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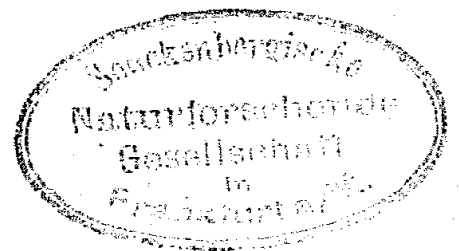
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"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society of Calcutta. It will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease." SIR WM. JONES.

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II.—*Descriptions of some new species of Orchideæ from North-West and Central India.*—By J. F. DUTHIE, B.A., F.L.S., *Director, Botanical Department, North India.*

[Received 25th November, 1901. Read 4th December, 1901.]

Since the publication in 1898 of the four volumes on the Sikkim orchids by Sir George King and Mr. R. Pantling, I have been engaged during my spare time in the preparation of a similar work on the orchids of North-West and Central India. As, owing to more pressing work, there may be some delay in its completion, I have decided to publish at once the descriptions of some new species, which have been discovered within the period during which I have been able to make a special study of the subject.

For the greater portion of the material, on which the following descriptions are based I am indebted to my friend, Mr. P. W. Mackinnon, who for many years has taken a keen interest in the botany, and especially the orchids, of the Mussoorie district. Also, by his having carefully trained some intelligent hillmen in his service to work as collectors, some very interesting results have been obtained. I wish to express also my appreciation of Sir William Thiselton-Dyer's kindness in allowing me to consult Mr. R. A. Rolfe, the eminent orchidologist at the Royal Herbarium at Kew, from whom I have received great assistance.

1. *MICROSTYLIS MACKINNONI* Duthie, n. sp.

Whole plant 1-1.7 dm. high. Stem 3-4 cm., swollen below and rising from the base of the previous year's pseudo-bulb; lower portion enclosed within the leaf-sheaths. *Leaves* 2 or 3, horizontal, unequal in size, the larger one about 6 cm. long and 4 cm. broad, ovate, obtuse, 3-7-nerved, cordate and amplexicaul at the base, fleshy; upper surface dark brownish-green; main nerves 3-7, prominent beneath and purple-coloured, the interspaces raised above, and giving the whole leaf a bullate appearance. *Scape* reddish-purple, sharply 4-angular. *Raceme* shorter than the scape; *bracts* subulate, persistent, reflexed, longer than the ovary. *Flowers* sessile, very small, reddish-purple, resupinate. *Dorsal sepal* ovate-lanceolate, subacute; *lateral* shorter, subfalcate, edges of all reflexed. *Petals* linear, shorter than the sepals, much reflexed. Basal and apical portions of *lip* divided by a raised rim, basal lobes falcately ovate-lanceolate, contiguous, or overlapping at the tips; apical portion of lip deeply bifid and protruded, deep crimson-purple. *Column* with fleshy rounded arms. *Anther* with a truncate or emarginate lip. *Ovary* clavate, curved, not twisted.

*Western Himālaya*, near Mussoorie, on the southern face of the Park Hill, up to 6,000 feet, *P. W. Mackinnon*; also on the Kalanga Hill in Dehra Dun, 2-3,000 feet, *Mackinnon's collector*.

Although most nearly related to *M. Wallichii*, the very different leaves at once distinguish this plant from any of the many forms of that species. It has also much smaller flowers and a very differently shaped lip.

### 2. OREORCHIS ROLFEI Duthie, n. sp.

*Pseudo-bulb* globose. *Leaves* two or three, about 2 dm. long by 1 to 1.5 cm. broad, deflexed at the tips. 3-5-nerved, plicate. *Scape* about as long as the leaves, rising from near the top of the pseudo-bulb. *Peduncle* firm, with 3 or 4 close-fitting tubular sheaths. *Raceme* many-flowered, about 6.7 cm. long. *Flowers* sessile, rather crowded, about 1.4 cm. across. *Floral bract* minute, less than half the length of the ovary. *Sepals* about equal, 1.4 cm. long, lanceolate, subacute, pale yellowish-green, slightly spreading. *Petals* as long as the sepals, but narrower, oblanceolate, subacute, pure white with a few purple blotches. *Lip* obovate-oblong (when spread out), narrowed at the base into a short sac-like claw, side-lobes linear, fleshy, white, half the length of the mid-lobe; mid-lobe deflexed, white, and like the petals blotched with purple, apex with a shallow sinus, base of disc with a prominent fleshy oval channelled callus. *Column* curved, dilated at the base, concave in front. *Pollinia* globular, united to a short thick conical caudicle.

*Western Himālaya*, on Nág Tibā in Tehri-Garhwal, at an elevation of about 8,000 feet. *Mackinnon's collector*. Flowers in June.

This species is most nearly allied to *O. micrantha*, but the spike is shorter and the flowers are more crowded; it differs also by having a saccate base to the lip, and both the lip and petals are pure white spotted with purple. The callus at the base of the lip is oval and not linear. I have much pleasure in naming this orchid after Mr. R. A. Rolfe, of the Royal Herbarium at Kew.

### 3. CIRRHOPETALUM HOOKERI Duthie, n. sp.

*Cæspitose*. *Pseudo-bulbs* crowded, ovoid or nearly round, 1.5-1.7 cm. long. *Leaves* solitary on each pseudo-bulb, 3-4 cm. long and 1-1.2 cm. broad, linear-lanceolate or falcately so, tapering to the base, hardly petioled, notched at the obliquely obtuse or acute apex, coriaceous, dark green above, paler beneath, margin narrowly hyaline. *Scape* equalling or exceeding the leaves, issuing from near the base of the pseudo-bulb, lower portion enclosed within sheaths. *Flowers* 3-4, umbellate. *Floral bracts* 5 m. long, lanceolate, acuminate, membranous, shorter than the long-stalked ovary, margins incurved. *Dorsal sepal* 5 m. long, quite

free at its base from the lateral pair, ovate, emarginate, concave and embracing the column, pale yellow with three broad reddish-purple veins; *lateral sepals* 2.1 m., cohering at their base and adnate to the foot of the column, twisted and constricted above their auricled base, linear-lanceolate and with acuminate cucullate tips, yellow with three to four bright red veins, which become indistinct upwards. *Petals* a little shorter than the dorsal sepal, broadly and obliquely ovate, rounded at the apex, yellow tinged with reddish-purple at the base. *Lip* deflexed from about the middle, oblong, with the margins incurved and forming a deep furrow on the upper surface, very thick and fleshy, yellow with reddish-purple blotches on the basal portion of the raised margins. *Column* thick, with a long incurved foot; apical processes 2, triangular, setaceous.

*Western Himālaya*: in Tehri-Garhwal, east of Tehri, epiphytic on *Rhododendron arboreum*, at elevations between 5 and 6,000 feet, Mackinnon's collector.

This species is most nearly related to *C. cæspitosum* of Wallich. It differs by having almost globular pseudo-bulbs and much longer scapes, the lateral sepals cohere at the base only; the petals are obtuse and quite entire; the shape of the lip is different, as is also the colouring of the flower. I have dedicated the species to my friend and benefactor, Sir Joseph D. Hooker, G.C.S.I., F.R.S.

#### 4. *EULOPHIA CAMPANULATA* Duthie, n. sp.

Height of plant 9-15 dm., the leaves and scape rising from a horizontal, oblong tuber. *Pseudo-stem* formed by the sheaths enclosing the bases of the leaves and scape. *Leaves* few, linear, acuminate, 3-4.5 dm. long, and about 3 cm. broad; veins sharply prominent. *Scape* exceeding the leaves, with a few long tight-fitting acuminate sheaths towards the base. *Flowers* 6-10, in a lax raceme, appearing with the leaves, about 2.5 cm. in diam., erect in bud, drooping and campanulate when open. *Floral bracts* lanceolate, acuminate, less than half the length of the ovary. *Sepals and petals* prominently veined on the back, bright yellow outside and pale lemon-coloured within. *Dorsal sepal* obovate, cuspidate, 2 cm. long; *lateral*, rather shorter, falcately oblong, obtuse, or mucronate, adnate to the base of the column. *Petals* obovate, obtuse, about as long as the lateral sepals. *Lip* 3-lobed, longer than the sepals, with a short subacute conical sac at the base; side-lobes erect, large, rounded, pale yellow tinged with purple; mid-lobe bent upwards, and with reflexed undulate margin, suborbicular when flattened out; the disc with 5-8 prominent ridges terminating within the apex of the apical lobe in an oblong grooved callus, and prolonged at the base into two sets of finger-

like projections. *Column* about 1 cm. long, oblong, narrowly winged, curving into a short foot at the base. *Pollinia* 2, globose, attached by a cylindric caudicle to a triangular gland.

NORTH-WEST INDIA: Dehra Dun, at Karwapáni, *W. Bell*, and *P. W. Mackinnon's collector*; N. Oudh, at Chandanpur in the Gonda district. *Duthie's collector*.

Amongst the Indian species this very handsome orchid appears to be most nearly related to *E. Mannii*, Hk. f., which is found in Sikkim and in Upper Assam. It was originally discovered in Dehra Dun in 1879 by Mr. W. Bell, formerly Head Gardener at the Saharanpur Botanical Garden, after whom I have named it.

##### 5. *EULOPHIA MACKINNONI* Duthie, n. sp.

*Rhizome* composed of a series of triangular flattened tubers. *Leaves* few, plicate, 5 to 6.5 dm. long and 5 to 8 cm. broad, appearing with the flowers, broadly lanceolate, acuminate, tapering into long sheaths, and with a few leafless sheaths below; nerves prominent. *Scape* 6-4 dm., arising from the swollen base of the pseudo-stem. *Flowers*, rather large, arranged in a lax raceme, spreading and afterwards deflexed. *Bracts* as long as, or shorter than, the ovary, linear, acuminate, persistent. *Sepals* and *petals* fleshy, yellow, tinged with reddish-brown, veins prominent outside. *Dorsal sepal* 1.7 cm. long, ovate, obtuse, subcordate at the base, 9-veined, margin inflexed at the apex; *lateral*, a little longer than the dorsal, unequal at the base. *Petals* shorter than the sepals, oblong-obovate, obtuse, overlapping and with their margins reflexed at the apex. *Lip* 3-lobed, with long erect rather shallow side-lobes, its body with 5-7 parallel purple-coloured ridges which extend into a carunculate area within the apical lobe; apical lobe rounded, its margin undulate. *Spur* short, geniculate. *Column* rather broad, winged, with no foot. *Anther* bicornute at the apex, its lip 2-toothed. *Stigma* transverse, placed immediately under the anther. *Pollinia*, transversely oval, attached by a broad caudicle to a shallow crescent-shaped gland.

NORTH-WEST INDIA: Dehra Dun, *Mackinnon*; Siwalik range, *Vicary* (in Herb. Calc.); Bahraich district in N. Oudh, *Duthie's collector*; Raipur district in Cent. Provinces, *J. Marten*. In the Saharanpur herbarium there is an old specimen named "*E. bicolor*" which is said to have been collected near Mussoorie in October 1842.

This species is evidently allied to *E. geniculata*, King and Pantling, an extremely rare Sikkim orchid. It differs chiefly in the shape of the rhizome, the very much broader leaves, the colour of the flowers, and in the shape of the lip.

6. *CYMBIDIUM MACKINNONI* Duthie, n. sp.

Terrestrial, caespitose. *Pseudo-stem* short, emitting many thick spongy roots. *Leaves* linear, acuminate, 3-4 dm. long and about 1.3 cm. broad; margins not serrulate, the lowest ones sheath-like and membranous. *Scape* 1-flowered, much shorter than the leaves, clothed to the base with loose lanceolate acuminate cymbiform hyaline sheaths. *Floral bract* longer than the much curved ovary, pale yellow with purple veins. *Flowers* about 5 cm. across, nodding. *Sepals and petals* spreading, green. *Sepals* lanceolate, obtuse, a little longer than the petals. *Petals* elliptic-lanceolate, obtuse, 5-nerved. *Lip* about as long as the petals, obovate-oblong (when spread out), 3-lobed, saccate at the base, very pale yellow blotched with purple; lateral lobes narrow, erect; the terminal one abruptly deflexed, rounded at the apex and nearly entire; the disk with two raised smooth lamellæ extending from the base to a little beyond the side-lobes. *Column* short, stout, curved, concave in front, marked with purple blotches like the lip. *Pollinia* 4, obliquely obovoid, plano-convex, the segments of each pair unequal, attached to a hemispherical gland. *Ripe capsule* 1.5 dm. long (including the long pedicel), ellipsoid-clavate, prominently ribbed.

WESTERN HIMĀLAYA: near Mussoorie, at an elevation of about 5,500 feet, growing under trees; in flower during February, P. W. Mackinnon.

Mr. Rolfe informs me that its nearest ally is *O. virescens*, Lindl., a native of Japan. Of Indian species it most nearly resembles *O. cyperifolium* in habit. It is, however, a much smaller plant, the scape is always 1-flowered, and the colouring of the lip and the shape of the pollinia and gland are very different; also the margins of the leaves are entire and not serrulate as in *O. cyperifolium*. The latter is also found in similar localities near Mussoorie, but always at a slightly higher elevation, and it comes into flower several weeks later.

7. *LISTERA INAYATI* Duthie, n. sp.

Whole plant 1.5 to 2 dm. high. *Roots* fibrous. *Stem* stout, about as long as the raceme, and bearing 3-6 loosely-fitting, blunt sheaths, the two upper ones sometimes opposite and leaflike. *Flowers* in dense racemes, 4 m. long; rachis glandular-pubescent. *Floral bract* ovate or lanceolate-acuminate, a little longer than the stalk of the ovary. *Sepals and petals* connivent; *dorsal sepal* oval, concave, about 2 m. long; *lateral sepals* a little longer than the dorsal, obliquely ovate, tapering to an obtuse apex. *Petals* about as long as the dorsal sepal, spathulate, subacute.

*Lip* twice as long as the lateral sepals, narrowly oblong, deeply cleft at the apex, with two slightly spreading obtuse lobes, midrib thickened. *Column* short, stout, dilated at the base and apex. *Anther* suborbicular, bifid at the apex. *Pollinia* narrowly obovoid. *Ovary* oval or subglobose, about as long as its stalk, glandular-pubescent.

WESTERN HIMĀLAYA; in the Kagán valley of the Hazāra district. Discovered in July 1897 by *Inayat Khán*, head plant-collector of the Botanical Department of N. India (No. 22,596).

A shorter and much stouter plant than *L. Lindleyana*, and with shorter and more densely-flowered racemes. The shape of the sepals, petals, anther and pollinia are altogether different.

#### 8. *LISTERA MICROGLOTTIS* Duthie, n. sp.

A leafless parasite, 2-3.3 dm. in height. *Root-fibres* cylindrical, brittle, pale yellowish-brown. *Stem* about as long as the raceme, nearly white, bearing 2-4 loose-fitting obtuse pale sheaths. *Rachis* of raceme, pedicels and bracts glandular-pubescent. *Flowers* crowded, about 7 m. in diameter, pale green; pedicel a little longer than the ovary; *floral bract* equalling or exceeding the pedicel, oblong, obtuse or subacute. *Sepals* ovate, subacute, about 4 m. long; the lateral ones somewhat oblique. *Petals* as long as the sepals, linear, margins reflexed. *Lip* linear-spathulate, equalling the petals in length, entire at the apex, margins reflexed. *Column* erect, a little shorter than the petals, dilated towards its base and apex. *Pollinia* 2, globose, without caudicles, extremely deliquescent. *Ovary* with pedicel 8 m. long. *Capsule* turgid, its ridges thick and often bearing short, broad-based, tooth-like projections.

WESTERN HIMĀLAYA: in Tehri-Garhwál, east of Tehri, growing under oaks and rhododendrons at elevations between 5,000 and 6,000 feet, *P. W. Mackinnon's* collector; also on the wooded hillsides below Mussoorie at similar elevations. Flowers during August and September. This plant, although resembling *L. Lindleyana* in general habit, differs from any known species of *Listera* (including *Neottia*) by its very remarkably restricted petal-like lip.

#### 9. *APHYLLORCHIS GOLLANI* Duthie, n. sp.

A tall leafless terrestrial herb, from 4 to 5 dm. in height. *Rhizome*. with numerous far-extending fleshy roots, not scaly. *Stem* erect, stout, bearing several unequal tubular blunt sheaths. *Raceme* about 1 dm. long, *Flowers* several, 2 cm. long. *Floral bract* a little longer than the ovary, elliptic-lanceolate, acuminate, 5-7-nerved, at first deflexed, ultimately erect. *Sepals* 2 cm. long, erect, ovate-lanceolate, acuminate, with spreading tips; their nerves, as also the ridges of the clavate ovary, dark

reddish-brown on a pale green ground. *Petals* shorter than the sepals, lanceolate, acuminate, pale green with purple veins, midrib thickened on the back. *Lip* shorter than the petals, somewhat deflexed from a concave winged claw attached to the base of the column; apical portion ovate-acuminate, its sides towards the base erect and with a reflexed erose margin, with no convexity near the apex. *Column* 1.2 cm. long, stout, curved, narrowed towards the base. *Anther* 2-celled, cells parallel. *Pollinia* ovate-oblong, mealy. *Ovary* (in flower) 1.7 cm. long, its apex with conspicuous granular projections between the ribs; *stigma* with an overlapping irregularly lobulate border.

WESTERN HIMALAYA: Tehri-Garhwál, on Nág Tibá, at elevations between 8,000 and 10,000 feet, *Gollan* (No. 2,062) and *Mackinnon's collector* (No. 23,000). The original specimens, discovered in 1881 by Mr. W. Gollan, after whom I have named this plant, were in too young a condition even for determining the genus. Its nearest ally is *A. alpina*, King and Pantling, a high-elevation Sikkim species. From the above it differs chiefly in the rhizome not being scaly, the bracts become erect as the flowers open, it has much shorter racemes, the lip is attached to the base of the column and does not form a pouch, the epichyle has no concavity at its apex, the colouring of the flowers is also very different.

#### 10. *POGONIA MACKINNONI* Duthie, n. sp.

*Tuber* globose, annular and warted, about 1.2 cm. in diameter. *Leaf* and *scape* frequently from the same tuber, but not contemporaneous. *Leaf* about 5 cm. long and broad, cordate at the base, 7-lobed, terminal lobe acute, the others rounded, principal veins terminating at the end of each lobe, with many less conspicuous intermediate ones; *petiole*, 2.5 cm. long. Leaves from the flowering tubers much smaller. *Scape* 1-flowered, about 10 cm. long when in flower, elongating till fruiting, enclosed by two or three rather loose tubular sheaths. *Flower* shortly pedicelled, spreading; *bract* erect, shorter than the cylindrical truncate ovary. *Sepals* spreading, linear-lanceolate, acuminate, 1.6 to 1.7 cm. long, light green blotched with reddish-brown outside. *Petals* very similar to the sepals, but a little shorter and not so acute at the apex. *Lip* shorter than the petals, oblong when spread out, strongly 3-nerved, white tinged with green towards the base; side-lobes erect, acute; terminal-lobe blotched with purple. *Column* slender, 7.8 m. long. *Pollinia* 2, narrowly clavate, connate below and without a gland.

WESTERN HIMALAYA: near Mussoorie, at elevations between 4,500 and 6,000 feet, *P. W. Mackinnon*. Flowers during May and June.

Very similar in habit to *P. macroglossa*, King and Pantling, but the



leaves are more distinctly lobed; the flowers are much smaller, and are spreading, not drooping. Leaves and fruiting scapes are sometimes found on the same tuber.

#### 11. *HERMINIUM MACKINNONI* Duthie, n. sp.

Whole plant upwards of 2.2 dm. high. *Tubers* narrowly oblong. Lower portion of the stem clothed with a few close-fitting tubular subacute sheaths. *Leaves* two, 12-14 cm. long by 1-2 cm. broad, oblong or linear-lanceolate, acuminate, with loosely amplexicaul tubular bases, 3-5-veined. *Spike* cylindric, rather broad, about 11 cm. long, many-flowered. *Flowers*, spreading, crowded, about 10 m. across. *Floral bract*, 5 m. long, broadly lanceolate, acuminate, a little shorter than the ovary. *Sepals* 3-4 m., ovate-oblong, acute, subterete, green. *Petals* as long as the sepals, linear-lanceolate, divergent, white. *Lip* trifid, a little longer than the petals, deflexed from near its base, white with a slight tinge of green, margins inflexed, lower portion very thick and with a small concavity at the base; side-lobes filiform, curved inwards; midlobe about half as long as the side-lobes, lanceolate, obtuse. *Anther-cells*, diverging below; *pollinia* obovate; *caudicles*, very short, the *glands* discoid, naked; *staminodes* large, spreading. *Stigmas* 2, transversely oblong and lying between the pollinia-glands and the concavity of the lip. *Ovary* about 6 m. long, ovate-oblong, beaked.

WESTERN HIMALAYA: near Mussoorie, at about 6,500 feet, on oak trees, P. W. Mackinnon. Flowers in August.

A very distinct species, its nearest ally being *H. angustifolium*. It differs from the latter by its fewer much shorter and broader leaves, its shorter and broader flowering spike, white petals and lip, and with the mid-lobe of the latter much longer; the shape of the ovary is also very different.

#### 12. *HABENARIA ELISABETHÆ* Duthie, n. sp.

Height of plant up to 4.5 dm. *Bulbs* ovoid. *Leaves* 2-3, approximate towards the base of the stem, with a few lanceolate finely acuminate sheaths above and a few loose ones below them, 6-12 cm. long and 1 to 2 cm. broad, lanceolate, the upper acuminate, the lowest one acute or obtuse, amplexicaul at the base, midrib prominent beneath. *Spike* long and slender, sometimes up to 2.5 dm. *Flowers* sessile, small, green, rather crowded, horizontal or deflexed. *Bracts* lanceolate, acuminate, about half as long as the ovary. *Sepals* erect, the dorsal one ovate, concave, the lateral ones obliquely ovate. *Petals* a little longer than the sepals, obliquely ovate, obtuse. *Lip* 3-cleft, fleshy, longer than the sepals, with a long concave claw; lateral lobes linear, spreading, gibbons

at their basal edges; midlobe oblong, obtuse, not exceeding the lateral ones. *Spur* a short obovate sac,  $\frac{1}{3}$  the length of the ovary. *Anther-cells* parallel. *Pollinia* obovate, curved, attached by a short caudicle to an oval gland. *Stigmatic processes* clavate. *Ovary* tapering upwards and curved.

WESTERN HIMĀLAYA: Song, at 8,000 ft. *Brandis*; near Simla, *Edgeworth*, *Lady E. Babington-Smith*; near Naini Tal, up to 8,000 feet, *Colonel Davidson*; Tehri-Garhwál, 7,000 to 10,000 feet., *Duthie* (524 and 22,990), *P. W. Mackinnon*; also at Mussoorie, between 6,000 and 7,000 feet, frequently as an epiphyte on oak trees.

Of the Himālayan species of *Habenaria* this plant appears to be most nearly related to *H. goodyeroides*. It differs principally in having much narrower and thinner leaves, and they are placed much lower down on the stem. The flowering spikes are longer and narrower; the flowers are much smaller and altogether green; the floral bracts are shorter, and the shape of the lip is very different. I have much pleasure in dedicating this species to Lady Elizabeth Babington-Smith, whose keen and practical interest in the botany of Simla during the Viceroyalty of her father, Lord Elgin, resulted in several interesting discoveries.

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