

NOTES ON THE SOLANACEAE OF BOMBAY.

BY

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The *Solanaceae* of India have been left practically unchanged from the time Clarke published his *Solanaceae* in Hook. f. *Flora of British India* in 1883; the authors of most of the local floras published since that time have confined themselves to copying Clarke's notes and descriptions almost without any alteration. Much work has been and is being done, especially in America, on the more important commercial plants of the Family. I shall try and introduce into these notes the results of my studies in the library and herbarium at Kew Gardens with the hope that they will be of help to other Indian botanists.

The most important changes in the Family concern the splitting of the genus *Solanum* into *Solanum* and *Lycianthes*, the identity of the Indian species of *Datura*, and a few other points in nomenclature. A comprehensive list of references is given at the end of this paper embodying the more important contributions on the Family; papers dealing exclusively with the cytology of the Family or of some of the genera have been purposely omitted.

SOLANUM LINN.

KEY TO THE SPECIES OF SOLANUM OF BOMBAY.

Unarmed plants:

An annual herb; flowers white, in umbellate, pedunculate cymes ... *S. nigrum*.

Shrubs or undershrubs or small trees:

Large shrub or small tree with white flowers in corymbose cymes ... *S. verbascifolium*.

Small shrub with purple flowers in racemose cymes ... *S. pubescens*.

Armed with prickles.

Herbs.

Leaves 15 cm. or more long; berry 2.5-4.5 cm. diam., clothed all over with long hairs ... *S. ferox*.

Leaves under 13 cm. long; berry glabrous, about 2 cm. diam., yellow or creamy or pale green with deep green veins:

Prostrate or procumbent plant, densely stellate hairy at least when young ... *S. xanthocarpum*.

Erect or suberect plant, glabrous or nearly so ... *S. McCannii*.

Shrubs or undershrubs.

Leaves entire, not prickly, 15-25 cm. long, under 6 cm. broad ... *S. giganteum*.

Leaves irregularly toothed or lobed, prickly on the main nerves, over 5 cm. long berry about 8 mm. diam.; erect shrub ... *S. indicum*.

Leaves under 5 cm. long; trailing or subscandent shrub or undershrub ... *S. trilobatum*.

1. *Solanum nigrum* Linn., Sp. Pl., 186, 1753; Dunal, in D. C. Prodr. 60; Clarke, 229; Cooke, 253; Schultz, 160; Gamble, 936; Merrill, 426.

Solanum rubrum Mill., Gard. Diet. (ed. 8), No. 4, 1768; Wight, Icon. t. 244.

Solanum incertum Donal, Hist. Solan., 155; Graham, 137.

At first sight, this plant may be confused with *Lycianthes bigeminata* (Nees) Bitt. (*Solanum bigeminatum* Nees); but the type of inflorescence at once distinguishes these two species: *Solanum nigrum* has white flowers in umbellate, long-peduncled cymes; whilst the other species has purple flowers in lateral fascicles.

2. *Solanum verbascifolium* Linn., Sp. Pl., 194, 1753; Don., 114; Wight, Icon. t. 1298; Clarke, 230; Cooke, 263; Schultz, 182; Gamble, 936; Merrill, 429.

Solanum pubescens Roxb., Fl. Ind., 2: 244, 1824 (non Willd.)

Solanum verbascifolium var. *castipulatum* O. Kuntze, Rev. Gen. Pl. 2: 155, 1891.

A large shrub or small tree, remarkably similar to *Callicarpo lanata* Linn. in general appearance; but it can be easily distinguished by its white flowers.

3. *Solanum pubescens* Willd., Phytogr., 5, 1794; Wight, Icon. t. 1402; Clarke, 230; Cooke, 263; Gamble, 936 (non Roxb.)

In many respects this plant is somewhat similar to *S. verbascifolium* Linn., from which it may be distinguished by its purple flowers in racemose cymes.

4. *Solanum ferox* Linn., Sp. Pl. (ed. 2), 267, 1762; Graham, 139; Wight, Icon. t. 1299; Clarke, 232; Cooke, 265; Gamble, 937; Merrill, 426.

One of the most typically distinct *Solanums* of Bombay; leaves about the largest of the genus in Western India, reaching 35 cm. long and up to 30 cm. broad; stems and branches densely velvety tomentose with erect or spreading tomentum, armed with a few, very fine, sharp yellow prickles, which are irregularly scattered among the tomentum. Most typical of this species however is the densely hairy fruit; this is the only hairy or tomentose fruit for the genus seen at Kew Herb. for the whole of India. It is also one of the largest-fruited wild *Solanums*.

5. *Solanum xanthocarpum* Schrad. & Wendl., Serot. 1: 8, L. 3, 1795; Clarke, 236; Cooke, 265; Gamble, 938.

Solanum Jacquinii Willd., Sp. Pl. 1: 1041, 1798; Roxb., Fl. Ind. 1: 509, 1824; Graham, 139.

Solanum difusum Roxb., loc. cit. p. 508.

About the most densely armed of the Bombay *Solanums*; prostrate or procumbent, or at times suberect, but I have not observed it creeping and rooting at the nodes. Common everywhere in roadsides and waste places. At times it is a somewhat gregarious plant, and when growing in overcrowded conditions, it becomes erect or suberect.

6. *Solanum giganteum* Jacq., Collect. 4: 129, 1790; Graham, 136; Wight, Icon. t. 893; Dalz. & Gibs., 175; Clarke, 238; Cooke, 266; Gamble, 937.

A large shrub, easily distinguished by its leaves which are long and relatively narrow, dark green and glabrous above, white velvety tomentose beneath. Spines or prickles are short, stout, yellowish or orange in colour and hairy at the base. It is found only on the highest hills of the Province of Bombay.

7. *Solanum indicum* Linn., Sp. Pl., 187, 1753 pro max. parte; Graham, 128; Wight, Icon. t. 346; Dalz. & Gibs., 174; Clarke, 234; Cooke, 266; Gamble, 938; Merrill, 426.

Examination of large numbers of sheets from all over India at Kew Herb. has shown that this is one of the most variable of the *Solanums* of India. Dry season plants when compared with others growing under better conditions of moisture are almost unrecognizable as belonging to the same species. Prickles vary from very numerous all over the plant to just a few on the upper and younger parts; the degree of pubescence is also very variable. Probably some good varieties could be made of this species, but in view of the great variability of the plant, I have found it very difficult to set the limits between neighbouring varieties, and in consequence have left the species as it has stood up to the present.

8. *Solanum trilobatum* Linn., Sp. Pl. 138, 1753; Graham, 138; Donal, 257; Wight, Icon. t. 854; Dalz. & Gibs., 175; Clarke, 296; Cooke, 297; Gamble, 698.

Generally a scandent or subscaudant plant; prickles hooked; leaves about the smallest among the Bombay Solanums, often 3-lobed, petioles fairly long and slender.

9. *Solanum McCannii* Santapan sp. nov.

Species haec distincta a suis videtur, proximaeque ad *Solanum zanthocarpum* Schrad. & Wendl. accedit, a quo tamen differt sequentibus notis: habitu erecto vel suberecto, longis internodiis; ramis acutis quadrangularibus, haud atratis; subliguosis, non vero herbaceis; ramis acutis quadrangularibus, haud atratis; scabulis rarioribus, minoribusque; petiolis longioribus; corollis largioribus, calycibus vero minoribus; pedicellis longioribus atque fortioribus; fructibus eiusdem fere vel paulo maioris magnitudinis; pubescentia multo sparsiore. His omnibus notis fit ut nova haec species primo intuitu diversa appareat a ceteris speciebus quae ex occidentalibus partibus Indiae sunt hucusque descriptae.

This is a clearly distinct species approaching *S. zanthocarpum* Schrad. & Wendl., but differing mainly in the following particulars: its erect or suberect habit, with fairly long internodes; stem and branches woody or subwoody, not herbaceous; branches sharply angular and either not at all or only very faintly striate; prickles not so dense as and generally smaller than in *S. zanthocarpum*; petioles longer; corollas larger, calyx smaller; pedicels both in flower and fruit longer and stouter; fruit of about the same size or slightly larger; the whole plant distinctly much less pubescent.

Erect or suberect, up to 40 cm. high, not prostrate nor procumbent, with woody base, woody or subwoody branches and fairly long internodes; young branches with an occasional stellate hair, older ones glabrous or nearly so, all more or less sharply angular, at times almost 4-winged; prickles compressed, straight, yellow or straw coloured from a fairly broad base, erect or spreading, and very sharp, more numerous and large in the upper than in the lower parts of the plant.

Leaves up to 9 x 6 cm., ovate or elliptic in outline, sinuate or subpinnatifid, acute or subacute, very sparsely hairy on both sides with an occasional stellate hair, at length glabrous or nearly so, armed on the midrib and some of the lateral nerves with sharp yellow prickles on both sides; prickles up to 9 mm. long; base of the leaf very unequal-sided, truncate or cuneate; petioles up to 3.5 cm. long, glabrous or nearly so, armed with stouter prickles than the rest of the leaf, and decurrent along the stem.

Flowers in extra-axillary racemose cymes, the axis of the cyme up to 7 cm. long; pedicels in flower up to 10 mm. long, and erect, elongating to 15 mm. and becoming curved and at times reflexed and stouter upwards in fruit; axis of the inflorescence and pedicels prickly. Calyx up to 7 mm. long, tube about a quarter of the length of the whole calyx; lobes acute, deltoid, sparsely stellately hairy in flower, glabrous in fruit, densely prickly outside with prickles of 2-6 mm. in length. Corolla bluish purple, up to 2.7 cm. diam., lobes deltoid, up to 9 mm. long, densely stellately hairy outside, stellately hairy but not so densely inside. Filaments very short, glabrous; anthers bright yellow, glabrous, slightly curved, up to 9 mm. long, opening by small apical pores facing upwards. Ovary and style glabrous; berry at first green, then pale green with deeper green veins, at length yellow, up to 2 cm. diam. Seeds 3 mm. diam., compressed, glabrous.

The type of this plant, Santapan 2972-2973, was collected in Khandals on the 12th October 1943. I wish to dedicate this species to my good friend Charles McCann, Esq., F.L.S., Joint Curator, Bombay Natural History Society, who has very often accompanied me in my excursions through Khandals.

10. *Solanum torvum* Swartz, Prodr., 47, 1788; id. in Flor. 1: 456; Don., Hist. Solance. 303, t. 33; Wight, Icon. t. 345; Dalz. & Gibs., 175; Clarke, 234; Cooke, 269; Gamble, 337; Merrill, 426.

Solanum indicum Linn., Sp. Pl. 137, 1753, pro parte.

Solanum stramonifolium Roxb., Fl. Ind., 1: 572, 1832 (non Jacq.)

Among the many sheets of the species in Kew Herb., there is none from Bombay; Dalz. & Gibs., loc. cit., are the only authorities for the inclusion of this among the plants of Bombay.

11. *Solanum tuberosum* Linn., Sp. Pl. 185, 1753; Graham, 137, Dunal, 31; Dals. & Gibs. Suppl., 60; Clarke, 229; Cooke, 269; Schultz, 248; Gamble, 938; Merrill, 436.

The Potato plant, extensively cultivated in Western India. In some districts the greatest enemies of the potato seem to be the village children who eat the tubers raw and apparently with relish. In Khandala I heard some Katakari children speaking of the 'Sweets' growing freely in the fields; they showed me some of their 'sweets' which proved to be some potato tubers from a neighbouring field.

12. *Solanum melongena* Linn., Sp. Pl. 186, 1753; Nees in Trans. Linn. Soc. 17, 48; Graham, 138; Dals. & Gibs., Suppl., 61; Wettstein in Engler & Prantl, Pflanzenfam. 4, (33): 33, f. 11 N; Cooke, 263; Schultz, 243; Gamble, 937; Merrill, 426.

Solanum esculentum Dunal, Hist. Solanac., 308.

The Brinjal or Egg-Plant, widely cultivated in fields and in flower pots in Western India.

LYCIANTHES (Dunn.) Hassl.

Lycianthes (Dun.) Hassl. in Ann. Cons. Jard. Bot. Geneva 30: 173-183, 1917, sensu ampl. Bitt. in Abhandl. Naturw. Ver. Bremen, 24: 292, 1920. *Solanum* sect. *Pachystemonum*, subs. *Lycianthes* Dun. in DC. Prodr. 13(1): 29, 186, 1852 pro max. parte. *Solanum* sect. *Lycianthes* (Dun.) Wettstein in Engl. Prantl, Pflanzenfam. 4, 3B: 22, 1891.

The following is the translation of the generic characters taken from Bitter, loc. cit.: 'Inflorescences sessile in the axils of the upper leaves (which are falsely geminate), often few-flowered; calyx shortly campanulate, truncate, mostly 10-toothed (lobes unequal alternatively subulate-linear), or rarely 5-toothed, the calyx often being cupulate or entirely destitute of teeth; corolla rotate or stellate; filaments at times almost equal, at other times more or less unequal in length, one or three being longer than the rest, all glabrous; anthers mostly ellipsoid, at times abbreviated, more often fairly long, nearly always opening inwards by apical oblique pores; style glabrous. Shrubs or undershrubs, more rarely herbs creeping and rooting at the nodes or below the nodes; leaves always simple, mostly entire, the higher ones falsely geminate, unequal.'

Bitter based his description on that of Hassler; but whereas the latter only recognized three South American species as belonging to the new genus, Bitter so enlarged it that over 100 species are now contained under *Lycianthes* Hassl. ampl. Bitt.

The type of fruit is the main foundation for the new genus according to Hassler. 'Most of the *Solanum*s possess or do not possess sclerotic nodules, but in no case does one find seeds enveloped in a sclerotic coating. . . . The discovery . . . of fruits with seeds surrounded by a sclerotic pericarpic coating constitutes an extremely interesting finding. . . . The sclerotic coating of the seeds is made up of a very dense shell of scleroides. . . . Under the name of subsect. *Polymeris* Dunal has collected numerous species of the genus *Solanum* (sect. *Pachystemonum*), which have only the inflorescence in common. . . . The subsect. *Polymeris* (Dun) Bitt. . . . contains those species with a 10- or more-lobed calyx; the section *Polymeris* shows also in its floral structure the greatest affinity with the small group of our three species which Dunal has placed under *Eulycianthes*. . . . The *Eulycianthes* Dun. are the only species of *Solanum* known up to the present to be provided with a drupaceous fruit, and on account of this character, clearly differentiated from the neighbouring species of the sect. *Polymeris* (Dun.) Bitt. Among the latter the fruit is that of a typical *Solanum*, that is to say, a berry.' (Hassler, loc. cit. p. 174-180). The basis then of the new genus according to Hassler is the character of the ovary and fruit, 'ovario 8-oculato, fructu pyriformi'.

Bitter, on the other hand, seems to pay so little attention to the fruit, that in his generic description he does not even mention it. More emphasis is placed on the nature of the apical pores of the anthers, and on the 10-toothed calyx. The genus thus enlarged by Bitter contains a great variety of types, shrubs, undershrubs, and even creepers, most of them with simple, entire leaves which at times appear fasciculate or subfasciculate on account of the suppression or abortion of the leaf-bearing branches. In the following list of

species of *Lycianthes* (Dun) Hassl., sens. ampl. Bitter, I depart somewhat of the original scope of my paper and shall include all the Indian species of *Lycianthes* mentioned by Bitter in his monograph; it is my hope in this manner to do a service to other Indian botanists who have not had access to Bitter's original paper.

1. *Lycianthes bigeminata* (Nees) Bitter, loc. cit. p. 450.

Solanum bigeminatum Nees, in Trans. Linn. Soc. 17: 43, 1837; Dunal, 175; Clarke, 231; Cooke, 264.

Solanum Neesianum Dalz. & Gibs., 175; 1861 (non Wall.)

Solanum laevis Clarke, 231; Gamble, 992 (non Dun.)

For the differences between this species and *Solanum nigrum* Linn. see above under the latter species. The position of the pores on the anthers is quite clear in all the specimens examined in Kew Herb. For the rest, in the dry state it is not easy to determine plants belonging to this species; it may be even difficult at first sight to say whether they belong to the *Solanaceae*, as they have very little which is typical except the anthers and the fruit, and either of these structures or both may be absent from the specimens.

2. *Lycianthes bigeminata* subsp. *Kaistis* (Dun.) Bitt. loc. cit. p. 481.

Solanum Kaistis Dun. in DC. Prodr., 13(1): 157, 1852.

Solanum denticulatum C. B. Clarke, 231; Cooke, 264 (non Blume).

3. *Lycianthes lysimachoides* (Wall.) Bitt., 491.

Solanum lysimachoides Wall. Cat. 2609; Wall. in Roxb. Fl. Ind. 2: 237 (excl. syn. *S. biflorum* Lour.)

4. *Lycianthes biflora* (Lour.) Bitt., p. 461.

Solanum biflorum Lour. Fl. Cochinch. 1: 129, 1790, 159, 1793; Dun., Hist. Solanac. 177; Dun. in DC. Prodr., 13(1): 178, 1852; Clarke, 232; Bitt. in Engl. Bot. Jahrb. 55: 99, 1917.

Solanum decandentatum Roxb., Hort. Beng., 16, 1814; Fl. Ind., 2: 247, 1824; Dun. in DC. Prodr., 13 (1): 179, 1852;

Solanum decandentum Nees, in Trans. Linn. Soc. 17: 43, 1837.

5. *Lycianthes macrodon* (Wall.) Bitt., 468.

Solanum macrodon Wall. Cat. 2621, 1828; Nees, loc. cit., 43; Dun., 180; Clarke, 232 ex parte (excl. var. *lysimachoides*).

6. *Lycianthes pachypetala* (Spreng.) Bitt., 475.

Solanum crassipetalum Spreng., Syst. 4(2): App. 72, 1827.
Solanum crassipetalum Wall. Cat. 2618, 1828; Wall. in Roxb., Fl. Ind., 2: 256, 1824; Clarke, 232; Nees, loc. cit. 42.

Lycianthes denticulata (Blume) Bitt., and *L. laevis* (Dun.) Bitt. do not occur in India. The following key will help to distinguish *Lycianthes* from *Solanum* and other allied genera:

Anthers allipsoid; pores apical, but facing inwards and often oblique; calyx 10-rarely 5-partite, not seldom truncate without lobes

... *Lycianthes*.

Anthers elongated; apical pores facing upwards or outwards; calyx 5-teeth 5

... *Solanum* & al.

PHYSALIS Linn.

The following key has been adapted from Gamble, *Flora of Madras*, p. 939.

Corolla 13 mm. diam. or more, with 5 purple spots near the base within; calyx more than 2.5 cms.

long, ovoid-cylindrical; leaves ovate, sinuate or angular, usually entire, pubescent, up to 7.5 cm.

long, 5 cm. broad; berry orange-yellow

... *P. peruviana*.

Corolla under 7 mm. diam., sometimes spotted; calyx under 2.5 cm. long, ovoid or subglobose;

leaves ovate, acute, sinuate or toothed, pubescent or nearly glabrous, up to 6.5 cm. long, 4 cm.

broad, berry small, yellow

... *P. minima*.

1. *Physalis minima* Linn., Sp. Pl., 163, 1753; Graham, 140; Clarke, 238; Cooke, 270; Merrill, 423.

Physalis parviflora R.Br., Prodr., 447, 1810.

Physalis pubescens Wight, Illustr. t. 183-b, fig. 6 (non Linn.).

There are two extreme forms of this plant: one is glabrous or nearly so, the other fairly densely pubescent. Specifically it is impossible to separate the two forms, so the grounds of pubescence, as they are connected by a number of intermediate stages. The same may be said of the sizes of the fruit and of the plant itself.

2. *Physalis peruviana* Linn., Sp. Pl. (ed. 2) 1670, 1768; Graham, 140; Dunal, 140; Dalz. & Gibb., Suppl., 61; Clarke, 238; Cooke, 270; Scholitz, 149; Merrill, 423.

Physalis edulis Sims., Bot. Mag. t. 1968, 1807.

Physalis pubescens R. Br., Prodr. 1: 447, 1810 (non Linn.).

In herbarium specimens this is very similar to the preceding species. The size of the fruit, however, is sufficient to distinguish the two species. *P. peruviana* has a fruit which together with the persistent, accrescent calyx reaches 4 cm. or more in length, whilst *P. minima* has a fruit scarcely reaching 2.5 cm. long; when observed in nature, there is no difficulty in distinguishing these two species, as *P. peruviana* is a fairly large shrub reaching 2 metres in height. *P. minima* is but a herb scarcely reaching and seldom passing 75 cm. in height.

WITHANIA Dunc.

Withania somnifera (Linn.) Dunal in DC. Prodr. 18(1): 453, 1852; Clarke 239; Cooke, 271.

Physalis somnifera Linn., Sp. Pl. 162, 1753; Graham, 139; Dalz. & Gibb., 175; Wight, Icon. t. 8553.

A typical xenophyte of dry situations; rare in the Province except in Gujerat and in the drier parts of the Deccan. A fine greenish white bloom covers the whole plant; for the rest in general appearance it is somewhat like *Physalis minima*, but flowers and fruits are much more numerous at the nodes and smaller than in *Physalis minima*.

DATURA Linn.

The nomenclature and identity of some of the *Daturas* of India have been fully discussed lately by Safford, whose main contributions on the subject have been listed in the bibliography at the end of this paper. It is a little surprising that authors of Indian floras published after Safford's papers on the *Daturas* seem to have taken no notice at all of his changes in nomenclature; Merrill on the other hand, in his Enum. Phil. Fl. Fl., vol. 3, p. 430 accepts Safford's changes; from the synonymy given by Merrill, there is no doubt that he is dealing with a plant identical with our Indian so-called *D. fastuosa*.

1. *Datura Metel* Linn., Sp. Pl. 179, 1753; Fleming in Asiatic Res., 11: 165, 1812 (Lond. edit.); Roxb. Fl. Ind. 1: 561, n. 2, 1832; Safford, in Journ. Wash. Acad. Sci. 11 (8): 178-179, 1921; id. in Journ. Hered. 12: 178-190, figs. 10 & 12 (1-2), 1921; id. in Ann. Rep. Smith. Instit. 1920, 541-548, figs. 1-8, 5, Pl. 1, 1922; Merrill, 430.

Datura fastuosa Linn., Syst. Nat. (ed. 10) 2: 932, 1759; Graham, 141; Wight, Icon. t. 1396; Clarke, 242; Cooke 273; Gamble et al. ann. al. auct. recent. Ind. passim.

Datura alba Nees in Trans. Linn. Soc. 17: 78, 1837; Dunal in DC. Prodr., 13 (1): 541-544, 1852; Wight, Icon. t. 852; Graham, Cat., 141; Dalz. & Gibb., 174.

Datura fastuosa var. *alba* (Nees) Clarke, 242; Cooke et al. recent.

Datura alba Roxb., Herb. Amb. 5: 242, tab. 87, 1763.

Flemming and Roxburgh, loc. cit., identify the *Datura* of India as the *Datura Metel* Linn. Hardwicke in Asiatic Res., 6: 251 enumerated *Datura Stramonium* among the plants found at Brinagar, but later he corrected his identification to *D. Metel*, as stated by Fleming, loc. cit. From the time of Nees the true *Datura Metel* Linn. seems to have mysteriously disappeared

from India. Without exception, all the local names consulted give *Datura Metel* Linn. as the name of an American plant, and call the Indian species by one of these names: *D. fastuosa*, *D. alba* or *D. fastuosa* var. *alba*. The following extracts are from Safford's 'Daturas of the Old World and New . . .' in Ann. Rep. Smith. Instit., 1920, pp. 537-567, 1922:

'*Confusion of Specific Names*.—It seems strange that botanists should have abandoned the valid name *Datura Metel* for the Asiatic species, substituting for it *Datura fastuosa*, which was first published as a specific name in the second edition of *Species Plantarum*, and transferring the name *Datura Metel* to an American plant specifically distinct from the true *Datura Metel* of Linnaeus.

Under the brief description in *Hortus Cliffortianus* . . . the first two references lead to the identification of the *Stramonium* or *Pomum spinosum* described and figured by Bauhin, with the *Stramonium* of Fuchsius (1542) in the form and surface of the fruit, which bears very short and thick spines not subulate or needle-like prickles; indeed, his second illustration . . . is a reduced copy of Fuchsius's. It was not until after publication of the *Hortus Cliffortianus* (1737) that Rumphius published his *Herbarium Ambonense* containing the plate (fig. 3 in Safford's paper). . . Linnaeus is careful to cite this plate, both in the tenth edition of his *Systema* and the second edition of his *Species Plantarum*, as an illustration of his *Datura metel*. In the former work he publishes *D. fastuosa* as the name of the second figure on the plate, not as a numbered species, but as a variety B; in the latter work he gives it specific rank, making it differ from the typical *D. metel* in having tuberculate instead of prickly pericarps. Fortunately the figures themselves show that these differences are nominal, and one has only to examine the fruits of the various forms of this East Indian *Datura* to be convinced of the variability of their tubercles or prickles . . . That the white and purple forms of the single or double flowered plants should all be referred to one species by Linnaeus, is justified by the best modern authorities on East Indian botany; but that the name *D. fastuosa* should be adopted for the species and the previously established type (*D. metel*) reduced to a synonym, as in Trimen's *Handbook of the Flora of Ceylon*, is inexcusable. Still more surprising is the treatment of this species by Nees von Esenbeck, who re-baptized the species *D. alba*, citing as its type the very plate of Rumphius which Linnaeus cites as the typical forms of his *Datura metel*; while C. B. Clarke in Hooker's *Flora of British India*, not only ignores Linnaeus's reference above mentioned in connection with *Datura metel* but transfers this specific name from the Asiatic metel-nut to a plant of American origin and cites as an illustration of the species not the figures of Fuchsius, Bauhin, or Rumphius, which fix Linnaeus's species, but an illustration in Curtis's *Botanical Magazine* . . . of a plant grown in London from seed of American origin, clearly identical with Miller's *Datura innoxia*, which will be described below . . .

Botanical Description of the Asiatic Datura Metel. *Datura metel* L. is a spreading plant with dichotomous branches, usually herbaceous but sometimes becoming shrubby with the base of the stem and the lower branches woody, and the root, which penetrates deeply into the soil, bearing several large branches of similar size. The entire plant is apparently glabrous and has the appearance of being covered with fine grayish dust or flour. The terete glossy stems and older branches are marked with the scars of fallen leaves. The leaves are triangular-ovate in general outline and unequal-sided at the base, especially those of the upper branches acute at the apex, and with the margins usually angulate but sometimes entire. The flowers . . . are large and funnel-shaped, often double or triple, one corolla issuing from another; in the type form pure white, but sometimes of a dirty whitish colour, violaceous, reddish-purple or purple on the outside and white within. The tubular calyx, as seen under the lens, is minutely appressed-pubescent, with five triangular, acuminate, marginal teeth, and is usually one third as long as the corolla. The corolla limb when fully expanded is almost circular, normally with 5 equidistant radiating nerves terminating at the margin in a short acute tail, but often 8-toothed, and in the inner Corollas of double flowers from 5 to 10-toothed. The tubercled or mucicose globose fruit . . . is borne on a short thick peduncle which is never erect as in *D. stramonium* . . . but curved to one side, so that the fruit is at length more or less inclined or nodding. The persistent expanded base of the calyx is either reflexed or appressed to the pericarp, which

is not valvate, as in *D. stramonium*, but cracks open irregularly, revealing a mass of closely packed, light brown, flat seeds which nearly fill the interior.

Type locality.—As to the mother country of *Datura metel* Linnaeus states in the first edition of his *Species Plantarum* (p. 179, 1763) "Habitat in Asia, Africa". In *Hortus Cliffortianns*, under his description of the plant which formed the basis of the species he is more definite: "Crescit in Oriente, in Malabar, Aegypto, etc."; while in the second edition of *Species Plantarum*, when he identifies his plant with Rumphius's *Dutra alba*, he extends its range to the Island of Amboyna. Nowhere does he mention its occurrence in the Canary Islands, as cited by Nees von Esenbeck, but it is very probable that "Canara" (the district of Kanara, W. India) mentioned by Rumphius as one of the localities of its occurrence, was mistaken for the Canary Islands by Willdarnow, who in the fourth edition of *Species Plantarum* (p. 1009, 1797) adds this locality to Asia and Africa; and it is this edition of *Species Plantarum* and not the first (where the species was originally established) that Nees cites, when he rechristens the species and improperly transfers its valid name to another.

2. *Datura innoxia* Mill., Gard. Dict. (ed. 8) n. 5, 1768; Safford in Journ. Wash. Acad. Sci. 11 (8): 179-180, f. 1 C; id. in Journ. Hered. 12: fig. 12 (3-4); id. in Ann. Rep. Smith. Instit. 1920: 649-650, fig. 3 (2), 4, 5, Pl. 2, 1922.

Datura metel Sims in Curtis, Bot. Mag. t. 1440, 1812; Dun. 543; Clarke, 243; Cooke, 273, et al. recent. auct. Ind. (non Linn.)

This is the plant mentioned in modern Indian floras under the name of *Datura metel*, but it is obvious from the extracts of Safford quoted above that this plant has been wrongly named. It is this plant that Dupal in De Candolle's *Prodromus* called *Datura metel*, in spite of the fact that its stem, according to his own description, is densely pubescent or hairy its leaves on both sides densely pubescent, and its calyx sparsely so; features which separate it at once from the true Asiatic *Datura metel* L. . . . (Safford, in Ann. Rep. Smith. Instit., loc. cit. p. 550). This pubescent or hairy plant of American origin is the one I have found to be very abundant in Khandala and other parts of the Province, but always in places near the roads or railway lines. The long spines and pubescence of the fruit are typical of this plant.

3. *Datura arborea* Linn., Sp. Pl. 179, 1763; Cooke, 274; Safford in Journ. Wash. Acad. Sci., 183, f. 1 G; id. in Ann. Rep. Smith. Instit. Pl. 8-9.

A cultivated South American plant, often seen in gardens in various parts of India. According to Cooke, it is very abundant at Mahabaleshwar where it has been planted as a road-side tree.

The following is a key to the Bombay, wild or cultivated, *Daturas*:

Herbs or undershrubs:

Glabrous or subglabrous plants; fruit tuberculate or armed with short spines; Corolla single, normally 5-toothed . . . *D. metel*.
Corolla double or triple, outer 5-toothed, inner ones 6-10-toothed . . . *D. metel* var. *fauciosa*.

Pubescent plants; corolla single, 16-toothed; fruit armed with long, weak spines . . . *D. innoxia*.

Large shrubs or small trees with very large white flowers and unarmed fruits . . . *D. arborea*.

LYCOPERSICON Mill.

The generic name *Lycopersicon* was first validly published by Miller (Gard. Dict. Abr. ed. 1754) in 1754. In the same year, as well as the preceding, Linnaeus treated the tomato species as a *Solanum* species, a concept in which he was followed subsequently by Miller (Gard. Dict., Posth. Edit., 1807) and others When the genus was finally recognized generally as being distinct from *Solanum*, Miller's name was used to designate it, but Hill's erroneous spelling (Veg. Syst. 9: 32, 1765), *Lycopersicum*, was adopted, and it was not until Druce (Rep. Bot. Exch. Cl. Brit. Isl. 1913: 433, 1914) in 1914

pointed out the error, that Miller's original name was taken up again . . .
 Muller, Rev. Gen. Lycop. 2, 1949.

Lycopersicon esculentum Mill., Gard. Dict. (ed. 8) n. 2, 1758; Graham,
 150, Clarke, 397; Schults, 249; Cooke, 275; Gamble, 941; Merrill, 429;
 Muller, loc. cit. in U.S. Dept. Agric. Misc. Public. 382: 10, Pl. 2 A-F,
 3 A-G, K, 1949; Luckwill, Gen. Lycop., 20, 1943.

Solanum lycopersicum Linn., Sp. Pl. 185; Bonati in Lecomte, Fl.
 Gen. Indoch., 4: 318, 1915.

Lycopersicon pomum amoris Meenab. 515, 1791.

Lycopersicon lycopersicon Brit. & Brown, Ill. Flor. 9: 168, 1913.

The Love-Apple or Tomato is extensively cultivated in Bombay. Graham loc. cit. remarks: . . . also called the Wolf Peach; an allusion to its very beautiful appearance, but worthless qualities as a fruit . . . From various sources I have heard many complaints against this plant. In Khandala, on the Western Ghats, it grows luxuriantly and produces plenty of flowers but scarcely any fruit, unless fertilisation is effected by some artificial means. In Bombay it produces fruit in abundance, but the seeds are useless for the following season; this may be the reason why this plant is not more extensively cultivated in Western India, some gardeners assuring me that they have to import seeds from Europe every time they wish to grow tomatoes in their gardens.

NICANDRA Adams

Nicaendra physaloides (Linn.) Gaertn., Fract. 2: 237, t. 141, f. 2, 1791;
 Clarke, 210; Graham, 140; Dun. 434; Dalz. & Gibs., Suppl., 62; Bot. Mag.
 1, 2458; Wettstein in Engl. & Prantl, Pflanzenfam. 4, (3B): 7, f. 4A; 11, f.
 5 A-F; Cooke, 275.

Atripe physaloides Linn., Sp. Pl. 181, 1753.

A tall, shrubby annual, cultivated in gardens and run wild in some parts of the Province. On Parandhar Hill this is one of the commonest plants. It is an annual growing to a height of 1.5 m., with fairly thick stems and branches. In the post-monsoon period, when there is plenty of moisture in the ground, this plant has a fine appearance with plenty of large leaves and flowers; but after the shedding of the leaves, when the fruits are the only thing left on the otherwise bare branches, the plant looks rank and wild and not attractive; the fruits remain on the plant till the beginning of the rainy season.

With regard to the distribution of the plant in India, in addition to the plants seen growing wild in Khandala and Parandhar (both places in Poona Dist.), I have examined specimens from the following parts of the country in Kew Herb.: a. *Himalayan and subhimalayan* region: Treutler 56, Sikkim; Clarke 28944, Darjeeling; Gamble 2386, Sikkim; b. *Sindia*, Punjab, etc.: Gamble 2774A; Drummond 25599, 25900; Collett, 589; c. *Assam*: Bar 6368, Kohima; d. *Palneys, Nishperries*: Hohenack, 1073; Wight, 2038; Sautière 341; Bezme 2811, 297, 3505; e. *Western India*: Ritchie 515, Belgaum. It is, therefore, correct to say that *Nicaendra* in cultivation or as an escape is found on a number of the higher hill stations of the country.

NICOTIANA Linn.

Nicotiana Tabacum Linn., Sp. Pl. 180, 1753; Clarke, 245; Graham, 140;
 Dun., 557; Dalz. & Gibs., Suppl., 62; Wettstein in Engl. & Prantl, Pflanzenfam.
 4, (3B): 83, f. 13 D-J; Comes, Mon. Gen. Nic. 7, 1899; Cooke, 276; Gamble,
 941; Merrill, 430.

Cultivated extensively in Gujerat and in some parts of the Deccan and occasionally, though rarely, run wild. The quality of the tobacco produced seems to be rather rough, and on this account not suitable for the better type of cigarettes; to some extent, this is said to be due to the quality of the soil on which *Nicotiana* is grown. Lately I have learnt of the very encouraging results obtained from the cultivation of the finer types of tobacco in and around Baroda. In some districts, especially Gujerat and Baroda, much harm is done to *Nicotiana* by a parasite (one of the *Orobanchae*) which grows attached to the roots of the tobacco plant.

PETUNIA Juss.

Petunia sp. (probably *P. nectaniflora* Juss. in Ann. Mus. Par. 2: 316, t. 47, f. 2, 1803) is widely cultivated as a border plant in gardens in Bombay and elsewhere. The bright colours and large size of the flowers and the ease of cultivation render this plant a very suitable one for the purpose. I have not seen it running wild.

CAPSICUM Linn.

Capsicum annum Linn., var. *acuminata* Fingerh., Mon. Gen. Caps. 13, t. 2, l. c. 1832; Irish, in Rep. Miss. Bot. Gard. 9: 69, t. 10, 1895; Cooke, 276. *C. frutescens* Roxb., Fl. Ind. 1: 574, 1832; Graham, 139; Dals. & Gibs., Suppl. 61; Clarke, 239 (non Linn.)

The common *Chilli*, *Mirchi* or *Lal Mirchi*, extensively cultivated in Western India. I have seen it growing in fields and in flower beds in and around Bombay. It is widely used in chutneys when green, or in curries when ripe. On several occasions I have noticed children in Khandala eating the ripe fruit raw.

As for the other species and varieties of *Capsicum* mentioned by Cooke, I have not seen them cultivated or wild in Western India; they seem, at any rate, to be much less common than the ordinary, popular Chilli.

REFERENCES.

- Ritter, G., 'Die papuanischen Arten von Solanum', Engler Bot. Jahrb., 55: 59-113, 1917.
- Ritter, G., 'Die Gattung Lycianthes. Vorarbeiten zu einer Gesamtschrift von Georg Ritter', Abhandl. Naturw. Ver. Bremen, 21(2): 292-520, 1920.
- Bonati, G., 'Solanaceae', Lecomte, Fl. Gen. Indoch., 4, 315-336, 1915; 337-341, 1927.
- Britten, N. & A. Brown, An illustrated Flora of the Northern United States, Canada, and the British Possessions . . . Solanaceae, vol. 3, ed. 2, 154-171, 1913.
- Brown, E., Prodrum Florae Novae Hollandiae et Insulae van Diemens. 1810.
- Clarke, C. B., 'Solanaceae', Hook. l. Fl. Brit. Ind., 4: 225-246, 1850.
- Comes, O., Monographie du Genre Nicotiana comprenant le Classement botanique des Tabacs industriels. 1899.
- Cook, Th., The Flora of the Presidency of Bombay, Solanaceae, 2: 261-278, 1905.
- Dalziel, N. A. & A. Gibson, The Bombay Flora, or Short Descriptions of all the indigenous Plants hitherto discovered in or near the Bombay Presidency; together with a Supplement of Introduced and Naturalized Species. 1861.
- Dunal, M. F. J., Histoire naturelle, médicale, et économique des Solanum, —1813.
2. Solanorum generumque affinium Synopsis, 1816.
3. Solanaceae, in DC. Prodr. 13(1): 1-690, 1852.
- Fingerhuth, A., Monographia Generis Capsici Auctore A. Fingerhuth. Cum tabulis X coloratis. 1852.
- Fleming, J., 'A Catalogue of Indian Medicinal Plants and Drugs, with their names in the Hindustani and Sanscrit Languages', Anal. Research, 11: 153-196, 1810.
- Gamble, J. B., The Flora of the Presidency of Madras, Solanaceae, in Pt. v, 331-342, 1923.
- Gaertner, J., De Fructibus et Seminibus Plantarum . . . 1788-1791.
- Graham, J., A Catalogue of the Plants growing in Bombay and its vicinity . . . 1830.
- Hassler, E., Solanaceae Austro-Americanae imprimis Paraguarienses auctore E. Hassler, Ann. Cons. Jard. Bot. Geneve, 20: 173-189, 1917.
- Irish, H. C., 'A Revision of the Genus Capsicum with especial reference to garden varieties', Rep. Missouri Bot. Gard. 9: 53-110, pl. 8-28, 1898.
- Jacquin, N. J., Collectanea ad Botanicam . . . spectantia cum figuris. 1764-1771.

- Jussieu, A. L., 'Sur Le *Petunia*, genre nouveau de la famille des plantes solanées' *Ann. Mus. Hist. Nat. Paris*, 2: 214-216, 1803.
- Kuntze, O., *Revisio Generum Plantarum* . . . 1851-1858.
- Linnaeus, C., 1. *Species Plantarum* . . . Ed. 1, 1753; ed. 2, 1762-1763; ed. 4 (Willdenow's), 1797-1810.
2. *Systema Naturae* . . . Ed. 10, 1758-1759.
- Luckwill, L. C., *The Genus *Lycopersicon*. An Historical, Biological, and Taxonomic Survey of the Wild and Cultivated Tomatoes*. Abord. Univ. Stud. No. 130, 1943.
- Loureiro, J., *Flora Cochinchinensis* . . . 1790.
- Merrill, E. D., *An Enumeration of the Philippine Flowering Plants. Solanaceae in 3*: 423-450, 1923.
- Miller, P., *The Gardener's Dictionary* . . . Ed. 8, 1768; ed. 10, 1807; Abridg. 4 ed. 1754.
- Moench, C. *Methodus Plantarum Horti Botanici et Agri Marburgensis a staminum situ describendi, auctore Conrad Moench*. 1794.
- Muller, C. H., *A Revision of the Genus *Lycopersicon**. U.S. Dept. Agric. Misc. Publ. 383, 1940.
- Nees von Esenbeck, C. G., *Monograph of the East Indian Solanaceae*. In *Trans. Linn. Soc.* 17: 87-82, 1837.
- Roxburgh, W., 1. *Hortus Bengalenis* . . . 1814.
2. *Flora Indica* . . . by the late William Roxburgh . . . Edited by William Carey, D.D. To which are added descriptions of plants more recently discovered by Nathaniel Wallich . . . 1820-1824.
3. *Flora Indica, or Descriptions of Indian Plants by the late William Roxburgh, M.D.* . . . 1832.
- Rumphius, G. E., *Georgii Everhardi Rumphii* . . . *Herbarium Amboinense* . . . *Nunc primo in lucem editum* . . . cura et studio Joannis Burmanni . . . 1750.
- Safford, W. E., 1. 'Synopsis of the Genus *Datura*', *Journ. Wash. Acad. Sci.*, 11(8): 173-180, f. 1-3, 1921.
2. *Datura*—an investing genus for the study of Heredity. In *Journ. Hered.* 12: 178-190, figs. 10-16, 1921.
3. *Daturas of the Old World and New: an Account of their Narcotic Properties and their Use in Oracular and Initiatory Ceremonies*. *Ann. Rep. Smith. Instn.* 1920: 537-567, figs. 1-13, Pl. 1-13, 1922.
- Schultz, O. E., 'Solanacearum Genera Nonnulla', *Symb. Antil.* 6: 140-279, 1909.
- Sprengel, C., *Caroli Linnæi* . . . *Systema Vegetabilium, editio decima sexta* . . . 1825-1828.
- Wettstein, R. V., *Solanaceae*, in Engler & Prantl, *Die Natürlichen Pflanzenfamilien* . . . 4, (5b): 4-58, 1896.
- Willdenow, K. L., 1. *Phytographia, seu Descriptio Roriorum minus Cognitarum Plantarum*. 1794.
2. *Caroli a Linnæi Species Plantarum* . . . *Editio quarta* . . . curante Carolo Ludovico Willdenow, 1798-1810.