

THE BRITISH-INDIAN SPECIES OF VISCUM REVISED

and compared with those
of South-Eastern Asia, Malaysia, and Australia,

by

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When revising the *Visca* of the Malay Archipelago and Indo-China, I met with some nomenclatorial difficulties, for which a more thorough study of the British-Indian *Visca* seemed necessary. The distinction of the species in HOOKER'S Flora soon appeared not to be depended upon. At the time of HOOKER'S revising the British-Indian *Loranthaceae*, only a scanty quantity of herbarium was available, and, the distinction between several species being extremely difficult, it is no wonder that HOOKER'S treatment of *Viscum* is no more up to date now. As appears from notes on herbarium sheets, GAMBLE later made a rather thorough study of the British-Indian *Visca*, which was only partly included in his Madras Flora, but he did not include the species of adjacent countries in his study. We now have a much larger quantity of herbarium materials at our disposal; several species described from outside British-India appeared to occur inside its frontiers, and new species had to be described from British India and China. Therefore a critical revision of all the Asiatic species seemed not to be superfluous. Moreover, the close relationship of the Australian *Visca* with Asiatic species made it desirable to include also the former in this revision. A revision of all the Asiatic, Malaysian, and Australian *Visca* would therefore have been the result, if not political circumstances had rendered it impossible to obtain the materials of several important Herbaria in the Tropics. I therefore preferred to close my study on the genus *Viscum* provisorily, and to publish it in the present form, in expectation of better times.

The Herbaria upon which the present revision is based, mainly are those of Kew Gardens (K), and the Dehra Dun Forest Experiment Station (DD), the *Viscum* materials of which were kindly sent to me for examination. Many data, however, could be added from other

Herbaria, such as those of Buitenzorg (B), Berlin-Dahlem (BD), the British Museum of Natural History (BM), Berkeley (UC), Brisbane (Bris), Edinburg (E), Geneva (G), Göteborg (Göt), Groningen (Gro), Honolulu (H), Leiden (L), Manila (M), Paris (P), Shillong (Sh), Singapore (S), and Vienna (V).

**On the arrangement of the species of *Viscum* by Korthals,
Van Tieghem, and Engler.**

The first author who made an attempt at giving a natural subdivision of *Viscum*, was KORTHALS, who, in 1839 (Verhand. Batav. Genootsch., 17, 235—236) distinguished 4 sections:

1. *Viscum verum*; dioecious species; type: *V. album*.
2. *Ploionuxia*; monoecious species, which have the male and female flowers surrounded by a boat-shaped bracteal cup, composed of a pair of connate bracts; type: *V. orientale*, i. e., our *Viscum ovalifolium*.
3. *Aspiduxia*; like the preceding section, but leafless, the bracteal cup moreover shield-shaped; type: *V. articulatum*.
4. *Baratostachys*, American species with the flowers in spikes; type: *V. torulosum*, nowadays *Phoradendron torulosum*. When discussing *Viscum geminatum* (p. 259, nowadays *Korthalsella geminata*), KORTHALS remarks that this species, according to its inflorescences, should be placed in the latter section.

If we bear in mind that, apart from the European *V. album*, KORTHALS only knew a limited number of Asiatic species, and a few American ones that nowadays have been removed into other genera, there is no denying that KORTHALS had some feeling for a natural subdivision.

In 1896, VAN TIEGHEM gave another subdivision of *Viscum* (Bull. Soc. Bot. Fr., 43, 187—193). Instead of one genus he distinguished two: *Viscum* (p. 187) and *Aspidixia* (p. 191), the latter based on KORTHALS' section *Aspiduxia*. When discussing his new genus, VAN TIEGHEM also critically considered KORTHALS' subdivision, making remarks about it that are not quite correct. He says (*l. c.*, p. 191):

"En 1839, Korthals a réparti, comme on sait, les diverses espèces de *Viscum* de l'Ancien Monde connues de lui entre trois sections, savoir: *Viscum verum*, pour les espèces feuillées à inflorescence terminale et dioïque, dont le type est le *V. album* L.; *Ploionixia*, pour les espèces feuillées à inflorescence latérale et monoïque, dont le type est *V. orientale* Willd.; *Aspidixia*, pour les espèces aphyllés dont le type

est le *V. articulatum* Burm. Ce sectionnement a été admis par tous les auteurs qui ont suivi, même les plus récents, comme Bentham et Hooker, en 1883, et M. Engler, en 1889 et en 1895."

"Il ne paraît pas cependant pouvoir être conservé. D'abord toutes les fois qu'un *Viscum* a ses fleurs en triade, les deux bractées de la triade s'écartent de la fleur médiane pour loger les deux fleurs latérales et ensemble prennent cette forme de nacelle qu'exprime le mot *Ploionixia*; les *Viscum verum*, ou *Euviscum*, sont donc, eux aussi, des *Ploionixia*. Toutes les fois, au contraire, qu'un *Viscum* a la fleur solitaire, les deux bractées sous-florales demeurent appliquées autour de la base de la fleur, qu'elles enveloppent d'une sorte de cupule ou de bouclier, d'où le nom d'*Aspidixia*. Par là, cette troisième section paraît donc se séparer nettement des deux premières. Mais Korthals a rendu cette séparation moins nette en n'y admettant que des espèces aphyllées et en retenant dans la section *Ploionixia* les espèces feuillées qui ont la même inflorescence. Il a sacrifié ainsi à une commodité plus grande la valeur scientifique de son sectionnement. C'est pourquoi on a cru devoir plus haut réunir dans le genre *Viscum* les *Viscum verum* de Korthals et la plupart de ses *Ploionixia*, en pratiquant d'après d'autres considérations le sectionnement de ce genre ainsi réduit."

"Si maintenant on croit devoir conserver, en l'érigant à l'état de genre autonome, la section *Aspidixia* de Korthals, c'est en lui donnant une extension plus grande et en y introduisant toutes les espèces, feuillées ou non, qui ont la fleur solitaire à base enveloppée par une cupule de deux bractées." &c.

From what I cited from KORTHALS, it is evident that this author has not at all "sacrifié à une commodité plus grande la valeur scientifique de son sectionnement". The fact that, in his section *Aspidixia*, he did not include leafy species, was merely caused by the circumstance, that he did not know leafy monoecious species with inflorescences like that of *Viscum articulatum*.

VAN TIEGHEM, who knew that the particularities of the inflorescences are independent of the development of the leaves, rightly preferred to base his distinctions of genera and sections upon the former. Yet he did this in an incorrect way, as, in the first place, he described *Aspidixia* as not having triads, but single flowers. A simple examination of the inflorescences of *Viscum articulatum*, *V. nepalense*, *V. liquidambaricolum*, *V. angulatum*, *V. ramosissimum*, and *V. mysorensis*, clearly shows that these species also have their flowers in triads, only with the middle flower sustained by a bracteal cup of its own. If one

prefers to denote these inflorescences by another names as "triads", one must also give this other name to the female inflorescences of *V. album* and its allies, which have the middle flower sustained by its own bracteal cup as well; the more so, as these inflorescences are often more than 3-flowered. The case, however, of *Viscum album*, which has the inflorescences 1—5-flowered, and usually the apical flower with bracteal cup in the female plant, without bracteal cup in the male plant, clearly shows that VAN TIEGHEM's distinction between the *Visca* with flowers in triads and those with flowers single, is an artificial one.

VAN TIEGHEM's subdivision of his genus *Viscum* is as follows (cfr. l. c., p. 189).

- I. Les triades sont à la fois terminales et axillaires, ce qui rend la ramification dichotomique; il y a en même temps dioecie et les fleurs mâles sont grosses Sect. 1. *Euvicum*.
- II. Les triades sont exclusivement axillaires, ce qui rend la ramification latérale; il y a en même temps presque toujours monoecie et les fleurs mâles sont petites.
 1. Dans chaque triade les fleurs sont de même sorte, mâles dans les unes, femelles dans les autres; espèces en majorité monoïques, quelquefois dioïques Sect. 2. *Isanthemum*.
 2. Dans chaque triade les fleurs sont de deux sortes.
 - a. La fleur médiane est mâle et les latérales femelles Sect. 3. *Mesandrum*.
 - b. La fleur médiane est femelle et les latérales mâles Sect. 4. *Mesogynum*.

This subdivision is not correct in all parts either. The distinctive characters between the first and the second section have not been exactly expressed, since in the first the inflorescences are mainly terminal, but also lateral, in the second mainly lateral, but exceptionally also terminal. Moreover the terms lateral and terminal express a difference of degree only. *V. orbiculatum* and *V. verruculosum* (both synonyms of *V. heyneanum* in this paper) do not belong to the section *Isanthemum*, but to *Mesogynum*, since the middle flowers of their cymes are, as a rule, female. None of the Asiatic *Visca*, known to the present author, belongs to *Isanthemum*.

The third and last subdivision of *Viscum* we owe to ENGLER (Pflanzenfam., Nachtr., 1897, p. 140), but it does not offer new points of view. ENGLER, rightly, again unites *Aspidixia* with *Viscum*, and then gives a subdivision which is mainly a combination of those given by VAN TIEGHEM for his two genera. ENGLER, however, follows VAN TIEGHEM too closely in all details, even in his errors. ENGLER again

distinguishes between the species with flowers in triads and those with single flowers; to *V. album* he ascribes triads only; the subsections *Ploionixia* and *Aspidixia* of his section *Botryoviscum* are distinguished by him by means of the structure of the inflorescences: to the former he ascribes mainly triads, to the latter mainly single flowers; all these errors have been taken from VAN TIEGHEM. Like VAN TIEGHEM, ENGLER mentions *V. orbiculatum* and *V. verruculosum* as belonging to *Isanthemum*, and he adds to these, likewise erroneously, *V. ramosissimum*. In the second edition of the Pflanzenfamilien, in vol. 16b, p. 196—203, the same subdivision of *Viscum* is met with unaltered.

It is impossible to me to give a criticism in full of VAN TIEGHEM's and ENGLER's subdivisions, as the bulk of the species of this genus is African, and has not been examined by me. In the Flora of Tropical Africa 26 species are enumerated, in the Flora Capensis 20 species, in the Catalogue des Plantes de Madagascar 44 species, and only few of these are common to two of the three regions mentioned. As little is it possible to give a system of the Asiatic species only. But to give as natural an arrangement as possible of the species accounted for in this paper, has been attempted in the following.

It is clear that the grade of development of the leaves cannot be the base for a natural arrangement of the species. The leafless *Viscum nudum* is most closely related to the leafy *Viscum album*; the leafy *V. mysorensis* is most closely related to the leafless *V. articulatum* and its allies; the leafless *V. Bancrofti* is most closely allied to the leafy *V. Whitei*, *V. capitellatum*, and *V. trilobatum*. It is, however, possible to distinguish more natural groups on the ground of the structure of the inflorescence, and it is therefore that the following arrangement is proposed here.

I. No adventitious flowers in the cymes.

A. Flowers in spikes with terminal flower, which are usually 1—5-flowered, and the terminal flower of which, if female, usually has a bracteal cup of its own.

1. Flowering part of the plant with terminal inflorescences on the apex of all internodes. Moreover lateral inflorescences or not. Dioecious species.

a. Leafy: 1. *V. album*, 2. *V. Alni-formosanae*, 3. *V. Fargesii*, 5. *V. cruciatum*.

b. Leafless: 4. *V. nudum*.

2. Flowering part of the plant exceptionally (*i. e.* on the extremities of weak branchlets) with terminal inflorescences, usually with numerous lateral inflorescences only. Monoecious species.

- a. Leafy: 6. *V. mysorensis*.
- b. Leafless: 7. *V. articulatum*, 8. *V. nepalense*, 9. *V. liquidambaricolum*, 10. *V. angulatum*, 11. *V. ramosissimum*; probably also: 12. *V. Loranthi*.
- B. Spikes reduced to triads with the middle flower female, the lateral flowers male. All leafy: 13. *V. ovalifolium*, 14. *V. Wrayi*, 15. *V. Acaciae*; probably also: 16. *V. indosinense*.
- II. Inflorescences enlarged by the development of adventitious flowers.
- A. Middle flower of the cymes female. All leafy: 17. *V. orientale*, 18. *V. heyneanum*, 19. *V. monoicum*, 20. *V. multinerve*.
- B. Middle flower of the cymes male.
- a. Leafy: 21. *V. trilobatum*, 22. *V. capitellatum*, 23. *V. Whitei*.
- b. Leafless: 24. *V. Bancrofti*.

Artificial key to the species.

1. Leafy 2
 Leafless 14
2. In the flowering part of the plant terminal inflorescences on all internodes, and ramification from the adjacent axils, hence a regular dichotomy . . . 3
 In the flowering part of the plant only exceptionally terminal inflorescences, hence no regular dichotomy 5
3. Plant in its lower portion with several decussate pairs of leaves on each branch, dichotomously branched at all nodes towards the extremities. Female cymes with no more than 3 flowers, the central one of which usually sessile. Fruits stipitate. Male flowers large, with tepals 6—8 mm long 5. *V. cruciatum*
 Plant dichotomously branched from the base. Female cymes 3—5-flowered, the central flower shortly pedicelled, the lateral ones in 1 or 2 decussate pairs. Fruits not stipitate. Male flowers smaller, tepals 2—3 mm long or even smaller 4
4. Leaves linear 3. *V. Fargesii*
 Leaves lanceolate to obovate 1. *V. album*
 Cfr. also the little different 2. *V. Alni-formosanae*
5. Cymes with no more than 1 female and 2 male flowers 6
 Cymes with more than 3 flowers and more than one female flower . . . 9
6. Fruits, with exception of the very young and entirely ripe ones, warty 13. *V. ovalifolium*
 Fruits dull by minute granules, but not warty 14. *V. indosinense*
 Fruits smooth and shining 7
7. Fruits not stipitate. Central flower of each cyme sustained by a bracteal cup of its own. Leaves partly normally developed, partly reduced to scales 6. *V. mysorensis*
 Fruits stipitate. Central flower of the triads without a bracteal cup of its own. Leaves normally developed on nearly all the nodes 8
8. Internodes gradually flattened towards the apex. Leaves nearly obovate 14. *V. Wrayi*
 Internodes not flattened, very slender. Leaves lanceolate to spatulate 15. *V. Acaciae*

9. Unripe fruits with warts or papillae 18. *V. heyneanum*
 Unripe fruits dull by minute granules, but not warty. Cymes often with
 more than one internode 17. *V. orientale*
 Unripe fruits smooth and shining in all stages 10
10. Fruits strongly stipitate. Plant very slender. Leaves with 5—9 longitudinal
 nerves 20. *V. multinerve*
 Fruits oblong, attenuate towards the base and the apex.
 18. *V. heyneanum* var. *liocarpum*
 Fruits attenuate only at the base, or contracted only below the tepal-bearing
 margin 11
11. Fruits oblong, not attenuate nor contracted at the apex, rather truncate.
 Central flower of the cymes female. Leaves with 3—7, usually 5, longitudinal
 nerves, acute or obtuse 19. *V. monoicum*
 Fruits roundish, often contracted below the tepal-bearing margin. Middle
 flower of the cymes male 12
12. Leaves lanceolate, acute. Stems very slender 23. *V. Whitei*
 Leaves broader, very obtuse or truncate. Stems stiff, divaricately branched 13
13. Leaves roundish to cuneate, 1.5—4.5 cm long, 1—4 cm broad. Peduncles of
 cymes 0—2 mm long 21. *V. trilobatum*
 Leaves 1.5—2 cm long, concave upwards. Peduncles of cymes 2—10 mm
 long 22. *V. capitellatum*
14. Flowering plant with terminal inflorescences on all internodes, branching
 from the adjacent axils, hence regularly dichotomous. Female inflorescences
 3-flowered, the central flower sustained by its own bracteal cup
 4. *V. nudum*
 Flowering plant only exceptionally with terminal inflorescences and dichoto-
 mously branched 15
15. Tepals persistent on the fruit, growing out with it. Plant stiff, divaricately
 branched; all parts with a granular, nearly papillose, dull-shimmering surface .
 12. *V. Loranthi*
 Petals deciduous, or only persistent in the dry state. More slender plants . 16
16. Inflorescences with a male central flower without bracteal cup of its own,
 and moreover 2—4 female flowers within the common bracteal cup
 24. *V. Bancrofti*
 Inflorescences with a female central flower with its own bracteal cup, and
 moreover usually 2 lateral male flowers 17
17. Flowering stems with the internodes distinctly flattened 18
 Flowering stems with the internodes not or only hardly flattened . . 20
18. Internodes slender, usually not more than 5 mm broad. Fruits white or
 greenish-white, globose, not more than 3 mm in diameter. Nearly always
 parasitic on *Loranthaceae* 7. *V. articulatum*
 Fruits darker-coloured, and also larger, or at least longer. Only now and
 then on *Loranthaceae* 19
19. Internodes 5—10 mm broad. Fruits globose or somewhat oblong in the unripe
 stage 8. *V. nepalense*
 Internodes usually 3—5 mm broad. Fruits oblong. Usually parasitic on
Quercus, *Castanea*, or *Liquidambar* 9. *V. liquidambaricolum*

20. Flowering stems with terete internodes, often grooved or striped, but not 4-angular 11. *V. ramosissimum*
 Flowering stems with distinctly 4-angular internodes 10. *V. angulatum*

1. *Viscum album* LINNAEUS, Spec. plant., ed. 1 (1753) II, 1023; THUNBERG, Fl. jap. (1784) 63; KORTHALS, in Verhand. Batav. Genootsch., 17 (1839) 254; LEDEBOUR, Fl. ross., II, 1 (1844) 380; MAXIMOWICZ, Primit. Fl. Amur. (1859) 134; BUHSE, in Nouv. Mém. Soc. Nat. Mosc., 12 (1860) 105; WYDLER, in Flora, 43 (1860) 443; MIQUEL, Annales, 3 (1867) 133; BRANDIS, Forest Fl. N.W. & Centr. India (1874) 392; FRANCHET & SAVATIER, Enum. plant. jap., 1 (1875) 406; MAXIMOWICZ, in Mélang. Biol. Acad. Sc. Pétersb., 9 (1877) 615; KURZ, Forest Fl. Burma, 2 (1877) 323, excl. var. *karensium*?; EICHLER, Blüthendiagr., 2 (1878) 553; BOISSIER, Fl. orient., 4 (1879) 1068; AITCHISON, in Journ. Linn. Soc., bot., 18, no. 106—107 (1880) 92, p.p.; BENTHAM & HOOKER FIL., Gen. pl., III, 1 (1880) 213; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 223; SCHÖNLAND, in Ann. Bot., 2 (1888) 283 seq., t. 17; LOEW, in Bot. Zeit., 48 (1890) 565 seq.; LINDMAN, in Bot. Centralbl., 44 (1890) 241 seq.; FORBES & HEMSLEY, in Journ. Linn. Soc., bot., 26, no. 177 (1894) 407; HEMSLEY, in Journ. Linn. Soc., bot., 31 (1896) 307; VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 173; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. (1897) 140; GAMBLE, Ind. timb. (1902) 583; COLLETT, Fl. simlens. (1902) 440; BRANDIS, Ind. trees (1906) 552; LECOMTE, in SARGENT, Pl. Wilson., 3 (1916) 318; LÉVEILLÉ, Cat. pl. Yun-Nan (1916) 285; TUBEUF, Monogr. Mistel (1923) 1 seq.; PARKER, For. Fl. Punjab (1924) 441; FISCHER, in Rec. Bot. Surv. Ind., XI, 1 (1926) 160 seq.; OSMASTON, For. Fl. Kumaon (1927) 465; HANDEL-MAZZETTI, Symbol. sin., VII, 1 (1929) 160; DINSMORE, in Post, Fl. Syria, Palest. & Sinai, ed. 2, 2 (1933) 486; ENGLER & KRAUSE, in ENGL., Nat. Pflanzenfam., ed. 2, 16b (1935) 199; DANSER, in Blumea, II, 2 (1936) 55; in Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1 (1938) 58; *Viscum dichotomum* GILIBERT, Exercit., 2 (1792) 394; *Viscum stellatum* D. DON, Prodr. fl. nepal. (1825) 142; A. P. DE CANDOLLE, Prodr., 4 (1830) 278; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 403; KORTHALS, in Verhand. Batav. Genootsch., 17 (1839) 254; BENTHAM & HOOKER FIL., Gen. pl., III, 1 (1880) 213; ? *Viscum karensium* VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 189; *Viscum Aitchisoni* VAN TIEGHEM, ibidem, 190, nom. nud., p.p.; *Viscum album* var. *typicum* & var. *rubro-aurantiacum* MAKINO, in Bot. Mag. Tokyo, 18 (1904) 67; *Viscum costatum* GAMBLE, in Kew Bull. 1913 (1913) 46; *Viscum album* ssp. *coloratum* KOMAROV, Fl. Mansh.,

2 (.....) 107, non visum; NAKAI, Fl. koreana, 2 (1911) 179; *Viscum coloratum* NAKAI, in MORI, Enum. pl. corean. (1922) 128.

Stems dichotomously or umbellately branched from the base, the number of branches at each node usually 2—6, rarely up to 13; internodes cylindrical, swollen at the nodes, the thickest ones up to 10 mm or more in diameter, the terminal flowering ones 0.5—2.5 mm in diameter, all of them green (without cork nor lenticels), wrinkled in the dried state, each internode with two lateral scales (prophylls) at its base and two, rarely three, normal leaves at its apex. *Leaves* lanceolate or elliptic to obovate-lanceolate or obovate, usually obtuse in the narrow-leaved, rounded in the broad-leaved forms, always strongly narrowed towards the base, sessile or subsessile, usually 25—100 mm long, 5—35 mm broad, thin- or thick-coriaceous (more or less succulent in the fresh state), little different above and below, curvinervous or flabellinervous with 3—9 longitudinal indistinct or distinct nerves, which in the latter case are somewhat more distinct above than below and connected by indistinct reticulate veins. *Inflorescences* terminal on the articulations of the stem, between the pairs of normal leaves and in the bifurcations of the stems, but also on articulations that are more or less reduced to pedunculate cymes, and in that case the cymes to 2—6 laterally inserted on the nodes and with leaves more or less reduced to bracts. Flowers dioecious. Male inflorescence nearly always 3-flowered, with a terminal flower subtended by a pair of bracts decussate with the leaves, and each bearing one male flower in its axil, below these a peduncle 0—3 mm long; female inflorescence usually 3—5-flowered, with a terminal flower subtended (perhaps not always) by a pair of bracts not bearing flowers in their axils, below these one or two decussate pairs of bracts bearing flowers in their axils; the bracts sometimes roundish and short, sometimes longer and more triangular, decussate with the leaves and with each other; below these a peduncle 0—2 mm long. *Male flowers* roundish in bud, nearly 2 mm in diameter, with 4 valvate lobes and a very short tube. *Female flowers* considerably smaller than the male ones, with a short-cylindrical ovary, crowned by 4 thickish, triangular tepals nearly 0.5 mm long, and a short nipple-shaped or short-cylindrical style. *Fruits* globose or roundish-elliptical, up to 4—8 mm long, 4—7 mm in diameter, probably larger in the fresh state. (Description from the British Indian plants of the Kew and Dehra Dun Herbaria.)

Remarks If we begin by considering the Indian forms of *Viscum album*, we may remark that, in the Himalaya, the species is

rather polymorphous. We cannot be surprised at this if only we keep in mind that already in Europe, which is so much nearer to the periphery of the total area, *V. album* is remarkably polymorphous. It seems, however, impossible to distinguish among the Himalayan forms any distinct varieties. Though we often meet with remarkable forms which are sufficiently different to be considered even as species, these forms are connected by so many intermediates, and their geographic distribution is so little characteristic, that even their distinction as varieties seems useless. The variability affects all the parts of the plant, *e. g.* the dimensions and mode of ramification of the stems, the dimensions, shape, texture, and nervation of the leaves, the numbers of flowers in the inflorescences, and the development of additional inflorescences beside the terminal ones. From the labels it is not evident whether in the Himalaya there exists any important variability in the colour of the ripe fruits, as is the case in more eastern regions.

In which way the stems may be divided into two to six branches at their nodes, is exactly described and explained by EICHLER (*l. c.*). WYDLER observed more numerous branches (up to 12), as I did in the Himalaya materials, and once I found 13 branches at the apex of an internode. That the branches, originating from the apex of the same internode, are usually very unequally developed, is described by all morphologists dealing with the subject (EICHLER, WYDLER, SCHÖNLAND, LINDMAN, *ll. cc.*, and others). At the apices of the weakest branches the leaves are often reduced to bracts, and in that case *Viscum album*, though characterised by its terminal inflorescences, moreover bears so-called lateral inflorescences, which are, in general, characteristic for other species. Among the Asiatic specimens I never met with stems which, on one twig generation, had more than one pair of normal leaves, as is characteristic for *V. cruciatum*. WYDLER, however, describes such instances (*l. c.*) for European plants.

The leaves of *V. album* show a high degree of variability in their dimensions, *viz.*, from 25 to 100 m in length by 5 to 35 mm in width; also the shape may be very different, varying from obtuse-lanceolate to broadly cuneate-obovate. The nervation is sometimes entirely indistinct, in other cases more or less distinct, and often very distinct on both sides. The number of longitudinal nerves is usually 3, but varies up to 9.

As regards the structure, the inflorescence is as EICHLER describes it, *viz.*, 3-flowered, with the two lateral flowers sessile in the axils of opposite bracts, the middle flower shortly pedicelled between them, and

sustended by its own pair of bracts if female, without such if male. Exceptions to this rule are, however, numerous. As in herbaria male plants are by some unknown cause much less numerous than female ones, we can say little about their variability. On the female plants we often meet with 5-flowered inflorescences, consisting of two decussate pairs of sessile lateral flowers, and one terminal flower, either with or without its own pair of bracts; the lateral flowers never bear prophylls. Inflorescences with more than 3 flowers are also described by LINDMAN and WYDLER (*l. cc.*), other aberrations from the most common type by SCHÖNLAND (*l. c.*). I once met with a so-called lateral inflorescence bearing in the axils of its involueral bracts again the same type of inflorescences.

It is a remarkable fact, that *V. album* is not found throughout the Himalayan tract; it is common from Afghanistan to the Nepal frontier, but much rarer more to the East. From Nepal I did not see more than a single specimen, of which the exact locality is not given, but *V. album* certainly occurs there, because D. DON'S *V. stellatum*, described from Nepal, undoubtedly represents the same species. Here, however, the southern boundary of the common form of *V. album* seems to run in N.E. direction. In Sikkim, however, the species reappears in a peculiar form, which is also spread in Assam, Burma, Yunnan, and even in Tonkin. This form appears to be a geographic variety, readily distinguishable in herbaria. GAMBLE'S *Viscum costatum* may be included in it, but is by no means characteristic for it; moreover, the leaves of the type specimen are rather strongly bullate between the main nerves, and consequently costate beneath, but this peculiarity is not found in other specimens of the variety, and hardly in any of the species. It is therefore, that I have not based my var. *meridianum* on GAMBLE'S type specimen of his *V. costatum*, nor used his specific name for the new variety.

If we now look at the common form of the species, we find it back in northern and north-eastern China, Korea, the Amur Basin, Japan, and Formosa. In China the polymorphy is still important, but in Japan and Formosa it decreases, and the plants from these countries are, in the herbarium, not distinguishable from the European forms. At the same time, however, there appears a remarkable variability as regards the fruit colour, the ripe fruits being white, yellowish, golden-yellow, orange, or red. Upon the red-fruited form of Manshuria, KOMAROV seems to have based a new subspecies, which also occurs in Japan and Formosa, and was elevated to

specific rank by NAKAI. The fruit colour, however, seems to be the only distinctive character of this so-called species, because no additional characters are mentioned, and in the herbaria it appears to be entirely like the white-fruited variety. MAXIMOWICZ (*l. c.*) mentions specimens with light greenish-yellow fruits from Japan, specimens with golden-yellow fruits from Manshuria.

Of the further varieties found among the Chinese herbarium materials, I must mention a slender form with remarkably narrow leaves, occurring here and there in the Himalaya, but more frequently in China, and which perhaps may be considered as an approach towards *Viscum Fargesii*. It is represented by the numbers DRUMMOND 23862, from the Himalaya, and LICENT 6056 and 6057, FORBES s.n., and HU 1110, all from China. Though, on one hand, it is connected with other forms of *V. album* by so many intermediates, that it seems useless to give it a varietal name, it does, on the other hand, not really connect *V. Fargesii* with *V. album*.

A doubtful name is *Viscum karensium* VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 189, a *nomen nudum*, enumerated by VAN TIEGHEM after *Viscum album* among the "diverses espèces voisines, considérées par beaucoup d'auteurs comme n'en étant que de simples variétés", and therefore undoubtedly the same as *Viscum album* var. *karensium* KURZ, For. Fl. Burma, 2 (1877) 324. The latter variety is described by KURZ in the following way: "inflorescence shorter or longer peduncled; perianth lobes 3; involucre smaller and narrower"; whereas *V. album proper* is described as follows: "inflorescence more robust, sessile or nearly so; perianth lobes 4; involucre larger and broader". The var. *karensium* is said to be "not unfrequent in the dryer hill forests of the Martaban hills, at 5,000 to 6,000 ft elevation".

I have seen no specimens, and from the description it is not clear what kind of plant KURZ means. It is not a *Viscum* at all? Or perhaps *V. album* var. *meridianum* DANSER, described as new in this paper?

For the interpretation of VAN TIEGHEM's *Viscum Aitchisoni*, based upon ARCHISON's *V. album*, see *V. cruciatum*.

Specimens examined:

ORIENT. Asia Minor. Dardanelles, SINTENIS 230 (K) ♂; Kurkuteh, 1000 m, TENGWALL 523 (K) ♂; Holy Land, Gamala, HAYNE s. n. (K) ♀; Southern Syria, Mt. Hermon, 6000 ft, LOWNE s. n. (K) ♀; Northern Persia, Ghilon, AUCLER-ÉLOY 4642, 4643 (K) ♀; prov. Asterabad, Bender Ges, FREYN 1414 (K) ♀.

INDIA. Without exact locality: JACQUEMONT 667 (K) ♀; "N. W. India", ROYLE s. n. (K) ♂; N. W. Himalaya, 5—7,000 ft, THOMSON s. n. (K); "Bendecoot", FALCONER s. n. (K); Afghanistan, Bharowul, GRIFFITH 1372 = Kew Distribution

2736 (K) ♂; Kurram Valley, Zeran Tangi, HARSUKH 15549 (DD, K) ♀; Kurram Valley, base of the Pêwârkotal, Turai, ATCHISON 87 (DD, K) ♀; N. W. Frontier Prov., Nathia, DEANE s. n. (K) ♀; Samana Range, HARE s. n. (DD) ♀; Chitral, Laram, 7000 ft, GATAKRE 17526 (DD) ♀; Hazara, DUTHIE s. n. (K) ♀; Punjab, DRUMMOND 23862 (K) ♀; Tandiani or thereabout, DRUMMOND 21985 coll. BARRETT 75 (K) ♂, ♀; dry hills above Dooah (♀), 5—6,000 ft, DRUMMOND 21492 (K) ♀; Parhatti Valley, Kulu, Jhari, 5300 ft, PARKINSON 3906 (DD) ♀; Kangra, SAHNI 49 (K) ♀; Kashmir, Chamba, between Kulel and Tisa, 4000 ft, GAMMIE 18220 (DD, K) ♀; Eismakhan, 6500 ft, CLARKE 31186 (K) ♀; Kamraj, Huni, 5000 ft, FULLER s. n. (DD); Simla, FIELDING s. n. (K); MADDEN s. n. (K); DALHOUSIE s. n. (K); 5—7,000 ft, EDGEWORTH 195 (K) ♂; Kothi, Mahasur (♀), COLLETT s. n. (K) ♀; Naldehra, 6500 ft, GAMBLE 4393 (DD, K) ♀; Sima, below Koti, GAMBLE 6269 (DD, K) ♀; Kumaon, JAMESON s. n. (K); THOMSON 1058 (K) ♀; Barun (♀), 4—5,000 ft, RAMSUKH 8016 (DD) ♀; Gungoli (♀), 5500 ft, STRACHEY and WINTERBOTTOM 2 (K) ♀; Bashahr State, Danglu, 8000 ft, KARTAR SINGH 52 (DD) ♂, ♀; Naini Tal Division, HIRA SINGH 78 (DD) ♂, ♀; Tihri Garhwal, Lambatach (♀), 7000 ft, GAMBLE 26738 (K) ♀; Kollich, 7000 ft, GAMBLE 26768 (K); Garhwal, 4—6,000 ft, STEWART 595 (K) ♀, "on *Alnus* and *Crataegus*"; Lohbsa, 5500 ft, OSMASTON 253 (DD) ♀; Jaunsar, RAMSUKH s. n. (DD) ♀; Kathian, 7000 ft, GAMBLE 21474 (DD, K) ♀; 6800 ft, KANJILAL 1057 (DD); 7—8,000 ft, DUTHIE 13012 (DD) ♀; Kotikanasar, 6000 ft, PARKINSON 7037 (DD) ♀; Nepal, WALLICH Catal. 490 (K) ♀.

CHINA. Kansu province, N. E., E. LICENT 6056, 6057 (K) ♀; between Choni and Lanchow, 2600—3000 m, CHING 1044 (BD) ♀, on *Populus*, *Ulmus*, *Acer*, fruit greenish-yellow; Kiangsi Prov., An Yüan Hsien, 2300 ft, HU 1110 (BD, K) ♀, on *Pterocarya*, white berries; Hupeh Prov., A. HENRY 7383 (K) ♀; Ichang, WILSON s. n. (K) ♀, on *Pterocarya*, berries greenish-yellow; Shantung Prov., Chefoo, FORBES s. n. (K) ♀; Chili Prov., Peking, BUSHELL s. n. (K) ♀; LIU L. 303 (K) ♀; Wuchang, PURDOM 64 (K); Tehang-Ting-Fou, CHANET 1001 (K) ♂; Jehol, DAVID 1706 (K) ♀; Shung-king Prov., between Mukden and Tung-she-shien, JAMES s. n. (K); Jaoling, ROSS 389 (K), "both red and yellow berries"; Manshuria, STUART s. n. (K) ♀; "ad flumen Ussuri", coll. ♀ s. n. (K) ♀.

AMUR PROVINCE. MAXIMOWICZ s. n. (DD, K) ♀; near Chabrovsk, on the Amur, KOMAROV 522 (K) ♀, type (♀) of the sp. *coloratum* KOMAROV.

JAPAN. Korea, Prov. Kogen, Kongo-san, 1000 m, WILSON 10522 (K), "*V. coloratum* NAKAI, on *Quercus mongolica*, rare"; *ibidem*, round Mutiuzi, WILSON 9289 (K), "*V. coloratum* NAKAI", on *Quercus mongolica*; Prov. N. Heian, around Maban (Musan), 833 m, WILSON 8709 (K), "*V. coloratum*, on *Quercus mongolica*"; Quelpart Island, Seiki-ho, to Mushroom House, WILSON 9576 (K) ♀, "*V. coloratum* NAKAI", fruit orange-red; from Mushroom House near Sopa to Monastery, WILSON 9581 (K) ♀ "fruit greenish-white, on *Quercus glandulifera*, common"; Hokkaido, Sapporo, INAGAKI s. n. (Gro, L) "*Viscum coloratum* NAKAI; Sapporo Plain, FAURIE 6809 (K); Hakodate, MAXIMOWICZ s. n. (K) ♀; Hondo, WILSON 7765, 7766 (K) ♀, "*var. rubro-aurantiacum* MAKINO"; Hondo, Hirotsuki, FAURIE 1253, 1254 (K) ♂, ♀, on *Alnus*; Fuji-yama, Tschonoski s. n. (B, K); Fuji-yama, OLDHAM 270 (K) ♀; Nikko, sine coll. & num. (K); Yokoska, SAVATIER 553 (K) ♂; Prov. Musashi, Nippara, H. TAKEDA s. n. (K) ♀, "*Viscum album* var. *rubro-aurantiacum* MAKINO";

Formosa, Dagelet Island, Oo-njong-too, WILSON 8583 (K) ♀, "*Viscum coloratum* NAK., common on *Fagus multinervis*, not seen on any other tree".

Viscum album var. *meridianum* DANSER, nov. var. — Folia obovato-cuneata, late rotundata, in herbario conspicue nervosa nervis longitudinalibus 3—9, ut caules plerumque luteola.

INDIA. Sikkim, THOMSON s. n. (DD) ♀; Darjeeling, the Shrubbery, 7000 ft, GAMBLE 711 (K) ♀, type of *Viscum costatum* GAMBLE; Assam, Naga Hills, Japu Forests, DE 17461 (Sh), type of the var. *meridianum* DANSER; Burma, Southern Shan States, Kalaw protected area, ROGERS 694 coll. WRIGHT (DD), on *Salix*.

CHINA. Yunnan, Shweli-Salwin Divide, Lat. 25°45' N., Long. 98°58' E., 9000 ft, FORREST 25388 (BD, E, K) ♀, fruits pale green.

FRENCH INDO-CHINA. Tonkin, Laokay Prov., forêt de Chapa, BRILLET s. n. (P) ♀.

2. *Viscum Alni-formosanae* HAYATA, Ic. pl. Formos., 6 (1916) 39, ic. 3.

I have not seen a type of this, but the under-mentioned specimen is from Formosa and has been found growing on *Alnus formosana*. It is a male plant, which very much resembles *Viscum album*, and which could very well be a form of this. The stems are slender, somewhat thickened at the nodes, somewhat longitudinally wrinkled, the longest lids 8.5 cm long by 2.5 mm in diameter. The leaves are very dull, ovate with attenuate base, obtuse, and therefore calling to mind those of *Viscum orientale*, with 3—5 longitudinal ribs, the largest ones 4.5—5 cm long (the petioles incl.), 15—18 mm broad. The inflorescences are terminal on the youngest articulations, and here and there lateral on the older nodes; their structure is as in *Viscum album*, though it often occurs that the middle flower of the triad is surrounded at its base by an involucre of two bracts, as is usually the case in the female plant. On the specimens in the Kew Herbarium I counted 14 terminal inflorescences, all normally 3-flowered, and of which 9 had the middle flower sustained by 2 bracts, 2 not so, whereas 3 were doubtful in this respect; I found only one inflorescence axillary at the side of a terminal inflorescence, and this was normally 3-flowered and had no bracts below the middle flower; I counted 13 lateral inflorescences on older nodes, all of which were normally 3-flowered, 3 with 2 bracts at the base of the middle flower, 5 without such, and 5 doubtful in this respect; of these lateral inflorescences only one had one leaf-like involucre bract; more than 3 flowers were not found in any of the inflorescences.

HAYATA says that this species mainly differs from *V. album* "in

the male flowers which are usually in pair at the top of the branches, and in the much narrower perianth segments of the same flowers". These differences are absent in the specimens described above; the flowers are all in bud, and subglobose. HAYATA describes and figures the flowers as 3- or 4-merous, but I only found 4-merous flowers. As, however, the description of the stems and the leaves matches those of the above mentioned plant, I think it quite possible that our plant is specifically identical with HAYATA's after all.

Specimens examined: FORMOSA. Arisan Prov., Kagi, WILSON 9713 (K) ♂, "*Viscum Alni-formosanae* HAY. on *Alnus formosana*".

3. *Viscum Fargesii* Lecomte, Not. syst., 3, p. 173 (1915).

Stems terete, dichotomous at all nodes or here and there with more than two branches; lower internodes to 5 cm long by 2 mm in diameter, little thickened at the nodes, green, the terminal ones somewhat less thick, to 1 mm in diameter, and also somewhat shorter, to 3.5 cm long. *Leaves* opposite, sessile at the tip of the ramifications, linear, usually 2.5—3.5 cm long, 1—1.75 mm broad, rounded at the apex, attenuate towards the base, thickish, wrinkled, nerveless, often, however, smaller or even scale-like, only 1.5 mm long; all ramifications moreover with a pair of scales (prophylls) at their bases. *Inflorescences* as in *Viscum album*, only the female ones known, nearly 5 mm long, with a short axis bearing two alternate pairs of bracts, of which the lower ones bear single sessile flowers in their axils, and the upper ones enclose one flower. *Fruits* only known in the half-developed stage, nearly 4 mm long by 3 mm in diameter, crowned by the nipple-shaped style. (Description from type specimens in the Buitenzorg and Kew Herbaria.)

Very much like a small, slender, and narrow-leaved form of *Viscum album*, but with a very peculiar appearance, and, as far as known, not connected with *V. album* by intermediate forms.

CHINA. Eastern Sze-chuan, Tchen-kéou-tin district, FARGES s. n. (B, K) ♀, apparently *types*.

4. *Viscum nudum* DANSER, n. sp. — Fruticulus foliis carens, omnino glaber, *Visco albo* defoliato similis. *Rami* multoties bifurcatim vel umbellatim ramosi; internodia teretia, nodis paulum tantum dilatatis neque incrassatis, vetustissima quae adsunt ad 7 cm longa, 6 mm diametro, superficie rugulosa, novissima circiter 1.5—2 cm longa, nonnihil applanata, 1.5 mm lata; rami omnes basi prophyllis 2 squami-

formibus appressis, apice foliis 2 squamiformibus patentibus, brevibus, latis, obtusis, circiter 0.5—0.75 mm longis, margine fimbriatis, denique nonnihil auctis et reflexis, passim ex internodiis 2 compositi, circa medium squamis 2 cum superioribus alternantibus. *Inflorescentiae* (femineae tantum notae) terminales in articulationibus novissimis et in bifurationibus recentissimis, pedunculo brevi crasso circiter 2—3 mm longo et diametro, triflorae, flore singulo mediano breve pedicellato basi cupula e bracteis 2 composita stipato, floribus 2 lateralibus oppositis in axillis bractearum sessilibus. *Alabastra* iuvenilia minima et *fructus* immaturi globoso-ellipsoides circiter 4 mm longi 3 mm diametro adsunt. (Description from the type specimen WILSON 4483 in the Kew Herbarium.)

Remarks. The type specimen appears to be a female specimen of a dioecious species and looks like a leafless specimen of *Viscum album*. As more or less leafless forms of *V. album* are unknown, and there are a few more differences between our new form and the latter, I prefer to distinguish our plant as a new species. Most remarkable is the fact, that here and there the twig generations appear to be composed of two internodes, which is so extremely rare in *V. album* and so common in the allied *V. cruciatum*. Our specimen has very young flower buds, apparently for the next spring, and unripe fruits, apparently from the last winter. Lateral inflorescences are absent.

The other two specimens mentioned below were discovered afterwards; they confirmed my belief, that I had rightly distinguished a new species. These specimens show more frequently twig generations composed of two internodes. On the specimen SCHNEIDER 1449 I even found such twig generations bearing decussate axillary branches, and moreover a few 5-flowered inflorescences.

CHINA. West Sze-chuan, beyond Tatsien-lu, 9000 ft, WILSON 4483 (K) ♀, parasitic on *Populus* sp., type specimen; South Sze-chuan, between Oti and Ouentin, 2800 m, SCHNEIDER 1449 (BD) ♀; South Sze-chuan, between Humati and Woholo, 2000—4000 m, SCHNEIDER 3487 (BD) ♀.

5. *Viscum cruciatum* BOISSIER — *Viscum orientale* (non WILLDENOW) SPRENGEL, Syst. veg., 1 (1825) 488, p.p.; A. P. DE CANDOLLE, Prodr., 4 (1830) 278, p.p.; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 403, p.p.; *Viscum album* (non LINN.) WEBB, It. hisp. (1838) 42, n.v.; ATCHISON, in Journ. Linn. Soc., bot., 18, no. 106—107 (1880) 92, p.p.; *Viscum cruciatum* BOISSIER, Voy. Bot. Esp., 2 (1839—1845) 274;

WILLKOMM & LANGE, Prodr. Fl. Hisp., 1 (1870) 25; CHALON, Rev. Lor. (1870) 66; ETTINGSHAUSEN, in Denkschr. Akad. Wissensch. Wien, Mathem.-Naturwiss. Cl., 32 (1872) 58; WILLKOMM, Prodr. Fl. Hisp., suppl. (1893) 6; VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 189, 243; BOISSIER, Fl. orient., 4 (1897) 1068; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. (1897) 140; HOOKER FIL., in Bot. Magaz., t. 7828 (1902); LÁZARO é IBIZA, Compend. Fl. Esp., ed. 2, 2 (1907) 65; TUBEUF, in Naturwiss. Zeitschr. Forst- & Landwirtsch., 6 (1908) 407 seq., 497 seq., ic. pp. 412, 498—501, 506; ASCHERS. & GRÄBNER, Synops. Mitteleur. Fl., 4, p. 670 (1912); TUBEUF, in Naturwiss. Zeitschr., 11 (1913) 151 seq., ic. 1—12; HANSEN, in KERNER, Pflanzenleben, ed. 2, 3 (1921) 321; TUBEUF, Monogr. Mistel (1923) 89, 94, 99, 769, 772, 784; ic. 10; ic. 112, 11 & 12; ic. 162; tab. 32, 33, 34; DINSMORE, in POST, Fl. Syria, Palest. & Sinai, ed. 2, 2 (1933) 486; *Viscum Willdenowianum* MOLKENBOER, in MIQUEL, Pl. Junghuhn., p. 108 (1852); *Viscum Aitchisoni* VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 190, nomen, p.p.

Stems usually 20—25 cm long, once or twice branched in the basal portion, with decussate branches, which in their turn are several times dichotomously branched; internodes terete, with more or less wrinkled surface, the lower ones often longitudinally grooved, up to 5 cm long by 5 mm in diameter, but usually much shorter, 1—2 cm long, the upper ones gradually less thick, usually somewhat flattened towards the apex, down to 1 mm or even to 0.5 mm broad. *Leaves* opposite, sessile, lanceolate to elliptical or somewhat obovate, rounded at the apex, contracted at the base, the largest usually 4 cm long by 1.5 cm broad, rarely to 5 cm long by 1.8 cm broad, most of them smaller, however, especially the upper ones, which usually are 15—30 mm long by 3—6 mm broad; thickish, without visible nerves or with 3 longitudinal nerves visible on both sides; all ramifications, inflorescences included, moreover with 2 scales (prophylls) at their bases. *Inflorescences* terminal in the bifurcations of the stems and lateral on all the nodes, up to 4 together, peduncled, the male ones usually 3-flowered with all the flowers sessile, but often reduced to the middle flower, the female ones always 3-flowered, with the middle flower either sessile like the lateral ones, or pedicelled, and in this case with an involucre of two small bracts at its base, the three flowers together always placed in a naviculate cup formed of two opposite acute bracts, together up to 2 mm long or rarely longer. Flowers dioecious. *Male flowers* in bud oblong-ovate, 6—8 mm long, 4-angular towards the tip, later divided into 4 lobes down to 1—2 mm above the base, the lobes

recurved in the upper half, covered on the inside, with exception of the margin, by the adnate anthers, which open with many pores. *Female flower* obovate, 1—2 mm long, composed of the large ovary and 4 triangular nearly 0.75 mm long tepals, which soon fall off, and a little prominent, nipple-shaped, persistent style. *Fruit* stipitate, with exception of the 1—2 mm long stipe globose, up to 5 mm in diameter. (Description from the specimens from Asia Minor in the Kew Herbarium.)

Remarks. Though *Viscum cruciatum* appears to be well-distinct from *Viscum album*, it is not always easy to distinguish it from the latter in all stages of development. It may therefore be remarked, that young specimens are characterised by all their parts being smaller, and especially by their twig generations being composed of more than one internode; flowering male plants are easily distinguished by their very large flowers; flowering female plants are characterised by the structure of their inflorescences, which are always 3-flowered with all the flowers sessile and the middle one without separate bracts, more rarely the middle one shortly pedicellate and with a small involucre of two small bracts. The fruit-bearing female plant is easily recognised by the smaller stipitate fruits, of which there are never more than 3 together in one bracteal cup.

To the synonyms the following must be remarked.

After WILLDENOW had, in 1805, based his *Viscum orientale* on plants from "India Orientalis", SIEBER collected plants of another species in Palestine (see the list of localities below) which he distributed under the name of *Viscum cruciatum* SIEBER. In 1825, SPRENGEL, in his *Systema Vegetabilium*, erroneously identified the latter with the former. In 1830, DE CANDOLLE, in his *Prodromus*, followed SPRENGEL in this respect, moreover including Javan plants, wrongly described by BLUME as *Viscum orientale* (see *V. ovalifolium*), in the same species. *Viscum cruciatum* was rightly separated from *V. orientale*, and validly published, by BOISSIER.

VAN TIEGHEM's *Viscum Aitchisoni* was published as a *nomen nudum* in 1896, and was based on AITCHISON's *Viscum album*, mentioned in *Journ. Linn. Soc., bot.*, 18, p. 92, and distributed, under the herbarium numbers 48 and 87. Now I met with AITCHISON's Kurram Valley *Viscums* in the Kew and Dehra Dun herbaria. In the Kew herbarium I found *Viscum cruciatum* attached to an olive twig, and on the same sheet *V. album* without host tree, and to these two species two labels, one mentioning *Viscum* no. 48 as a parasite on

olive, and another mentioning *Viscum* no. 87 as a parasite on *Quercus Ilex*; moreover two labels bearing on both the numbers 48 and 87, therefore without value to our purpose. In the Dehra Dun Herbarium I found the same, with exception of the fact that a separate label for no. 87 was absent. These facts give me the certainty, that ARCHISON's *Viscum album* is partly this species, partly *V. cruciatum*, and it is highly probable, that no. 48, indicated as a parasite on olive, is *V. cruciatum*, whereas no. 87, indicated as a parasite on *Quercus*, is *Viscum album*.

Specimens examined:

PALESTINE, without exact locality, PINARD s. n. (DD, K); BOISSIER s. n. (K) ♀; Jerusalem, CHRISTY s. n. (K) ♀; MEYERS 5458 (K) ♂, and B162 (K) ♀; 800 m, DINSMORE 8162 (Gron) ♀, "on olive trees"; temple area, HEYNE s. n. (K) ♂, "on olive trees"; Mount of Olives, BORNMÜLLER 1414 (K) ♀; "in arboribus vetustis horti Gethsemani", SIEBER s. n. (K) ♀, "*Viscum cruciatum* SIEBER" type of this and of *Viscum Willdenowianum* MOLKENBOER; Holy Land, Jebel Attarus, Moab, HEYNE s. n. (K) ♀; Syria, HOOKER & HANBURY s. n. (K) ♀; South Syria, Nablous, LOWNE s. n. (K) ♂ & ♀.

INDIA. Afghanistan, Tors-appar, Khyber Pass, 34° N. L., 5200 ft alt., JOHNSTON 73 (K) ♀; Kurrum Valley, Ballish Khel (or Badishkhél), ARCHISON 48 (DD, K) ♀, "common on olive"; N. W. Frontier Prov., Chitral, Pangkora Valley, 4000 ft, GATACRE 17527 (DD) ♀; Samana Range, HARE s. n. (DD) ♀; Hazára, Mushturah, 4500 ft, INAYAT 20934 (DD) ♀; West Himalaya, Tirah, DUTHIE 134 (K) ♀.

6. *Viscum mysorense* GAMBLE, in Kew Bull. 1925 (1925) 329; Fl. Madras, 7 (1925) 1257, 1259. — Vide tab. II, A.

All parts with a golden-yellow hue. Only stem available slender, over 50 cm long, at nearly all the nodes di- or trichotomous, its basal portion terete, 5—6 cm long, up to 3 mm in diameter, longitudinally wrinkled, hardly striped, slightly thickened at the nodes, the young internodes usually 2.5—4 cm long, distinctly longitudinally striped with shallow grooves, nearly terete or slightly flattened near the base, 1—1.5 mm broad, strongly alternately flattened and double-edged towards the apex, 2—3 mm broad. Leaves normally developed only on a part of the nodes, the largest obtusely lanceolate to spatulate, up to 4 cm long by 10 mm broad, often smaller, rounded at the apex, tapering into a short petiole that is rounded beneath, flat or slightly canaliculate above, the lamina rather thick-coriaceous, with 3 longitudinal nerves, that are somewhat more distinct above than beneath and connected by indistinct veins. Leaves scale-like on most of the nodes, nearly 0.5 mm long, acute; also 2 scales (prophylls) at the base of all

ramifications. *Inflorescences* rarely terminal, usually axillary or at both sides of the axillary ones, sessile or shortly pedunculate 1—3-flowered cymes; peduncle flattened, up to 1 mm long and broad, bearing at its apex 2 opposite acute bracts forming together a naviculate cup up to 2 mm long, each bearing one sessile flower in their axil devoid of a bracteal cup and usually male, rarely female, nearly 1 mm long and compressed between the bract and the middle flower; moreover a middle flower, female, rarely sessile and without bracteal up, usually very shortly pedicellate and surrounded by a cup composed of two small bracts alternating with those of the lower pair. *Fruit* unknown. (Description from the type specimen in the Kew Herbarium.)

Remarks. *Viscum mysorensense* is a remarkable and very distinct species. According to the structure and distribution of the inflorescences it belongs to the leafless species like *Viscum articulatum*, but it certainly is no leafy form of any of the leafless species dealt with in this paper. As to the flattening of the articulations, it is intermediate between the leafy and the leafless forms, just like *Viscum Wrayi*, but it is entirely different from this species and its allies by the structure of its inflorescences.

SOUTHERN INDIA, Mysore, Arsikere, 2000 ft, MEEBOLD 8207 (BD, K), in the latter herbarium *type* of the species.

7. *Viscum articulatum* BURMANNUS, Fl. ind. (1768) 211; KORTHALS, in Verhand. Batav. Genootsch., 17 (1839) 258; KURZ, in Journ. As. Soc. Bengal., 40, II (1871) 64; For. Fl. Burma, 2 (1877) 325; excl. *var. dichotomo*; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 226, p.p., et excl. *var. dichotoma*; RIDLEY, in Transact. Linn. Soc., ser. 2, 3 (1893) 343; BRANDIS, Ind. trees (1906) 552, 716, p.p.; GAMBLE, in Journ. As. Soc. Bengal, 75, II (1914) 389; *Viscum fragile* WALLICH, ex DE CANDOLLE, Prodr., 4 (1830) 284; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 407; *Viscum aphyllum* GRIFFITH, Not. pl. as., 4 (1854) 634; Ic. pl. as., 4 (1854) t. 630; *Aspidixia articulata* VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 193; *Viscum flexuosum* GAMBLE, in Kew Bull. 1913 (1913) 47; in Journ. As. Soc. Bengal, 75, II (1914) 389; RIDLEY, Fl. Mal. Pen., 3 (1924) 165; *Viscum angulatum* (non HEYNE) BENTHAM, Fl. austr., 3 (1866) 396; FERNANDEZ-VILLAR, Noviss. app. (1880) 184; F. v. MUELLER, Syst. cens. Austr. pl. (1882) 64; BAILEY, Synops. Queensl. Fl. (1883) 451; F. v. MUELLER, Sec. syst. cens. (1889) 111; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., III, 1 (1889) 195, p.p.; Nachtr. (1897) 140, p.p.; MERRILL, in Philipp. Journ. Sc., bot., 4 (1909)

151; BAILEY, *Compreh. Catal. Queensl. Pl.* (1913) 460; KOERNICKE, in *Annal. Jard. Bot. Buitenzorg*, suppl. 3, II (1910) 678 seq.; KOORDERS-SCHUMACHER, *Syst. Verz.*, I, fam. 67 (1912) 4; MERRILL, *Spec. Blanco.* (1918) 133; in *Philipp. Journ. Sc.*, 15 (1919) 234; DOMIN, *Beitr. Fl. Austr.*, I, 3 (1921) 605; BLAKELY, in *Proc. Roy. Soc. Queensl.*, 34, 1 (1922) 30, 63; MERRILL, *Enum. Phil. Fl. Pl.*, 2 (1923) 113; SP. MOORE, in *Journ. Bot. Bot.*, 63, suppl. (1925) 90; BLAKELY, in *Proc. Linn. Soc. N.S. Wales*, 53, 2 (1928) 47.

Synonyms and literature that were mentioned by the author in previous publications (mainly *Bull. Jard. Bot. Buitenzorg*, sér. 3, XI, 3—4; XVI, 1; *Philipp. Journ. Sc.*, 58, 1) and did not need correction or discussion, have not been mentioned again.

While revising the leafless *Visca* of the Asiatic Continent, I soon discovered that the real *Viscum articulatum* reaches its North-western limit south of the Brahmaputra, and does not, or only rarely, occur in China. It has originally been described from Java, and not only occurs in the whole Malay Archipelago between Luzon, Sumatra, and New Guinea, but also in the Malay Peninsula, Indo-China as far north as Tonkin, and North Queensland, and is in many regions a common species. While revising the Indo-Chinese *Loranthaceae* I learned how to distinguish it from *V. liquidambaricolum*, which in these countries occurs along with it. Though the distinction is often difficult, transitional forms are absent. Now most of the leafless *Visca* collected in British India appear to belong to other species, certainly but little different from *V. articulatum* and very difficult to be distinguished, but probably sharply delimited against it.

The real *V. articulatum* has rather narrow, or very narrow, or more rarely rather broad, usually strongly flattened, internodes, and small, globose, usually white or light-yellowish fruits; it is usually parasitic on *Loranthaceae*. The other leafless British-Indian *Visca* are sometimes as narrow as *V. articulatum*, sometimes distinctly broader, and have larger and darker-coloured fruits; these fruits are either globose or more oblong, and their exact colour, rarely indicated on the herbarium labels, seems to be yellow or brownish. They rarely seem to grow on *Loranthaceae*. Cfr. the discussions of *V. nepalense*, *V. liquidambaricolum*, and *V. angulatum*.

Owing to the inadequate descriptions and imperfect herbarium materials, it is extremely difficult, if not entirely impossible, to disentangle what has been taken together under *V. articulatum* in different floras. What I am giving in the list of synonyms and

literature must be considered as approximative and incomplete.

Of the synonyms, *V. fragile* and *V. flexuosum*, based on British-Indian plants, may be shortly discussed.

V. fragile has been based, by A. P. DE CANDOLLE, upon a plant so named by WALLICH, and collected near Martaban and Tavoy. In these regions *V. articulatum* seems to be common, and the plants seen by me in the Kew Herbarium under number 498 are undoubtedly *V. articulatum*.

GAMBLE did not fail to notice the difference between *V. articulatum* and its nearest allies. In most of his papers he united them under one specific name, but the plant, distinguished by me as *V. nepalense*, was then considered by him as a *var. dichotomum*. In his revision of the *Loranthaceae* of the Malay Peninsula he kept *V. dichotomum* separated from *V. articulatum* as a species, and moreover distinguished a third species, *V. flexuosum*, in the following way (*l. c.*, p. 385):

Articles 4—10 mm. broad; flowers comparatively large, in many fascicles; berry 5 mm. in diam. *V. dichotomum*
 Articles 2—4 mm. broad; flowers very minute, in few fascicles; berry about 3 mm. in diam. *V. articulatum*
 Articles 2 mm. broad; flowers very minute, in few fascicles; berry about 2.5 mm. in diam. *V. flexuosum*

For the distinction of the first two species see the discussion of *V. nepalense*. *V. flexuosum*, though differing more strikingly from both *V. articulatum* and *V. dichotomum* at first sight, must be considered, in my opinion, as a very narrow form of *V. articulatum*. Besides in the vicinity of Singapore, such very narrow forms occur also elsewhere in the area of *V. articulatum*, and it is perhaps more out of reverence for GAMBLE's knowledge and sharp insight, that I accept his *V. flexuosum* as a variety of *V. articulatum*. See also the discussion of the synonym *V. elongatum*, under *V. nepalense*.

Specimens examined:

INDIA. ASSAM, WALKER s. n. (K); Khasia, GRIFFITH, Kew Distr. 2743 (BD, K); Khasia, Nongbri, 5000 ft, CLARKE 19286 (B, K); prov. Panur, 3—5,000 ft, HOOKER & THOMSON s. n. (K), "parasitic in *Osyris*"; Myrung (†), 3—5,000 ft, HOOKER & THOMSON s. n. (K), "growing on *Loranthus*"; Upper Burma, Ruby Mines, ABDUL HUK 171 (DD); Rangoon, small plant on PARKER's no. 2781, which is *V. monoicum* (K); Rangoon, University Avenue, PARRINSON 14391 (DD), on *Viscum monoicum*; "juxta ripas flum. Martabaniae" and "Tavoy", WALLICH 498 (G, K), "*Viscum fragile* WALL." type; Tavoy, Maungmagon, PARKER 2157 (BD, DD), "parasite on *Loranthus*, forming dense tufts 18 inches in diameter"; Penang, 1000—2500 ft,

KING's collector 1186 (K), "flowers pale green, fruit glossy white"; Penang Hill, SCOTT s. n. (K), "parasite on *Loranthus pentandrus*"; Perak, SCORTECHINI s. n. (DD); Perak, Simpang, plains, WRAY 2023 (K), named as *V. dichotomum* by GAMBLE; Kelantan, Kota Bahru, RIDLEY s. n. (K); Trengganu, YAPP 393 (K); Malacca, CUMING 2258 (K); MAINGAY 1406 = Kew Distr. 697 (K); HERVEY s. n. (K), named as *V. dichotomum* by GAMBLE; GRIFFITH Kew Distr. 2742 (K), named as *V. dichotomum* by GAMBLE; Negri Sembilan, Kuala Pilah, Singapore Field No. 9801 coll. HOLTTUM (K); Singapore Gardens, RIDLEY s. n. (BD).

Moreover the following 4 specimens of the *Viscum articulatum* var. *flexuosum* (GAMBLE) DANSER, nov. var. = *Viscum flexuosum* GAMBLE, in Kew Bull. 1913 (1913) 47; Journ. As. Soc. Bengal, 75, II (1914) 389.

Singapore Island, KING's collector 1187 (K), "ripe fruit glossy white"; Singapore, Tanglin, RIDLEY 6018 (K); Singapore, MURTON 151 (K); Fresh Water Island, RIDLEY 100 (BD, K), "parasitic on a species of *Loranthus*".

CHINA. Probably the following: Kwangsi prov., Nan-ning, 140 m, SIN & WHANG 2 (BD), with one small globose fruit, twigs like typical *V. articulatum*, host not mentioned.

COCHIN-CHINA AND SIAM. Cfr. Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1, p. 56—57; XVI, 3, p. 1.

PHILIPPINE ISLANDS. Cfr. Philippine Journ. Sc., 58, p. 142.

FURTHER MALAY ARCHIPELAGO. Cfr. Bull. Jard. Bot. Buitenzorg, sér. 3, XI, p. 463—464; Rec. Trav. Bot. Néerl., 31, p. 758; Blumea, III, p. 58.

Moreover:

FLORES, Keo, 1200 m, DE VOOGD 2823 (B). TIMOR, South Central, Soë, 2500 ft, in forest, WALSH 20 (BD).

AUSTRALIA. Cfr. BLAKELY, in Proc. Linn. Soc. N. S. Wales, 53, p. 48, under *Viscum angulatum*.

Specimens examined: Queensland: North Queensland, Mt. Molloy (†), 1200 ft, BRASS 2519 (Bris), "parasitic on *Loranthus* sp. on *Casuarina* sp."; Mowbray River, BRASS 1933 (Bris, H), on *Loranthus* sp.; Rockhampton, DIETRICH 374 (BD); Brisbane River, DIETRICH s. n. (BD); Goodna, 15 mi. w. of Brisbane, 100 ft, HUBBARD 2899 (H), "on *Loranthus* which was growing on *Eucalyptus tereticornis*, fruits yellow"; Stewart River, JOHNSON s. n. (BD). Moreover: North Expedition, Adelaide, SCHULTZ 475 coll. SCHOMBURGK (BD).

8. *Viscum nepalense* SPRENGEL — *Viscum dichotomum* (non GILBERT 1792, nec SPRENGEL 1825) D. DON, Prodr. fl. nepal. (1825) 142; A. P. DE CANDOLLE, Prodr., 4 (1830) 284?; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 407?; ELLIOTT, in Journ. Linn. Soc., 29 (1893) 45; GAMBLE, in Journ. As. Soc. Bengal, 75, II (1914) 388, p.p.; RIDLEY, Fl. Mal. Pen., 3 (1924) 164, p.p.; *Viscum nepalense* SPRENGEL, Syst. veg., cur. post. (1827) 47; *Viscum elongatum* A. P. DE CANDOLLE, Prodr., 4 (1830) 284; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 407; *Viscum attenuatum* A. P. DE CANDOLLE, Prodr., 4 (1830) 284; WIGHT & ARNOTT, Prodr. Pen. Ind. Or. (1834) 380; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 407; THWAITES, Enum. pl. Zeylan. (1859) 136; BRANDIS, For.

Fl. N.W. & Centr. Ind. (1874) 394, p.p.; TRIMEN, Syst. Catal. Ceyl. pl. (1885) 77; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. (1897) 140; *Viscum opuntioides* (non LINN. 1753) ROXBURGH, Fl. ind., ed. 2, 3 (1832) 764; ed. 3 (1874) 715; *Viscum articulatum* var. *dichotomum* KURZ, For. Fl. Burma, 2 (1877) 325?; *Viscum articulatum* (non BURMANNUS 1768) HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 226, p.p., incl. var. *dichotoma*; COLLETT & HEMSLEY, in Journ. Linn. Soc., 28, bot., No. 189—191 (1890) 121; GAMBLE, Man. Ind. Timb. (1902) 584; BRANDIS, Ind. trees (1906) 552, p.p.; COOKE, Fl. Bombay, II, 3 (1906) 553, p.p., incl. var. *dichotoma*; TALBOT, For. Fl. Bombay, 2 (1911) 423, ic. 482; DUTHIE, Fl. Upp. Ganget. Plain, III, 1 (1915) 65; HAINES, Bot. Bihar & Orissa, 5 (1924) 804; PARKER, For. Fl. Punjab (1924) 441, p.p.?; GAMBLE, Fl. Madras, 7 (1925) 1258, 1259, incl. var. *dichotoma*; FISCHER, in Rec. Bot. Surv. India, XI, 1 (1926) 161 seq., cum var. *dichotoma* p. 181; OSMASTON, For. Fl. Kumaon (1927) 465, p.p.; HANDEL-MAZZETTI, Symb. sinicae, VII, 1 (1929) 160, prob.; KANJILAL, For. Fl. Pilibhit &c. (1933) 319; *Aspidixia dichotoma* & *A. attenuata* VAN TIEGHEM, in Bull. Soc. Bot. Fr., 34 (1896) 193.

Stems slender and probably hanging, to 100 cm and more long, strongly branched, the branches generally decussate but often more or less than two at each node; lower internodes terete, usually 2—5 cm long, more or less thickened at the nodes, the younger ones slightly flattened at the base, strongly so towards the apex, usually 2—6 cm long, 3—10 mm broad, with truncate, or in broad forms with somewhat rounded apex. *Leaves* all scale-like, at first erect, spreading later, 0.5—0.75 mm long, obtuse; scales at the bases of the branches indistinct. *Inflorescences* sessile and crowded, up to 2 mm long and finally as broad, usually 1—3-, rarely 5-flowered, first developing one terminal female flower sustained by a pair of bracts connate into a cup, then a pair of lateral male flowers below this cup and in the axils of another pair of bracts, but not sustained each by a pair of bracts of their own, rarely below these another pair of male flowers, likewise in the axils of bracts and without a pair of bracts of its own, decussate with the upper pair; often later (usually after the male flowers have fallen off) at the base of the inflorescence two new ones, which usually remain restricted to one female flower sustained by a bracteal cup; bracts of the flowers all nearly 0.75 mm long, rounded. Young *fruits* globose or somewhat oblong, smooth (wrinkled by drying), older fruits nearly globose, usually 3—4 mm in diameter. (Description mainly from materials in the Kew Herbarium.)

Remarks. *Viscum nepalense*, as it is distinguished here, is most closely related to *V. angulatum*, *V. articulatum* and *V. liquidambaricolum*. It seems to differ from *V. angulatum* by its distinctly flattened internodes only. Neither in the inflorescences, flowers, and fruits, nor in the choice of the host plants (cfr. in the first place FISCHER, l. c.) could I discover any differences. Contrary to what I had expected, I found *V. nepalense* and *V. angulatum* sharply delimited against each other, and I could not discover any intermediate forms. This is the reason why I have kept them apart as species, but it seems quite possible that they should be varieties of one species.

The delimitation of *V. nepalense* against *V. articulatum* gives other difficulties. Though probably here the differences are more important, it is the inadequate state of the herbarium materials that makes a distinction very difficult. In most of the herbarium specimens flowers and fruits are absent, or the fruits are shrivelled in such a way that their size and colour can hardly be estimated. Extensive and exact label notes about the host plant and the form, size, and colour of the fruits are indispensable for a more thorough study of the species limits in this critical group. Better still it would be to study the living plants in those regions where *V. nepalense* and *V. articulatum* occur together (Assam to Perak, and perhaps more to the South), and by botanists who live there and are in a position to compare the two species at leisure. As GAMBLE distinguished them mainly by means of the width of the internodes (cfr. what has been cited in the discussion of *V. articulatum*), it is no wonder that he includes specimens in *V. nepalense*, which I prefer to include in *V. articulatum*, and that he mentions much more southern localities for *V. nepalense* than I do.

We meet with more serious difficulties when trying to distinguish *V. nepalense* from *V. liquidambaricolum*. There seems to be only one real difference, viz., the ripe fruits being nearly globose in *V. nepalense*, more oblong in *V. liquidambaricolum*. To this may be added that *V. nepalense* usually has broader internodes than *V. liquidambaricolum*, but this difference is not to be depended on. It remains, therefore, very doubtful, whether *V. nepalense* and *V. liquidambaricolum* are distinct species or geographical varieties of one species. I am much inclined to accept the latter supposition, because it is remarkable that, if we take the form of the fruits as a criterion, *V. nepalense* in its further characters shows a distinct approach towards

V. liquidambaricum when we come nearer to the area of distribution of the latter.

In India *V. nepalense* is rather uniform, and not restricted to special hosts (see FISCHER, l. c.). In the Himalaya we meet with forms with narrower internodes, and others with somewhat oblong fruits, which may be regarded as transitions towards *V. liquidambaricum*. At the same time it is more restricted to *Quercus* and *Liquidambar*, the typical hosts of *V. liquidambaricum*. More to the East, in China, *V. nepalense* is hardly found any more, and *V. liquidambaricum* continues getting still narrower. All this gives the impression, that the Indian *V. nepalense*, with broad and coarse internodes and globose fruits, gradually merges into the East-Asiatic *V. liquidambaricum*, with narrower and slenderer internodes and more oblong fruits. On the other hand, typical *V. nepalense* and typical *V. liquidambaricum* seem to occur together in certain regions, especially in certain parts of the Himalaya, and as long as their specific rank is still doubtful, I prefer to draw attention to this question by accepting them as separate species.

In China we find, apart from the specimens with narrow internodes and oblong fruits (real *V. liquidambaricum*), also such with narrow, but very thick, almost terete internodes. Whether the latter only represent a form of *V. liquidambaricum* or a separate (new) species, I was unable to settle, and therefore I have previously included them in *V. liquidambaricum*.

In the southern part of the Deccan Peninsula, there occur leafless *Visca* of this alliance with very narrow internodes, which strongly call to mind *V. articulatum* (WIGHT 1228, WIGHT Kew distr. 1248, WALLICH 496, BOURNE 864), but I found no data that prove the occurrence of *V. articulatum* in these regions. The same may be said of a few specimens from Ceylon examined by me.

In my revision of the *Loranthaceae* of the Netherlands Indies I did not distinguish *V. nepalense* from *V. articulatum*. Yet the former seems to occur in the Malay Peninsula south of Siam. The specimens from Perak, mentioned below, are not beyond doubt, but very probable. Among the leafless *Visca* of French Indo-China, Siam and the Philippine Islands, I found no specimens possibly belonging to *V. nepalense*.

A remarkable form is the new variety *thelocarpum*. It has entirely the appearance of *V. nepalense*, and belongs to the narrow forms of this, but the young fruits are warty. As a rule, warty fruits indicate

separate species, but I had not sufficient reasons to give the new form more than varietal rank. Other leafless *Visca* with warty fruits are found in Africa, but these are dioecious.

As regards the nomenclature of this species it must be remarked, that none of the names enumerated among the synonyms is quite certain.

With his *V. dichotomum* D. DON certainly meant forms of this alliance, but from his short description it is not clear whether he distinguished between the forms with broader internodes and globose fruits and those with narrower internodes and more oblong fruits. His description runs as follows:

"*V. dichotomum*, aphyllum; ramulis compressis striatis articulatis: articulis subtrifloris, internodiis ovali-oblongis. Hab. in Nepaliâ ad Narainhetty. Hamilton. Wallich."

I have not seen HAMILTON's plant, nor do I know where it is preserved now. WALLICH's plant has been indicated without number, and hence I do not know what plant it is. In Nepal undoubtedly our *V. nepalense* occurs as well as *V. liquidambaricum*, and from the description one would suppose that DON had meant a form with broad articulations, *i. e.*, our *V. nepalense*.

DE CANDOLLE only mentions WALLICH's plants, and in his herbarium in Geneva these are actually present. According to notes made by me from these specimens, WALLICH's plants are different among each other, but all are coarse and broad, and therefore probably *V. nepalense*. DE CANDOLLE, however, adds to his description: "Bractea membranacea cupularis sub fructu ovali", which calls to mind *V. liquidambaricum*. I suppose that DE CANDOLLE mainly based his description on specimens of *V. nepalense*, but I think it not at all impossible that among his specimens there were of *V. liquidambaricum*.

The name *V. dichotomum* cannot, however, be valid, as before DON's *V. dichotomum* there had already been published two other plants as *V. dichotomum*, *viz.*, *V. dichotomum* GILBERT in 1792, which represents *V. album*, and *V. dichotomum* SPRENGEL in 1825, an American species, later transferred to *Phoradendron*. In 1827, SPRENGEL therefore replaced DON's name by that of *V. nepalense*, which name, though somewhat doubtful, is the best name for our species.

Also DE CANDOLLE's names *Viscum elongatum* and *V. attenuatum* are not quite certain. The specimens of *V. elongatum* in DE CANDOLLE's herbarium are strongly flattened forms without fruits, and probably

represent *V. nepalense*, but they might be *V. liquidambaricolum*, as in Assam, whence *V. elongatum* is mentioned, also *V. liquidambaricolum* certainly occurs. WALLICH's specimens in the Kew Herbarium have somewhat oblong fruits, but yet seem to be *V. nepalense*. DE CANDOLLE's *V. attenuatum* is based on the *V. opuntioides* of HEYNE's herbarium; HEYNE's specimens in DE CANDOLLE's herbarium rather seem to be *V. articulatum*, but might be a narrow form of *V. nepalense*; those in the Kew Herbarium partly look like *V. articulatum*, but partly undoubtedly are *V. nepalense*. From this it is evident that neither the name *V. elongatum* nor that of *V. attenuatum* must be preferred to that of *V. nepalense*.

Specimens examined:

INDIA. Without exact locality: ROXBURGH s. n. (K), originals of *Viscum opuntioides* ROXBURGH; HEYNE s. n. (BD), ex Herb. ROTH, "*V. opuntioides*"; WALLICH 496 (K), "*Viscum opuntioides* LINN. f. Herb. Heyneanum"; WIGHT 1228 (BD, G, K), "*Viscum attenuatum* D. C.", types; WIGHT Herb. 48 (BD, DD); Peninsula Indiae Orientalis, Paulghautcherry, WIGHT Herb. 48 = Kew Distr. 1248 (K), no ripe fruit, narrow articulations, looks like *V. articulatum*; "Nundydr.", HEYNE s. n. (K), "*V. opuntioides*" Hb. BOTTLER ex Hb. HEYNE; Ceylon, THWAITES C. P. 1637 (K); Galagama, THWAITES C. P. 479 (K); Komagalli (f), THWAITES C. P. 479 (BD); Murroothey Malay nr. Coimbatore, WIGHT Kew Distr. 1248 (K); Cooridy Malay nr. Coimbatore, WIGHT 48 (K); Coimbatore Distr., Sivahamudram, BARBER (f) 10376 (K); Vizagapatam Distr., Karaka, BARBER 1607 (K); Palni Hills, SAULIÈRE 635 (K); Kodaikanal Ghat, BOURNE 864 (K); "Mont. Nilghiri & Kurg", THOMSON s. n. (BD, K); Nilgiris, Segor Ghat, LAWSON s. n. (K); Culhatty, 4000 ft, CLARKE 11266 (B, K); Masnagooodi, DAS 138 (DD); Coonoorshal, 1850 ft, FISCHER 2079 (DD); Madras, Kistna, HEARSEY s. n. (DD); Bangalore, Ayyur, BOR 7512 (DD); Mysore, Circars, WIGHT s. n. (K); Bhimanbidu, BARBER 6821 (K); Seegor, 3000 ft, CLARKE 11254 (K); Kumsi, 2—3,000 ft, MEEBOLD 10152 (BD); North Kanara, Ghauts, RITCHIE 333 (K); Devikope, TALBOT 16 (K), 1142 (DD); Central Prov., Chánda Distr., DUTHIE 9727 (DD), "on *Diospyros*"; Pachmarhi, DUTHIE 10549 (DD); Orissa, Puri Distr., Partab, LACE 2510 (DD); Sambalpur, GRIFFITH s. n. (K); Bihar, 1000 ft, HOOKER s. n. (BD, K); Bihar, Banda, EDGEWORTH 4004 (K); Monghyr, LOCKWOOD s. n. (K); Chota Nagpur, Kumandi Reserve, Palamow, GAMBLE 8810 (K); Kodenua, Hazaribagh, GAMBLE 10232 (DD, K), "on *Diospyros*"; Hazaribagh, VICARY s. n. (K); Chakulia, Dhalbhum, GAMBLE 9210 (K), "on Ebony"; Sillee, Rahé outpost, 500—1000 ft, WOOD s. n. (K); N. W. Himalaya, Bhimtal, 4500 ft, MEEBOLD s. n. (BD); Simla, Hundwan, GAMBLE (f) 1143 (DD); Jubbal State, Piuntra, 4000 ft, KANJILAL 1100 (DD); Saharanpur Siwaliks, GAMBLE 25663 (DD, K); Ranipur Siwaliks, 1000 ft, KANJILAL 1099 (DD), on *Cordia*; 1200 ft, KANJILAL 1038 (K); Garhwal, Naini Tal, Dogori, Haldwani, MANOHARLALL s. n. (DD); Haldwani, 1000 ft, OSMATON 1310 (DD), on *Cassia fistula*; Dhela, KANJILAL 1299 (DD); Chuia Range, Laria Kanta, 7700 ft, URTI DUTT 8101 (DD); Almora Distr., Siuni, 1800 m, PARKER 2022 (DD), on *Quercus incana*, one specimen bearing a young plant of *Taxillus vestitus*; Bijnor Dist., Barhapura, MARKHAM s. n. (DD), on *Diospyros melanoxyylon*; Upper Gangetic Plain near Nipal frontier,

Khairbatti, INAYAT 23818 (BD, DD); Nipal, HORNEMANN s.n. (BD); Sikkim, THOMSON s.n. (DD); 7—8,000 ft, ROGERS s.n. (DD), on *Quercus*; lower hills to 4000 ft, HOOKER s.n. (K); Preng Kola, Munsong, CRAIB 341 (B, K); Namchee, 7000 ft, CLARKE 27572 (K); Darjeeling, 7000 ft, GAMBLE 370 (DD, K) on *Acer*; GAMBLE 698 (DD, K), on *Acer, Castanea*; GAMBLE 2979 (K); E. Bengal, Mishmee, GRIFFITH Kew Distrib. 2744 (BD, DD, K); E. Himalaya, Tsangpo Gorge, 5—6,000 ft, F. KINGDON WARD 6359 (K), particularly on *Dalbergia*; Chibaon, Delei Valley, 28°10' N., 96°30' E., 8000 ft, F. KINGDON WARD 8059 (K); Assam, Sylhet, Pundua, WALLICH 495 (G, K), "*Viscum elongatum*", types; Khasia, OLDHAM s.n. (DD); SIMONS s.n. (B, BD); Khasia Hills, HOOKER s.n. (DD); native collector Bot. Gard. Calcutta s.n. (B, DD); Surureen, GRIFFITH s.n. (K); HOOKER FIL. & THOMSON 1226 (K); Naga Hills, Pulebadze Ridge, 7000—7500 ft, BOR 2992, 2993 (DD, K), on *Quercus semiserrata*; Konoma, Reporter Econ. Prod. Government India 11750 (B); near Phesama, PRAIN s.n. (B); Lushai Hills, Phongui, 6000 ft, PARRY 555 (K); Shan Hills, Lwe Kaw, 5000 ft, COLLETT 718 (K).

MALAY PENINSULA. Perak, Larut, within 300 ft, KING's coll. 4191 (BD, DD, K), a parasite 1 to 2 feet long, colour light green when young, dark green when old.

CHINA. Yunnan, DUCLOUX 606 (K); Mengtsz, HANCOCK 362 (K). These two Chinese specimens have no fruit, and are therefore doubtful.

Viscum nepalense var. *thelocarpum* DANSER, nov. var. — Omnino ut *Viscum nepalense*, sed fructibus immaturis diverso modo verruculosus, maturis minus verruculosus.

INDIA. Concan, reg. trop., STOCKS s.n. (BD, K), type of the variety; Concan, Bombay, LAW s.n. (K); Ajmere, coll. (DD); Canara, Ooshelé, RITCHIE 333 (K), "on seeshum tree".

9. *Viscum liquidambaricolum* HAYATA — *Viscum angulatum* (non HEYNE) KORTHALS, in Verhand. Batav. Genootsch., 17 (1839) 258; MOLKENBOER, in MIQUEL, Pl. Junghuhn., 107 (1852); MIQUEL, Fl. Ind. Bat., I, 1, 5 (1856) 806; *Viscum articulatum* (non BURMANNUS) FORBES & HEMSLEY, in Journ. Linn. Soc., bot., 26, No. 177 (1894) 407; COLLETT, Fl. siml. (1902) 440, ic. 143; BRANDIS, Ind. trees (1906) 552, p.p.; MATSUMURA & HAYATA, Enum. pl. Formos. (1906) 357; LÉVEILLÉ, Catal. pl. Yun-nan (1916) 172; LECOMTE, in SARGENT, Pl. Wilson., III, 2 (1916) 318; GROFF, DING, & GROFF, in Lingn. Agric. Rev., I, 2 (1924) 76; PARKER, For. Fl. Punjab (1924) 441, p.p. ?; OSMASTON, For. Fl. Kumaon (1927) 465, p.p.; DANSER, in Blumea, II, 2 (1936) 55; *Viscum articulatum* var. *Balansae* LECOMTE, Fl. Indo-Ch., V, 3 (1915) 210; Not. syst., 3, 173 (1915); *Viscum liquidambaricolum* HAYATA, Ic. pl. Formos., 5 (1915) 194, ic. 71 & 72; DANSER, in Trop. Nat., 18 (1929) 119; in Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1 (1938) 57; *Viscum bongariense* HAYATA, Ic. pl. Formos., 5 (1915) 190, ic. 65 & 66; *Viscum Querci-Morii* HAYATA, ibid., p. 196, ic. 74; *Viscum stenocarpum* DANSER, in Bull. Jard. Bot. Buitenz., sér. 3, XI, 3—4 (1931) 469.

When revising the *Loranthaceae* of French Indo-China and Siam, I learned how to distinguish *V. liquidambaricum* from *V. articulatum*. These species were sharply delimited against each other there. I could not, however, distinguish *V. liquidambaricum* from a number of closely allied species also described from Formosa, and I therefore mentioned the latter among the synonyms.

The delimitation against *V. nepalense*, however, is extremely difficult, if not impossible. *V. nepalense* has globose fruits, *V. liquidambaricum* oblong ones, but most of the herbarium specimens have no fruits at all, or only half-developed or shrivelled ones, and are therefore indeterminable. *V. nepalense* usually has, it is true, broader and more strongly ribbed articulations than *V. liquidambaricum*, but this character certainly is not to be depended on. As about *V. nepalense* in China I have no other indications but a few fruitless specimens collected in Yunnan, and of *V. articulatum* nothing but one collection from Kwangsi, I include all further Chinese leafless *Visca* in *V. liquidambaricum*, though I am well aware that among them there may perhaps be closely allied new species. If my delimitation of this species should be correct, *V. liquidambaricum* would appear to be a much more northern species than *V. articulatum*. Perhaps it is only the eastern variety of the more western *V. nepalense*. See for this the discussion of the latter.

Specimens examined:

INDIA. "*Viscum*, a museo Lambertiano DON misit 1822 (ex Herb. KUNTH)" (BD), perhaps type specimen of *Viscum dichotomum* DON? — N. W. India, Hb. BOYLE s. n. (K); Kulu Hill States, Bahu, 4500 ft, PARKER s. n. (DD), "on *Cornus capitata*"; Simla, MEEBOLD 5096 (BD); Simla, The Glen, COLLETT s. n. (K); The Glen, 6000 ft, GAMBLE 6233 (DD, K), "on *Cornus capitata*"; Kumaon, Moud li Kaladoonjee (f), DAVIDSON s. n. (DD); Gungoli, 5500 ft, STRACHEY & WINTERBOTTOM 1 (K); Sarju Valley, 3—4,000 ft, DUTHIE 5944 (DD, K), "on *Terminalia Chebula*"; Bhabur of Garhwal, 1000 ft, MADDEN (f) s. n. (K); Naini Tal Div., Muktesar, 6000 ft, OSMASTON 1309 (DD), "on *Loranthus vestitus*"; Bootan, GRIFFITH 2079 (K); Nepal, WALLICH s. n. (K); Sikkim, 4000 ft, KING s. n. (DD); Sikkim, Choongtam Hill, 5—6,000 ft, HOOKER s. n. (K); Assam, Khasy & Jyntea Hills, Lao-soh to Mynkhar, KANJILAL 5935 (DD), "on *Castanopsis hystrix*"; Mao (E. frontier of India), 6500 ft, WATT 6164 (BD).

CHINA. Yun-nan, Lichiang Range, Lat. 27°40' N., 11,000 ft, FORREST 10174 (BD, E, K), "on pines"; on the Tong Shan in the Yangtze bend, Lat. 27°20' N., 9—10,000 ft alt., FORREST 11112 (BD, E, K), "on pines and oaks"; *ibidem*, 9,000 ft, FORREST 12719 (E, K), "on pines and poplars"; between Tan-tui and Pungtula, Lat. 28° N., 10,000 ft, FORREST 13811 (E, K), "stems orange-yellow, on oaks"; on the descent from Lu-tien to the Yangtze, Lat. 27°12' N., 8,000 ft, FORREST 16142 (E, K), "on *Alnus*, fruits greeny-white"; Shweli-Salwin divide, Lat. 25°40' N.,

10,000 ft, FORREST 18155 (E, K), "fruit immature greenish-white, on pines and various other trees"; Yun-nan, Mi-lê distr., A. HENRY 9942 (K), "on *Zanthoxylum*"; *ibidem*, 4000 ft, A. HENRY 10303 (BD, K), "on *Castanea*"; Szemao, N. W. Mts., 5000 ft, A. HENRY 10303A (K); Yunnan-fu, DUCLOUX 364 (K); Yunnan-sen, MAIRE 1728 (K); Houang-ts'ao-pa, CAVALERIE 4258 (K); Yungpeh, "in decliv. mont. versus boream", 2600 m, SCHNEIDER 1694 (BD, K); Yangtze Valley, E. H. WILSON 4482 (K); "on *Aleurites Fordii*"; E. Sze-chuan, Tchen-kéou-tin distr., FARGES s. n. (B); Sze-chuan, Nan chuan, v. ROSTHORN 1212 (BD), on *Taxillus*; Hunan prov., Yinshan, Wukang, SIN no. S. H. 854 (BD), on *Fagacea*; Choa-shan, Siangtan, 300 ft, SIN no. S. H. 223 (BD); South Hunan, SIN 338 (BD); Lung Yen Tung nr. Canton, CHUN 7871 (B, S); Kwantung, Yun Fou, C. T. WANG 541 (BD, K); Win Foo, 120 m, SIN 5360 (BD); Swatow, DALZIEL s. n. (K); Amoy †, HANCE 1451 (K); Amoy interior, SWINHOE s. n. (K); Fukien, Foochow Kushan, CHUNG 3799 (K); Foochow, little wood, CARLES 855 (K); Chekiang, Tai suan, 500—900 m, CHING 2182 (BD, K); Hainan, Nodoa, 250 m, Canton Christian College 7970 coll. McCLUKE (K); Hainan, TSANG FUNG TANG 17593 (H).

Specimens from China, doubtful for lack of fruits: Yunnan, CAVALERIE 3134 (K); Yunnan-sen, CAVALERIE 7323 (K); Huang-ts'ao-pa, CAVALERIE 7496 (K); Sung Kwei Valley, 7000 ft, FORREST 542 (E, K); N. of Yunnan-fu, between Seiao-ma-kai and Schinlung, near De-ka, SCHNEIDER 263 (BD, K), "on *Fraaxinus*"; E. Sze-chuan, Tchen-kéou-tin distr., FARGES s. n. (B, K), named by LECOMTE as "*V. articulatum* var. *nodosum* (v. T.) H. LEC."; Hu-peh, Ichang, Nanto Mts. to northward, A. HENRY 3206 (BD, K), "on t'an tree"; W. Hupeh, WILSON 3262, 3263 (K); Kiang-si prov., Yü Du Hsien, 2000 ft, HU 1172 (BD), "on *Liquidambar*"; Chung Yih Hsien, 2000 ft, HU 916 (BD), on oak, yellow berry; Kwantung prov., Wu-king-fu, a valley of unimportant elevation about 60 miles inland from Swatow, DALZIEL s. n. (K); Fukien, Diangloh, and vicinity, METCALF 2727a (B); Chekiang, Ping-Yang-Hsien, HU 146 (K); Nan-Hoo, S. Yentang, HU 146 (BD), "on oak"; Nan-kong, HU 243 (BD), "on oaks"; Taishun Hsien, KENG 274 (BD), "on *Quercus*"; Hainan, TSANG WAI-TAK 18319 (DD); Hainan, B. C. HENRY 18 (K), "chiefly found on *Liquidambar*"; Nodoa and vicinity, Nai No Mts., TSANG WAI-TAK 91 = Lingnan University 15590 (BD, K).

INDO-CHINA. Cfr. Bull. Jard. Bot. Buitenzorg, sér. 3, VI, 57—58.

FORMOSA. Bankinsing, A. HENRY 59 (K); Nanto prov., nr. Shushu, 2000 m, WILSON 10024 (K); Musha, WILSON 10032 (K); Kagi prov., Arisan, 2133 m, WILSON 9834 (K).

JAVA. Cfr. Bull. Jard. Bot. Buitenzorg, sér. 3, XI, 470.

Viscum diospyrosicolum HAYATA, Ic. pl. Formos., 5 (1915) 192, ic. 67, 68; 6 (1916) 41, ic. 4.

This leafless *Viscum* from Formosa has been described by HAYATA together with other leafless *Visca* from the same Island, *viz.*, *V. bongariense*, *V. filipendulum*, *V. liquidambaricolum*, and *V. Querci-Morii*. Whereas I cannot acknowledge *V. liquidambaricolum*, *V. bongariense*, and *V. Querci-Morii*, as specifically different, I am in doubt about the other two. Though *V. diospyrosicolum* is, according to HAYATA, the most slender among the Formosan *Visca*, the young internodes are

distinctly flattened. The type materials were incomplete, but soon afterwards HAYATA gave a completion to the description on the ground of additional collections, and in this he described the plant as leafy in the basal portion, "foliis oppositis oblongo-ovatis 1½ cm. longis 4½ mm. latis apice obtusissimis basi cuneatis margine integris chartaceis glabris venis haud visis sessilibus". The fruits are described as ellipsoidal, 4.5 mm long by 2 mm in diameter, and this again calls to mind *V. liquidambaricolum*. The presence of leaves in the basal portion does not make this impossible, because *V. ramosissimum*, which perhaps only is a variety of *V. angulatum*, has similar leaves in its basal portion.

Viscum filipendulum HAYATA, Ic. pl. Formos., 5 (1915) 193, ic. 69, 70.

This *Viscum*, published together with the preceding one (cfr. this), is certainly closely allied to it. The stems are very slender, yet with distinctly flattened internodes; the fruits are nearly globose, 7 mm long by 6 mm in diameter. None of these peculiarities, however, makes it impossible that *V. filipendulum* should be a form of *V. liquidambaricolum*, or, together with this, of *V. nepalense*.

10. *Viscum angulatum* HEYNE, ex A. P. DE CANDOLLE, Prodr., 4 (1830) 283; WIGHT & ARNOTT, Prodr. Fl. Pen. Ind. Or. (1834) 380; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 407; DALZELL & GIBSON, Bombay Fl. (1861) 110; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 225; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., III, 1 (1889) 195, p.p.; Nachtr. (1897) 140, p.p.; BOERLAGE, Handl. Fl. Ned. Ind., III, 1 (1900) 167, 172; GAMBLE, Ind. timb. (1902) 584; BRANDIS, Ind. trees (1906) 552; COOKE, Fl. Bombay, II, 3 (1906) 553; TALBOT, For. Fl. Bombay, 2 (1911) 422, ic. 481; GAMBLE, Fl. Madras, 7 (1925) 1257, 1259; FISCHER, in Rec. Bot. Surv. Ind., XI, 1 (1926) 181, seq.; ENGLER & KRAUSE, in ENGL., Nat. Pflanzenfam., ed. 2, 16b (1935) 203; *Viscum ramosissimum* WIGHT, Ic. pl., III, 3 (1845) tab. 1017 tantum.

Stems slender and probably hanging, strongly branched, with decussate branches or more than two branches at each node, all attenuate towards the extremities; lower internodes terete or with two opposite ribs, usually 2—5 cm long, to 4 mm in diameter, usually less thick; articulations of the medium part of the plant usually distinctly 4-angular, sometimes with less prominent ribs between the 4 main ones, hardly attenuate or flattened towards their apices, usually 1—2 mm in

diameter, 1—4 cm long; youngest articulations less thick, terete towards the base, distinctly decussately flattened towards their apices. *Leaves* all scale-like, usually 0.5 mm long or still shorter, short-triangular, obtuse or subacute; also small scales (prophylls) at the bases of all ramifications. *Inflorescences* nearly always sessile, rarely terminal on short twigs and in that case peduncled, 1—3-flowered, if one-flowered with one female flower sustained by two bracts connate at their base, if 3-flowered then moreover with 2 lateral male flowers, these rarely in the axils of the two bracts sustaining the female flower, usually below these in the axils of another pair alternating with the upper one; sometimes two more inflorescences, one at each side of the first one and probably in the axils of the indistinct prophylls, these two inflorescences usually one-flowered, more rarely again 3-flowered; still more rarely numerous branchings, the structure of which is not clear, but always all flowers crowded, the whole complex 2—2.5 mm long and broad, the bracts obtuse or rounded. *Fruits* nearly globose in the adult stage, in the herbarium up to 3 mm in diameter, usually surrounded at the base by two depressed bracteal cups. (Description from specimens in the Kew Herbarium.)

Remarks. As already has been remarked in the discussion of *V. nepalense*, *V. angulatum* is a remarkable and sharply delimited form, distinguished from *V. nepalense*, however, by the hardly flattened 4-angular articulations only. It is restricted to the Deccan Peninsula and by no means identical with non-flattened forms of *V. articulatum* from other regions, recorded under this name from the Philippine Islands, the Netherlands East Indies, and Queensland, but differing from *V. angulatum* as distinctly as *V. articulatum* from *V. nepalense*.

Specimens examined:

INDIA. Deccan Peninsula. Without exact locality: "Voyage de N. JACQUEMONT No. 634", or JACQUEMONT 1283 (K); WALLICH Catal. 497 (K) = *Viscum angulatum* Herb. HEYNE; Malabar, Chedleth, 3000 ft, FISCHER 324 (K); Agalhatti, MEEBOLD 8251 (BD); Lonaula (S. India), 2000 ft, MEEBOLD 4250 (BD), "hängt 30—40 cm von den Aesten herab"; Coonoor, BOURNE s. n. (K); Periya Shola Pulneys, BOURNE 191 (K); ... achur Shola, Lower Pulneys, BOURNE 2423 (K); Madura Distr., Lower Pulneys, 4200 ft, SAULIÈRE 262 (K); Madura Distr., Sirumalais (?), BOURNE 1768 (K); Anamallay Forests, WIGHT 52 = Kew Distr. 1246 (BD, K); Mettupalayam, BARBER 8548 (K), on *Zyziphus xylopyrus*; Tambracheri ghaut, BARBER (?) 7400 (K); Coimbatore Distr., Hassanur, BARBER (?) 10531 (K); "Mont. Nilghiri & Kurg, reg. trop.", THOMSON s. n. (BD, K); Coorg, "*Viscum angulatum* HEYNE ex Herb. ROTTLE", type ? (K); Nilgiris, S. E. Wynaad, Devala, 3000 ft, GAMBLE 15436 (K); Nilgiri Distr., Kundalu, nr. Kilkunda, 4000 ft, GAMBLE 17242 (K); Nilgiris, Seegor, 3000 ft, CLARKE 11254 (B, K); Nilgiris Distr., Sigúr Ghát, 4000 ft alt., GAMBLE 14508 (DD); Nilagiri, nr. Juduru, HOHENACKER 1478 (BD, K); Mysore,

Singadhully, 3000 ft, TALBOT s. n. (DD); Belgaum, RENCHIE 334 (K); Concan &c., STOCKS s. n. (K); Concan, LAW s. n. (K); Bombay, ex Herb. College of Science, Poona (DD).

11. *Viscum ramosissimum* WIGHT & ARNOTT, Prodr. Fl. Pen. Ind. Or. (1834) 380; WALPERS, Repert., 2 (1843) 437; WIGHT, Ic. pl., III, 3 (1845) p. 13, excl. t. 1017; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 225; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., III, 1 (1889) 195; TRIMEN, Handb. Fl. Ceylon, 3 (1895) 472; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. (1897) 140; GAMBLE, Man. Ind. timb. (1902) 584; BRANDIS, Ind. trees (1906) 552; COOKE, Fl. Bombay, II, 3 (1906) 554; GAMBLE, Fl. Madras, 7 (1925) 1257, 1258; FISCHER, in Rec. Bot. Surv. Ind., XI, 1 (1926) 161, seq.; ENGLER & KRAUSE, in ENGL., Nat. Pflanzenfam., ed. 2, 16b (1936) 201; *Aspidixia ramosissima* VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 193.

When we delimitate *Viscum ramosissimum* against *V. angulatum* as has been done here, the two species do not show any other difference but the form of the articulations, which in *V. angulatum* are 4-angular, in *V. ramosissimum* terete, with the exception of the very young ones, which in both species are flattened. WIGHT and ARNOTT, the authors of the latter, do not indicate other differences either, and in WIGHT's Icones *V. angulatum* is figured under the name of *V. ramosissimum*. Though it is mentioned, that *V. ramosissimum* sometimes has a few leaves, the herbarium specimens examined are nearly all entirely leafless. Only the specimen WIGHT Cat. 6876 in the Kew Herbarium bears one leaf and, opposite to this, a leaf scar; the leaf is lanceolate-obovate, attenuate towards the base, but not petiolate, rounded at the apex, 22 mm long, 5.5 mm broad, thickish, with 3 hardly prominent, but distinct longitudinal nerves. The originals of *V. ramosissimum* represent an extreme form; they are small specimens, with very densely and finely branched stems, but they are apparently young and bear no flowers nor fruits.

Though *V. angulatum* has been described as early as 1830, and *V. ramosissimum* in 1834, both species are inadequately known and a thorough examination of the living plants is still a desideratum.

Specimens examined:

INDIA. Ceylon, Maturata, coll. ♀ (K), on *Rhododendron arboreum*; Peninsular India, WIGHT Herb. 53 (BD); WIGHT Catal. 1225 = WALLECH Cat. 6876 (BD, K), types; Mt. Gingu, WALLECH Cat. 6876 (K), "*Viscum ramosissimum* WIGHT, types; Neelgherry Hills, Iyamalay nr. Coimbatore, WIGHT 53 = Kew Distr. 1244 (K); Coimbatore Distr., Mettupalayam, BARBER 8547 (K); Tinnevely, Mundanthorai

Ghaut, BARBER 2785 (K); Nilgiris, Blackbridge, 6000 ft, GAMBLE 12115 (K); Coonoor, 6000 ft, GAMBLE 11693 (BD, K).

12. *Viscum Loranthi* ELMER, Leaflets Philipp. Bot., 8, art. 121 (1919) 3089; MERRILL, Enum. Phil. Fl. Pl., 2 (1923) 113; DANSER, in Bull. Jard. Bot. Buitenzorg, sér. 3, XI, 3—4 (1931) 464, ic. 27, b—c; in Philipp. Journ. Sc., 58, 1 (1935) 142; *Viscum* sp., OSMASTON, For. Fl. Kumaon (1927) 465; *Viscum Osmastonii* RAIZADA, in Indian Forester, 60 (1934) 537, t. 55; *Phacellaria ferruginea* (non W. W. SMITH) HANDEL-MAZZETTI, Symb. sin., VII, 1 (1929) 157.

The discovery of *V. Loranthi* in the Himalaya and Yunnan makes a larger distribution in the mountains of south-eastern Asia probable. Of the Yunnan plant I only examined a few fragments, of the Himalaya plants copious materials, including the types of *V. Osmastonii*. They show hardly any peculiarities when compared with the Luzon and Sumatra plants; the largest specimens are somewhat more robust, with stems up to 5 mm in diameter at the base, up to 18 cm long, and with the thickest whorls of flowers up to 14 mm in diameter. It seems better not to call the fruits verruculose, as it is the swollen epidermis cells that cause the papillose, somewhat glittering surface. The same papillae make the bracts sometimes shortly ciliate. In older fruits the papillae are larger, but they cannot be compared with those of *V. heyneanum* or *V. ovalifolium*, which are much larger and many-celled.

Whereas the Luzon specimens were found parasitic on *Taxillus chinensis* (= *estipitatus*) and the Sumatra ones on *Scurrula ferruginea*, those from Yunnan were parasitic on *Taxillus Kaempferi*, those from the Himalaya on *Taxillus vestitus*, *Scurrula cordifolia*, *Scurrula pulverulenta*, and *Dendrophthoë falcata*, all belonging to closely allied genera.

If my former observations on the structure of the inflorescences are correct, I yet would have to add data on the arrangement of the bracts, the high morphological value of which was unknown to me formerly. The examination of these, however, appeared to be very difficult on herbarium specimens. The development of the inflorescences apparently proceeds so quickly, that numerous buds and bracts have already developed before the differences between male and female flowers can be stated, and the bracts are moreover densely crowded and their morphological arrangement seems to be disturbed by reciprocal pressure. I got the impression, that the first axillary flower is sustained by a bracteal cup, and that the next pair of

flowers is placed laterally, sometimes in the axils of the first pair of bracts, sometimes outside the bracteal cup, and that there soon develop more numerous triads of flowers, perhaps at first in the axils of the first one.

INDIA. Dehra Dun, 7 VII 1899, P. W. MUCKUNIM (†) 23028 (K), "on *Loranthus longiflorus*"; Garhwal Div., Mohan Chilkua Range, 25 V 1902, INAYAT 26008 (K), on *Scurrula cordifolia*; Garhwal, between Mussoorie and Rajpore, 4000 ft, 17 III 1904, DRUMMOND 15081 coll. GOLLAN (K), on *Scurrula* prob. *pulverulenta*; Naini Tal Distr., Bhine Tal, 4000 ft, 28 X 1925, OSMASTON 1291 (K); Gaula Valley, 4200 ft, 24 V 1926, OSMASTON 1308 (K); Kumaon, East Almora Div., Nalia Reserve, 6000 ft, 8 I 1933, OSMASTON 1536 (DD, K), "parasitic on *Loranthus vestitus*, which was parasitic on *Quercus dilatata*", type of *Viscum Osmastonii* BAIZADA. Probably also: Kumaon, STRACHEY & WINTERBOTTOM 4 (K).

CHINA. N. W. Yunnan, in pine woods near Haba S. E. of Dschungdien, 2650 m, HANDEL-MAZZETTI 4414 (V), the living plant was light-ochraceous, on *Loranthus caloreas* (= *Taxillus Kaempferi*).

LUZON. Zambales Prov., CUMING 1960 (V); Rizal Prov., Mt. Kanumay, 5 X 1911, on *Taxillus chinensis* coll. RAMOS 1020 (BM); Laguna, Los Baños, VIII 1917, COPELAND 618117 (UC), "on *Loranthus*"; Mt. Maquiling, VI—VII 1927, ELMER 17777 (B, H, M, L, U, UC), "on *Loranthus estipitatus*" (= *Taxillus chinensis*), types of *Viscum Loranthi* ELMER.

SUMATRA. Fort de Kock, 920 m, JACOBSON 19B, 2044, and 2162 (B), on *Sourrula ferruginea*.

13. *Viscum ovalifolium* A. P. DE CANDOLLE, Prodr., 4 (1830) 278.

For the synonymy of this species see Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1 (1938) 48—50. To this must be added:

Viscum orientale BENTHAM, in HOOKER, Lond. Journ. Bot., 2 (1843) 222; BRANDIS, For. Fl. N.W. & Centr. Ind. (1874) 393, p.p.; GAMBLE, in Journ. As. Soc. Bengal, 75, II (1914) 386, cum var. *ovalifolio*; LECOMTE, Not. syst., 3, p. 172 (1915) cum var. *verruculosa*; *Viscum ovalifolium* DANSEER, in Blumea, III, 1 (1938) 34—36, 58, t. I, p.p.; in Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1 (1938) 48; in Blumea, III, 3 (1940) 401; *Viscum monoicum* GRIFFITH, Not. pl. as., 4 (1854) 637; Ic. pl. as., 4 (1854) 631; Probably also: *Viscum birmanicum* GANDOGER, in Bull. Soc. Bot. Fr., 65 (1918) 33; *Viscum verruculosum* (non WIGHT & ARNOTT) BLAKELY, Proc. Roy. Soc. Queensl., 34 (1922) 29.

From the same list must be cancelled: *Viscum navicellatum* (non KORTHALS) MOLKENBOER, in MIQUEL, Pl. Junghuhn., p. 108 (1852), which represents *Viscum orientale*.

Now that I have learned to distinguish this species from its allies, especially from *V. orientale*, with which it had been confounded by all authors writing on the *Visca* of the Malay Archipelago (cfr. Bull. Jard.

Bot. Buitenzorg, sér. 3, XVI, p. 48—51), it appears to have a very characteristic and continuous area of distribution. It is found in the whole Malay Archipelago from Luzon and Sumatra to New Guinea, and reaches its north-eastern limit in Ava (Burma) and Chiengmai (Siam). In China it is restricted to Hainan and Hongkong. In Formosa, and South and East of New Guinea, it appears to be absent.

Specimens examined:

INDIA. Burma, Ava, Mt. Paong Dong, WALLICH 494 (K), *type of Viscum obtusatum* WALLICH; Bassein Distr., Sebyauk Reserve, ROGERS 51 (DD), "on *Rhizophora mucronata*"; Bassein Distr., Kyaukpya Chaung, sea level, PARKINSON 8717 (DD), "on *Rhizophora*, foliage light green, flowers pale yellow, small, fruits greenish"; Moulmein, LOEB 168 and 379 (K); Tavoy, Heinze Reserve, PARKER 2190 (DD), "on *Croton*"; Mergui, MEEBOLD 14317 (BD).

For more southern localities in the Malay Peninsula, cfr. Bull. Jard. Bot. Buitenzorg, sér. 3, XI, p. 468, among which WALLICH 489 (BM, K), *type of Viscum ovalifolium*.

CHINA. Without exact locality: MILLETT s. n. (K); GAUDICHAUD s. n. (BD); Kwangsi prov., Lin Shan Shen, 150 m, SIN & WHANG 141 (BD); Hongkong, CHAMPION 402 (K); WRIGHT 181, 182 (K); woods at Little Hongkong, WILFORD 286 (K); Hainan, TUTCHER 2208 (K); A. HENRY 8420 (BD, K); Canton Christian College 9265 coll. McCLURE (K); Dung Ka, 2400 ft, CHUN & TSO 43963 (Göt, H), "fruit green, echinate"; Yaichow, LIANG 62185 (Göt), "fruit green"; Po-ting, 1000 ft, Herb. Arnold Arboretum 72651 coll. How (B); Ma Augza Volcano, Hoihow, in ancient shallow crater, HANCOCK 37 (K); Lam Ko Distr., Lin Fa Shan and vicinity, Sung Ka, Kai Tsui Ki Shang, Herb. Lingnan University 15930 coll. TSANG WAI-TAK 431 (BD, K); Taam-chau Distr., Nodoa and vicinity, Lok Tong Ki Shang, Herb. Lingnan University 15553 coll. TSANG WAI-TAK 54 (BD, K); Taam-chau Distr., Shui Mei River, Ki Shang, Herb. Lingnan Univ. 16161 coll. TSANG WAI-TAK 662 (BD, K).

INDO-CHINA AND SIAM. See Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, p. 50—51.

PHILIPPINE ISLANDS. See Philipp. Journ. Science, 58, p. 140, under *V. orientale*.

FURTHER MALAY ARCHIPELAGO. See Bull. Jard. Bot. Buitenzorg, sér. 3, XI, p. 468—469; Rec. Trav. Bot. Néerl., XXXI, p. 758, under *V. orientale*; Blumea, III, p. 401.

14. *Viscum Wrayi* GAMBLE, in Kew Bull. 1913 (1913) 47.

For this species see Bull. Jard. Bot. Buitenzorg, sér. 3, XI, p. 470.

After having once more studied this species and compared it with its allies, I am more than ever convinced that it is a separate species, readily distinguished from all its congeners by means of the characters given in the determination key on page 266.

To the distribution may be added:

MALAY PENINSULA. Johore, 13.5 mile Mawai-Jemulang Road, low alt., Singapore Field No. 28992 coll. CORNER (B), on *Gomphia corymbosa*.

15. *Viscum Acaciae* DANSER, n. sp. — Vide *tab. I.* — Omnis glabra. *Caules* graciles, parte basali fere omnibus nodis dichotomi, apices versus minus ramosi vel ramis oppositis, raro passim ramo singulo adventicio; internodia omnia levia vel longitudinaliter costulata, inferiora teretia apice basiue incrassata, 3—7 cm longa, nodis ad 5 mm crassis, medio 3—1 mm diametro, superiora gradatim tenuiora et breviora, nodis dilatatis nec incrassatis, terminalia 2—4 cm longa, 0.6 mm diametro, nodis ad 2 mm dilatatis. *Folia* lanceolata vel subspathulata, basi sensim in partem petioliformem 2—5 mm longam attenuata, plerumque 3.5—7 cm longa, 7—20 mm lata, apice rotundata, tenuiter coriacea, utrinque haud lucida, nervis longitudinalibus 3 plerumque distinctis. *Inflorescentiae* singulae vel paulatim in axillis defoliatis, versus apices ramulorum numerosiores ibique passim terminalis et laterales in ramulis defoliatis, ergo subracemosae, cymae triflorae pedunculatae, flore medio femineo, lateralibus masculis; pedunculus tempore florendi brevis, circ. 1 mm longus, post anthesin auctus, denique 3—4 mm longus, 0.3—0.5 mm crassus; bractee connatae in naviculam initio 1 mm denique 2 mm longam, apicibus acutis. *Flos femineus* oblongo-clavatus, circ. 2—3 mm longus, 1 mm diametro, 4-tepalus. *Flores masculi* in axillis bractearum, ad 0.7 mm longi, nonnihil compressi, aperti ignoti. *Fructus* singuli in inflorescentiis, clavati, parte superiore subglobosa vel nonnihil ellipsoide, ad 6 mm longa 4.5 mm diametro, basi subabrupte in stipitem 2—3 mm longum ad 0.6 mm diametro attenuati, apice stylo breve coronati, immaturi in herbario superficie rugulosa, semilucida, haud verruculosa neque granulosa, maturi superficie sub lente minutissime granulosa. (Description from the specimen ROBERTSON 1823 in the Dehra Dun Herbarium, which is the type of the species.)

R e m a r k s. In general appearance, and especially by its stipitate fruits, this new species shows a superficial resemblance with *Viscum multinerve*, from which it may be readily distinguished by its obtuse, 3-nerved leaves, and especially by the different structure of the inflorescences.

BURMA. Magwe Distr., Ywamun—Shwetandaw, 800 ft, 7 IX 1925, ROBERTSON 1823 (DD), "on *Acacia leucophloea*, berries red", type of the species; Upper Burma, Mentuta (V), 1 1888, COLLETT 15 (K), "on *Acacia leucophloea*".

16. *Viscum indosinense* DANSER, in Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1 (1938) 51, ic. 2, f; XVI, 3 (1940) p.?

For this species see ll. cc.

17. *Viscum orientale* WILLDENOW, Sp. pl., IV, 2 (1805) 737; PERSOON, Synops., 2 (1807) 613; POIRET, in LAMARCK, Enc. méth., suppl., 2 (1811) 860; SPRENGEL, Syst. veg., 1 (1825) 488, p.p.; A. P. DE CANDOLLE, Prodr., 4 (1830) 278, p.p.; WIGHT & ARNOTT, Prodr. (1834) 379; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 403, p.p.; OLIVER, in Journ. Linn. Soc., bot., 7 (1864) 103; BRANDIS, For. Fl. N.W. & Centr. India (1874) 393, p.p.; KURZ, For. Fl. Burma, 2 (1877) 324, p.p.†; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 224, p.p.; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., III, 1 (1898) 195, p.p.; TRIMEN, Handb. Fl. Ceylon, 3 (1895) 471, probab. p.p.; VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 190; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. (1897) 140, p.p.; GAMBLE, Ind. timb. (1902) 584, p.p.; BRANDIS, Ind. trees (1906) 552; COOKE, Fl. Pres. Bombay, II, 3 (1906) 552; TALBOT, For. Fl. Bombay, 2 (1911) 420, p.p.†; HAINES, Botany Bihar & Orissa, 5 (1924) 803; GAMBLE, Fl. Madras, 7 (1925) 1257, 1258; FISCHER, in Rec. Bot. Surv. India, XI, 1 (1926) 161, t. 1, 2, 4; ALSTON, in TRIMEN, Handb. Fl. Ceylon, 6 (1931) 250; DANSER, in Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1 (1938) 53, p.p., excl. synonym.; *Viscum verticillatum* ROXBURGH, Fl. ind., ed. 2, III (1832) 764; ed. 3 (1874) 715; *Viscum navicellatum* (non KORTHALS) MOLKENBOER, in MIQUEL, Pl. Junghuhn., 108 (1852); *Viscum verruculosum* (non WIGHT & ARNOTT) TALBOT, For. Fl. Bombay, 2 (1911) 419, p.p.

Stems to more than 45 cm long, terete with swollen nodes, strongly branched, the branches decussate in the lower portion of the plant, but often moreover with additional branches on the nodes, more dichotomously or umbellately arranged towards the extremities of the stems; oldest internodes up to 6 cm long by 6 mm in diameter, smooth or slightly striped; younger internodes gradually less thick and usually somewhat shorter; youngest ones usually 1–3 cm long, to less than 1 mm in diameter, deeply grooved, flattened and dilated to 1.5 or 2 × their width at their apices. *Leaves* normally developed on all the nodes, ovate, contracted into a cuneate basal portion, or more oblong, or somewhat obovate, or roundish, often inaequilateral, always distinctly tapering into a short or very short petiole, usually 2–6 cm long, 0.6–3 cm broad, very obtuse to rounded at the apex, thin-coriaceous, usually with 3 longitudinal nerves that are somewhat more distinct above than beneath; probably always scale-like leaves (prophylls) at the bases of all branchings, which are rarely distinct. *Inflorescences* lateral on the nodes, first single in the axils, later to 6 on each node, moreover terminal on the weak extremities of the twigs,

like the nodes of the stems often papillose by the vaulted epidermal cells, with a peduncle usually 1—5 mm long, angular and grooved and bearing on its apex a boat-shaped cup composed of 2 opposite bracts connate at their bases, together nearly 2 mm long and 0.5 mm deep; usually 5 flowers in each cup, of which the middle 3 female, the lateral ones male; more rarely another pair of bracts above the lower pair, and in that case either a similar set of flowers in the upper cup, or moreover flowers in the axils of the lower bracts; very rarely still a third pair of bracts bearing flowers in the same way, or instead of the second pair a weak leafy twig. *Female flowers* oblong, somewhat angular by compression, with erect, small, triangular tepals. *Male flowers* shorter and more strongly compressed. *Fruits* roundish to oblong-ellipsoidal, in the latter case contracted towards the apex and the base, probably nearly globose when fresh, the largest ones up to 6 mm long by 5 mm in diameter, with the surface velvety-dull by minute granules or papillae, but smooth for the rest, and never with larger papillae nor warts. (Description from plants in the Kew and Dehra Dun Herbaria.)

Remarks. Now that I have learned to distinguish *Viscum orientale* from its allies, especially *Viscum ovalifolium*, it appears to have a rather restricted area of distribution, viz., the Deccan Peninsula south of the Ganges, and Ceylon. Probably it does not occur east of Calcutta, and it certainly does not reach the area of distribution of *Viscum ovalifolium*.

The confusion of *Viscum orientale* with other species seems to start already with SPRENGEL, who included Palestine plants in it that later appeared to belong to the entirely different *Viscum cruciatum*. BLUME, as early as 1823, determined Javan plants as *V. orientale*, and on the ground of specimens distributed by him under that name DE CANDOLLE and subsequent authors included *V. ovalifolium*, so common and widely spread in the Malay Archipelago, in the same species. The *Viscum orientale* mentioned by BENTHAM in his *Flora Hongkongensis* is likewise *V. ovalifolium*, that of his *Flora australiensis* is *V. Whitei*. The *V. orientale* of HOOKER's *Flora of British India* is a mixture of 5 species: 1°, the real *V. orientale*; 2°, specimens of *V. heyneanum* (though this species is also enumerated separately under the name *V. verruculosum*); 3°, specimens of *V. monoicum*, wrongly named because of their leaves, that are neither acute nor falcate; 4°, *Viscum ovalifolium* (though this is mentioned for Burma as a separate species); 5°, the Australian *V. Whitei*. The *Viscum orientale*

of the Ceylon floras often represents *V. heyneanum*, either exclusively or partly.

Specimens examined:

INDIA. Without exact locality: "India orientalis", KLEIN s.n. and DE FRIEDLAND s.n., in Herb. WILLDENOW (BD), the former type of *Viscum orientale* WILLDENOW; HEYNE s.n. (BD); ROXBURGH s.n. (K), "*Viscum verticillatum*"; WALLICH 491B (K), "Herb. WIGHT", 491C (K), "*Viscum Thespesiae* Hb. WIGHT"; WALLICH 491 (K); "*Viscum orientale* ? var. *angustum* WALL. Cat. 491E" (BD, K, L), "ex Herb. Heyneano mst. WALL."; Herb. WIGHT 46 (BD, DD, L); WIGHT 1219 (BD).

Ceylon. Jaffna, seashore, HOLTERMANN s.n. (BD); Batticaloa, coll. ? s.n. (DD); Dimboda, THWAITES C. P. 412 (K).

"Peninsula Indiae Orientalis", Herb. WIGHT 1219 (P), "*Viscum orientale*"; "In itinere Madraspatensi, Iuly 1804", BOTTLER s.n. (K), "*Viscum Indicum* Nob."; Sammulcotta, III 1811, and 29 IV, HEYNE s.n. (K), "*Viscum Indicum* nob." (scripsit BOTTLER); Post (?), near Tapoor, 31 III 1806, "cum *V. Ind.* Nob. idem videtr.", BOTTLER s.n. (K); Madras, WIGHT s.n. (K); "Mont. Nilghiri & Kurg, reg. trop.", G. THOMSON s.n. (BD, K, L, P); Iamalai, R. W(IGHT?) s.n. (DD); Kotagiri Ghaut (?), 16¾ milestone, BARBER 8648 (K); Nilgherries, Gudalur, 5000 ft, MEEBOLD 11484 (BD); Katagherry, ADAM s.n. (K); Coimbatore, WIGHT 46 = Kew Distr. 1249 (K); Coimbatore Distr., locality illegible, 1500 ft, FISCHER 1923 (DD); Mettapalayam, BARBER 8549 (K); Chengapalli, BOURNE 5076 (K); Madras, Cuddapah, Thanakonda, 1000 ft, GAMBLE 21206 (K); Madras, Sadras, Chengalpat, BOURNE s.n. et 2875 (K); Godavari Distr., Annavaram, BARBER (?) 12609 (K); Pulomamri, 500 ft, GAMBLE 15866 (K); Vizagapatam Distr., Karaka, BARBER 1609 (K); Tinnevely, Mundanthorai Ghaut, BARBER 2786 (K); Nellore Distr., Ramapatam, GAMBLE 12380 (DD); Ganjam Distr., Kaliyaguda, 1500 ft, GAMBLE 13837 (K); Tickapalli to Linepada, BARBER 1205 (K); North Kanara, Dodmune, TALBOT 3573 (DD); Central Provinces, Raipur, Balod & Dhamtari Ranges, HAINES 3500 (K); Chutia Nagpur, WOOD s.n. (DD); Kumarbera, Saranda, GAMBLE 9106 (DD, K); Hazaribagh, VICARY s.n. (K); 2000 ft, MEEBOLD 5024 (BD, K); Sumbulpore, GRIFFITH s.n. (K); Angul, HAINES 5235 coll. CHATTERJEE 16 (K); Singhbhum, HAINES 349 (DD, K); base of Mt. Parasnath, HOOKER (?) s.n. (K); Calcutta, Mutlah, CLARKE 21652 (K); East Bengal, Khasi, GRIFFITH 2738 (K), to which HOOKER remarks: "probably wrong label"; the same number in (P) labelled "Birma & Malay Peninsula".

18. *Viscum heyneanum* A. P. DE CANDOLLE, Prodr., 4 (1830) 278; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 403; DANSEER, in Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1 (1938) 51; *Viscum verruculosum* WIGHT & ARNOTT, Prodr. Fl. Pen. Ind. Or. (1834) 379; WALPERS, Repert., 2 (1843) 437; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 224; VAN TIEGHEM, Bull. Soc. Bot. Fr., 43 (1896) 190; ENGLER, in ENGL. & Pr., Nat. Pflanzenfam., Nachtr. (1897) 140; GAMBLE, Ind. timb. (1902) 584; BRANDIS, Ind. trees (1906) 552; GAMBLE, Fl. Madras, 7 (1925) 1257, 1258; FISCHER, in Rec. Bot. Surv. India, XI, 1 (1926) 180 seq.;

ALSTON, in TRIMEN, Handb. Fl. Ceylon, 6 (1931) 250; ENGLER & KRAUSE, in ENGL., Nat. Pflanzenfam., ed. 2, 16b (1935) 201; *Viscum orbiculatum* WIGHT, Ic. pl., III, 3 (1845) 13, t. 1016; WALPERS, Annales, I (1848) 361; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 224; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., III, 1 (1889) 167; VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 190; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. (1897) 140; GAMBLE, Ind. timb. (1902) 594; BRANDIS, Ind. trees (1906) 552; GAMBLE, Fl. Madras, 7 (1925) 1257, 1258; FISCHER, in Rec. Bot. Surv. India, XI, 1 (1926) 181 seq.; ENGLER & KRAUSE, in ENGL., Nat. Pflanzenfam., ed. 2, 16b (1935) 201; *Viscum orientale* (non WILLDENOW) THWAITES, Enum. pl. Zeylan. (1859) 136; BRANDIS, For. Fl. N.W. & Centr. India (1874) 393, p.p.; TRIMEN, Syst. Catal. Ceylon (1885) 77; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 224, p.p.; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., III, 1 (1889) 195, p.p.; TRIMEN, Handb. Fl. Ceylon, 3 (1895) 471; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. (1897) 140, p.p.; *Viscum capitellatum* (non SMITH) LECOMTE, Not. syst., 3, p. 171 (1915); Fl. Indo-Chine, V, 3 (1915) 209.

Stems to 40 cm and more long, strongly branched, in the lower portion with decussate branches, or moreover with additional branches on the nodes, often dichotomously or umbellately branched towards the extremities; lower articulations terete, usually up to 4 cm long by 5 mm in diameter, their nodes thickened in all directions or with two opposite tubercles, the upper ones gradually less thick, more angular, also somewhat shorter, the uppermost ones usually 1—2 cm long, angular and grooved, their nodes gradually flattened and dilated towards the apex to twice the width. *Leaves* sessile or subsessile, very variable as regards the shape, roundish-ovate to obovate or nearly cuneate-obovate, or elliptic to oblong-lanceolate, usually 1.5—5 cm long, 0.8—3 cm broad, acute to rounded at the apex, attenuate to contracted into the base, often with a finely crisp margin, thickish, thick-chartaceous to thin-coriaceous in the dry state, dull above and beneath or somewhat shining above, with 3—5 longitudinal nerves which often are connected by a distinct network of fine prominent veins, the whole nervation usually more distinct above than beneath. *Inflorescences* very rarely terminal, nearly always lateral, axillary or up to 6 together on the nodes, short-peduncled cymes with 3—7 sessile flowers sustained by 2 bracts, very rarely with another flower-bearing internode, the peduncle 0—2 mm long, angular and grooved, the bracts united into a boat-shaped cup, which is 1.5—2 mm long, acute or

obtuse, and very short at the sides, the outer flowers usually male, the others usually female. Young *fruits* oblong, attenuate towards both ends, dull and slightly finely papillose and moreover usually with rather long warts, the older fruits less attenuate and less warted, perhaps entirely smooth at length, up to 5 mm long by 2 mm in diameter, often crowned by the persistent tepals. (Description from Indian specimens listed below).

Remarks. *Viscum heyneanum* is, in some respects, intermediary between *V. orientale* and *V. monoicum*, in other respects not, but careful attention is often needed to distinguish it from both. As regards the general appearance, it is very similar to *V. orientale*, but it is, averagely, smaller in all parts. The stems are nearly as in *V. orientale*, but the young internodes are, usually, more strongly flattened, more gradually dilated from the base to the apex, more abruptly dilated at the apex. The leaves are not only somewhat smaller averagely, but also more obtuse than in *V. orientale*; the number of longitudinal nerves is 3 to 5, as in *V. orientale*, but it is more often 5 than in the latter species; also the reticulate veins between them are often more distinct in *V. heyneanum* than in *V. orientale*. The inflorescences are mainly as in *V. orientale*, but they are always short-peduncled or even subsessile, and very rarely have more than one flower-bearing internode, as is so often the case in *V. orientale*. The young fruits furnish the best distinctive character: they are oblong, attenuate towards both ends, somewhat dull by the slightly papillose surface, but much less so than in *V. orientale*, and moreover warty: the warts, however, may be very different in number and development, and become less distinct in the ripe fruit; in that case the fruit becomes similar to that of *V. monoicum*, but this species has the fruits less attenuate towards the base and not at all so towards the nearly truncate apex. The tepals are more often persistent in *V. heyneanum* than in allied species, but it seems that this peculiarity is caused or influenced by the dryness of the climate.

HOOKEE places the name *V. heyneanum* among the synonyms of *V. orientale*, and, consequently, uses the younger specific name *verruculosum* for our species. This may be caused by the fact, that we find the name *V. heyneanum* written, in a handwriting unknown to the present author, on several sheets with *V. orientale* in the Kew Herbarium. The same name, however, also occurs in the Kew Herbarium, in the same handwriting, on a few sheets with *V. verruculosum*, and DE CANDOLLE's type specimen preserved in Geneva, cer-

tainly is no *V. orientale*, as it has rather strongly warted fruits. The fact that DE CANDOLLE, in his Prodrômus, does not mention the warts of the fruits at all, may have confirmed HOOKER in his belief, that the plant described by DE CANDOLLE was *V. orientale*.

HOOKEER, in his Flora of British India, accepts *V. orbiculatum* as a distinct species, and expresses his doubt as to whether it is not a form of *V. orientale*. GAMBLE, in his Flora of Madras, likewise accepts *V. orbiculatum* as a distinct species, closely allied to *V. verruculosum*, but ascribes to it, as distinctive character, that the fruits are smooth and that the middle flowers of the "triads" are sometimes male. The present author, however, though he will not deny that the latter may be exceptionally the case, did not find the inflorescences of the specimens, named as *V. orbiculatum* by GAMBLE, different from those of *V. heyneanum*, and as the fruits show the same peculiar shape and warty surface, he cannot discover any valid reason to distinguish *V. orbiculatum* from *V. heyneanum*.

Now that the distribution of *V. heyneanum* appears to be restricted to so small an area in the Deccan Peninsula, it appears more doubtful than ever that this species should be collected in Cochin-China (see Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 51—53).

Specimens examined:

INDIA, without exact locality: WIGHT 45 (BD); WIGHT 47 (L), "*Viscum orientale* var."; WALLICH 491 (K), "*Viscum orientale* LINN. Herb. Heyneanum"; 2500 ft, WALLICH 6875 (BD, K, L).

CEYLON. WALKER s. n. (K); TEWAIRES C. P. 412 partly (B, BD, P), C. P. 1639 (K); Jaffna, C. HOLTERMANN s. n. (BD); Pointe de Galles, PIERRE 6462 (P), on *Bandia*; probably also: Mrs. WALKER s. n. (K); TEWAIRES C. P. 481 (K); GARDINER 831 (K).

PENINSULAR INDIA. Pondichéry, PERROTTET 325 (P); Courtallem, WIGHT 47 = Kew Distrib. 1250 (K); Tinnevely Distr., Naterikal, way to Manshola, BARBER (?) 13339 (K); Mt. Anamalay, BEDDOME s. n. (K); Palni Hills, Muliar, ANGLADE 2151 (K); "Mont. Nilghiri & Kurg, reg. trop.", G. THOMSON s. n. (K); Nilgiri Hills, WIGHT 45 = Kew Distr. 1251 (K); WIGHT 51 = Kew Distrib. 1253 (BD, K), probably types of *Viscum orbiculatum* WIGHT; Mayaburam, ADAM s. n. (K); Khoondas, HOHENACKER 1480 (BD, K); Bikkatti, 5000 ft, GAMBLE 20669 (DD, K); Avalanché, 7000 ft, GAMBLE 16115 (K); Blackbridge, 6000 ft, GAMBLE 12114 (K); Coimbatore Distr., Maonattam (?) Ghát, LUSHINGTON s. n. (K); Nellore Distr., Ramapatam, GAMBLE 12380 (K); Striharikota, GAMBLE s. n. (K).

Very doubtful (see above): French Indo-China, "Ad Thu-dhau-mot austro-cochinchinae", PIERRE 3081 (P).

Among the specimens examined there were a few with entirely smooth fruits. Perhaps they represent a variety, and in order to draw attention to this form I prefer to distinguish it under a varietal name:

Viscum heyneanum var. *liocarpum* DANSE, nov. var., fructibus verruculis carentibus, omnino levibus.

Madura Distr., Sirumalais, BOURNE 1767 (K); Palni Hills, Poombari Valley, BOURNE 1767 (K); Nilgiris, Kuchgooch (Kaguchi), LAWSON s. n. (K), *type* of the variety: moreover "Galh" or "Gath", CHAMPION s. n. (K).

19. *Viscum monoicum* A. P. DE CANDOLLE, Prodr., 4 (1830) 278; ROXBURGH, Fl. ind., ed. 2, 3 (1832) 763; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 403; WIGHT & ARNOTT, Prodr. Fl. Pen. Ins. Or. (1834) 379; ROXBURGH, Fl. ind., ed. 3 (1874) 715; BRANDIS, For. Fl. N.W. & Centr. Ind. (1874) 393; KURZ, For. Fl. Burma, 2 (1877) 324; HOOKER FIL., Fl. Brit. Ind., V, 13 (1886) 224, cum var. *Edgeworthii*; CLARKE, in Journ. Linn. Soc., bot., 25 (1889) 64; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., III, 1 (1889) 194; TRIMEN, Handb. Fl. Ceylon, 3 (1895) 471; VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 190; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., Nachtr. (1897) 140; GAMBLE, Ind. timb. (1902) 584; BURKILL, in Rec. Bot. Surv. India, IV, 4 (1904) 77, 129; COOKE, Fl. Bombay, II, 3 (1906) 552, p.p.†; BRANDIS, Ind. trees (1906) 552, 716; RIDLEY, in Journ. Straits Branch, Roy. As. Soc., 59 (1911) 164; GAMBLE, in Journ. As. Soc. Bengal, 75, II (1914) 386; DUTHIE, Fl. Upp. Ganget. Plain, III, 1 (1915) 68; LECOMTE, Fl. Indo-Chine, V, 3 (1915) 208; RIDLEY, in Journ. Fed. Mal. States Mus., X, 2 (1920) 114; HAINES, Bot. Bihar & Orissa, 5 (1924) 803; GAMBLE, Fl. Madras, 7 (1925) 1257, 1258; FISCHER, in Rec. Bot. Surv. India, XI, 1 (1926) 161 seq.; COWAN, in Rec. Bot. Surv. Ind., XI, 2 (1928) 221; KANJILAL, For. Fl. Pilibhit &c. (1933) 319; ENGLER & KRAUSE, in ENGL., Nat. Pflanzenfam., ed. 2, 16b (1935) 201; *Viscum falcatum* A. P. DE CANDOLLE, Prodr., 4 (1830) 278; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 403; VAN TIEGHEM, in Bull. Soc. Bot. Fr., 43 (1896) 190; *Viscum confertum* ROXBURGH, Fl. ind., ed. 2, 3 (1832) 764; ed. 3 (1874) 715; *Viscum Benghalensis* ROXBURGH, ex W. & A., Prodr. (1834) 379, in synonymis; *Viscum Edgeworthii* BRANDIS, Ind. trees (1906) 552; *Viscum verruculosum* (non W. & A.) TALBOT, For. Fl. Bombay, 2 (1911) 419, p.p.; *Viscum orientale* (non WILLDENOW) DANSE, in Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1 (1938) 53, t. 1, ic. 3, d—g.

Stems to 40 cm and more long, strongly branched, more decussately so in the lower part, more dichotomously towards the extremities; twigs terete, at first slightly dilated, later thickened at the nodes, in old stems with decussate tubercles; oldest internodes 2—7 cm long, up to 10 mm in diameter, smooth or longitudinally wrinkled, youngest

ones 1.5—4 cm long, 0.5—1 mm in diameter at the base, 1.5—2 × as wide at the apex, longitudinally grooved. *Leaves* normally developed on all nodes, moreover a pair of scales (prophylls) at the base of every branching (but not always distinctly visible); leaves sessile or very shortly petioled, elliptic to lanceolate, often somewhat falcate, 2.5—13 cm long, 0.6—4 cm broad, always attenuate at the base, acute or somewhat acuminate towards the obtuse or very obtuse apex, chartaceous to thin-coriaceous, nearly equal above and beneath, dull or slightly shining, with usually 5, more rarely 3 or 7 longitudinal nerves and between these distinct or indistinct connecting veins. *Inflorescences* rarely terminal on weak twigs, usually lateral, at first single in the axils with the bracts in one plane with the stem and the leaf, later more numerous (usually up to 6) on the nodes, peduncled cymes with one or more pairs of scales at the base and one pair of bracts at the tip, and, included by the latter, usually 5, more rarely 3 or 7, sessile flowers, the outer ones of which are male, the others female; peduncle 0—2 mm long, usually very short; bracts connate into a boat-shaped whole which at first is 1.5—2 mm, later up to 4 mm long, and 0.5—0.75 mm deep. *Female flowers* clavate or obovate, nearly 1.5 mm long, with 4 erect short-triangular tepals. *Male flowers* shorter, nearly 1 mm long, usually oblong, compressed. *Fruits* usually oblong, truncate at the apex, attenuate to rounded at the base, up to 4—6 mm long, 2—3 mm in diameter, smooth with exception of the wrinkles caused by drying. (Description from the British Indian materials under mentioned.)

Remarks. The only difference to be depended on, between *Viscum monoicum* and its nearest allies with more than 3-flowered inflorescences, is in the oblong, almost truncate, entirely smooth fruits. When fruits are absent the species may be distinguished by its leaves, which are usually 5-nerved, more rarely 3- or 7-nerved. In *V. orientale* and *V. heyneanum* the leaves are usually 3-nerved, more rarely 5-nerved, in *V. multinerve* the longitudinal nerves of the leaves are much more numerous.

Specimens examined:

INDIA. Ceylon, Ella Uva, HOLTERMANN s. n. (BD); Madras, Trao, Udambanshola, 5000 ft, MEEBOLD 13034 (BD); "Mont. Nilghiri & Kurg, reg. trop.", THOMSON s. n. (BD, K); Godavari Distr., Rumpa Hill, 2000 ft, GAMBLE 16012 (DD); Vizagapatam, Kurubapalli Ghát, 3500 ft, LUSHINGTON s. n. (K); North Kanara, Kumbhaswada, SEDGWICK 3889 coll. BELL (DD); Yellapore, TALBOT 780 (K); Bundelkhand, Banda, EDGEWORTH 4006 (K), *types* of the var. *Edgeworthii* HOOKER FIL.; Bahraich Distr., SRI RAM s. n. (DD); Gorakhpur Distr., Sakhai, SRI

RAM s. n. (DD); Gorakhpur, VICARY s. n. (K); Upper Gangetic Plain, Nepal frontier, Khairbatti Nala, INAYAT 23819 (BD, DD); Koomargaon, W. Duars, GAMBLE 6640 (DD), 6668 (K); Chutia Nagpur, Amjeria Tori, Lohardaga, 2000 ft, GAMBLE 8711 (DD, K); Jona, PRAIN s. n. (B); Pitorea, 2000—2500 ft, WOOD s. n. (K); Ranchi Distr., Adar, HAINES 5234 (K); Purulia, 750 ft, CLARKE 20806 (K); Sikkim, lower hills, Simsibong (?), 2—4000 ft, HOOKER s. n. (K); Behar, Monghyr, LOCKWOOD s. n. (K); East of Chandna (?), HAINES 2373 (K); Calcutta, WALLICH s. n. (G); "Sillet et Mont. Pundua", WALLICH 492 (BD, K), originals of *Viscum falcatum* WALLICH; "Mont. Pundua", WALLICH s. n. (G), type of *Viscum falcatum* DE CANDOLLE; Sunderbans, HEINIG s. n. (B, DD, P); Sunderbans, Bhoma Khali, BHATTACHARYAY 11 (DD); Bengal, Mymensingh, Shooshung, sea level, CLARKE 17290 (B); Assam, Khasi & Jyntea Hills, Barpani, 3200 ft, KANJILAL 6115 (DD); Silhet, WALLICH 492, 492e, 492E (P), originals of *Viscum falcatum* WALLICH; Khasia, 0—3000 ft, HOOKER & THOMSON s. n. (BD, K, L, P); Chittagong station, CLARKE s. n. (K); Rangoon Distr., Kamayut, PARKINSON 14855 (DD); Rangoon, PARKER 2781 (BD, DD), on the plant in DD a small specimen of *Viscum articulatum*; Rangoon, University Avenue, host of PARKINSON 14391 (K), which is *Viscum articulatum*; Tenasserim, Tavoy, WALLICH s. n. (G); Mergui, GRIFFITH 601 (K); Mergui Distr., Theinkun, PARKER 2576 (BD, DD).

FRENCH INDO-CHINA AND SIAM. See Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1, p. 55 (under *V. orientale*); XVI, 3, p. †

20. *Viscum multinerve* HAYATA — *Viscum orientale* var. *multinerve* HAYATA, in Bot. Mag. Tokyo, 20 (1906) 72; in Journ. Coll. Sc., Imp. Univ. Tokyo, 25 = Fl. montan. Formos. (1908) 192; KAWAKAMI, List Pl. Formosa (1910) 97; *Viscum multinerve* HAYATA, Ic. pl. Formos., 5 (1915) 196, ic. 73; ENGLER & KRAUSE, in ENGL., Nat. Pflanzenfam., ed. 2, 16b (1935) 201; *Viscum stipitatum* LECOMTE, in SARGENT, Pl. Wilson., III, 2 (1916) 319; LÉVEILLÉ, Cat. pl. Yun-Nan (1916) 285; GROFF, DING, & GROFF, in Lingnaam Agric. Rev., I, 2 (1924) 76; DANSER, in Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 1 (1938) 55; XVI, 3 (1940) p. †

For a description see DANSER, l. c. 1938, p. 55.

Specimens examined:

CHINA. Yunnan, Szemao, 5000 ft, A. HENRY 12758 (K), type of *Viscum stipitatum* LECOMTE; Yunnan-sen Distr., Kiang-ti, CAVALERIE 4201 (K); Kwantung, Yunfou Distr., WANG 520 (K, L, P, S); Kwantung, Winfoo, 110 m, SIN 5350 (BD, ex Hb. Sun Yatsen Univ.); Kwangsi, Yao Shan, SIN 3974 (BD); Hainan, TSANG & FUNG 18073 (DD); Yaichow, LIANG 63210 (Göt), shaded forest, fruit green; Five Finger Mt., Canton Christian College Herb. 9560 coll. MCCLURE (K, P), wooded ravine, $\frac{2}{3}$ m high.

FRENCH INDO-CHINA & SIAM. See Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 55, (under *V. stipitatum*).

FORMOSA. Prov. Nanto, Musha, 500—3000 m, E. H. WILSON 10109 (K); (Jitsugetsutan, NAKAHARA s. n., type of *Viscum multinerve*, ex HAYATA, in Bot. Mag. Tokyo, 20, p. 72).

21. *Viscum trilobatum* TALBOT, For. Fl. Bombay, 2 (1911) 419, ic. 479; *Viscum capitellatum* (non SMITH) HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 225, p.p.; COOKE, Fl. Bombay, II, 3 (1906) 552, p.p.; GAMBLE, Fl. Madras, 7 (1925) 1257, 1258, p.p. — Vide tab. III.

Stems rather short and rigid, to 25 cm long and more, decussately branched in the lower portion, more dichotomously towards the extremities by the development of terminal inflorescences; lower internodes terete with thickened nodes, up to 6 cm long, to 5 mm in diameter, the middle ones sometimes a little longer, gradually less thick, slightly angular, the upper ones usually 1.5–4 cm long, angular-grooved, usually 1–2 mm in diameter at the base, gradually flattened and dilated to 1.5 or 2 × the width towards the apex, once more abruptly dilated to 1.5 or 2 × at the node. *Leaves* normally developed, sessile with narrow base or with a petiole up to 3 mm long, which is flat above, nearly flat or slightly rounded beneath; lamina obovate to suborbicular or sometimes more cuneate and subtruncate, abruptly or gradually contracted into the base, 1.5–4.5 cm long, 1–4 cm broad, coriaceous, dull or slightly shining, nerveless or with 3–5 longitudinal nerves and indistinct veins, which are sometimes more distinct above than beneath. *Inflorescences* short-peduncled cymes, usually lateral in the lower portion of the plant, single or to 3 in the leaf axils, also terminal, usually in threes, on the extremities of the stems, the peduncle bearing at its tip a boat-shaped bracteal cup and usually 3 flowers, the lateral ones of which are female, the middle ones male, more rarely all female; rarely instead of the middle flower a second internode bearing a bracteal cup with one male and two female flowers; peduncle usually 0–2 mm long and more than 1 mm in diameter, in terminal cymes rarely up to 4 mm long; boat-shaped cup 2–4 mm long, usually acute, 0.75–1 mm high in the middle. *Male flowers* obovate, nearly 2 mm long, 1 mm broad, with 4 rounded broad tepals. *Female flowers* oblong, with 4 small erect tepals. *Fruits* as far as known (probably unripe ones only) roundish, up to 5 mm long by 4.5 mm in diameter, somewhat contracted below the tepal-bearing rim, crowned by the very short style. (Description from all the specimens listed below.)

Remarks. When we compare TALBOT'S specimens in the Dehra Dun Herbarium, which are labelled *V. capitellatum*, to the drawing in his Flora of Bombay (cfr. plate III A), it is evident, that these specimens are types of his *Viscum trilobatum*. When we, furthermore, compare these type specimens, with their cuneate, very slightly trilobate leaves, to the

other ones mentioned below (cfr. also *plate III A to III B*), we must admit that the latter specimens probably represent the more normal leaf shape, and that TALBOT's choice of the specific name was not a happy one.

With the exception of TALBOT, all authors who knew this plant seem to have included *V. trilobatum* in *V. capitellatum*. The present author, however, though acknowledging the close relationship, considers *V. trilobatum* clearly distinct from *V. capitellatum* by its larger leaves and shorter-peduncled cymes, and sharply delimited against it.

Specimens examined:

INDIA. Deccan Peninsula, Nilgiri, Masnigudi, 3000 ft, GAMBLE 15693 (K); Malabar, Chedleth, 3000 ft, FISCHER 329 (DD), "on *Loranthus longiflorus*"; Kanara, Sindolé, RITCHIE 1769 (K), "on *Loranthus loniceroides*"; North Kanara, Ioida, TALBOT s. n. (DD), *types of Viscum trilobatum* TALBOT; "N. Kanara district in monsoon and rain-forest growing on different trees" (TALBOT, l. c.).

22. *Viscum capitellatum* SMITH, in REES, *Cyclopedia*, vol. 37, *Viscum* no. 18 (1817); A. P. DE CANDOLLE, *Prodr.*, 4 (1830) 279; G. DON, *Gen. Hist. Dichl. Pl.*, 3 (1834) 404; WIGHT & ARNOTT, *Prodr. Fl. Penins. Ind. Or.* (1834) 380; WALPERS, *Repert.*, 2 (1843) 437; THWAITES, *Enum. Pl. Zeylan.* (1859) 136; CHALON, *Rev. Loranth.* (1870) 67; TRIMEN, *Syst. Catal. Ceylon* (1885) 77; HOOKER FIL., *Fl. Br. Ind.*, V, 13 (1886) 225, p.p.; ENGLER, in *ENGL. & Pr., Nat. Pflanzenfam.*, III, 1 (1889) 195; TRIMEN, *Handb. Fl. Ceylon*, 3 (1895) 471; VAN TIEGHEM, in *Bull. Soc. Bot. Fr.*, 43 (1896) 190; ENGLER, in *ENGL. & Pr., Nat. Pflanzenfam., Nachtr.* (1897) 140; GAMBLE, *Ind. timbers* (1902) 584; BRANDIS, *Ind. trees* (1906) 552; COOKE, *Fl. Bombay*, II, 3 (1906) 552, p.p.; TALBOT, *For. Fl. Bombay*, 2 (1911) 421, ic. 480; GAMBLE, *Fl. Madras*, 7 (1925) 1257, 1258, p.p.; FISCHER, in *Rec. Bot. Surv. India*, XI, 1 (1926) 171 seq.; ENGLER & KRAUSE, in *ENGL., Nat. Pflanzenfam.*, ed. 2, 16b (1935) 201. — Vide *tab. II, B*.

Stems short, rigid, to 15 cm long or somewhat longer, usually shorter, strongly branched, the branches of the lower portion decussate, divaricate, those of the upper portion of the plant more umbellately arranged; lower internodes terete, smooth or wrinkled, up to 5 mm in diameter, thickened at the nodes, the upper ones up to 6 cm long, usually shorter, terete, wrinkled, less thick, dilated and flattened at the tip, the uppermost ones less thick and shorter and more distinctly dilated and flattened at the tip, usually 1—2 cm long, 1—1.5 mm in diameter at the base, 1.5—2.5 × as broad upwards, sometimes rather distinctly grooved, usually wrinkled only, once more abruptly dilated at the tip to 1.5 or 2 × the breadth. *Leaves* partly normally developed,

partly reduced to scales (the scales at the bases of the ramifications indistinct or absent), especially towards the base of the plant and the extremities of the stems, rarely the whole plant leafless, but in that case the normal leaves probably fallen off; normal leaves roundish-obovate, thickish, dull, always curled upwards, without visible nerves, usually 1.5—2 cm long, often smaller, always rounded at the apex, strongly contracted at the base, sessile. *Inflorescences* lateral, axillary or to 6 around the nodes, hardly ever terminal, always with a long peduncle bearing at its apex a boat-shaped cup formed by two bracts connate at their bases, and in this cup at first one, later up to 5 flowers, finally with 4 fruits and without middle flower, which is probably male; rarely instead of the middle flower a pedicellate flower with a pair of bracts of its own; peduncles 2—10 mm long; bracteal cups 2.5—4 mm long, acute. *Male flower* obovate, nearly 2 mm long, 1 mm broad, with short tepals and obconic base. *Female flowers* more oblong, with ellipsoid ovary and small erect tepals. *Fruits* (as far as known, certainly unripe) roundish-ellipsoid, up to 3.5 mm long, 2.5 mm in diameter, contracted under the tepal-bearing margin, wrinkled (by drying) but smooth and shining for the rest. (Description from specimens in the Kew and Dehra Dun Herbaria.)

Remarks. Though this species seems to be common in several regions, the specimens in the herbaria examined by the author are scanty. From these materials, however, it is sufficiently evident, that the young plants have normal leaves on most of the nodes, but that the leaves are often scale-like towards the base of the plant and towards the extremities; older plants usually have their normal leaves fallen off for the greater part and look almost leaf-less. From this it is evident, that WALKER & ARNOTT's varieties α and β deserve no varietal name.

I have separated from this species the specimens from North Kanara distinguished by TALBOT as *Viscum trilobatum*, and considered by several authors as a variety of *V. capitellatum*.

Specimens examined:

INDIA. Ceylon, Peradenia, THWAITES C. P. 1638 (BD, K, P), on *Dendrophthoë*; "Peninsula Indiae Orientalis", ex Herb. WIGHT s. n., WIGHT Catal. 1223, "*Viscum capitellatum* SM. α = *Viscum Mangiferae* WALL. L. n. 6878 (BD, K, P); *ibidem*, Herb. WIGHT 54 = WIGHT Catal. 1224 *Viscum capitellatum* SM. β *subaphyllum* = Kew Distrib. 1252 (K, P), on *Dendrophthoë falcata*; "Orawur", ex Herb. BOTTLE s. n., "*Viscum umbellatum* nob." (K); Coimbatore Distr., Iruttupallam (?), BARBER 8552 (K), on *Dendrophthoë falcata*, "which was on *Salvadora persica* L."; Western Peninsula from the Konkan southwards, Ceylon; commonly parasitic on *Loranthus*

longiflorus and other species of *Loranthus* in monsoon or rain-forest; also on *Terminalia paniculata*." (TALBOT, l.c.).

23. *Viscum Whitei* BLAKELY, in Proc. Linn. Soc. N. S. Wales, 53, 2 (1928) 45, t. 7; *Viscum orientale* (non WILLDENOW) BENTHAM, Fl. austr., 3 (1866) 396; F. v. MUELLER, Syst. cens. (1882) 64; BAILEY, Syn. Queensl. Fl. (1883) 451; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 224, p.p.; F. v. MUELLER, Sec. syst. cens. (1889) 111; ENGLER, in ENGL. & PR., Nat. Pflanzenfam., III, 1 (1889) 195, p.p.; Nachtr. (1897) 140, p.p.; BAILEY, Compreh. Catal. Queensl. Pl. (1913) 460; DOMIN, Beitr. Fl. Austr., in Bibl. Bot., 22 (1921) 605.

Stems long and slender, over 1 m long, hanging, branched but not strongly so; lower internodes terete, up to 4 mm in diameter, indistinctly ribbed, usually 2—4 cm long, rather strongly thickened at the nodes; upper internodes gradually somewhat longer, often 5—6 cm long, less thick and more distinctly decussately flattened and dilated towards the apex to twice the width, usually 1—1.25 mm in diameter at the base, with 3—5 longitudinal ribs on each side. *Leaves* lanceolate, usually 2—4 cm long, 4—6 mm broad, obtuse or somewhat acute, often mucronulate, attenuate at the base into a 1—2 mm long petiole, dark-coloured (in the herbarium) with 1—3 longitudinal nerves, which usually are visible on the underside only. *Inflorescences* peduncled cymes, usually single, rarely to 3 in the axils, also on the leafless nodes; peduncle 2—12 mm long, 0.25—0.5 mm in diameter at the base, dilated and flattened towards the apex like the internodes of the stem; bracts conduplicate-triangular, acute, slightly uncinata, at first incurved, divaricate or somewhat reflexed later, finally up to 0.75 mm, rarely to 1 mm long, not connate at the base. Flowers 3—5 in each cyme, the middle one male (or sometimes female?), the lateral ones always female. *Male flowers* flattened by pressure of the adjacent flowers, apparently 2-valved, rhomboid-spathulate, nearly 1.25 mm long, soon caducous. *Female flowers* cylindrical, nearly 2 mm long, of which the tepals occupy about one-third. *Fruits* 1—3 in each cyme, the largest ones nearly globose, up to 4 mm in diameter, crowned by the short style, hardly stipitate at the base, wrinkled by drying but smooth and shining for the rest. (Description from the under mentioned specimens.)

Remarks. In many respects, especially in the peculiar structure of the inflorescences, *V. Whitei* is closely allied to *V. Bancrofti*. It differs from this species not only by its well-developed leaves, but also by the larger dimensions of its vegetative parts. Among the

Asiatic species, *V. trilobatum* and *V. capitellatum* are very near by the similar structure of the inflorescences. I could not discover, on the specimens examined, the peculiar stripes on the fruits described and figured by BLAKELY.

Specimens examined

AUSTRALIA. Queensland, F. v. MUELLER s. n. (BD); Rockhampton, DIETRICH s. n. (BD). (See also BLAKELY, l. c., who, moreover, quotes BANCROFT s. n., the *type* of the species.)

24. *Viscum Bancrofti* BLAKELY, in Proc. Linn. Soc. N. S. Wales, 53, 2 (1928) 46, t. 8.

Stems slender, pendulous, strongly branched with decussate branches; lower internodes terete, indistinctly longitudinally ribbed, up to 3.5 cm long by 2.5 mm in diameter, slightly thickened at the nodes; upper ones gradually shorter, to less than 2 cm long, gradually less thick, to less than 0.25 mm at the base, distinctly flattened and dilated towards the apex to twice the width, usually with 3 strong ribs on both sides. *Leaves* all scale-like, those at the bases of the branches (prophylls) very small, triangular, often invisible; those at the apices of the internodes acute, conduplicate-triangular or claw-shaped, here and there up to 1 mm long or even slightly longer, usually somewhat shorter, connected at their bases by a short but distinct limb. *Inflorescences* pedunculate, single in the axils, lateral, or sometimes terminal on weak twigs; peduncles usually 1—5 mm long, like the internodes of the stem dilated to twice the width and flattened towards the apex from a terete base; bracts divaricate, acute, connate to a boat-shaped cup 2 mm long. *Male flowers* not seen (see BLAKELY's description) but certainly not all the cymes with the middle flower male; middle flower often, lateral flowers usually or always *female*, with a cylindrical nearly 1 mm long ovary and a very small perigone hardly covering the small style and soon falling off. *Fruits* 1—3 in each cyme, roundish-ellipsoid, not or hardly stipitate, the largest ones up to 3 mm long, nearly 2 mm in diameter, strongly wrinkled by drying, but smooth and shining for the rest. (Description from the under mentioned specimens.)

Remarks. Only superficially resembling *Viscum articulatum* and its nearest allies, and easily distinguished from them by the entirely different inflorescences.

Specimens examined:

AUSTRALIA. Queensland, DIETRICH s. n. (BD). (See also BLAKELY, l. c., who only gives BANCROFT no. 11, the *type*, from Eidsvold, parasitic on *Loranthus Quandang* var. *Bancroftii*.)

Visca dubia et excludenda.

In the following list of forms, which mainly have been described or mentioned as *Viscum*, but in reality belong to other genera, I omit those already mentioned in my former revisions of *Loranthaceae*, viz., those of the Netherlands Indies and adjacent regions (Bull. Jard. Bot. Buitenzorg, sér. 3, XI, 3—4, 1931), the Philippine Islands (Phil. Journ. Sc., 58, 1, 1935), French Indo-China and Siam (ibid., XVI, 1, 1938, and XVI, 3, 1940), and that of the genus *Korthalsella* (ibid., XIV, 2, 1937, and XVI, 3, 1940). In the latter genus all forms must be included which are described as *Viscum* from regions East of New Guinea and the Australian Continent, but also many of those from more Western parts of the Old World.

Viscum cornifolium CUNNINGHAM, ex OLIVER, in Journ. Linn. Soc., bot., 7 (1864) 92 = *Notothixos cornifolius* OLIVER.

Viscum floccosum THWAITES, Enum. pl. Zeylan. (1864) 418; OLIVER, in Journ. Linn. Soc., bot., 7 (1864) 92 = *Notothixos floccosus* (THWAITES) OLIVER.

Viscum grossum WIGHT & ARNOTT, Prodr. Fl. Pen. Ind. Or. (1834) 380; WALPERS, Repert., 2 (1843) 437; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 227.

Specimens examined: Madras, Dindigul Hills (ex WIGHT & ARN., l. c.) Herb. WIGHT 55 = WIGHT Catal. 1226 = WIGHT in WALL. List 6879 (K).

HOOKER rightly says about these specimens: "WIGHT & WALLICH's plants consist of nothing but fragments of branches resembling those of *V. album*. The flowers are described as fascicled at the nodes, but there are none in the specimens." The specimens examined do indeed call to mind *Viscum album*, but also other *Visca*, and most of all *V. capitellatum*. As *V. album* does not occur in the Deccan Peninsula, the remark on the sheet by GAMBLE: "perhaps *V. capitellatum*", may be right.

Viscum Helferi PRESL, Epim. bot. (1851) 256; WALPERS, Annal., 2 (1852) 729; BENTHAM & HOOKER FIL., Gen. pl. III, 1 (1880) 215 = *Ginalloa Helferi* (PRESL) KURZ.

Viscum heteranthum WALLICH, ex A. P. DE CANDOLLE, Prodr., 4 (1830) 279 = *Viscum latifolium* SPRENGEL, see below.

Viscum incanum HOOKER, Ic. pl., t. 73 (1837); ENDLICHER, Gen. pl. (1836—40) 801; WALPERS, Repert., 2 (1843) 438; F. v. MUELLER, Fragm., 2 (1860) 109; OLIVER, in Journ. Linn. Soc., bot., 7 (1864) 104 = *Notothixos incanus* (HOOKER) OLIVER.

Viscum Kaempferi A. P. DE CANDOLLE, Prodr., 4 (1830) 285; G. DON, Gen. Hist. Dichl. Pl., 3 (1834) 408; FRANCHET & SAVATIER, Enum. pl. jap., 1 (1875) 406 = *Taxillus Kaempferi* (A. P. DE CANDOLLE) DANSER.

Viscum latifolium (non LAMARCK 1789, nec SWARTZ 1797) D. DON, Prodr., fl. nepal. (1825) 142 = *Viscum platyphyllum* SPRENGEL, Syst. veg., cur. post. (1827) 47; A. P. DE CANDOLLE, Prodr., 4 (1830) 279 = *Viscum heteranthum* A. P. DE CANDOLLE, Prodr., 4 (1830) 279 = *Henslowia heterantha* ALPH. DE CANDOLLE, in D. C., Prodr., XIV, 2 (1857) 632 = *Hylomyza platyphylla* (SPRENGEL) DANSER (Santalacea).

Viscum platyphyllum SPRENGEL, Syst. veg., cur. post (1827) 47 = *Viscum latifolium*, see above.

Viscum pycnanthum DOMIN, Beitr. Fl. Austr., I, 3, in Bibl. bot., 22 (1921) 604.

I have seen no specimens, but from the description this seems to be rather a *Korthalsella* than a *Viscum*. Perhaps it is the same plant as *Korthalsella Brassiana* BLAKELY, in Proc. Roy. Soc. Queensl., 47 (1936) 79; cfr. Bull. Jard. Bot. Buitenzorg, sér. 3, XVI, 3 (1940).

Viscum spathulifolium THWAITES, Enum. pl. Zeylan. (1864) 418; OLIVER, in Journ. Linn. Soc., bot., 7 (1864) 92, 103; BENTHAM & HOOKER FIL., Gen. pl., III, 1 (1880) 215 = *Ginalloa spathulifolia* (THWAITES) KURZ.

Viscum subaureum F. v. MUELLER, ex OLIVER, in Journ. Linn. Soc., bot., 7 (1864) 92 = *Notothixos subaureus* OLIVER, ibidem.

Viscum verticilliflorum ROYLE, Ill. Himal. Bot., 1 (1839) 235, nomen.

This is enumerated, with other *Visca*, as follows: "and *Viscum verticilliflorum* nob., nearly allied to *V. Wightianum*, WALL. at Mussooree on the oak." The leafy species perhaps meant here and occurring near Mussooree on oak are: *V. album*, and perhaps *V. monoicum*; the leafless ones are: *V. nepalense*, *V. liquidambaricolum*, and *Korthalsella opuntia*. The comparison with *V. Wightianum* does not help us in interpreting ROYLE's plant.

Viscum Wallichianum WIGHT & ARNOTT, Prodr. Fl. Pen. Ind. Or. (1834) 379; WALPERS, Repert., 2 (1843) 437; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 227.

This species is based on WIGHT Cat. no. 1221. In the Kew Herbarium there is a specimen under this name numbered "1221" and "Herb. WIGHT No. 57". This certainly is a *Loranthacea*, but no *Viscum*. According to a note by GAMBLE on the sheet, this botanist supposed

the specimen to be *Helicanthes elastica* (DESROUSSEAUX) DANSER ("May this not be a *Loranthus* near *elasticus*, DESR.?").

Viscum Wightianum WIGHT & ARNOTT, Prodr. Fl. Pen. Ind. Or. (1834) 380; WALPERS, Repert., 2 (1843) 437; HOOKER FIL., Fl. Br. Ind., V, 13 (1886) 227.

This species is based on WIGHT Catal. no. 1222 = WALLICH, Cat. no. 6877 partly. I found, in the Kew Herbarium, under this name, a specimen numbered Herb. WIGHT 56. This is certainly a *Loranthaceae*, but no *Viscum*, and probably, as GAMBLE remarks, on the sheet, *Helicanthes elastica* (DESROUSSEAUX) DANSER. ["May not this be *Loranthus Euphorbiae*, Wt.? (*L. elasticus*, DESR.)"].

List of collectors' numbers

referring to the species by means of their number.

(β = var., app. = dubia et excludenda).

- | | |
|--|--|
| ADAM, Sir F., s. n. = 17, 18. | CANTON CHRISTIAN COLLEGE 7970 = 9;
9265 = 13; 9560 = 20. |
| ATCHISON 48 = 5; 87 = 1. | CARLES 855 = 9. |
| ANGLADE 2151 = 18. | CAVALERIE 3134 = 9†; 4201 = 20;
4258 = 9; 7323 = 9†; 7496 = 9†. |
| ARNOLD ARBORETUM 72651 = 13. | CHAMPION s. n. = 18; 402 = 13. |
| AUCHER-ELOY 4642 = 1; 4643 = 1. | CHANET 1001 = 1. |
| BARBER 1205 = 17; 1607 = 8; 1609 =
17; 2785 = 11; 2786 = 17; 6821 =
8; 7400 = 10; 8547 = 11; 8548 =
10; 8549 = 17; 8552 = 22; 8648 =
17; 10376 = 8; 10531 = 10; 12609
= 17; 13339 = 18. | CHATTARJEE 16 = 17. |
| BARRETT 75 = 1. | CHING 1044 = 1; 2182 = 9. |
| BEDDOME s. n. = 18. | CHRISTY s. n. = 5. |
| BHATTACHARYAY 11 = 19. | CHUN, W. Y., 7871 = 9. |
| BOISSIER s. n. = 5. | CHUN & TSO 43963 = 13. |
| BOB 2992 = 8; 2993 = 8; 7512 = 8. | CHUNG 3799 = 9. |
| BORNMÜLLER 1414 = 5. | CLARKE s. n. = 19; 11254 = 10, 8;
11266 = 8; 17290 = 19; 19286 =
7; 20806 = 19; 21652 = 17; 27572
= 8; 31186 = 1. |
| BOURNE s. n. = 10, 17; 191 = 10;
864 = 8; 1767 = 18 β ; 1768 = 10;
2423 = 10; 2875 = 17; 5076 = 17. | COLLETT s. n. = 1, 9; 15 = 15; 718
= 8. |
| BRASS 1933 = 7; 2519 = 7. | COPELAND 618117 = 12. |
| BRILLET s. n. = 1 β . | CORNER 28992 = 14. |
| BUSHELL s. n. = 1. | CRAIB 341 = 8. |
| | CUMING 1960 = 12; 2258 = 7. |

- DALHOUSIE s. n. = 1.
 DALZIEL s. n. = 9, 9f.
 DAS 138 = 8.
 DAVID 1706 = 1.
 DAVIDSON s. n. = 9.
 DE 17461 = 1♂.
 DEANE s. n. = 1.
 DE VOOGD 2823 = 7.
 DIETRICH, AMALIA, s. n. = 7, 23, 24;
 374 = 7.
 DENSMORE 8162 = 5.
 DRUMMOND 15081 = 12; 21492 = 1;
 21985 = 1; 23862 = 1.
 DUCLoux 364 = 9; 606 = 8.
 DUTHIE s. n. = 1; 134 = 5; 5944 =
 9; 9727 = 8; 10549 = 8; 13012
 = 1.
 EDGEWORTH 195 = 1; 4004 = 8; 4006
 = 19.
 ELMER 17777 = 12.
 FALCONER s. n. = 1.
 FARGES s. n. = 3, 9, 9f.
 FAURIE 1253 = 1; 1254 = 1; 6809
 = 1.
 FIELDING s. n. = 1.
 FISCHER, C. E. C., 324 = 10; 329 =
 21; 1923 = 17; 2079 = 8.
 FORBES, F. B., s. n. = 1.
 FORREST 542 = 9f; 10174 = 9; 11112
 = 9; 12719 = 9; 13811 = 9; 16142
 = 9; 18155 = 9; 25388 = 1♂.
 FREYN 1414 = 1.
 FRIEDLAND s. n. = 17.
 FULLER s. n. = 1.
 GAMELE s. n. = 18; 370 = 8; 698 =
 8; 711 = 1♂; 1143 = 8; 2979 =
 8; 4393 = 1; 6233 = 9; 6269 =
 1; 6640 = 19; 6668 = 19; 8711
 = 19; 8810 = 8; 9106 = 17; 9210
 = 8; 10232 = 8; 11693 = 11;
 12114 = 18; 12115 = 11; 12380
 = 17, 18; 13837 = 17; 14508 =
 10; 15436 = 10; 15693 = 21;
 15866 = 17; 16012 = 19; 16115
 = 18; 17242 = 10; 20669 = 18;
 21206 = 17; 24174 = 1; 25663 =
 8; 26736 = 1; 26768 = 1.
 GAMMIE 18220 = 1.
 GARDNER 831 = 18.
 GATACRE 17526 = 1; 17527 = 5.
 GAUDICHAUD s. n. = 13.
 GRIFFITH s. n. = 8, 17; 601 = 19;
 1372 = 1; 2079 = 9; 2736 = 1;
 2738 = 17; 2742 = 7; 2743 = 7;
 2744 = 8.
 HAINES 349 = 17; 2373 = 19; 3500
 = 17; 5234 = 19; 5235 = 17.
 HANCE 1451 = 9.
 HANCOCK 37 = 13; 362 = 8.
 HANDEL-MAZZETTI 4414 = 12.
 HARE s. n. = 1, 5.
 HARSUKH 15549 = 1.
 HAYNE s. n. = 1, 5.
 HEARSEY s. n. = 8.
 HEINIG s. n. = 19.
 HEINIG & GAMMIE 15 = 19f.
 HENRY, A., 59 = 9; 3206 = 9f; 7883
 = 1; 8420 = 13; 9942 = 9; 10303,
 10303A = 9; 12758 = 20.
 HENRY, B. C. 18 = 9f.
 HERVEY s. n. = 7.
 HEYNE s. n. = 8, 17.
 HOHENACKER 1478 = 10; 1480 = 18.
 HOLTERMANN s. n. = 17, 18, 19.
 HOLTUM 9801 = 7.
 HOOKER s. n. = 8, 9, 17, 19.
 HOOKER & HANBURY s. n. = 5.
 HOOKER & THOMSON s. n. = 7, 19;
 1226 = 8.
 HORNEMANN s. n. = 8.
 HU, H. H., 146 = 9; 243 = 9f; 916
 = 9f; 1110 = 1; 1172 = 9f.
 HUBBARD 2899 = 7.
 HUK, ABDUL, 171 = 7.
 INAGAKI s. n. = 1.
 INAYAT 20934 = 5; 23818 = 8; 23819
 = 19; 26008 = 12.
 JACOBSON 19B, 2044, 2162 = 12.
 JACQUEMONT 634 = 10; 667 = 1;
 1283 = 10.
 JAMES s. n. = 1.
 JAMESEN s. n. = 1.
 JOHNSON s. n. = 7.
 JOHNSTON 73 = 5.
 KANJILAL 1038 = 8; 1057 = 1; 1099

- = 8; 1100 = 8; 1299 = 8; 5935
 = 9; 6115 = 19.
 KENG 274 = 9♀.
 KING s. n. = 9.
 KING'S COLLECTOR 1186 = 7; 1187
 = 7♂; 4191 = 8.
 KLEIN s. n. = 17.
 KOMAROV 522 = 1.
 LACE 2510 = 8.
 LAW s. n. = 8♂, 10.
 LAWSON s. n. = 8, 18♂.
 LIANG 62185 = 13; 63210 = 20.
 LICENT 6056 = 1; 6057 = 1.
 LINGNAN UNIVERSITY 15553 = 13;
 15590 = 9♀; 15930 = 13; 16161
 = 13.
 LIU, L., 303 = 1.
 LOBB 168 = 13; 379 = 13.
 LOCKWOOD s. n. = 8, 19.
 LOWNE s. n. = 1, 5.
 LUSHINGTON s. n. = 18, 19.
 MADDEN s. n. = 1, 9.
 MAINGAY 697 = 7; 1406 = 7.
 MAIRE 1728 = 9.
 MANOHARLALL s. n. = 8.
 MARKHAM s. n. = 8.
 MAXIMOWICZ s. n. = 1.
 MEEBOLD s. n. = 8; 4250 = 10; 5024
 = 17; 5096 = 9; 8207 = 6; 8251
 = 10; 10152 = 8; 11484 = 17;
 13034 = 19; 14317 = 13.
 METCALF, F. P., 2727a = 9♀.
 MEYERS 5458 = 5; B162 = 15.
 MILLETT s. n. = 13.
 MUCKUNIM 23028 = 12.
 MUELLER, F. v., s. n. = 23.
 MURTON 151 = 7♂.
 NAKAHARA s. n. = 20.
 NATIVE COLLECTOR BOT. GARD. CALCUT-
 TA s. n. = 8.
 OLDHAM s. n. = 8; 270 = 1.
 OSMASTON 253 = 1; 1291 = 12; 1308
 = 12; 1309 = 9; 1310 = 8; 1536
 = 12.
 PARKER s. n. = 9; 2002 = 8; 2157 =
 7; 2190 = 13; 2576 = 19; 2731
 = 19 + 7.
 PARKINSON 3906 = 1; 7037 = 1;
- 8717 = 13; 14391 = 19 + 7;
 14855 = 19.
 PARRY 555 = 8.
 PERROTTEY 325 = 18.
 PIERRE 3081 = 18; 6462 = 18.
 PINARD s. n. = 5.
 PRAIN s. n. = 8, 19.
 PURDOM 64 = 1.
 RAMOS 1020 = 12.
 RAMSUKH s. n. = 1; 8016 = 1.
 REPORTER ECON. PROD. GOVERN. INDIA
 11750 = 8.
 RIDLEY s. n. = 7; 100 = 7♂, 6018
 = 7♂.
 RITCHIE 333 = 8, 8♂; 334 = 12;
 1769 = 21.
 ROBERTSON 1823 = 15.
 ROGERS s. n. = 8; 51 = 13; 694
 = 1♂.
 ROSS 389 = 1.
 ROSTHORN, v., 1212 = 9.
 ROTTLER s. n. = 17, 22.
 ROXBURGH s. n. = 8, 12, 17.
 ROYLE s. n. = 1, 9.
 SAHNI 49 = 1.
 SAULIÈRE 262 = 10; 635 = 8.
 SAVATIER 553 = 1.
 SCHNEIDER, CAMILLO, 263 = 9♀; 1449
 = 4; 1694 = 9; 3487 = 4.
 SCHULTZ 475 = 7.
 SOORTECHINI s. n. = 7.
 SCOTT s. n. = 7.
 SEDGWICK 3889 = 19.
 SIEBER s. n. = 5.
 SIMONS s. n. = 8.
 SIN 223 = 9; 338 = 9; 854 = 9;
 3974 = 20; 5350 = 20; 5360 = 9.
 SIN & WHANG 2 = 7; 141 = 13.
 SINGAPORE FIELD NUMBER 8901 = 7;
 28992 = 14.
 SINGH, HIRA, 78 = 1.
 SINGH, KARTAR, 52 = 1.
 SINTENIS 230 = 1.
 SRI RAM s. n. = 19.
 STEWART 595 = 1.
 STOCKS s. n. = 8♂, 10.
 STRACHEY & WINTERBOTTOM 1 = 9;
 2 = 1; 4 = 12.

- STUART s. n. = 1.
 SWINHOE s. n. = 9.
 TAKEDA s. n. = 1.
 TALBOT s. n. = 10, 21; 16 = 8; 780 = 19; 1142 = 8; 3573 = 17.
 TENGWALL 523 = 1.
 THOMSON s. n. = 1, 1 β , 8, 10, 17, 18, 19; 1058 = 1.
 THWAITES C. P. 412 = 17, 18; 479 = 8; 481 = 18 \dagger ; 1637 = 8; 1638 = 22; 1639 = 18.
 TSANG WAI-TAK 54 = 13; 91 = 9 \dagger ; 431 = 13; 662 = 13; 18319 = 9 \dagger .
 TSANG FUNG TANG 17593 = 9.
 TSANG & FUNG 18073 = 20.
 TSCHONOSKI s. n. = 1.
 TUTCHER 2208 = 13.
 UTHI DUTT 8101 = 8.
 VICARY s. n. = 8, 17, 19.
 WALKER s. n. = 7, 18.
 WALLICH s. n. = 9, 19; 489 = 13; 490 = 1; 491 = 17, 18; 492 = 19; 494 = 13; 495 = 8; 496 = 8; 497 = 10; 498 = 7; 6875 = 18; 6876 = 11; 6877 = app.; 6878 = 22; 6879 = app.
 WANG, C. T., 541 = 9.
 WANG, Y. K., 520 = 20.
 WALSH 20 = 7.
 WARD, F. KINGDON, 6359 = 8; 8059 = 8.
 WATT 6164 = 9.
 WIGHT s. n. = 8, 17, 22; 45 = 18; 46 = 17; 47 = 18; 48 = 8; 51 = 18; 52 = 10; 53 = 11; 54 = 22; 55 = app.; 56 = app.; 57 = app.; 1219 = 17; 1221 = app.; 1222 = app.; 1223 = 22; 1224 = 22; 1225 = 11; 1226 = app.; 1228 = 8; 1244 = 11; 1246 = 10; 1248 = 8; 1249 = 17; 1250 = 18; 1252 = 22; 1253 = 18.
 WILFORD 286 = 13.
 WILSON, E. H., s. n. = 1; 3262 = 9 \dagger ; 3263 = 9 \dagger ; 4482 = 9 \dagger ; 4483 = 4; 7765 = 1; 7766 = 1; 8583 = 1; 8709 = 1; 9289 = 1; 9576 = 1; 9581 = 1; 9713 = 2; 9834 = 9; 10024 = 9; 10032 = 9; 10109 = 20; 10522 = 1.
 WOOD s. n. = 8, 17, 19.
 WRAY 2023 = 7.
 WRIGHT 181 = 13; 182 = 13.
 YAPP 393 = 7.

Index to the names of *Viscum* species and varieties.

(Accepted names in heavy types, new names indicated by an asterisk).

Viscum

- **Acaciae* 266, 298.
Aitchisoni 268, 272, 277, 278.
album 262, 264—266, 268—276, 278, 279, 287, 313, 314.
 var. coloratum 268, 273, 274.
 var. karensium 268, 272.
 *var. *meridianum* 271, 272, 274.
 var. rubro-aurantiacum 268, 273.
 var. typicum 268.
Alni-formosanae 265, 266, 274—275.
angulatum 263, 266, 268, 280, 281, 283, 285, 289, 292—294.
aphyllum 280.
articulatum 262, 263, 265, 267, 280—286, 288—290, 293, 307, 312.

(*Viscum articulatum*)...

- var. Balansae* 289.
 var. dichotomum 280, 282, 284.
 *var. *flexuosum* 283.
 var. nodosum 291.
attenuatum 283, 287, 288.
Bancrofti 265—267, 311, 312.
benghalense 305.
birmanicum 296.
bongariense 289, 291.
capitellatum 265—267, 302, 308, 309—313.
 var. subaphyllum 310.
coloratum 269, 273, 274.
confertum 305.
cornifolium 313.

(Viscum)

- costatum* 268, 271, 274.
cruciatum 265, 266, 270; 272, 276—
 279, 300.
dichotomum 268, 282, 283, 287, 290.
diospyrosicolum 291—292.
Edgeworthii 305.
elongatum 282, 283, 287—289.
falcatum 305, 307.
Fargesii 265, 266, 272, 275.
filipendulum 291, 292.
flexuosum 280, 282, 283.
floccosum 313.
fragile 280, 282.
geminatum 262.
grossum 313.
Helperi 313.
heteranthum 313, 314.
heyneanum 264, 266, 267, 295, 300,
 301—306.
 *var.*thelocarpum* 267, 305.
incanum 313.
indicum 301.
indosinense 266, 298.
Kaempferi 314.
karensium 268, 272.
latifolium 313, 314.
liquidambaricolum 263, 266, 267, 281,
 285—289—292, 314.
Loranthi 266, 267, 295—296.
Mangiferae 310.
monoicum 266, 267, 282, 296, 300,
 303, 305—307, 314.
 var. Edgeworthii 305, 306.
multinerve 266, 267, 298, 306, 307.
mysorense 263, 265, 266, 279—280.
navicellatum 299.
nepalense 263, 266, 267, 281—283—
 290, 292, 293, 314.

(Viscum nepalense)

- var.*thelocarpum* 286, 289.
**nudum* 265, 267, 275—276.
obtusatum 297.
opuntioides 284, 288.
orbiculatum 264, 265, 302, 304.
orientale 262, 266, 267, 274, 276, 278,
 296, 297, 299—307, 311.
 var. angustum 301.
 var. multinerve 307.
 var. ovalifolium 296.
 var. verruculosum 296.
Osmastonii 295, 296.
ovalifolium 262, 266, 278, 295, 296—
 297, 300.
 platyphyllum 314.
pycnanthum 314.
Querci-Morii 289, 291.
ramosissimum 263, 265, 266, 268,
 292, 294—295.
spathulifolium 314.
stellatum 268, 271.
stenocarpum 289.
stipitatum 307.
subaureum 314.
Thespesiae 301.
torulosum 262.
trilobatum 265—267, 308—310, 312.
umbellatum 310.
verruculosum 264, 265, 296, 299—
 301, 303—305.
verticillatum 299, 301.
verticilliflorum 314.
Wallichianum 314.
Whitei 265—267, 300, 311—312.
Wightianum 314, 315.
Willdenowianum 277, 279.
Wrayi 266, 280, 297.



Plate I. Type of *Viscum Acaciae* DANSER (ROBERTSON 1823) in the Dehra Dun Herbarium. (Photo L. ALKEMA.)

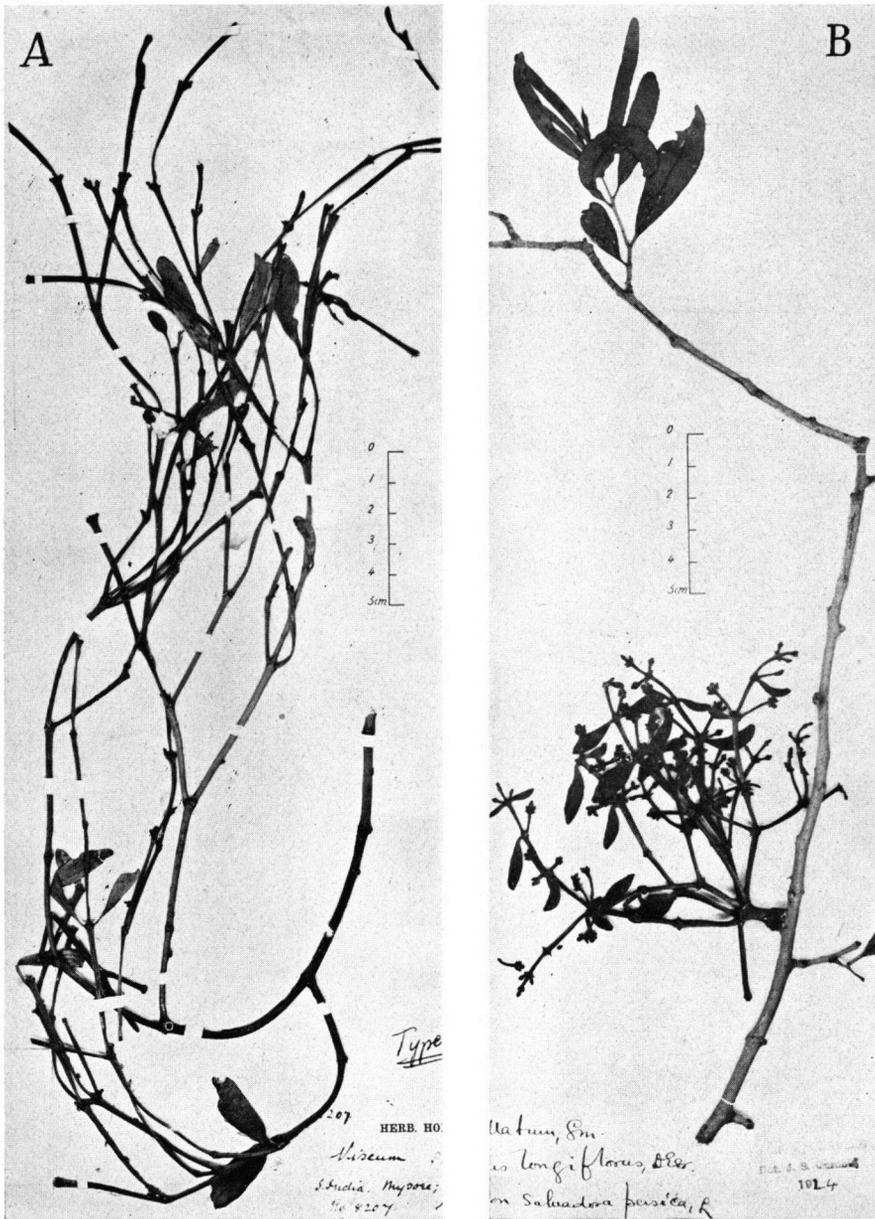


Plate II. A: Type of *Viscum mysorensis* GAMBLE (MEEBOLD 8207) in the Kew Herbarium. B: Rather young, flowering specimen of *Viscum capitellatum* SMITH (BARBER 8552), on *Dendrophthoe falcata*, in the Kew Herbarium (Photo L. ALKEMA.)

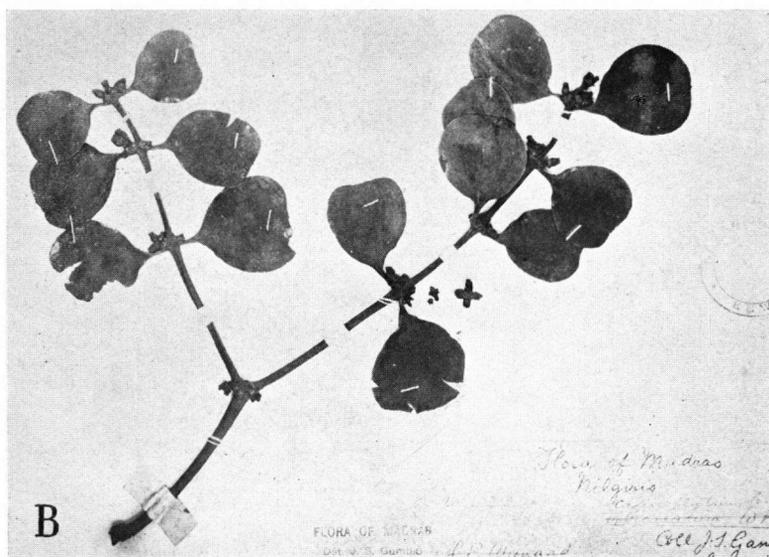
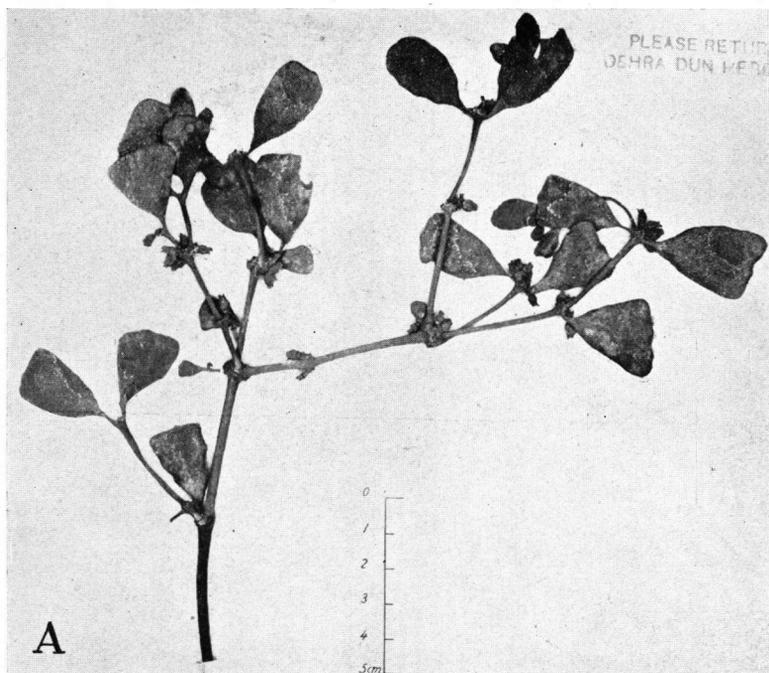


Plate III. A: Type of *Viscum trilobatum* TALBOT (TALBOT s. n.) in the Dehra Dun Herbarium. B: Twig of *Viscum trilobatum* TALBOT with more normal leaf shape (GAMEBLE 15693) in the Kew Herbarium. (Photo L. ALKEMA.)