly curled inward. Mericarps oblong, nearly 8 mm long 2 mm broad, with filiformous nearly equal ribs, not at all winged.

Anethum Foeniculum LINN., Sp. pl., ed. 1 (1753) 1, p. 263; *Foeniculum vulgare* MILLER, Gard. dict., ed. 8 (1768); D. C., Prodr., 4 (1830) p. 142; WIGHT & ARNOTT, Prodr., (1834) p. 371; HASSKARL, Cat. Pl. Hort. Bot. Bog. (1844) p. 164; JUNGHUHN, in Nat. & Geneesk. Arch. Ned. Ind., 2, p. 33 (1845); MOLKENBOER, in MIQ., Pl. Jungh., p. 98 (1851); MIQUEL, Fl. Ind. Bat., I, 1, p. 742 (1856); suppl. Sum. (1860) p. 134; TEYSMANN & BINNEND., Cat. Pl. Hort. Bot. Bogor. (1866) p. 166; MIQUEL, Ill. Fl. Arch. Ind. (1871) p. 43; FILET, Plantk. Woordenb. (1876) p. 1; BAKER, Fl. Maur. & Seych. (1877) p. 133; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 695 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 620; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 208 (1898); KOORDERS, Versl. Dienstr. Minah. (1898) p. 488; in Teysmannia, 11, p. 239 (1901); in Nat. Tijdschr. Ned. Ind., 60, p. 370 (1901); MATSUMURA & HAYATA, Enum. pl. Formos. (1906) p. 171; DE CLERCQ, Plantk. Woordenb. (1909) p. 243; DE JONG, in Teysmannia, 20, p. 351 (1909); BACKER, in Ann. Jard. Bot. Buitenz., suppl. 3, 1 (1910) p. 402; KOORDERS-SCHUM., Syst. Verz., I, 1, fam. 228 (1911) p. 99; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 729; HAYATA, Ic. pl. Formos., 5 (1912) p. 54; VAN DONGEN, Overz. geneesmidd. Ned. Ind. (1913)

p. 130; BAILEY, Compr. Cat. Queensl. Pl. (1913) p. 229; WIGMAN, in VAN GORKUM, O.I. Cult., 2 (1913) p. 883; BOLDINGH, Zakfl. Landbouwstr. Java (1916) p. 174; HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3 (1917) p. 400; MERRILL, Enum. Phil. Fl. Pl., 3, p. 239 (1923); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1284, ic. 2484—2486, t. 200, 1 (1926); HEYNE, Nutt. Pl. Ned. Ind., ed. 2 (1927) 2, p. 1215; DAKKUS, in Bull. Jard. Bot. Buitenz., sér. III, suppl. 1 (1930) p. 142; EWART, Fl. Victoria (1930) p. 908; OCHSE & BAKH., Ind. groenten (1931) p. 712, ic. 432; CRAIB, Fl. siam. enum., 1, p. 790 (1931); VAN STEENIS, in Bull. Jard. Bot. Buitenz., sér. III, 13, t. 3 (1935); BURKILL, Diction. Econ. Prod. Mal. Pen. (1935) 1, p. 1027; *Foeniculum capillaceum* GILIBERT, Fl. lithuan. inchoata, coll. IV (1782) p. 40; HIERN, in Fl. Trop. Afr., 3 (1871) p. 3; *Foeniculum officinale* ALLIONI, Fl. pedem., 2 (1785) p. 25; BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 209; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 208 (1898); *Ozodia foeniculacea* WIGHT & ARNOTT, Prodr. (1834) p. 375.

Foeniculum vulgare, originally cultivated, appears to be naturalized on several mountains in eastern Java, *e. g.* on Mt. Lawoe (after communication by Dr. BACKER) and on Mt. Tengger from Tosari to the Sandsea (after KOORDERS, and HEYNE, ll. cc.).

JAVA. Batavia, JUNGHUHN s.n. (L), cultivated, v.n.: *ahtès*; Buitenzorg, HEYNE s.n. (B), cultivated; Salabintana, n. of Soekaboemi, 1000 m el., BACKER 26532 (B), cultivated; Lemah Goenting, nr. Bandoeng, DOCTERS VAN LEEUWEN s.n. (B), cultivated; G. Tjikoerai, BURCK 391 (B); Sadang, OCHSE s.n. (B), cultivated, v.n.: *hades*; Diëng Plateau, 2050 m el., BACKER 21899 (B), cultivated, v.n.: *adas*; G. Merbaboe, JUNGHUHN l. c.; Wanasari, VAN SLOOTEN 2366 (B); Sepakoeng, 1000 m el., KOORDERS 36322β (B), cultivated, v.n.: *adas*; Bajalali, BEGUIN s.n. (B); G. Lawoe, above Maospati, 500 m el., BACKER 4670 (B), cultivated; 1600 m el., DORGELO (after communication by Dr. C. A. BACKER); Lebaksari, near Poedjon, 800 m el., cultivated, VAN STEENIS 2619 (B); G. Ardjoena, 3300 m el., KOORDERS 43789β (B), v.n.: *adas*; Malang, cultivated, OCHSE s.n. (B); G. Tengger, Tosari, 1700 m el., BACKER 8356 (B); above Tosari, 1800—2000 m el., BACKER & POSTHUMUS s.n. (B); Tosari, Moenggal, Penandjaan, 1800—2500 m el., KOBUS s.n. (B), v.n.: *adas*; Ngadisari, 2000 m el., KOORDERS 37876β (B, L), v.n.: *adas*; between Tosari and Ngadisari, WENT s.n. (L); S.W. Tengger, 1800—2400 m el., BEUMÉE A632, v.n.: *nadar*; G. Bromo, RANT s.n. (B).

TIMOR. Cultivated, REINWARDT (?) s.n. (L).

SELEBES. Tondano, cultivated, FORSTEN s.n. (L).

BANDA. coll.? (L), v.n.: *adas manis*.

Distribution: indigenous in the Mediterranean region, cultivated throughout the world (THELLUNG l. c.).

XIX. ANETHUM

LINN., Sp. pl., ed. 1 (1753) 1, p. 263; Gen pl., ed. 5 (1754) p. 127; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 208 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1290 (1926); *Peucedanum* sect. *Anethum* BENTH. & HOOK.F., Gen. pl., 1, p. 919 (1867).

Only species:

1. Anethum graveolens LINN. — Annual herb. Stems 50—100 cm high, terete, striate. Leaf-sheath rather short, 1.5—2 cm in the lower leaves, shorter in the upper leaves, white-margined, with cucullate-connate auricles at the apex; lamina tri-pennate with filiform segments. Compound umbels terminal to the stem and the branches; peduncles 4—13 cm long, umbel-rays 5—15 in number, 2—4 cm long; pedicels 5—25 in number, 0.5—1 cm long; involucre and involucels none. Calyx teeth none; petals yellow, strongly curved inward. Mericarps oblong, nearly 5 mm long, 3 mm broad, moreover with a wing 0.25—0.5 mm broad.

Anethum graveolens LINN., Sp. pl., ed. 1 (1753) 1, p. 263; D. C., Prodr., 4 (1830) p. 186; HASSKARL, Cat. Pl. Hort. Bot. Bogor. (1844) p. 164; MIQUEL, Fl. Ind. Bat., I, 1, p. 743 (1856); TEYSMANN & BINNEND., Cat. Pl. Hort. Bot. Bogor. (1866) p. 166; FILET, Plantk. Woordenb. (1876) p. 1; BAKER, Fl. Maurit. & Seych. (1877) p. 133; BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 210; MASSART, in Mém. Soc. Bot. Belg., 34, p. 203, 324 (1895); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 208 (1898); DE CLERCQ, Plantk. Woordenb. (1909) p. 168; KOORDERS, Exkursionsfl. Java, 2 (1912) p. 730; HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3 (1917) p. 400; CHERMEZON, in LEC., Fl. Indo-Ch., 2, p. 1152, ic. 136, 9 (1923); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1291, ic. 2307b, 2487, 2488 (1926); HEYNE, Nutt. Pl. Ned. Ind., ed. 2 (1927) 2, p. 1215; OCHSE & BAKH., Ind. groenten (1931) p. 695, ic. 423; CRAIB, Fl. siam. enum., 1, p. 791 (1931); BURKILL, Diction. Econ. Prod. Mal. Pen., 1, p. 158 (1935); *Anethum Sowa* D. C., Prodr., 4 (1830) p. 186; ROXBURGH, Fl. Ind., ed. CAREY (1832) 2, p. 96; WIGHT & ARN., Prodr. (1834) p. 372; WIGHT, Icones, 2, t. 572 (1843); ROXBURGH, Fl. ind., ed. CLARKE (1874) p. 272; CRAIB, Fl. siam. enum., 1, p. 791 (1931); *Peucedanum graveolens* HIERN, in Fl. Trop. Afr., 3 (1871) p. 19; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 709 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 622; HAYATA, Mat. Fl. Formosa, p. 130 (1911); Ic. pl. Formos., 2 (1912) p. 57; WIGMAN, in VAN GORKUM, O.I. Cult., 2 (1913) p. 883; VAN DONGEN, Overz. Geneesmidd. Ned. Ind. (1913) p. 130; EWART, Fl. Victoria (1930) p. 905.

SUMATRA. Palèmbang, Moearadoea, 250 m el., in native gardens, GRASHOFF 418 (B), vn..: *adas*; Lampongs, G. Raté Berenong, 400 m el., IBOET 266 (B, L).

JAVA. Batavia, 10 m el., coll.? (B), v.n.: *adas*, cultivated; BACKER s.n. (B); HEYNE s.n. (B); between Batavia & Meester Cornelis, cultivated, BACKER s.n. (B); Buitenzorg, 250 m el., BACKER s.n. (B); Sindanglaja, cultivated, OCHSE s.n. (B); Tjipanas nr. Sindanglaja, 1050 m el., BACKER 21503 (B); G. Goentoer, cultivated in the garden of Hotel Kamodjan, after oral communication by Prof. DANSER, Groningen; also cultivated in the mountains of E. Java, after oral communication of Prof. J. KUYPER, Groningen.

MADOERA. Pegantènan, cultivated, VORDERMAN 97 (B), v.n.: *adas*.

SOEMBA. Mengiliwai nr. Maomarroe, IBOET 432 (B, U), v.n.: *walahandji*.

TIMOR. Collector? „ex Herb. Paris" (K), imperfect specimen.

NEW GUINEA. Merauke, KOCH s.n. (B, L), v.n.: *djinten*, mentioned by VALETON, in Bull. Agr. Ind. Néerl., 10 (1907) p. 43, as *Foeniculum vulgare*.

Distribution: wild in S. and S.W. Asia, cultivated in most parts of the world (after THELLUNG, l. c.).

XX. PASTINACA

LINN., Sp. pl., ed. 1 (1753) p. 262; Gen. pl., ed. 5 (1754) p. 126; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 238 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1404 (1926).

Only species:

1. Pastinaca sativa LINN. — Biennial herb. Primary root fusiformis. Stems angular and strongly grooved. Leaves pennate, the leaflets 2—13 cm long, 1—5 cm broad, oblong-ovate, often 3-lobate to 3-partite, irregularly crenate. Inflorescences terminal to the stem and its branches; peduncles 3—7 cm long; umbel-rays 5—12 in number, 1—4 cm long; pedicels 10—20 in number, 2—7 mm long; involucres and involucels none or 1—2-leaved. Calyx teeth none; petals yellow, with inflexed tip. Mericarps nearly 5—7 mm long, 4—5 mm broad, broad-elliptical, the marginal wing 0.25—0.5 mm broad inclusive. (Description after European materials.)

Pastinaca sativa LINN., Sp. pl., ed. 1 (1753) 1, p. 262; D. C., Prodr., 4 (1830) p. 188; BENTHAM, Fl. austr., 3 (1866) p. 336; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 238 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1405, ic. 2435b, 2542—2544, t. 203, 2 (1926); BURKILL, Diction. Econ. Prod. Mal. Pen., 2, p. 1677 (1935).

JAVA. Salabinta above Soekaboemi, 900 m el., cultivated, BACKER 22156 (B).

Distribution: spontaneous in Europe and temperate Asia, cultivated and subspontaneous elsewhere (THELLUNG l. c.).

XXI. HERACLEUM

LINN., Sp. pl., ed. 1 (1753) 1, p. 249; Gen. pl., ed. 5 (1754) p. 118; BENTHAM & HOOKER FIL., Gen. pl., 1, p. 921 (1867); DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 239 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1415 (1926).

Only species:

1. Heracleum sumatranum BUWALDA n. sp. — **Fig. 6.**— Caulium pars inferior ignota, partes quae exstant ad 80 cm longae, prope basin ad 6 mm crassae, probabiliter erectae, teretes, striatae vel leviter sulcatae, basin versus glabrae, apices versus magis vel minus hirsutae, pilis ad 0.5 mm longis, nodis nonnihil incrassatis, internodiis inferioribus 20—55 cm longis, superioribus gradatim breviores et minus crassis. Folia sparsa, inferiora ignota, media (inferiora partium quae exstant) rosulas minores in axillis ferentia, sessilia in vaginis ad 40 mm longis 15 mm latis amplexicaulibus margine membranaceis apice auriculatis vel in petiolum brevissimum attenuatis; folia inferiora biternata foliolo apicali tripartito vel ternato, circuitu deltoidea, ad 20 cm longa 28 cm lata, foliolis primariis longe petiolulatis petiolulo folioli primarii terminalis 10 cm longo lateralium 3.5 cm longo, petiolulis foliolorum secundariorum et tertiariorum gradatim brevioribus, ultimorum terminalium 1 cm longis, lateralium nullis; folia superiora gradatim minus composita, suprema ternata; foliola foliorum caulinorum oblongo-ovata longiuscule acuminata, terminalia oblongiora quam lateralia, ad 8 cm longa 3 cm lata, foliorum superiorum etiam angustoria, omnia serrata subbiserrata, dentibus breve acuminatis apiculatis 1—2 mm longis 2—5 mm latis, facie superiore subglabra, inferiore nervis tenuiter hirsutis; folia rosularum axillarium probabiliter ut basalia sed minora et minus composita, petiolo lamina breviore, subbiternata, foliolis latioribus. Pedunculi inflorescentiarum 10—20 cm longi, ceterum ut caules; involucra nulla, involucella bracteis lanceolatis, longe acuminatis, 6—7 mm longis, c. 0.5 mm latis, paulum hirsutis, margine angusto membranaceo; radii umbellae 9—12, tempore florendi 1.5—3 cm longi, sulcati, breve hirsuti, postea 4—6 cm longi, magis divaricati, denique subreflexi; pedicelli ad 20 in quaque umbellula, tempore florendi 2—5 mm longi, tenuiter denseque hirsuti, postea 8—12 mm longi, gradatim magis divaricati vel etiam reflexi. Ovarium 0.75 mm longum et

Fig. 6. — *Heracleum sumatranum*, after BÜNNEMEIJER 2629; *a*: stem with leaves, *b*: inflorescence, and *c*: fruit-bearing inflorescence, all ½ ×; *d*: pedicel with carpophore; *e*: mericarp seen from the outside; *f*: mericarp seen from the inside, all 3 ×.

Fig. 6 — *Heracleum sumatranum* (cf. p. 204, bottom).

latum; calycis dentes inconspicui, flores marginales autem saepe dente singulo prolongato ad 1.25 mm longo; petala florum centralium elliptica ad obovata, ad 1.5 mm longa 1 mm lata, apice angusto inflexo ad 1 mm longo, florum marginalium radiantia, exteriora late obcordata, ad 3 mm longa 4 mm lata; filamenta c. 2.5 mm longa; antherae c. 0.75 mm longae 0.5 mm latae; styli tempore florendi c. 0.3 mm longi, postea ad 1 mm longi, denique decidui; stylopodium tempore florendi planum, postea conicum ad 1 mm altum. Mericarpia circuitu rotundato-obovata, 6.5—8 mm longa, 5.5—7 mm lata, glaberrima, margine ala tenui membranacea c. 2.5 mm lata, corpore elliptico apice basique acuto 3—4 mm longo 2 mm lato, jugis dorsalibus 3 parte media latiusculis vittis angustis tantum separatis, parte apicali et basali tenuibus parallelis, jugis marginalibus remotis ad 0.5 mm a margine currentibus, vittis omnibus transverse septatis, facie exteriore 6, 2 inter juga dorsalia seminis corpore fere aequilongis, apice basique acutis, utroque latere jugorum dorsalium binis, quarum interiores seminis corpore aequilongae, exteriores plerumque apice basique breviores, liberae acutae vel cum interioribus confluentes et obtusae, facie interiore (commissura) carina indistincta obtusa mediana vittisque 4, quarum interiores minus quam 1 mm remotae, seminis corpore aequilongae, exteriores interioribus proximis et parallelis, plerumque dimidio breviores; carpophorum tenue, usque ad basin bifidum.

Heracleum sumatranum BUWALDA, ex VAN STEENIS, in Bull. Jard. Bot. Buitenzorg, sér. III, 13, p. 255 (1934) nomen.

There is some difficulty about the question, whether our plant is a *Heracleum*, a *Pastinaca*, or a *Peucedanum*.

According to BENTHAM and HOOKER (Gen. pl., 1, p. 870, 871, 918—921), it certainly is either a *Peucedanum* (this genus including *Pastinaca*), or a *Heracleum*. Between these two genera there appear to exist no constant characters, but because of the radiating flowers, the hirsute indumentum, the rather broad leaflets, the broad mericarps, the vittae, especially the lateral ones, not prolongated down to the base of the fruit, and the hairy ovary, our plant is rather a *Heracleum* than a *Peucedanum*.

After the characters given by DRUDE (in ENGLER and PRANTL, Nat. Pflanzenfam., III, 8, p. 115), we cannot state whether our plant belongs to the *Ferulinae* or to the *Tordyliinae*, as only detached mericarps are available. In the former case it would be a *Pastinaca*, in the latter a *Heracleum*. The differences, indicated for the distinction for *Pastinaca* and *Heracleum*, are slight, but on the same arguments as enumerated above one should conclude that our plant is a *Heracleum*.

According to THELLUNG (in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1405), *Pastinaca* is more closely allied to *Heracleum* than to *Peucedanum*, and *Pastinaca* differs from *Heracleum* by non-radiating flowers and transversely septate vittae, whereas *Heracleum* often has radiating flowers and always non-septate vittae. Now our plant has radiating flowers, but distinctly septate vittae, so that a decision based on these characters appears difficult. I found, however, distinctly septate vittae also in *Heracleum Wallichii* D. C. in the Kew Herbarium.

On the ground of the general appearance, the hirsute indumentum, the radiating flowers, and the hairy ovary, I prefer to accept the present new species as a *Heracleum*.

The locality, where our plant has been collected justifies the supposition that it may be a specimen of some species of the Asiatic Continent. Therefore I have tried to identify it with one of the British Indian species of the Kew Herbarium. From these materials appears that none of these species resembles our plant to such a degree, that the latter might be reckoned to it; it even is evident, that those species, to which our plant comes most closely, show less differences than our plant from them all; these species belong to the group enumerated in the Flora of British India from *Heracleum Wallichii* D. C. to *H. barmanicum* KURZ.

As already remarked, the British Indian species show only slight differences, and it seems questionable whether many of these could not better be united to one polymorphic one. The distinction is mainly based on the locality, the dimensions, the colour of the ripe fruit, the leaf shape, and the development of involucels and calyx teeth, all of them very variable in *Heracleum* species. In that case also our species might perhaps better be regarded as a form of such a polymorphic species, but I am not in the condition to sattle this question.

SUMATRA. Padang Uplands, G. Singgalang, 2400 m el., BÜNNEMEIJER 2629 (B, L), flowers white.

XXII. DAUCUS

LINN., Sp. pl., ed. 1 (1753) 1, p. 242; Gen. pl., ed. 5 (1754) p. 113; BENTH., Fl. austr., 3 (1866) p. 376; BENTHAM & HOOK.F., Gen. pl., 1, p. 928 (1867); CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 718 (1879); BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 623; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 248 (1898); THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1501 (1926).

Only species:

1. Daucus Carota LINN. — Annual, biennual or perennial herb. Primary root fusiformous. Stems erect, striate or grooved, hirsute. Leaves 2—3-pennatipartite with lanceolate segments. Compound umbels with flat or rounded surface when flowering, with incurved peduncles aud pedicels and hollow surface when fruiting; peduncles 2—25 cm long; umbel rays 15—30 in number, 1—6 cm long; pedicels 20—30 in number in each umbellule, 0.5—1.5 cm long; involucral leaves 3—5 cm long, pennatipartite, white-margined towards the base; involucels 5—7-leaved, the leaves entire to pennatipartite, lanceolate, 0.5—2 cm long. Calyx teeth triangular, acute, 0.25—0.5 mm long. Petals in all flowers white, or dark-red in 5—7 central sterile flowers of the middle-umbel, with inflexed tip, the peripheric ones of the inflorescence radiating. Mericarps nearly oblong, 3 mm long, 1.5—2 mm broad, the primary ribs filiformous with rather few nearly 0.25 mm long fine bristles, the secundary ribs beset with nearly 1 mm long rigid bristles. (Description after Javan and European specimens.)

Daucus Carota LINN., Sp. pl., ed. 1 (1753) 1, p. 242; D. C., Prodr., 4 (1830) p. 211; WIGHT & ARN., Prodr. (1834) p. 374; HASSKARL, Cat. pl. Hort. Bot. Bogor. (1844) p. 164; MIQUEL, Fl. Ind. Bat., I, 1, p. 743 (1856); TEYSMANN & BINNEND., Cat. pl. Hort. Bot. Bogor. (1866) p. 166; BENTHAM, Fl. austr., 3 (1866) p. 377; MIQUEL, Ill. Fl. Arch. Ind. (1871) p. 43; HIERN, in Fl. Trop. Afr., 3 (1871) p. 25; FILET, Plantk. Woordenb. (1876) p. 10; BAKER, Fl. Maurit. & Seych. (1877) p. 133; CLARKE, in HOOK.F., Fl. Br. Ind., 2, p. 718 (1879); BISSCHOP GREVELINK, Pl. Ned. Ind. (1883) p. 212; BOERLAGE, Handl. Fl. Ned. Ind., I, 2 (1890) p. 624; KOORDERS, Versl. Dienstr. Minah. (1898) p. 488; DRUDE, in ENGL. & PR., Nat. Pflanzenfam., III, 8, p. 249 (1898); KOORDERS, Exkursionsfl. Java, 2 (1912) p. 730; WIGMAN, in VAN GORKUM, O.I. Cult., 3 (1913) p. 696; HEYNE, Nutt. Pl. Ned. Ind., ed. 1, 3 (1917) p. 401; OCHSE, Trop. groenten (1925) p. 185, ic. p. 188; THELLUNG, in HEGI, Ill. Fl. Mitteleur., V, 2, p. 1508, ic. 2576—2583, 2575d, t. 204, 2 (1926); HEYNE, Nutt. pl. Ned. Ind., ed. 2 (1927) 2, p. 1216; EWART, Fl. Victoria (1930) p. 902; DAKKUS, in Bull. Jard. Bot. Buitenz., sér. III, suppl. 1 (1930) p. 96; OCHSE & BAKH., Ind. groenten (1931) p. 708, ic. 430; VAN STEENIS, in Bull. Jard. Bot. Buitenz., sér. III, 13, p. 345, t. 3 (1935); BURKILL, Diction. Econ. Prod. Mal. Pen., 1, p. 772 (1935).

Daucus Carota, originally introduced in Java as a vegetable, appears to be naturalized in some localities in the mountains, e. g. near Rarahan, on Mt. Gedé, and on Mt. Tengger, near Tosari, where it grows, just like in Europe, among the grass along road sides.

SUMATRA. Cultivated near Berastagi and Pematang Siantar, brought at the market in Médan (after oral communication by Prof. J. KUYPER, Groningen).

JAVA. Without exact locality, WAITZ s.n. (L); cultivated, HASSKARL s.n. (B); Batavia, cultivated, BACKER s.n. (B); Buitenzorg, cult., SMITH s.n. (B); Tjipanas, Tjibodas, cult., 1300 m el., VAN STEENIS 1809 (B); nr. Rarahan above Sindanglaja, 1300 m el., DANSER 6022 (G), growing wild; Semarang, brought upon the market from the mountains, MULLER, Nat. & Geneesk. Arch. Ned. Ind., 2, p. 465 (1845); G. Tengger, above Tosari, 1800 m el., BACKER 8377 (B); 1700—1800 m el., BACKER s.n. (Pa), along paths among the grass.

TIMOR. Cultivated and subspontaneous, after MIQUEL, l. c.

Distribution: spontaneous in Europe, N. Africa, and temperate Asia, cultivated in all parts of the world (THELLUNG, l. c.).

Species dubia.

Hydrocotyle azorellacea F. v. MUELLER, in Journ. Bot., 31, p. 324 (1893). This species is mentioned without description as a new species, collected with other plants by Sir W. MACGREGOR on the summit of the Owen Stanley's Range. It is incidentally typified with the following words: „a new *Hydrocotyle (H. azorellacea)*, much resembling a *Huanaca* in habit".

Species excludendae.

Bifora testiculata (LOUREIRO) HOFFMANN — MIQUEL, in Fl. Ind. Bat., I, 1, p. 744 (1856), mentions *Atrema testiculatum* MIQ., = *Coriandrum testiculatum* LOUREIRO, = *Bifora Loureiri* KOSTELETZKY, as probably occurring in Java and the other Sunda Islands, and this supposition is taken over by BOERLAGE, in Handl. Fl. Ned. Ind., I, 2 (1890) p. 623, under the right name *Bifora testiculata* HOFFMANN. As far as known, no specimens of this species have ever been met with in Java, neither cultivated nor wild, and MIQUEL's supposition that the plants mentioned by MOLKENBOER in the Plantae Junghuhnianae under *Coriandrum sativum*, but with the remark „involucro involucellisque multifidis et umbellâ 6—8-radiata", might be this species, is incorrect as well.

Conium maculatum LINN., perhaps found subspontaneous in the Netherlands Indies according to BOERLAGE (Handl. Fl. Ned. Ind., I, 2, p. 616), in reality has never been found there.

Hydrocotyle villosa KOORDERS, in Teysmannia, 11, p. 252 (1901), probably is a writing mistake for some other common species. The true *H. villosa* LINN.FIL. is a native of South Africa.

ERRATUM.

On page 130, line 12 from bottom, before the name ZOLLINGER, the name *Hydrocotyle latisecta* must be inserted.

Index of herbarium numbers,

referring to the species by means of their genus number and, if necessary, their species number.

KOENS 105=V; 116=I,1; 253, 282, 367 =IV; 393=II; 493=V.

KOOPER 39=XVII.

KOORDERS (β-numbers only) s.n. =VII; 15036=XVII; 15057=IV; 15135= V; 15244=IV; 15246=XVII; 15269 =V; 15518=II; 19031=XVII; 19032=I,1; 19033, 19034=II; 19035, 19036=I,1; 19037=II; 21377 =XVII; 21378=I,1; 21379=II; 23194=XVII; 23237=II; 23252= V; 23276=IV; 26231=V; 26530= IV; 27118=V; 27125=IV; 27126 =I,1; 28011=V; 28039=II; 28045 =XVII; 28050=IV; 28051=I,2; 28052, 28557=I,1; 29477=IV; 29654=II; 29655=XVII; 30867= II; 31679=IV; 31695=I,2; 31731 =XVII; 31800=IV; 31844=II; 31918=V; 32086=I,2; 32561=IV; 32613=V; 32668=I,1; 33163=I,2; 33176=I,1; 35653=II; 35917=V; 35976=IV; 36318=XVII; 36320= II; 36322=XVIII; 37090=I,2; 37466=IV; 37876=XVIII; 37877 =I,2; 37878=VIII; 37880, 37881, 37882, 37883=XVI,2; 37884, 37886 =XVI,3; 37887=IV; 37888=VII; 38091=XII; 38092=XI,1; 38252= XVI,3; 38093=VIII; 38251=XVI, 2; 36236=XVII; 37879=XVI,2; 37885=XVI,3; 40561=IV; 40769 =I,1; 41187=II; 42610=I,2; 43159=I,1; 43160, 43161=I,2; 43162, 43163=IV; 43164, 43432= XVII; 43453=XVI,3; 43460=I,2; 43466=IV; 43581=I,2; 43789= XVIII; 43794=XVI,3; 43853= XVI,2; 44301=V; 47887=IV; 47888=V; 47889=II.

KORNASSI 620=IV; 640=XIII,2; 731 =I,1; 1392=I,2.

KORTHALS s.n. = I,1(3×), I,2, II(2×), IV(3×), XVII(3×), 202=IV.

KUHL & VAN HASSELT 1=II; 748= XVII.

LAHAYS 43=XVII.

LAM 161=IV; 197=I,1; 1586=III,2; 1645=III,4; 1659=III,2; 1674= IX,2; 1692=III,2; 1694=IX,2; 2076=XVII; 2122=IV.

LAUTERBACH 1275, 2838=II.

LEDERMANN 10955, 11055a, 12064, 12391 =I,1.

LEEFMANS s.n. = II, IV; 17=XVI,2; 27=IV.

LIEFTINCK 22=IV.

LÖRZING 38=IV; 69=XVII; 106=I,1; 248, 295=I,2; 317=IV; 350=V; 441=XVI,2; 819=IV; 835=II; 1004, 1047=V; 1107=II; 1111=V; 1312=XVII; 1341=I,1; 1343= IV; 1431=I,1; 3082, 3509, 3859= II; 3867, 4033=I,1; 4088=XVII; 4216=XIII,2; 4826=I,2; 4904= VII; 4912=XVII; 4951=IV; 4976 =II; 5263=V; 5271=I,2; 5919= VII; 6015=XVII; 6071=I,2; 6074 =II; 6214=IV; 6245=I,2; 6246= II; 6269=VII; 6528=II; 6557= I,2; 6716=VII; 6737=XVII; 6786, 7463=I,1; 7660=I,2; 7818=IV; 8114=XVII; 8226=I,1; 8281= XVII; 8564=I,2; 8844=VII; 9367 =I,2; 9379=XVII; 9526=I,1; 9536=IV; 9775=II; 9808=I,2.

LOWE s.n. = III,1.

MACHADO 11544=V.

MATTHEW s.n. = IV(2×).

MAYR 547, 722, 810=I,1; 826=XVII.

MERRILL 6174=III,1.

MOTLEY 238=I,2.

MOUSSET 59=IV(2×); 88=II; 110= I,2; 116=I,2; 248=I,1; 332=I,2; 337=XVI,2; 647=I,1; 705=VII.

NAGEL 230=XVII; 259=I,1.

NATIVE COLLECTOR 44=III,1.

NOLTÉE 2590=V.

NUR 6204=II; 7423, 11413=I,1.

NUR & FOXWORTHY s.n. = I,1; 10283= I,1.

NYMAN 204=II; 474, 666=I,1.

OCHSE s.n. = VIII, XVIII(2×), XIX.

INDEX OF VERNACULAR NAMES

occurring on herbarium labels.

INDEX OF SCIENTIFIC NAMES.

Names of accepted genera and species are printed in **heavy Roman**, synonyms in *italics*, all other names in Roman. Asterisks before names indicate new names and combinations, asterisks after page numbers indicate figures. Page numbers in heavy types indicate most important mention.