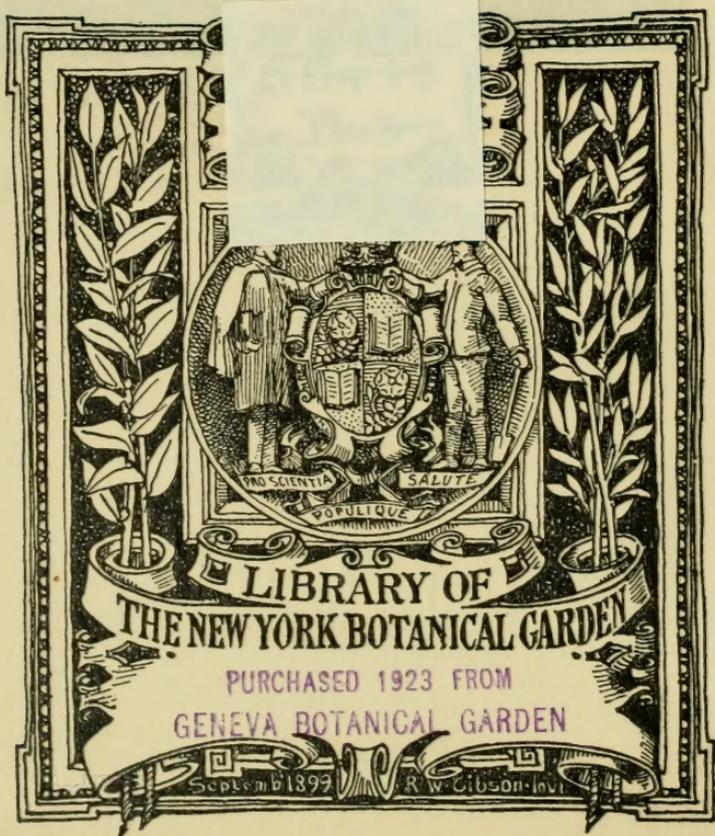


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THE TRANSACTIONS
OF THE
SOUTH AFRICAN
PHILOSOPHICAL SOCIETY.

VOLUME V.—PART I.

CONTAINING

THE ORCHIDS OF THE CAPE PENINSULA

By HARRY BOLUS, F.L.S.

WITH THIRTY-SIX PLATES, PARTLY COLOURED.

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CONTENTS.

	PAGE
PREFACE	vii
INTRODUCTION	75
I. General Remarks on the Order	75
II. The Cape Peninsula	76
III. Orchids in relation to the Flora of the Peninsula ...	79
IV. Comparison with the Orchid Flora of other Countries	80
V. Distribution of Genera and Species	82
VI. Elevation above the Sea-level	83
VII. Colour and Odour of the Flowers	84
VIII. Fertilisation of the Flowers	85
IX. Period of Flowering	88
CHIEF COLLECTORS OF ORCHIDS ON THE CAPE PENINSULA ...	90
BIBLIOGRAPHY OF SOUTH-AFRICAN ORCHIDS	93
TRIBE I. EPIDENDREÆ	99
„ II. VANDEÆ	99
[„ III. NEOTTIEÆ]	99
„ IV. OPHRYDEÆ	99
[„ V. CYPRIPEDEÆ]	101
KEY TO THE GENERA	102
LIPARIS	103
EULOPHIA	104
BARTHOLINA	111
HOLOTHRIX	112
SATYRIUM	117
DISA	134
DISPERIS	174
CORYCIUM	179
PTERYGODIUM	183
CERATANDRA	189
NOTE RESPECTING BURMANN'S HERBARIUM	194
ERRORS AND OMISSIONS	195
INDEX	197
PLATES 1 to 36.	

THE TRANSACTIONS
OF THE
SOUTH AFRICAN PHILOSOPHICAL SOCIETY.

ORCHIDS OF THE CAPE PENINSULA.

LONDON:

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P R E F A C E .

THIS is an attempt to describe the Orchids growing on the Peninsula of the Cape of Good Hope; to give their names and synonyms; to arrange them as far as possible in groups; to adduce the stations where they have been found, and their further distribution so far as known. To this is added a list of collectors; and of books and papers already published upon the subject of South-African Orchidology.

I regret that it does not go further; and that I have been unable to clothe these dry bones with living flesh and blood, and exhibit the life-history of some of the complex and curious organisms here enumerated. Such as the work is, it has occupied a great part of the leisure time in an active business life during several years. I can only hope that I may have made it easier for those who may come after me, and who, freed from the work of the systematist, may find themselves stimulated to the more agreeable task of patiently watching the operations and discovering the secrets of Nature.

But, incomplete as the work is, it is not entirely my own, and could not have been accomplished without the help of others. First must be acknowledged the unstinted aid of the authorities of that splendid institution of which all Englishmen are justly proud, the Royal Gardens and Herbarium at Kew; especially of Mr. N. E. BROWN, A.L.S., a member of its staff, who, in the most liberal manner, has placed at my disposal the results of his valuable, and as yet unpublished work upon the Orchids of Thunberg's herbarium; also of Prof. OLIVER, F.R.S., who has most kindly, during my absence from England, superintended the passing of the plates through the press. Next, amongst friends at the Cape, I must express my hearty thanks to Prof. A. BODKIN, M.A., whose enthusiastic pleasure in botanical excursions, and success in the

discovery of new Orchids, are equalled by his readiness to make fresh observations, and furnish new material, so that his name will be found frequently mentioned in these pages; also to Prof. MACOWAN, B.A., F.L.S., who has assisted me with living plants, and duplicate specimens from the Cape Government Herbarium under his charge; to Dr. MARLOTH, who has helped me in various ways, and has been the first observer of several Orchids on the Cape Peninsula; and lastly, to Mr. RUSSELL HALLACK, of Port Elizabeth, who has sent me several specimens from that neighbourhood, which have aided in elucidating those of our district.

I take this opportunity of respectfully soliciting from friends of Natural History, known and unknown, contributions of living specimens of native Orchids from any part of South Africa, in aid of further study, and with the view of preparing an account of all the species south of the tropic. Considerable numbers of species are only known to science, and therefore imperfectly known, from dried specimens, while it is certain that many novelties yet remain to be discovered. Several species have never been found since THUNBERG'S, BURCHELL'S and DRÈGE'S time, and only exist in few, or even single and imperfect specimens. Such are *Disa bracteata*, *D. porrecta*, *D. excelsa*, *D. telipogonis*, *D. gladioliflora*; *Pachites appressa*, from the top of the Swellendam Mt.; *Forficaria graminifolia*, from Du Toit's Kloof; *Corycium vestitum*, from Piquetberg; and many others. The parcel post now affords great facilities for transmission, and with moderately careful packing Orchids will keep their freshness for several days. Any such parcels addressed to me, "Sherwood, Kenilworth, near Cape Town," will be most gratefully received, and the expense of postage will be gladly returned.

H. B.

KEW, October, 1888.

INTRODUCTION.

I.—GENERAL REMARKS ON THE ORDER.

THE Order ORCHIDÆ is one of the most natural and sharply-defined amongst flowering plants, containing about 5000 known species, the most numerous amongst Monocotyledons, and the third largest (after COMPOSITÆ and LEGUMINOSÆ) of all Phanerogams. It is distributed over almost the whole globe, most abundantly in the tropics, and is rare only on the highest mountains, in extreme Arctic and Antarctic regions, or in some of the nearly rainless desert tracts of the globe.

It is most nearly allied to the Order SCITAMINEÆ (best known at the Cape by the beautiful *Strelitzia* of the southern coast districts); and has also affinities, though more remote, with the Order IRIDÆÆ.

Orchids are distinguished from all other plants by four chief characters:—(1) By the consolidation of the stamens and pistil into a common mass, which is called the column; (2) by the suppression of all the anthers (normally six), except one, in the vast majority of the Order, or except two in *Cypripediæ*; (3) by the peculiar condition and arrangement of its pollen and the anther which contains it; (4) by the very general development of one of the petals (the lip, or labellum) in an excessive degree, or different or unusual form. To these may be added, “great variety of habit and diversity of station; the immense variety of its peculiar and highly-specialized flowers; and the unusually large number of seeds produced in one capsule.”*

While it is often extremely difficult for the inexperienced botanist to understand the true nature of the peculiarities of the flowers of Orchids, yet their characters are so distinctly marked that a very short acquaintance enables the beginner to recognise an Orchid when he sees one.

The extreme irregularity and variety in the structure and position of the floral organs of this Order led to a close investigation of their homologies by Robert Brown, Lindley, and Darwin. The following are the conclusions arrived at by the last-named, after a laborious

* Herm. Müller, ‘On the Fertilisation of Flowers.’

An Orchid-flower properly, therefore, consists of fifteen organs arranged in five whorls or circles. Beginning from the outside there are: (1st whorl) 3 sepals; (2nd whorl) 3 petals, of which one is called the *lip*; (3rd whorl) 3 anthers, one only of which is fertile in most Orchids; (4th whorl) 3 stamens, which are undeveloped in all Orchids, excepting in Cyripediæ, where two are fertile; (5th whorl) 3 pistils. In most Orchids the two suppressed stamens of the outer whorl are continued into the lip, and there appear as lobes, wings, calli, fringes, or other appendages; and this view of the nature of the lip explains its large size, its frequently-tripartite form, and especially the manner of its coherence to the column, unlike that of other petals. Of the suppressed anthers of the inner whorl, two often appear as papillæ, auricles, or tubercles (as in many of the Cape Disæ and Satyria), while the third is absorbed into the face of the column. Of the three stigmas, two are usually confluent (yet often distinctly separated in the Cape genera, *Disperis*, *Corycium*, *Pterygodium*, and *Ceratandra*), and the third is modified into the *rostellum*. No such organ as the last-named exists in any other group of plants. Its function is to secrete viscid matter for the purpose of attaching the pollen-masses to an insect's body, and, though homologically a stigma, it has lost the capacity of being penetrated by the pollen-tubes. "There is every reason to believe that the whole of this upper stigma, and not merely a part, has been converted into the *rostellum*; for there are plenty of cases of two stigmas, but not one of three stigmatic surfaces being present in those Orchids which have a *rostellum*. On the other hand, in *Cyripedium* and *Apostasia*, which are destitute of a *rostellum*, the stigmatic surface is trifid" (*ib.* p. 248).

In concluding this portion of his subject Darwin observes:—"It is interesting to look at one of the magnificent exotic species, or indeed at one of our humblest forms, and observe how profoundly it has been modified, as compared with all ordinary flowers,—with its great labellum, formed of one petal and two petaloid stamens,—with its singular pollen-masses, hereafter to be referred to,—with its column formed of seven cohering organs, of which three alone perform their proper function, namely, one anther and two generally confluent stigmas,—with the third stigma modified into the *rostellum* and incapable of being fertilised,—and with three of the anthers no longer functionally active, but serving either to protect the pollen of the fertile anther, or to strengthen the column, or existing as mere rudiments, or entirely suppressed. What an amount of modification, cohesion, abortion, and change of function do we here see! Yet, hidden in that column, with its surrounding petals and sepals, we know that there are fifteen groups of vessels, arranged three within three, in alternate order, which probably have been preserved to the present

time from being developed at a very early period of growth, before the shape or existence of any part of the flower is of importance for the well-being of the plant.

“Can we feel satisfied by saying that each Orchid was created, exactly as we now see it, on a certain ‘ideal type’; that the omnipotent Creator, having fixed on one plan for the whole Order, did not depart from this plan; that He, therefore, made the same organ to perform diverse functions,—often of trifling importance compared with their proper function,—converted other organs into mere purposeless rudiments, and arranged all as if they had to stand separate, and then made them cohere? Is it not a more simple and intelligible view that all the Orchideæ owe what they have in common, to descent from some monocotyledonous plant, which, like so many other plants of the same class, possessed fifteen organs, arranged alternately three within three in five whorls; and that the now wonderfully-changed structure of the flower is due to a long course of slow modification,—each modification having been preserved which was useful to the plant, during the incessant changes to which the organic and inorganic world has been exposed?” (*ib.* pp. 245, 246).

Not only have Orchids attracted attention by the beauty and singularity of their flowers, and by the long-hidden secrets of their structure, but also on account of the wonderful complexity and diversity in the contrivances for their fecundation, which, in the great majority of the Order, is effected solely by the agency of insects, and for the most part appears to be specially designed to ensure cross-fertilisation. There are remarkable exceptions, but the general rule is as above stated. On this subject the student is referred to the classical work of Darwin named above, where it is treated with entrancing interest.

II.—THE CAPE PENINSULA.

The Cape Peninsula is a tract of land about 40 miles long, varying in width from about 3 to 11 miles, and connected with the continent by a broad and low sandy isthmus of 11 miles wide. As I have taken it, for this and other purposes, it is bounded by a line drawn 3 miles east and north-east of the main road which runs from Cape Town to Simonstown, and has a total area of $197\frac{1}{2}$ square miles, being thus about one-fourth larger than the Isle of Wight, which contains 155 square miles. A great part of its surface is occupied by a central mountain-range, running north and south from Table Mountain (the highest part, and which attains an elevation of 3562 feet) to the southern extremity at Cape Point.

The exposed rocks are, for the most part, sandstone on the mountains, with patches of the underlying clay-slate, and also granite; on the low ground are sandy downs of considerable extent.

The climate is temperate; the mean annual temperature 61° F.; frosts on the low ground are rare, and even on the mountain-tops snow is an unusual occurrence and never lies for more than a few hours. The average annual rainfall varies in different localities from 28 to about 60 inches, and two-thirds of it fall during the winter months of May, June, July, and August; the warmth of the summer months being tempered by the prevalent southerly winds of that season. In many respects the climate resembles that of the Riviera.

The steep ravines of the mountains are filled with indigenous shrubs or trees, while their sides are in many places dotted with the silver-tree (*Leucadendron argenteum*); at their feet are scattered bushes or copses of imported pines and oak; all else, including the sandy downs of the isthmus, is covered with a heath-like growth of small dull-coloured shrublets, from one to three feet in height, yet not closely, but interspersed with a great variety of herbs, Restiaceæ, grasses, and bulbous plants. Stretches of grasses, or grass-like plants, occur in a few places where the bushes by continued burning and grazing have been eradicated, but are not common. Surface-water, except for a few months of the rainy season, is deficient, and aquatic plants, though not absolutely wanting, are not abundant either in species or individuals.

III.—ORCHIDS IN RELATION TO THE FLORA OF THE PENINSULA.

The Flora of the Peninsula, so far as yet known, consists of about 1750 species of flowering plants. It will thus be seen that the Order ORCHIDÆ (of which 102 species are enumerated in this book) occupy, for a Flora of the temperate zone, an extremely high position, *viz.*, fourth (after COMPOSITÆ, LEGUMINOSÆ, and ERICACÆÆ), and actually constituting 5·8 per cent. of the whole.

The Cape Peninsula forms a portion of the great South-western Region of the Cape, the Flora of which is so remarkably different from that of any other part of Africa, and presents so many striking affinities with that of Southern, and especially South-western, Australia. The ORCHIDÆ, however, assume a much higher position in respect of number of species, in the Peninsula, than they do in the S.W. Region of the Cape as a whole, the Order only ranking tenth in number in the latter. There is little doubt that they here reach their maximum for South Africa, and are probably even more numerous than in any area of equal extent on the whole continent.

As the floral affinity of this Region with Australia has been referred to, it must be added that in respect of the ORCHIDÆ of both countries scarcely any relationship is to be traced, and that on the contrary the divergences are considerable. In Australia the tribes Vandæ and Neottieæ chiefly prevail (Ophrydeæ being restricted to two species); while on the Cape Peninsula the Vandæ are few (six species), the

Neottieæ completely absent, and the Ophrydeæ constitute 93 per cent. of all Cape Peninsular Orchids. There are only two genera common to both, *viz.*, *Liparis* and *Eulophia*, which, however, are of almost world-wide distribution; and not a single identical species.

These divergences would, of course, not be inconsistent with the probability of the ancient genetic connection of the vegetation of Australia and South-western South Africa (and with the hypothesis of the continuity of the land between them in some remote geological period), especially if the supposition of the comparatively recent development of the Order ORCHIDÆÆ should hereafter be strengthened by more direct evidence of its truth. We should then infer that the Order had become differentiated in each region at a period much later than the Orders PROTEACEÆ and RESTIACEÆ, so distinctively characteristic of both countries, and perhaps subsequent to the submergence of the land which connected them.

One of the most marked characteristics of the Order in South Africa, and also, as will be seen, on the Cape Peninsula, is the presence of the Coryciæ, regarded by Bentham (in the 'Genera Plantarum') as a sub-tribe of the Ophrydeæ. The structure of the column in this group is often very singular, and presents peculiarities which separate it widely from all other Cape Orchids. One of these is the tendency to a separation of the two stigmas which are most usually confluent. In some species the stigma is merely bilobed; but in others there are two, situate on either side of the column, and widely distant from each other. A second peculiarity is the great degree of cohesion between the lip and the column.

The Coryciæ are almost confined to Southern Africa. Of the four recognised genera, three are strictly so; while of the fourth, *Disperis*, two-thirds of the species are also thus restricted, the remainder crossing the tropic, with outliers in the Mascarene Islands, and one in India. Of the 46 known South-African species of this sub-tribe, 22 occur on the Cape Peninsula.

IV.—COMPARISON WITH THE ORCHID-FLORA OF OTHER COUNTRIES.

In comparing the Orchid-Flora of the Cape Peninsula with that of other countries we are met by the difficulty of finding regions of about the same size, in the same latitude, and existing under somewhat similar physical conditions. These may be sought in vain; and we can only avail ourselves of instances which approximate in some slight degree to those of the region here treated of.

In Montevideo, lying in nearly the same latitude as Cape Town, there are recorded in Gibert's 'Enumeratio Plantarum sponte nascentium in agro Montevidensi' (Montevideo, 1878) 5 genera and 11 species of Orchids. But, unfortunately, the author gives no information as to the area of the region he has investigated.

In the whole of Chili, according to Philippi's 'Catalogus Plantarum Vascularum Chilensium' (Santiago de Chili, 1881), there are 5103 species of flowering plants, of which 104 are Orchids, belonging to 7 genera.

Near Sydney (New South Wales), Mr. Fitzgerald, the author of the splendid work, 'Australian Orchids' (Sydney, 1882, &c.), states that "within the radius of a mile I have obtained sixty-two species of Orchids, fifty-seven of which were terrestrial—a number that could not, I believe, be equalled in any other part of the world within a similar area" (*l. c.* p. 4). Certainly no such concentration would be found on the Cape Peninsula. It is not stated, however, whether the number would be greatly increased by a further extension of the area; and it may be mentioned that in F. von Müller's 'Systematic Census of Australian Plants' (Melbourne, 1882) only 252 species, belonging to 46 genera, are enumerated for the whole of Australia; whereas in all extra-Tropical S. Africa, with an area only one-fifth as large as that of Australia, about 320 species of Orchids are known.

In the island of Tasmania there are, according to F. von Müller's 'Systematic Census,' *ut supra*, 957 species of flowering plants; and 21 genera with 64 species of Orchids.

In the whole of Western Australia, south of the Tropic of Capricorn, there are, according to the same authority (including Supplements of 1885 and 1886), 3272 species of flowering plants; of these 75 are Orchids belonging to 18 genera.

Hong-Kong, the well-known island on the coast of China, only 29 square miles in extent, has, according to Bentham's 'Flora Hongkongensis' (London, 1861), about 1056 flowering plants, of which 36 are Orchids belonging to 27 different genera.

Sicily, with an area of 8000 square miles, has, according to Gussone's 'Floræ Siculæ Synopsis' (Naples, 1844), 60 species of Orchids, belonging to 14 genera.

Madeira, although it has an area of about 300 square miles, thus larger than the Cape Peninsula, and with a Flora of 710 species of flowering plants (Capt. Norman, *Trans. Bot. Soc. Edin.* v. xvii. 83-86), has only 4 species of Orchids.

The last-named island is situate about 400 miles from the nearest African coast, and strikingly illustrates the paucity of Orchids in insular Floras which has been pointed out by Hemsley ('Report on the Voyage of H.M.S. "Challenger"', *Botany*, vol. i., London, 1885, Introduction, p. 27), who gives a considerable list in evidence, from which I have extracted the above. The islands previously cited are not to be regarded as possessing insular, but rather continental, Floras, being, from a phyto-geographical point of view, merely portions of the great continents near which they are situate.

The following summary of the foregoing facts affords good evidence of the richness of the Cape Peninsula in Orchids, and shows that it is only surpassed, if indeed it be surpassed, by some portions of Australia:—

	Lat.	Area in square miles.	Total Flowering Plants.	ORCHIDS. Genera. Species.	
Cape Peninsula	34° S.	197	about 1750	10	102
Montevideo	34° S.	not stated.	..	5	11
Chili	20°—50° S.	..	5103	7	104
Western Australia (Extra-trop.)	23°—35° S.	..	3272	18	75
Sydney (spot near)	34° S.	3	..	23	62
Tasmania	41°—43° S.	24,000	957	21	64
Hong-Kong	22° N.	29	1056	27	36
Sicily	37°—38° N.	8000	..	14	60
Madeira	33° N.	600	710	..	4

V.—DISTRIBUTION OF GENERA AND SPECIES.

Of the ten genera represented on the Peninsula, four, *viz.*, Bartholina, Corycium, Pterygodium, and Ceratandra, are exclusively confined to South Africa. *Holothrix*, *Disa*, *Satyrium*, and *Disperis* attain their maximum in South Africa, but have outliers in other parts of Africa, and the Mascarene Islands,—besides one species of each of the two last-named in the Indian Peninsula. Lastly, *Liparis* and *Eulophia* are very widely distributed over almost the whole globe.

The distribution of the species is, however, much more restricted. Out of the 102 recorded on the Peninsula, only one as yet has been even said to be found beyond Southern Africa, *viz.*, *Liparis Capensis*, which was thought by Dr. Hooker to have been discovered by Mann on the Cameroons Mountain,* where some other typical Cape plants have also been detected. Of the remainder—

1 extends northward into Namaqualand (Karoo Region).

52 extend eastward and northward within the Western Province (South-western Region).

15 extend eastward through the last-named districts into the Sub-Tropical Region.

33 have not yet been recorded beyond the limits of the Cape Peninsula.

The last number will, however, doubtless be reduced as botanical exploration, hitherto very incomplete, is further extended.

* The locality given is "Cameroons Mountain, alt. 6000—7000 ft. (Frt. Dec.)—A small species, in fruit only, but clearly the same as *L. Capensis*."—Dr. J. D. Hooker, in 'Journal of the Linnean Society,' vol. vii. (1864), p. 218.—I have seen Mann's specimens, which certainly greatly resemble those of *L. Capensis*, but cannot regard the identification as sufficiently certain in the absence of flowers.

VI.—ELEVATION ABOVE THE SEA-LEVEL.

Most of the species are confined either to the mountains, or to the "Flats," as the low, sandy downs of the isthmus are termed; but a considerable number nevertheless enjoy a wide range of elevation. For convenience they may be broadly divided into three groups, as follows:—

I.—*Species which do not ascend the mountains to a greater elevation than 500 feet.*

Eulophia cochlearis.

Bartholina pectinata.

Holothrix Mundtii.

Satyrium emarcidum, S. marginatum, S. Hallackii, S. bracteatum, var. lineatum.

Disa æmula, D. barbata, D. venusta, D. lugens, D. cernua, D. flexuosa, D. bifida.

Disperis secunda.

Corycium bicolorum, C. orobanchoides.

Pterygodium cruciferum, P. Volucris, P. alatum.

Total, 20 species.

II.—*Species which do not descend into the plain to a lower elevation than 500 feet.*

(The numbers indicate the observed height, or, where two numbers are given, the range in feet, above the level of the sea, approximately.)

Eulophia tristis, 1200; E. tabularis, 1400–2300; E. aculeata, 1500–3550; E. ustulata, 1200.

Holothrix condensata, 2800; H. gracilis (height not recorded); H. parvifolia, 2400.

Satyrium rhynchanthum, 1100–3000; S. ochroleucum, 1500; S. foliosum, 3300; S. lupulinum, 500–1200; S. ligulatum, 2500; S. bicallosum, 600–2500; S. Lindleyanum, 800; S. bracteatum var. nanum, 800; S. saxicolum, 1000–2400; S. striatum, 1200.

Disa longicornu, 2100–3000; D. maculata, 1200–1600; D. uniflora, 1100–3300; D. ocellata, 3300; D. tenuicornis, 2500; D. tabularis, 2500–3300; D. obtusa, 800–2400; D. cylindrica, 2400–3500; D. lineata, 2700; D. racemosa, 800–2500; D. venosa, 2400; D. tenuifolia, 800–2500; D. patens, 1100–1300; D. Harveiana, 1500–2500; D. glandulosa, 1600–3000; D. vaginata, 1400–2500; D. rosea, 1400–3300; D. Richardiana, 2500–3400; D. Bodkini, 2300–3000; D. melaleuca, 1300–3300; D. atricapilla, 1300; D. fasciata, 1500–2700; D. grami-

nifolia, 1200–3500; *D. purpurascens*, 800–1100; *D. ferruginea*, 1800–3500; *D. pygmæa*, 1300; *D. ophrydea*, 1400–2500; *D. affinis*, 1400–2500; *D. reticulata*, 2000–2800; *D. torta*, 2000; *D. inflexa*, 2500–3550; *D. obliqua*, 1000–2300; *D. clavigera* (height not recorded).

Disperis paludosa, –2500.

Corycium bifidum (height not recorded).

Pterygodium platypetalum, 1800; *P. acutifolium*, 1400–3500; *P. carnosum*, 1300–3550.

Ceratandra bicolor, 1300–2400; *C. Harveiana*, 2400; *C. globosa*, 3000; *C. parviflora* (height not recorded).

Total, 59 species.

III.—*Species which are found growing above, and also below, an elevation of 500 feet.*

Liparis Capensis, 50–2500.

Eulophia lamellata, 50–1400.

Bartholina Ethelæ, 150–1000.

Holothrix squamulosa, 50–2500; *H. villosa*, 50–2400.

Satyrium carneum, 100–800; *S. candidum*, 50–2400; *S. bicorne*, 50–2500; *S. coriifolium*, 50–700; *S. odorum*, 50–2500.

Disa cornuta, 50–3550; *D. tenella* (height not recorded); *D. tenuis*, 100–1400; *D. multiflora*, 100–600; *D. micrantha*, 50–3550; *D. rufescens*, 100–3300.

Disperis capensis, 50–3500; *D. cucullata*, 200–800; *D. villosa*, 50–600.

Corycium excisum, 50–800.

Pterygodium catholicum, 50–800; *P. cafferum*, 200–800.

Ceratandra chloroleuca, 50–3500.

Total, 23 species.

From the foregoing it will be seen that certain species have a very considerable vertical range; fifteen enjoying a range of from 2000 to 3000 feet, and six species a range of more than 3000 feet. This peculiarity is shared in common with many other flowering-plants on the same spot, and is doubtless due to the equability of the temperature and of the moisture of the atmosphere of the Peninsula at different elevations, owing to its close proximity on nearly every side to the sea. It stands in marked contrast to the results of differences of elevation on the mountains a short distance inland.

VII.—COLOUR AND ODOUR OF THE FLOWERS.

The colours of the flowers of Orchids play an important part, as is well known, in the economy of their fertilisation. Blue and red

flowers have been supposed to be the most attractive colours to insects; yellow and green less so; while white flowers are probably most visited by night-moths. It is not always easy to define accurately and briefly the colours of Cape Orchids, since they are often variously combined in the same flower. I have endeavoured to arrange them in groups as to their predominant colours, with the following results:—

Green	9	species.
Yellow	32	„
Brown.....	8	„
Red	24	„
Blue and blue-purple	14	„
White	16	„

Liparis has green flowers; *Eulophia*, brown, yellow, and white; *Bartholina*, purple and white; *Satyrium*, all colours named above, except blue; *Disa*, all the colours named above; *Disperis*, red, yellow, and green; *Corycium*, yellow and white; *Pterygodium*, yellow and purple; *Ceratandra*, yellow, white, and red.

With respect to the odours exhaled by the different species, it is noticeable that, speaking generally, those of red hues are the least fragrant; those with white flowers most so. The scent of some (chiefly species with yellow flowers, as *Corycium orobanchoides*, *Pterygodium catholicum*, &c.) is often heavy and unpleasant.

VIII.—FERTILISATION OF THE FLOWERS.

The fact that a vast number of Orchids, if not the great majority of species, are fertilised by insect agency only, has already been mentioned. I have not observed the actual process in any Peninsular species, although it is certain that a large number are so fertilised. M. Peringuey, an able and experienced entomologist, who has resided several years in Cape Town, has informed me that he has never captured or seen any insect with the pollinia of an orchid adhering to it. I add, however, a few notes made upon specimens gathered, which show evidences of the removal of pollinia by insects, or of fertilised capsules.

Bartholina pectinata.—The method of fertilisation of this species is very similar to that of *Orchis mascula*, as described by Darwin, and is a useful illustration for beginners in the study of Cape Orchids. The process may be readily understood if a fine-pointed pencil be introduced into the throat of the flower, and then withdrawn. It will be observed that the pollinia adhere by the viscid glands, and stand upright upon the pencil-point, making a right angle with it, exactly as they would do upon the head of any insect seeking to rifle the flower of its honey.

But in this position the pollinia would be useless, since they could never reach the stigma, as may easily be seen if the observer immediately attempts to re-introduce the pollinia on the pencil; but in from two to three seconds the caudicles or stalks of the pollen-masses become bent forward, through an arc of 90 degrees, into a line with the pencil, which, if then re-introduced, will carry the pollen-masses exactly on to the viscid stigma, and some of the grains of the former will adhere to it so as to fertilise it. This delay, before the caudicles bend forward, probably prevents the fertilisation of a flower by its own pollen, and, the insect then flying to another flower, affords the probability of cross-fertilisation, which Darwin has shown to be generally so advantageous to plants. In the case of *Orchis mascula*, the bending did not take place until after an interval averaging thirty seconds. Robert Brown had previously pointed out another arrangement, which is common amongst the tribe Ophrydeæ:—"The stigma is very viscid, but not so viscid as, when touched by a pollinium, to pull the whole off an insect's head, or off a pencil, yet sufficiently viscid to break the elastic threads by which the packets of pollen-grains are tied together, and leave some of them on the stigma. Hence a pollinium attached to an insect or to a pencil can be applied to many stigmas, and will fertilise all." (Darwin, 'On the various contrivances by which Orchids are fertilised by Insects,' 2nd ed., p. 13.) The process here described is, in its main features, that most common in all the Ophrydeæ. It may, however, be even more plainly seen in some of the larger Disas and Satyriums than in this species.

Disperis Capensis.—In September, 1884, I examined 100 flowers of this species, and found that 13 had been visited by insects, of which only 7 had been fertilised. The details were as follows:—

Both pollinia <i>in situ</i>	88	stigma pollinated	1
One pollinium removed ...	2	„ „	2
Both pollinia removed ...	10	„ „	4

The pollinia cannot be removed by the wind, or by a blow. The viscid disc of the pollinary glands appeared to be wanting in adhesiveness. In this species and in several others which I examined, the caudicle, which may be said to extend the whole length of the pollinium, becomes strongly revolute in less than a second after withdrawal from the cell, in such manner that the granules (which are disposed in a second order along each margin) stand out at a wide angle, and are then well adapted for striking the stigma when approaching it from very different directions. This is shown, as to another species, in Plate 19, fig. 6, though less forcibly, because the granules and the curve are both smaller in that than in the present

species. This arrangement is most probably correlated with the habits of the insect which effects its fertilisation. I have never been fortunate enough to find the insect, which may be some night-moth, though the colour of the flower is rather dingy, and it has very little scent. On the other hand, I have failed to find any nectar in its galea, or in the pouches of its side sepals; it may, however, be present in the surface-tissues. Whatever the method, it appears sufficiently effective, since it is a common plant, appearing very regularly every year, the individuals mostly scattered, but sometimes growing closer together and in some abundance along mountain streams.

Disperis villosa.—The fertilisation of the flowers in this species appears to be but slightly more frequent than in *D. Capensis*. I examined 103 flowers gathered on 16th, 17th, and 18th Sept., 1884. Of these 28 had been visited by insects, and 8 had been fertilised. The following exhibits the details:—

Both pollinia <i>in situ</i>	81	stigmas pollinated	6
One pollinium removed...	17	„ „	1
Both pollinia removed ...	5	„ „	1

Pterygodium catholicum.—In Sept., 1884, I examined 55 flowers from 16 different plants. Of these 16 had been visited by insects, 15 had one or both pollinia removed, while 5 had been fertilised.

There are, however, grounds for suspecting that some Orchids have, perhaps by the dying-out of the species of insect which is alone fitted to effect fertilisation, ceased, or are gradually ceasing, to perpetuate themselves by seed, and are now propagated by new annual tubers only. This was suggested by a writer in 'Trimen's Journal of Botany,' vol. v. (1876), p. 251, in regard to the Orchids of Australia, which, he thinks, may be "in a special condition, inasmuch as energy is now being directed towards vegetative as opposed to sexually reproductive existence. This is evinced by the wonderful development of tubers and roots, some of which latter organs, we believe, may possibly be found to be modified leaves."

So long ago as 1863, Mr. Roland Trimen, F.R.S., contributed to the Linnean Society a note on this subject, so far as it is illustrated by the life-history of *Disa grandiflora*, which was published in the 'Linnean Society's Journal' (Bot.), vol. vii. (1864), p. 144, with an excellent drawing. He observes:—"When I examined the plants, most of the flowers were partially withered; but in the greater number, even in those quite *withered*, both pollinia were still in their cases; in not one instance had both been removed; but in several flowers one had been carried away. In some of the withered flowers the pollinia protruded

from the anther-case; and in a few instances the upper sepal, in curling inwards, had touched the disc, and had drawn out the pollinium; but I saw no case in which the pollen-grains had thus reached the stigma. Considering how well-stored the nectary is with honey, it is surprising that the flowers are not more regularly visited; but as the nectar fills the lower part alone of the nectary, only insects with a long proboscis could reach it; and perhaps the larger moths are rare at the elevation at which this plant grows. The remarkably brilliant colours, however, of the flower probably indicate that it is attractive to some day-flying Hymenopterous or Lepidopterous insect. However this may be, the infrequency with which the pollen-masses are removed offers a nearly parallel case to that described by Mr. Darwin, of the extremely imperfect fertilisation of the *Ophrys muscifera* in England." Mr. Trimen has since informed me that he had never found any trace of insect agency. I have never seen a matured seed-vessel, nor been able to detect any insect employed in its fertilisation. On its native mountains it has a wide range of altitude, grows vigorously in dense masses, or at least several together, being apparently propagated exclusively by the formation of new tubers, and isolated plants (such as might be expected if it seeded freely) are rarely to be seen. Considering the brilliant colour of the flowers these facts are remarkable, and seem to point to the extinction of the insect by which this species was originally fertilised. If we seek still further for the cause of such extinction, the suggestion might be hazarded that it may be due to repeated bush-fires which, some observers think, may have been prevalent for a period long prior to the advent of Europeans in South Africa, and have played a very important part in the modification both of animals and plants in this region.

The preceding remarks under this head show little more than our ignorance of the processes of fertilisation of the Peninsular Orchids generally, or of what species are propagated by tubers exclusively. The latter are probably extremely few in number, since in *Satyrium* and *Disa*, our two largest genera, most of the species bear seed abundantly. The field of investigation is large and deeply interesting, and will afford a rich harvest of results to those who may have the time and patience to labour in it.

IX.—PERIOD OF FLOWERING.

The majority of the species flower in spring and early summer; yet there is no month (excepting, perhaps, April, in some unfavourable year) in which some Orchid may not be found in flower on the Peninsula. Beginning in April, sometimes even before the first

winter rains, *Disa tenuis* may be gathered near the Kenilworth race-course, though its thin spikes of greenish flowers are by no means easy to discover. In the same month I have gathered *Liparis Capensis* on the southern slopes of Table Mountain, and in May near Rondebosch. Both these continue flowering in various stations until June; they are succeeded in July by *Disperis Capensis*, scattered everywhere over the Flats. All the foregoing have green or dull-coloured flowers, produced at the season when, bright as it often is between the rains, there is not less certainly the minimum of sunshine. A note of brighter colour is struck when *Satyrium coriifolium*, with its orange flowers, begins to stud the Flats in the latter part of July; and when *Disa obliqua* appears on the sandy slopes of Muizenberg. In August these are joined by *Satyrium odorum*; and then come on rapidly *Disperis villosa* and *D. cucullata*, *Pterygodium catholicum*, *Corycium orobanchoides*, &c. In October probably the maximum is reached; but November and December are still rich on the mountains, though the Orchids on the Flats have by that time disappeared. After December the number rapidly diminishes, yet the peerless *Disa uniflora* is in its glory on the rivulets of Table Mountain in February. The last to linger are the lovely blue *Disa graminifolia* and the flame-coloured *D. ferruginea*, which may often be found until late in March. The three last named are the brilliant product of the unclouded summer sun; and with them Nature gloriously closes, as in a gorgeous and many-coloured sunset, the splendid array of these beauties of the floral year.

CHIEF COLLECTORS OF ORCHIDS ON THE CAPE PENINSULA.

(LIVING COLLECTORS EXCLUDED).

AUGE, Johann Andreas : b. Stollberg, 1711 ; d. Swellendam, Cape of Good Hope, subsequent to 1805. Arrived at the Cape in 1747. Became superintendent of the Dutch East India Company's Garden near Cape Town. He made considerable collections, which fell chiefly into the hands of the Burmanns of Amsterdam. A portion was purchased at the Cape by one Michiel Grubb, a Swedish merchant returning from China to Stockholm, who handed them over to Pehr Jonas Berg. The latter described from them, in 1767, a number of new genera and species, including the celebrated *Disa unijlora*, which Auge was thus probably the first to introduce to the knowledge of Europeans. He was subsequently, for a time, guide and companion both of Thunberg and Masson.

BERGIUS, C. W. A collector who resided in Cape Town in the early part of this century. Died prior to 1826 (see Schlectendal in 'Linnæa,' vol. i. (1826) p. 250). His collections are in the Berlin Herbarium.

BOWIE, James : b. ; d. 1869. A gardener from Kew. Arrived at the Cape in 1817 ; returned to England in 1823. Again returned to the Cape in 1827, where he remained until his death. His collections do not appear to have been numerous or important.

BURCHELL William James : b. 1781 ; d. 1863. Arrived at the Cape in 1810, as a traveller of independent means. He remained in South Africa until 1815, and during the interval made journeys extending beyond Kuruman northward and to the mouth of the Fish River eastward. His specimens were excellently preserved, and their value enhanced by the Geographical Catalogue, in which the dates and stations of collection were carefully registered. He ascended Table Mountain more than once, and several orchids of the Peninsula were first discovered by him. A few were named by him in manuscript and adopted by Lindley, but Burchell did not himself publish any descriptions of Orchids.

DREGE, Johann Francis : b. Altona ; d. Altona, 1881. Arrived at the Cape in 1826, for the purpose of making general collections in natural history, but chiefly of plants, for sale. During eight years he

made the most extensive and systematic journeys which have ever been effected throughout South Africa, reaching to Port Natal on the east, and to the mouth of the Orange River on the west. His collection of plants was enormous, and in this respect his work has never been equalled. They included many Orchids from the Peninsula, of which those new to science were described by Lindley.

ECKLON, Christian Friedrich: b. Apenrade, Schleswig-Holstein, 1795; d. Cape Town, 1868. Arrived at the Cape in 1823: travelled extensively throughout South Africa for many years, collecting plants for sale, for the most part in conjunction with Zeyher. Their Orchids were worked by Dr. Sonder, of Hamburg.

HARVEY, William Henry: b. near Limerick, 1811; d. Torquay, 1866. Arrived in the Colony in 1835; collected only in the Western Districts, and for the most part near Cape Town. His Orchids were partly described by Lindley. He was a botanist of European reputation, and an acute observer. He made drawings of plants and taught himself lithography while in Cape Town, for the purpose of publishing them.

KRAUSS, Ferdinand: Arrived in the Colony in 1838 and travelled for two years in the western and eastern coast districts and in Natal. He does not seem to have discovered any novelties, but his collections were numbered and distributed.

MASSON, Francis: b. Aberdeen, 1741; d. Montreal, 1805. Was an under gardener at Kew. First visited the Cape in 1772, and returned in 1775; again arrived in the Colony in 1786 and remained until 1795.* Made many journeys, collected living plants, seeds and dried specimens; also made some excellent drawings of Peninsular and other Cape Orchids, now preserved in the British Museum, South Kensington. Was the companion of Thunberg on one of the latter's journeys.

OLDENBURG, D.: b. ; d. 1774. A Swedish private soldier, who accompanied Masson as a servant during part of his stay at the Cape, and made considerable botanical collections.

PAPPE, Karl W. Ludwig, M.D.: b. Hamburg, 1803; d. Cape Town, 1862. Was for some time Colonial Botanist. Collected plants chiefly in the western districts, and especially about Cape Town, but did not publish any descriptions of Cape Orchids.

SPARRMAN, Andreas: b. 1748; d. 1820. A Swede. Arrived at the Cape in March, 1772, and soon made several excursions in company with his compatriot Thunberg. Captain Cook's expedition with the Forsters on board, arriving in November of the same year, he joined them and sailed in the 'Resolution' for New Zealand, &c., returning with them in March, 1775. In July he undertook an extensive journey into the interior and returned with large collections in April, 1776.

* Britten in 'Journal of Botany,' vol. xxii. (1884), pp. 114—123.

THUNBERG, Carl Pehr, M.D.: b. Jönköping in Sweden, 1743; d. Upsala, 1828. The "Father of Cape Botany." Arrived at the Cape in 1772, and spent three years in travelling and assiduously collecting. The Orchids, the greater part of which were new to science and included many from the Cape Peninsula, were partly described by himself, but the greater part by Swartz, about the year 1800.

VERREAUX, the Younger. Arrived at the Cape in 1827 and remained until 1829, exploring especially the Cape Peninsula, afterwards visiting other parts of the Colony. His specimens are in the Lessertian Herbarium.

WRIGHT, C. S.: b. Connecticut, U.S.A., 1811; d. 1885. Arrived at Simon's Bay, in Ringgold's U. S. North Pacific Exploring Expedition, in 1853. Remained six weeks, and made a large collection of plants in the neighbourhood, including several Orchids.

ZEYHER, Karl Ludwig Philip: b. Dillenberg, Germany, 1799; d. Cape Town, 1858. Arrived at the Cape in 1823, and travelled over a considerable part of South Africa, reaching northward as far as the Magaliesbergen. He collected in company with C. F. Ecklon, for sale. Their Orchids were described by Dr. Sonder.

BIBLIOGRAPHY OF SOUTH-AFRICAN ORCHIDS.

ANDREWS, Henry C.

Botanists' Repository, &c. London, 1799-1811. 10 vols. 4to, 664 col. plates, with corresponding text.—Contains but very few South-African Orchids.

BAUER, FRANZ, *see* LINDLEY.

BERGIUS, Petrus Jonas: b. 1730; d. 1790.

Descriptiones Plantarum e Capite Bonæ Spei. Holmiæ, 1767. 8vo, 360 pp., 5 plates.—Describes the genus *Disa* and the species *D. uniflora* (*D. grandiflora*, Linnæus fil.).

BOLUS, Harry.

Notes on some Cape Orchids, in Journal of Linnean Society (Bot.), vol. xix. (1882), pp. 233-238.

List of Published Species of Cape Orchideæ, *l. c.*, pp. 335-347.

Contributions to South-African Botany, Orchideæ, *l. c.*, vol. xx. (1884), pp. 467-488.

Ditto, Part 2, with additional notes by N. E. Brown, A.L.S., *l. c.*, vol. xxii. (1885), pp. 65-80, with plate.—The two latter papers describe several new species of Orchids.

BROWN, Robert: b. 1773; d. 1858.

Hortus Kewensis, ed. 2. London. 8vo. Vol. v. (1813).—Describes several species.

BROWN, N. E.

Terrestrial Orchids of South Africa, in the Gardeners' Chronicle, vol. xxiv. (1885), pp. 135, 231, 307, 331, 402.

BUXBAUM, Johann Christian: b. 1693; d. 1730.

Plantarum minus cognitarum, Centuria I., II. Petropoli, 1728, 4to; Cent. III., *ib.*, 1729, 4to.—The last century contains figures of several Cape Orchids, which, though poorly executed, appear to be the earliest on record.

CURTIS, William: b. 1746; d. 1799.

The Botanical Magazine, &c. London, 1787-1887. 113 vols. large 8vo, 6972 col. plates, with text; still continuing.—Contains a considerable number of figures of South-African Orchids.

DRÈGE, Johann Francis: d. 1881.

Zwei Pflanzengeographische Documente von J. F. Drège, nebst einer Einleitung von Dr. E. Meyer, Prof. in Königsberg (Besondere Beigabe zur Flora, 1843. Band 2). No imprint or date. Printed as a supplement to the botanical journal 'Flora.' Regensburg, 1843. 8vo, 230 pp., with map.—There are no new species described, but valuable records of stations of Orchids on the Peninsula and elsewhere.

EDWARDS, Sydenham.

The Botanical Register, &c. London, 1815–1847, 33 vols. 8vo, 2702 col. plates, with text.—Contains a few Cape Orchids.

HARVEY, William Henry: b. 1811; d. 1866.

The Genera of South-African Plants arranged according to the Natural System. Cape Town, 1838. 8vo, pp. i.–lxvi., 1–429. Second edition, edited by J. D. Hooker, M.D. Cape Town and London, 1868. 8vo, pp. 1–12, i.–lii., 1–488.

Thesaurus Capensis, or, Illustrations of the South-African Flora, being figures and brief descriptions of South-African plants, selected from the Dublin University Herbarium. Vol. i. Dublin, 1859. 8vo, pp. 68, plates 1–100. Vol. ii., *ib.* 1863. 8vo, pp. 68, plates 101–200.—Contain several plates of Peninsular Orchids.

See also, Notes upon Cape Orchidaceæ, in Hooker's Lond. Journal of Botany, vol. i. London, 1842. Pp. 14–18.

JACQUIN, Nicolaus Joseph: b. 1727; d. 1817.

Plantarum rariorum horti Cæsarei Schönbrunnensis descriptiones et icones. Viennæ, 1797–1804. 4 vols. folio, 500 plates.—Contains on t. 179 a fine figure of *Satyrium ochroleucum* under the name of *Orchis bicornis*.

JOURNAL OF SCIENCE AND THE ARTS. Edited at the Royal Institution of Great Britain. London, 8vo. Various dates.

"Of the Three Species of the Natural Order Orchideæ represented in Plate VI.," in vol. iv. (1818), pp. 199–206.

"Select Orchideæ from the Cape of Good Hope," in vol. v. (1818), pp. 104–105, Plate I.

"Ditto," continued, in vol. vi. (1819), pp. 44–46, Plate I.

"Ditto," continued, in vol. viii. (1820), pp. 221–222, Plate III.

"Ditto," continued, in vol. ix. (1820), pp. 310–311, Plate IV.

An introductory statement in the first paper quoted above from this now rare work (Brit. Mus. Libr.) explains that Francis Masson, while at the Cape of Good Hope, "unexpectedly met with, among the Dutch soldiers who then guarded that colony, an artist of great skill as a designer of the objects of Natural History," and that he had formed a considerable portfolio of coloured drawings. Of these the Editor adds, "it has been allowed us to make use of such as might suit this Journal." The concluding statement in the last paper attributes this permission to Sir Joseph Banks; and it appears that what must be the originals of these drawings are now

preserved with others (all being attributed to Masson) in the Natural History Department of the British Museum. No name is attached to the papers above enumerated, and only one new species is described, viz., *Disa graminifolia*, also without a name. Lindley (Gen. and Sp. Orch. 363) attributes this name to Ker, and, as he was a contemporary of Ker, and the latter published other botanical papers in the same Journal, no doubt the authorship may safely be attributed to him. The plates, though a little rough (being amongst the early attempts at lithography in England), and without analyses, are excellent pictures of the plants. They include the following:—

- Vol. IV., Plate VI., fig. 1. "*Disa grandiflora*, Linnæus f.
 2. "*Bartholina burmanniana*.
 3. "*Disa spathulata*, Swartz.
 ,, V., Plate I., fig. 1. "*Disa porrecta*, Swartz.
 2. "*Disperis secunda*, Swartz.
 3. "*Disperis Capensis*, Swartz.
 ,, VI., Plate I., fig. 1. "*Corycium bicolor*, Swartz.
 2. "*Disa graminifolia*.
 3. "*Pterygodium catholicum*, Swartz.
 4. "*Disperis cucullata*, Swartz.
 5. "*Disperis villosa*, Swartz.
 ,, VIII., Plate III., fig. 1. "*Satyrium bracteatum*, Thunberg.
 2. "*Pterygodium alatum*, Swartz.
 3. "*Corycium orobanchoides*, Swartz.
 ,, IX., Plate IV., fig. 1. "*Pterygodium inversum*, Swartz.
 2. "*Pterygodium Volueris*, Swartz."

[KER, John Bellenden]. See JOURNAL OF SCIENCE AND THE ARTS.

Of Three Species of the Natural Order Orchidææ, from the Journal of Science and the Arts. London, 1817. 4to, pp. 1–8, plate.—This is a separate reprint of the first of the series of articles entered above under the name of the above Journal. The plate is a reproduction of the octavo form, although entirely re-drawn. As to the ascription of these papers to Ker, see the article referred to; the probability is strengthened by the fact of the initials I. B. K. being engraved at the foot of this 4to plate. It is curious that, though this professes to be a reprint, it is dated 1817, while the vol. iv. of the Journal of Science in which it appeared is dated 1818. Pritzel in his first edition ascribed this paper to R. Brown, but in the subsequent edition it appears to be entirely withdrawn.

KRAUSS, Ferdinand.

Beiträge zur Flora des Cap- und Natal-landes. Regensburg, 1846. 8vo, pp. 215, 2 tab. (An off-print from the 'Flora' for 1844–1846.)—Contains records of collection of certain Orchids on the Peninsula which have not been found by other collectors.

LINDLEY, John: b. 1799; d. 1865.

Collectanea Botanica; or figures and botanical illustrations of rare and curious exotic plants. London, 1821. Folio, 41 plates.—One Cape species, t. 31.

The Genera and Species of Orchidaceous Plants. London, 1830-40. 8vo, pp. xviii., 553.—Indispensable to the study of South-African Orchids; contains many new species.

Illustrations of Orchidaceous Plants, by Franz Bauer, with notes and prefatory remarks by J. Lindley. London, 1830-38. 4to, Pref. (2 pp.); Pref. remarks (i.-xiv.); Plates 1-15 (Fructification), with as many leaves of text; Plates 1-20 (Genera), with as many leaves of text.—Four South-African Orchids are amongst the magnificent drawings in this now very rare work.

Notes on the Cape Orchidaceæ of Drège, in Hooker's Companion to the Botanical Magazine, vol. ii. London, 1835-36. 8vo, pp. 200-210.—More than forty species of South-African Orchids are described.

On Four New Species of Cape Orchidaceæ, in Annals of Natural History, vol. iv. London, 1840, p. 314.

Notes upon Cape Orchidaceæ, in Hooker's London Journal of Botany, vol. i. London, 1842. 8vo, pp. 14-18.

LINNÆUS, Carl: b. 1707; d. 1778.

Species Plantarum, &c. Stockholm, 1753. 2 vols. 8vo, pp. 1200, pref., and index. 2nd edition, enlarged, Stockholm, 1762-3. 2 vols. 8vo, pp. 1684, pref., and index. 3rd edition, Vienna, 1764. 2 vols. 8vo, pp. 1682. 4th edition, edited by Willdenow, Berlin, 1797-1830. 6 vols. 8vo.—The three latter editions contain descriptions of several species.

Systema Vegetabilium, &c., ed. 13. Göttingen, 1774. 8vo, pp. vi., 844. Supplementum, &c., by Linnæus the younger, Brunswick, 1781. 8vo, pp. 467, pref. *Ib.*, ed. 16, edited by K. Sprengel. 4 vols. 8vo. Göttingen, 1825-28.

Amœnitates Academicæ, &c. Stockholm & Leipsic, 1749-1779. 7 vols. 8vo.—The 6th vol. (1764) contains Cape species.

LODDIGES, Conrad.

The Botanical Cabinet, &c. London, 1818-1833. 20 vols. small 4to, 2000 plates, plain or coloured, with corresponding text. Only a single figure of a South-African Orchid appears in this work.

REICHENBACH, Heinrich G., the younger.

Orchidographische Beiträge in 'Linnæa,' vol. xix. Halle, 1847. 8vo, pp. 369-379.—Many Cape species. *Ib.*, vol. xx., 1847, pp. 673-696. *Ib.*, vol. xli., 1877, pp. 55, 62 (where two species are described).

Icones Floræ Germanicæ et Helvicæ, &c., vols. i.-xxii. Leipsic, 1834-1870. 4to, 2800 plates.—In vol. xiii. (1850), p. viii., t. 354, figs. 13-26, 31-34 are notes and analyses of a few Cape species.

De Pollinis Orchidearum genesi ac structura, &c. Leipsic, 1852. 4to, pp. 38.—On p. 31 is a note on the structure of *Herschelia caelestis*, Lindl. (*Disa graminifolia*, Ker.).

Description of *Polystachya Ottomiana*, in Hamburger Garten-
Zeitung, vol. xi., for 1855, p. 249.

Description of *Calanthe natalensis*, in Bonplandia, vol. iv. (1856). Hanover. 4to, p. 322.

Orchides. [An enumeration of species] in Walpers Annales

Botanices Systematicæ. Leipsic. 7 vols. 8vo, 1848-1868.—Vol. i. (1849), pp. 773-810, and vol. vi. (1861), pp. 167-933, contain several Cape species.

Dr. Welwitsch's Orchideen aus Angola, in 'Flora' for 1865. 8vo, pp. 177-191.—Includes some Cape species.

Novitiæ quædam Africanæ, *ib.* for 1867, pp. 115-118.

Orchideæ Kalbreyerianæ, *ib.* for 1878, pp. 77-78.—Kalbreyer's Orchids were from Western Africa; but two species from South-eastern Africa are here described, one of which, from Natal, comes within our limits.

Orchideæ describuntur, *ib.* for 1881, pp. 328-330.

Die Orchideen des Herbars Thunbergs, *ib.* for 1883, pp. 459-463.—Discusses the types of this important collection, and describes one new species.

Comoren-Orchideen Herrn Leon Humblot's, *ib.* for 1885, pp. 535-544. Contains a few species, placed between parentheses, said by the author to belong to "the South-eastern African Flora," but of the origin of which no further indication is given.

Orchideæ describuntur, *ib.* for 1886, p. 547 (one species).

Otia Botanica Hamburgensia. Hamburg, 1878-81. 4to. Fasc. i., 1878, pp. 68; fasc. ii., part 1, 1881, pp. 71-119.—Many Cape species.

SONDER, Otto Wilhelm.

Enumeratio Orchidearum quas in Africa Australi Extratropica collegerunt C. F. Ecklon, Dr., et C. Zeyher. In Linnæa, vol. xix. Halle, 1847. 8vo, pp. 71-112.—Several new species; important to the Cape student.

Vergleichungen der von Ecklon und Zeyher und von Drège gesammelten südafrikanischen Pflanzen, &c. *Ib.*, vol. xx., pp. 216-221 (where several new names are published without descriptions).

SPRENGEL, Kurt: b. 1766; d. 1833.

See under Linnæus, Systema Vegetabilium, ed. 16, vol. iii., p. 720 *et seq.*

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ORCHIDEÆ.

TRIBE I. EPIDENDREÆ.

Anther lid-like; cells distinct. Pollen-masses waxy, usually without caudicles or gland.

SUB-TRIBE LIPARIEÆ.—Stem usually pseudo-bulbous. Inflorescence terminal. Pollen-masses 4, rarely 8, subequal, crowded, generally free, inappendiculate.

1. LIPARIS.—Stem (in the Peninsular species) pseudo-bulbous at base. Leaves one or few, contracted into a sheathing petiole. Flowers small, racemose.

TRIBE II. VANDEÆ.

Anther lid-like; cells usually confluent. Pollen-masses waxy, mostly attached to a glandular appendage of the rostellum.

SUB-TRIBE EULOPHIEÆ.—Leaves of the pseudo-bulbs plicate-veined. Flowering scapes leafy, or leafless. Lip spurred, gibbous or mucous, at base.

2. EULOPHIA.—Sepals and petals nearly equal, free, spreading or subconnivent. Lip spurred, gibbous or mucous, at base. Flowering scapes usually leafless, more rarely leafy. Pollinia usually attached to a short glandular appendage of the rostellum.

TRIBE III. NEOTTIEÆ.

[Not represented on the Cape Peninsula.]

TRIBE IV. OPHRYDEÆ.

Anther without a lid; cells distinct. Pollen granular; the pollinia terminating in a true caudicle.

SUB-TRIBE 1. HABENARIEÆ.—Anther erect. Glands of the pollinia nude, or more rarely half-included in the channelled or inflexed lobes of the rostellum.

3. BARTHOLINA.—Sepals herbaceous, small. Petals narrow, erect. Lip spreading, large, deeply cut or fringed, spurred at base. Anther distant from the stigma; glands of the pollinia 2. Rostellum obsolete.
4. HOLOTHRIX.—Flowers small. Sepals herbaceous. Petals longer than the sepals, narrow. Lip small, concave or involute, variously divided, spurred at base. Gland of the pollinia 1, or 2. Rostellum nearly obsolete.

SUB-TRIBE 2. DISEÆ.—Anther reclined, or reflexed on the back of the column, more rarely sub-erect. Stigma large, pseudo-terminal, or distant from the anther and subadnate to the lip.

5. SATYRIUM.—Lip posticous, erect, fornicate or galeate, 2-spurred or 2-saccate at base. Anther anticous. Caudicles of the pollinia terminating in two glands, or rarely (in one species) in a single gland. Stigma pseudo-terminal.
6. DISA.—Odd sepal usually posticous, more rarely anticous, galeate, fornicate, or nearly flat, 1-spurred, 1-saccate, or umbonate towards the base. Lip usually smaller than the sepals, variously shaped, but never galeate or fornicate, muticous at base. Caudicles of the pollinia terminating in one or in two distinct glands. Stigma separate from the anther, lying immediately above the ovary.

SUB-TRIBE 3. CORYCIEÆ.—Odd sepal posticous, more rarely anticous, cohering with the petals into a single galeate, hooded, fornicate, or explanate piece. Lip adnate to the face of the column, usually produced above the junction into a variously-shaped appendage. Cells of the anther usually distant, less commonly (in *Disperis* only) approximate. Stigma bilobed or bipartite, the lobes separated by the intervening adnate lip; or stigmas 2, distant.

7. DISPERIS.—Side sepals free, spurred or saccate. Lip appendiculate. Rostellum produced into cartilaginous arms in front. Anther ascending, the cells approximate. Stigma usually situate on the front face of the column, bilobed, the lobes approximate; or stigmas two, lateral and distant.
8. CORYCIUM.—Flowers contracted, somewhat small. Side sepals connate into an anticous lower lip. Lip appendiculate. Stigma posticous, lunate, or bilobed; or stigmas two, lateral and distant. Flowers in dense spikes.

9. **PTERYGODIUM.**—Flowers usually expanded, somewhat large. Odd sepal with the cohering petals posticous, usually hood-shaped. Side sepals free. Lip appendiculate. Stigma posticous, hippocrepiform, or bilobed; or stigmas two, lateral and distant.
10. **CERATANDRA.** — Odd sepal forming with the cohering petals a posticous, or more rarely anticous, spreading or reflexed, rarely erect, nearly explanate piece. Side sepals free. Lip appendiculate, or the appendage nearly obsolete. Arms of the rostellum elongated and horn-like, or shorter and dilated laterally, or (in one species) the arms obsolete and the column resembling that of *Corycium*. Stigma posticous, bilobed; or stigmas two, lateral and distant.

TRIBE V. CYPRIPEDIEÆ.

[Not represented in South Africa.]

KEY TO THE GENERA.

- Anther lid-like. Pollen-masses waxy, without gland. LIPARIS 1.
- „ „ „ „ attached to a
rostellary gland. EULOPHIA 2.
- „ without lid. Pollen granular, attached to a
caudicle.
- Sepals and petals all free from each other.
- Sepals herbaceous.
- Flowers solitary; lip deeply fringed..... BARTHOLINA 3.
- „ spiked; lip not fringed. HOLOTHRIX 4.
- Sepals petaloid.
- Lip posticous; 2-spurred or 2-saccate. ... SATYRIUM 5.
- Lip mostly anticous, never spurred or
saccate. DISA 6.
- Odd sepal and petals cohering together.
- Side sepals free.
- Side sepals spurred or saccate. DISPERSIS 7.
- „ „ not spurred or saccate.
- Odd sepal and petals cohering into
a hood-shaped erect piece. PTERYGODIUM 9.
- Odd sepal and petals cohering into a
nearly flat and usually reflexed piece. CERATANDRA 10.
- Side sepals connate into an anticous lower lip. CORYCIUM 8.

I.—LÍPARIS.

L. C. Richard, in *Memoires du Mus. d'Hist. Nat.* vol. iv. (1818), p. 52; *Bentham & Hooker f.*, *Gen. Plant.* vol. iii. (1883), p. 495; *H. N. Ridley*, *Monograph in Journ. Linn. Soc. (Bot.)*, vol. xxii. (1887), pp. 244–297.

Sepals and petals all free and spreading, equal and similar, or the petals and dorsal sepal narrower. Lip much broader, united to the column at the base, erect or ascending, entire or indistinctly lobed. Column elongated, incurved, the apex winged. Anther lid-like, terminal. Pollen-masses 4, waxy, ovoid, equal in pairs in the two cells, free or slightly united at the apex. — Small terrestrial or epiphytcal herbs, the stems sometimes thickened at base into small pseudo-bulbs, with few leaves, and a scape bearing a raceme of small greenish or purplish flowers. (Name from *λίπαρός*, *fat* or *shining*, in allusion to the smooth or unctuous leaves).

DISTRIBUTION. — Mr. H. N. Ridley's Monograph (*loc. cit.*) enumerates 110 species, spread over the warmer and temperate regions of the world. There are two other S.-African species—*L. Bowkeri*, Harvey, from Grahamstown to Natal; and *L. Gerrardi*, Reichenbach f., Natal.

1. *Liparis Capensis*, *Lindley*, in *Annals of Natural History*, vol. ii. (1840), p. 314.—Glabrous, 2–4 inches high; stem thickened below the soil into an ovate, whitish pseudo-bulb, having the withered bulb of the previous year attached; leaves usually two, lying flat on the ground, ovate, subacute, thick, leathery, with depressed veins, shining above, 1–2½ inches long (luxuriant specimens show smaller third and fourth leaves); raceme 10–30 flowered, the rhachis angular from the decurrent, lanceolate bracts, which are shorter than the ovaries; flowers spreading, about ½ inch long; side sepals oblong, oblique, 2 lines long; back sepal longer, with recurved margins, all reflexed; petals linear, margins recurved, 3 lines long; lip oblong, with raised sides, somewhat saddle-shaped, fleshy, obsoletely 3-lobed at the apex, about 1½ line long; column oblong-cuneate, thick, shorter than the lip; capsule terete, about 8 lines long, including the pedicel. *Sturmia capensis*, *Sonder*, in 'Linnæa,' vol. xix. (1847), p. 71.

HAB. In heathy sandy places on the Cape Flats, near Rondebosch; hills behind Simon's Town, 800 feet; mountain sides, Table Mountain, 2500 feet; fl. April—June. *Herb. Norm. Austr.-Afr.*, 151; *Zeyher*, 3887; *Bolus*, 4598. —Extends eastward to the Hottentot's Holland range of mountains.

There are specimens, in fruit only, in the Kew Herbarium, collected by *Mann* on the Cameroon Mt., at one time regarded by Dr. J. D. Hooker as identical with this species; but this is certainly doubtful.

The flowers are greenish, becoming yellow as they wither. The

species is interesting, as being the only one of the large tribe Epidendreae found within our limits. It does not seem to be common; and the only place where I have found it in any abundance is on the sandy ridge due west of Simon's Town.

PLATE 22.—Fig. 1, flower viewed laterally; 2, column; 3, pollen-masses: all enlarged.

2.—EULOPHIA.

R. Brown, in Bot. Register, vol. vii. (1821), *sub t.* 573, and *ib.* vol. viii. (1822), t. 586. — *Orthochilus*, *Hochstetter in A. Richard, Flor. Abyss.* vol. ii. (1851), p. 284. *Lissochilus*, *R. Brown, in Bot. Reg.* vol. vii. (1821) *sub t.* 573. *Cyrtopera*, *Lindley, Gen. and Sp. Orch.* (1833), p. 189.

Sepals and petals nearly equal, free, and spreading or subconnivent; or the side sepals sometimes adnate to the base of the column; or the petals larger and more coloured than the sepals. Lip free or shortly adnate to the base of the column, produced at base into a spur or pouch, or muticous, usually three-lobed, the side lobes involute round the column, or spreading, or reflexed, the terminal lobe mostly broader and bi-lobed, or entire, the upper surface marked with crested or bearded veins, or by two or more calli, or smooth. Column erect, semi-terete, rounded, or the front angles acute or winged, sometimes produced at base into a projecting foot or chin. Pollen-masses 4, in pairs, or 2, ovoid, waxy, usually attached by a short pseudo-caudicle to the flat, transverse gland of the rostellum.—Terrestrial herbs with stems often thickened into pseudo-bulbs at the base. Leaves usually narrow with raised veins, or plicate, those of the flowering stems mostly reduced to sheathing scales. Inflorescence terminal, leafy below, or on leafless radical scapes; sometimes branched above. (Name from *εὖ*, *well*, and *λόφος*, *a crest*, in allusion to the crested lip of the species on which the genus was founded).

The satisfactory location of certain South-African Orchids into the genera *Eulophia*, *Lissochilus*, *Cyrtopera*, and *Cymbidium*, was for a long time a great difficulty to students. After repeated efforts to reconcile apparent anomalies, the matter was submitted to the authorities at Kew, and Sir J. D. Hooker, Prof. Oliver, and Mr. N. E. Brown considered it fully. Since it concerns a number of other species with which I am wholly or in part unacquainted, and therefore unable to form a competent judgment; and since, moreover, their opinion must possess great value, I am glad to be allowed to quote their views as follows:—

“1st. It is quite clear that *Cymbidium tabulare*, *C. ustulatum*, *C. aculeatum* (syn. *C. pedicellatum*, Sw. non Reichb. f.), and *C. Buchananii*

(syn. *C. pedicellatum*, Reichb. f. non Sw.), must be removed from the genus *Cymbidium*.—2nd. That these in a body must go with the group described under the name *Cyrtopera*.—3rd. That the genus *Cyrtopodium* has been wrongly united with *Cyrtopera* by Bentham, and should be kept distinct, the genus appearing to be a perfectly natural group and confined to America.—4th. That there appears to be no character by which *Cyrtopera* can be separated from *Lissochilus*. Lindley described *Cyrtopera* as being ecalcarate, but *C. plantaginea* has a spur $\frac{1}{4}$ inch long. *C. flava* has a very distinct and large pouch, and in everything but colour has almost exactly the appearance of *Lissochilus arenarius*, Lindley, and cannot possibly be generically separated from it; and the other species of *Cyrtopera* have a more or less decided spur, pouch, or chin to the lip, formed partly by the foot of the column, partly by the lip, with various intermediate grades.—5th. That there appear to be no good grounds for separating *Lissochilus* from *Eulophia*; the character of the broad petals as a distinctive mark of *Lissochilus* breaks down, and the character of an uncrested lip, upon which Brown founded the genus *Lissochilus*, equally so. The question then arises, which genus should take precedence, since both names were published in October, 1821 (see Bot. Reg. t. 573), where in the text it is spelt *Eulophus*, and was altered at t. 686 to *Eulophia*. The genus *Eulophia* has the largest number of species, and the adoption of this name would perhaps involve least change; besides which, *Lissochilus* is unsuited as referring to a smooth lip, while most of the species have a crest on the lip. The result of all this then is that *Cyrtopera* should be separated from *Cyrtopodium* and, together with *Lissochilus*, united to *Eulophia*, under which genus they might be grouped in a series gradually passing from the typical and distinctly-spurred *Eulophias* to the short-chinned and spurless plants put in *Cyrtopera*. This, as it appears to us, will then form a very natural genus, uniform in habit and not differing much in general floral structure.”

In accordance with the foregoing opinions I have, in describing the genus, united with it the genera *Lissochilus*, *Orthochilus*, and *Cyrtopera*; have again included the old species *E. aculeata* of Sprengel; and have also referred to it *Cymbidium tabulare*, Swartz, and *C. ustulatum*, mihi.

DISTRIBUTION.—The genus is a large one, with probably over 100 species, spread chiefly over the warmer regions of the Old World, and largely African. There are about 40 species belonging to the eastern coast region of South Africa, between Port Elizabeth and Zululand.

KEY TO THE SPECIES.

Lip spurred or saccate at base.

Lip three-lobed.

- | | | |
|--|-----------------------|----|
| Capsule spherical | <i>E. SPHÆROCARPA</i> | 1. |
| Capsule ovoid; sepals 5-6 lines long ... | <i>E. TRISTIS</i> | 2. |
| Capsule cylindrical; sepals 7-8 lines long | <i>E. LAMELLATA</i> | 3. |

Lip undivided; sepals 2-3 lines long	<i>E. COCHLEARIS</i>	4.
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Lip not spurred or saccate.

- | | | |
|--|---------------------|----|
| Flowers large, expanded, yellow | <i>E. TABULARIS</i> | 5. |
| Flowers small, connivent, nearly white | <i>E. ACULEATA</i> | 6. |
| Flowers small, very dark coloured | <i>E. USTULATA</i> | 7. |

A. Lip spurred or saccate at base.

1. *Eulophia sphærocarpa*, *Sonder, in Linnaea*, vol. xix. (1847), p. 74.—“Robust, 2-3 ft. high. Leaves ensiform, equitant, rigid, half as long as the terminal branched scape, the lower more than a foot long and an inch wide; spike branched, a foot long, branches erect-spreading, 10-20-flowered; flowers nodding; bracts acuminate, as long as the pedicel, which is 7-8 lines long; sepals and petals oblong-lanceolate, acute, the former 7 lines long; lip 3-lobed, cuneate at base, the side lobes short, the intermediate oblong, obtuse, crisped at the margin, all the veins crested with lacerate processes; spur short, inflated; capsule spherical, ribbed, pendulous, as long as the pedicel.”

HAB. “In sandy places of the Cape Flats, near Wynberg. February.”
Ecklon & Zeyher's collection.—Extends also to “Saldanha Bay.”

I do not know this species, and quote from Sonder, who adds that the flowers are “larger than in *E. tristis*,” and that “the petals are marked with two dark purple spots above the base.” It must come very near to *E. lamellata* in floral characters, but the capsule is described as spherical, whereas in the latter it appears to be generally cylindrical.

2. *Eulophia tristis*, *Sprengel, in Syst. Veg.* vol. iii. (1826), 720.—Glabrous, 1½ ft. high; leaves as in *E. lamellata*; panicle branched, spreading, with acuminate sub-persistent bracts; sepals narrow-lanceolate, acute, slightly spreading, about 5 lines long; petals nearly as long, obtuse; lip nearly as in *E. lamellata*; capsule ovoid, with three prominent ribs. *Satyrium triste*, Linnæus the younger, *Suppl. to Syst. Veg.* (1781), p. 402. *Limodorum triste*, Thunberg, *Prodr. Plant. Capens.* (1794), p. 4.

HAB. Eastern mountain sides on the Cape Peninsula, above Klassenbosch, &c., 1200 ft., frequent; fl. Dec.—Jan.; *Bolus*, 4779; Simon's Town, *MacGillivray*, 471.—Extends eastward to Port Elizabeth and Grahamstown (*MacOwan*, 1220; *Eckl. & Zeyl.*, 285; *Burchell*, 3984, 4213, 7038).

3. *Eulophia lamellata*, *Lindley, Gen. and Sp. Orch.* (1833), p. 184.—Glabrous, 1–1½ ft. high; leaves sword-shaped, acuminate, minutely serrulate, rigid, nerved, erect or somewhat spreading, shorter than the simple or branched, distantly leafy scape; flowers distant, spreading, at length deflexed, pedicels slender, ½–1 in. long; bracts acuminate; sepals and petals nearly uniform, oblong, the sepals subacute, petals blunter, slightly spreading, about 7 lines long; lip cuneate in outline, 3-lobed, side lobes obtuse, middle lobe dilated and upturned, crisped, the apex nearly truncate, its length traversed on the upper surface by about seven parallel crested lines, spur bilobed, blunt, the whole about 9 lines long; operculum with 2 blunt spreading horns nearly its own length; pollinia sessile on an oblong entire hyaline gland; capsule cylindrical, deeply ribbed, about 1 in. long, crowned by the persistent withered perianth.

HAB. Sandy flats near Rondebosch, and the lower mountain-tops of the Cape Peninsula up to 1400 ft.; fl. Oct.—Nov.; *Herb. Norm. Austr.-Afr.*, 152; *Zeyher*, 1590; *Bolus*, 4558.—Extends eastward to Riversdale district (*Burchell*, 7072).

Flowers brown, except the upper surface of the lip, which is creamy white, with rosy tints at base and on the side lobes. Nearest to *E. tristis*, to which the flowers are very similar but larger, and the sepals and petals broader in proportion to their length (*Lindley* says the lip is “very different,” but I have not found it so), the panicle less spreading; the capsule different. It occurs somewhat frequently, and flowers regularly every year.

PLATE 22.—Fig. 4, flower viewed laterally; 5, column front view; 6, operculum, from behind; 7, pollinarium,—all variously magnified.

4. *Eulophia cochlearis*, *Lindley, in Comp. Bot. Mag.* vol. ii. (1836), p. 202.—Glabrous, 1–2 ft. high, scape leafy, simple below, racemose-paniculate above; leaves sword-shaped, equitant, entire, or sometimes minutely serrulate, rigid, nearly erect, 6–8 in. long; the upper reduced to sheathing bracts; panicle 6–8 in. long, with 2 to 4 ascending branches; flowers rather distant and spreading; bracts acute, persistent, much shorter than the flowers; sepals and petals nearly similar and connivent, narrow-ovate, acute or sub-obtuse, about 3 lines long; lip always posticous and erect, oblong, undivided, concave, crisped, and crenulate, narrowed at the base and produced into a short subspherical spur, the whole about 5 lines long, the limb emarginate, and its inner surface distantly and irregularly crested; column short and thick, arched and somewhat square in section; operculum subglobose, without horns; stigma orbicular, very slightly

depressed; pollinia sessile on a cuneate gland; capsule oblong or elliptical, 6-7 lines long.

HAB. Sandy downs east of Table Mountain; fl. Nov.; not very frequent; Bolus, 4561.—The species extends eastward to Port Elizabeth and Grahamstown (Zeyher, 1589, 3897; Burchell, 4594, 6177, 6201).

The flowers are brownish, the limb of the lip creamy white. The species is easily distinguished from its congeners on the Peninsula by its small flowers and undivided lip, which Lindley calls "spoon-shaped"; the short and thick column is also very characteristic and quite different from that of either of the preceding species. In herbaria it has often been confounded with *E. micrantha*, Lindley, which seems to grow only in the Eastern Province.

B. Lip muticous at base.

5. *Eulophia tabularis*.—Glabrous, a foot or more in height, the stem erect, strong, from a creeping scaly root-stock; leaf solitary (or sometimes two), radical, linear-lanceolate, springing from the same sheath as the scape, the upper reduced to swollen amplexicaul acute sheaths; spike laxly or closely 3-10 flowered, the flowers nodding; sepals ovate-oblong, spreading, about 10 lines long; petals oblong, obtuse, apiculate, a little shorter than the sepals; lip 3-lobed, not spurred or saccate at base, the side lobes involute, the middle spreading, crenulate, obtuse, a little shorter than the petals, traversed throughout its length on the upper surface by a ridge which is forked at either end; column curved at base into a short projecting chin; operculum obtuse, without horns; pollen-masses affixed near their middle to a large oblong gland.—*Satyrrium tabulare*, Linnæus the younger, Suppl. (1781), 402; *Serapias tabularis*, Thunberg, Prodr. Plant. Cap. (1794), p. 3; *Cymbidium tabulare*, Swartz, in Schrader's Journ. (1799), p. 224; Bolus, in Journ. Linn. Soc. (Bot.), vol. xx. (1884), 471.

HAB. Shallow moist valleys on the mountains; Table Mountain, above Klassenbosch, 2300 feet; Muizenberg, 1400 feet; flowering in the latter half of December and first half of January; Bolus, 4844.—Extends eastward to Swellendam (Burchell, 7358).

The flowers are a dull yellow, the ridge on the lip orange-coloured. The species will be easily enough recognised when the orchid-lover has found it. But it is by no means common. Thunberg, who was the first, so far as is known, to collect it, says, in describing the ascent of Table Mountain in 1773, in the middle of January, "Of the *Serapias tabularis* we found only one specimen" ('Travels,' Engl. trans., 1794, vol. i., p. 220). Nor did he find it subsequently; for, in his 'Flora Capensis' (ed. 1823, p. 27), he adds, after the description, "Only one specimen has hitherto been found." Harvey also found a solitary specimen, and marked it "Summit of Table Mountain, very rare; Jan., 1841." After that, the

first record of its collection on the Peninsula was that of my friend Prof. Bodkin, on the Muizenberg, Dec. 18, 1882; and I subsequently found six or eight specimens in the same place, *viz.*, the valley at the head of the ravine leading up from the east end of the mountain. It also occurs sparingly on Table Mountain; and doubtless in unfavourable seasons it does not appear at all. Besides the Peninsula, the only recorded stations are Hottentot's Holland Mountains, *Zeyher*, *W. C. Scully*; and near Swellendam, *Burchell*.

PLATE 1 (Erroneously lettered "*Cymbidium tabulare*"). — Fig. 1, parts of the perianth $\times 1\frac{1}{2}$ diameters; 2, bract, labellum and ovary, side view $\times 2$; 3, column, front view; 4, ditto, side view; 5, apex of the column, showing the operculum raised; 6, pollinarium; 7, nearly mature capsule: all variously magnified.

6. *Eulophia aculeata*, *Sprengel*, in *Syst. Veg.*, vol. iii. (1826), p. 720.—Glabrous, from 3 inches to a foot or more high; root-stalk short, creeping; stem erect, with several linear-lanceolate, acuminate, sheathing bracts; leaves one or two, from the lowest sheath, erect, linear, subrigid, several-nerved, acuminate, as long as, or a little longer than, the scape; spike densely flowered, sometimes subcapitate; flowers slightly expanded, or more generally connivent, about $\frac{1}{2}$ inch long; sepals oblong-lanceolate, subequal, subacute; petals a little narrower and shorter; lip cuneate in outline, 3-lobed, mucous at base, traversed by two rows of papillæ from behind, which are longer, and scattered generally over the middle lobe in front; pollinia elliptical, approximate, each attached at base by a short stalk to the flat diaphanous gland of the rostellum. *Satyrium aculeatum*, *Linnaeus* f., *Suppl.* (1781), p. 402. *Cymbidium aculeatum*, *Swartz*, in *Schrader's Journ.*, vol. ii. (1799), p. 225. *C. pedicellatum*, *Swartz*, l. c., p. 224. *Cyrtopera pedicellata*, *Lindley*, *Gen. & Sp. Orch.*, p. 190. *Cymbidium plicatum*, *Harvey*, in *Comp. Bot. Mag.*, vol. ii. (1836), p. 203; *Hook. Icon. Plant.*, t. 104. ~~*C. Buchananii*, *Reichenbach* f., in *Flora* (1881), p. 329.~~ *E. plicata*, *Bolus*, in *Journ. Linn. Soc. (Bot.)*, vol. xix. (1882), p. 336 (excl. syn. in part).

HAB. Common on Table Mountain, from 2300 ft. up to 3550 ft., fl. Dec.—Jan., *Burchell*, 653; *Bolus*, 3900.—Extends eastward through the colony to Natal (*MacOwan*, 1859, 2129; *Burchell*, 4571, 7094, &c.).

The flowers (of the form on the Peninsula) are cream-coloured. The species varies very much in size, but seems fairly constant in floral characters; in large specimens the leaves become ensiform and plicate. There is nothing whatever to distinguish *Harvey's C. plicatum*, quoted above, notwithstanding *Lindley's* remarks. How far the species extends eastward, and in how far the lip is modified in the eastern forms, in colour or in shape, are problems awaiting solution. I believe that there is a gradual transition from the western form to a more robust, and more highly-coloured form, which has been called in

herbaria *Cymbidium pedicellatum*, &c., as above. Specimens gathered by me near Grahamstown, though larger and differently coloured, scarcely appeared to differ in the structure of the flowers from the Peninsular form, which seems to be always more slender, and to have always uniformly cream-coloured flowers. Thunberg's type specimen of *C. pedicellatum* is, according to Mr. N. E. Brown, a tall lanky plant, exactly matching my No. 4207, but in everything else agreeing with *C. aculeatum*, which, as it occurs on the top of Table Mountain, is usually only 5 or 6 inches high.

7. *Eulophia ustulata*.—Glabrous, 2–6 inches high; tubers several, cylindrical, thicker at the extremity, sometimes ovate; stem short, erect, leafy; leaves several, linear-lanceolate, rigid, acuminate, sheathing at base, many-nerved, $\frac{3}{4}$ –2 inches long; raceme laxly 3–6 flowered; flowers with connivent, fleshy segments; sepals lanceolate, acute, the lateral subfalcate, $3\frac{1}{2}$ lines long; side petals oblong, a little shorter; lip elliptical, bluntly 3-lobed, the terminal lobe larger, rounded, densely papillose above, margined and reflexed, the side lobes obtuse incurved, adnate to the chin of the column, without spur or gibbosity at base, about 4–5 lines long; column semiterete, produced at base into a scoop-like chin, much shorter than the lip; pollinia elliptical, approximate, affixed to the middle of a nearly square diaphanous gland. *Cymbidium ustulatum*, Bolus, in Journ. Linn. Soc. (Bot.), vol. xx. (1884), p. 469.

HAB.—In sandy soil in the valley opposite the "Farmer Peck's" Hotel, on the Muizenberg Mountain, at about 1200 ft., fl. December, Bolus, 4848; *Herb. Norm. Austr.-Afr.*, 153.

In the structure of the flower this comes nearest to *E. aculeata*, Sprengel, but the petals are fleshy and of a deep chocolate-colour, almost approaching to black, and the habit is very different. I have only found it on one spot, less than a hundred yards in diameter, where some sixty or eighty plants were growing, in the summer of 1862–83. It may probably also be found hereafter on the mountains between Fish Hoek and Simon's Town, which have not yet been well explored. It may be noted that a few plants of *Bartholina Ethela*, also a somewhat rare species, were found growing with it.

PLATE 2 (Erroneously lettered "*Cymbidium ustulatum*").—Fig. 1, flower $\times 4$ diameters; 2, sepals and two petals $\times 4$; 3, lip, column, and ovary, side view $\times 4$; 4, lip flattened out $\times 4$; 5, column, front view; 6, pollinarium, front view; 7, ditto, back view; 8, ditto, side view:—magnified.

III.—BARTHOLINA.

R. Brown, in *Aiton's Hortus Kewensis*, 2 ed., vol. v. (1813), p. 194 ;
Benth. & Hook. f. Gen. Plant., vol. iii. (1883), p. 623.
 (*Lathrisia*, *Swartz. Adnot. Bot.* (1829), 49.)

Sepals herbaceous, narrow, connate into a semitubular piece at the base, nearly equal, parallel, erect or re-curved. Petals about as long as the sepals and adnate to them at base, narrow, erect. Lip adnate at base to the sepals, and forming with them a tube, the limb wide, spreading, and deeply cut into many linear, fringe-like segments, with an acute spur at the base. Column with its parts distant (not closely combined and contiguous). Anther situate immediately in front of the petals, erect, long, narrow, with the parallel twisted cells on either side of the diaphanous connective ; pollinia short, coarsely-grained, with long, rigid caudicles, and oblong glands placed at the throat of the basal tube of the lip. Stigma elliptical, nearly flat, viscid, situate at the apex of the ovary, and entirely separated from the anther by the short tube formed by the base of the sepals and lip. Ovary terete, curved, ribbed, not twisted.—Terrestrial herbs, 1- or very rarely 2-flowered. Leaf solitary, radical, orbicular or reniform, appressed to the soil, eared and sheathing at base. Flowers white to pale violet, sometimes purple beneath. (Named after *Thomas Bartholin*, a celebrated Danish anatomist and physiologist.)

DISTRIBUTION.—The genus is exclusively South African, and consists only of the two species here enumerated :—

Petals acuminate, segments of the lip acute, deflexed. . 1. *B. pectinata*.
 ,, obtuse, segments of the lip knobbed, upturned. . 2. *B. Ethelæ*.

1. **Bartholina pectinata**, *R. Brown*, in *Hort. Kew.*, 2 ed., vol. v. (1813), p. 194 ; *Bot. Reg.* t. 1653. — Slender, erect, 3-4 in. high, all parts excepting the petals, pilose with spreading hairs ; leaf 8-12 lines in diam., somewhat convex above, appearing with the flower ; scape slightly curved ; bract ovate, cucullate, more than half as long as the ovary ; sepals with linear-lanceolate erect segments, 5-6 lines long ; petals lanceolate, falcate, acuminate, $1\frac{1}{2}$ times as long as the sepals ; lip orbicular or ovate in outline, somewhat 3-lobed, cut into 17-23 linear acuminate decurved segments, the spur about 5 lines long, the whole about $1\frac{1}{2}$ in. long ; ovary curved, about 8 lines long.—*Orchis Burmanniana*, Linnæus, *Sp. Plant.*, ed. 2 (1763), p. 1334 ; *O. pectinata*, Thunberg, *Prodr. Pl. Cap.* (1794), p. 4 ; *Arcthusa ciliaris*, Linnæus the younger, *Suppl. Syst. Veg.* (1781), p. 405 ; *Bartholina Burmanniana*, Ker, in *Journ. Sci. R. Inst.*, vol. iv. (1818), p. 204, t. vi., fig. 2.

HAB. Grassy places and amongst bushes at the foot of the hills near the sea-shore, Sea Point; also on Wynberg Hill, &c.; fl. Sept.; tolerably common, especially in the first-named locality; *Herb. Norm. Austr.-Afr.* 154.—It also extends along the coast eastward as far as Grahamstown, and possibly further.

The petals and labellum vary from creamy-white, suffused with violet, to light purple. The flowers vary in size, which led Lindley to distinguish two species, which, however, cannot otherwise be separated. It is one of the prettiest as well as one of the most curious of our smaller Orchids, and the fancied resemblance of the lip-segments to the legs of a spider has led to its being called the "Spider Orchid." It was introduced into England by Masson in 1787.

2. *Bartholina Ethelæ*, *Bolus, in Journ. Linn. Soc.*, vol. xx. (1884), p. 472.—All parts, except the flower, clothed with spreading hairs; scape erect, slender, 6–10 in. high, 1- or very rarely 2-flowered; leaf flat, withering before the flower opens, 10–15 lines in diam.; sepals linear-lanceolate, acute, glabrous, reflexed, 6–7 lines long; petals oblong-falcate, obtuse, a little longer than the sepals; lip nearly orbicular in outline, 3-lobed, the lobes cut into 17–23 linear upturned segments, which are dilated at the apex into flattened cushion-like processes, the whole, including the spur at base, $1\frac{1}{2}$ – $1\frac{3}{4}$ in. long; ovary bent, about 10 lines long.

HAB. Under shrubs at the foot of a dry hill overlooking the sea between Kalk Bay and Fish Hoek, altitude 150 ft.; fl. Dec.; *Bolus* 4850! *Herb. Norm. Austr.-Afr.* 500; also in a valley on Muizenberg Mt. in sandy places, at about 900–1000 ft. elevation, growing with *Eulophia ustulata*.

This species seems to be comparatively rare. I have twice gathered it at the same spot near Kalk Bay, but it needs to be carefully searched for. It had previously been collected by the Rev. W. Rodgers and by Admiral Sir F. Grey, who sent it to Kew, but gave no locality more exact than the vague term, "Cape." The colour of the petals is a pale blue; the lip pale blue above, brownish beneath. The species is readily distinguished by the characters given.

PLATE 3.—Fig. 1, lip $\times 1\frac{1}{2}$ diameters; 2, column, with side petals, anterior view $\times 3$; 3, flower, side view, natural size; 4, the flower, after removal of the petals and lip, to show the position of the stigma, magnified; 5, tip of one of the segments of the labellum, magnified; 6, pollinium, magnified. Note.—The scape has been drawn too thick.

IV.—HÓLOTHRIX.

L. C. Richard, in Memoires du Mus. d'Hist. Nat. Paris, vol. iv. (1818), p. 55 (name only); *Lindley, Gen. & Spec. Orch.* (1835), p. 283; *Benth. & Hook. f., Gen. Plant.*, vol. iii. (1883), p. 623. (*Saccidium*,—*Monotris*,—*Scopularia*,—*Tryphia*, all of *Lindley, Gen. & Sp. Orch.* (1835), pp. 301, 303, 333.—*Bucculina, Lindley, in Comp. Bot. Mag.*, vol. ii. (1836), p. 209).

Sepals herbaceous, subequal, connivent. Petals longer than the sepals, narrow, entire or variously divided at the apex. Lip adnate to the column at base, erect or spreading, concave or involute at the sides, cut into three or more segments at the apex, produced at base into a straight or curved spur. Column very short, [the rostellum?] usually eared at the sides of the small bipartite stigma; clinandrium erect, wide, hollow, or almost hood-shaped; connective of the anther not distinct from the clinandrium, the cells ovoid, adnate, distinct, included; pollinia coarsely-grained, with very short caudicles terminating in one (or perhaps sometimes two?) glands. Capsule ovoid or oblong, erect or bent.—Terrestrial herbs with one, or two, sessile, broadly ovate, or orbicular-reniform radical leaves; slender and usually hairy scapes; small, spiked, often secund, mostly greenish flowers; sepals usually hairy; petals and lip always glabrous. (Name from *ἅλωος*, *wholly*, and *θρίξ*, *a hair*, in reference to the constantly hairy indument.)

DISTRIBUTION.—About twenty species are known, three of which are Abyssinian, the rest South-African, occurring mostly in the coast districts; two species, however, reach the mountains of the inland regions, and one is even found in the dry country of Little Namaqualand, near Oókiep.

KEY TO THE SPECIES.

- Leaves glabrous; petals white 1. *H. MUNDTII*.
 Leaves pubescent; petals green.
 Leaves more or less thick and fleshy.
 Hairs coarse, or scaly..... 2. *H. SQUAMULOSA*.
 Hairs fine.
 Flowers large, 3-5 lines long 3. *H. CONDENSATA*.
 Flowers small, 2-3 lines long..... 4. *H. PARVIFOLIA*.
 Leaves not fleshy.
 Segments of lip very long 5. *H. GRACILIS*.
 Segments of lip short 6. *H. VILLOSA*.

1. *Holothrix Mundtii*, *Sonder, in Linnaea*, vol. xix. (1847), p. 77.—Three to six in. high, slender; tuber globose or ovoid, matted with fine hairs; leaves two, radical, the lower broadly ovate or orbicular, the upper smaller, ovate, acute, glabrous, ciliate on the margin; scape pilose with shortish brown hairs, which are thinly placed above, but thicker below, 4-9-flowered, flowers somewhat erect, turned in every direction; bract ovate, cuspidate, pilose, very much shorter than the ovary; sepals glabrous, oblong, obtuse, shorter than the petals; petals ovate-

oblong, obtusely pointed, shorter than the lip; lip nearly orbicular in general outline, cleft into five nearly equal segments, of which the upper pair are two-toothed, the odd middle lobe spatulate, all somewhat obtuse, with a short straight conical spur at base; ovary glabrous, straight.

HAB. Sandy banks under pine-trees two miles east of Rondebosch, at about 60 ft., flowering the first half of October, *Bolus*, 4971; under "silver-trees" on Wynberg Hill, *Miss Hoskyns-Abraham*.—Extends to Swellendam, where it was first found by Mundt, a collector, about 1827; also to Tulbagh.

The petals of this species are white, and by this character and by its glabrous leaves it is readily distinguished from its congeners on the Peninsula. I have not given any measurements of the parts of the flower, because they seem to vary a good deal; those I have seen in a living state were about $2\frac{1}{2}$ lines long, the ovaries about $3\frac{1}{2}$ lines long. Sonder, whose careful description agrees in every other respect with my specimens, says that the petals were three times as long as the sepals, which I did not find. For the first sight of this rare and modest little plant I am indebted to Prof. Bodkin, who found it on Oct. 4th, 1884, and then took me to see it growing, when we succeeded together in finding a few more. Subsequently a single specimen was found on Wynberg Hill by the lady above-named.

2. *Holothrix squamulosa*, *Lindley*, in *Comp. Bot. Mag.*, vol. ii. (1836), 206.—Five to eight in. high, all parts, except the petals, hirsute with thick rough white hairs, sometimes swollen at the base and becoming scales, retrorse on the scape; leaves ovate, acute, fleshy, often withering before the flowers, $\frac{1}{2}$ –1 in. long; scape erect, straight; spike 1–2 in. long; flowers secund, about 3 lines long; bracts about as long as the ovary; sepals ovate-lanceolate, obtuse, about half as long as the petals; petals from a broad base, linear, obtuse, erect or ascending; lip equalling the petals, the upper half cut into five, or sometimes seven, unequal subulate lobes, the two lower short and tooth-like, the three upper longest, having at base a conical generally strongly-curved spur nearly as long as the ovary; pollinia attached to a single gland; ovary curved, $1\frac{1}{2}$ –2 lines long.—*H. Harveiana*, *Lindley*, *ib.*, in part.

α . Var. SCABRA.—Hairs on the upper surface of the leaves very coarse, resembling scales.—*H. squamulosa*, *Lindley*, *ib.*

β . Var. HIRSUTA.—Hairs on the upper surface of the leaves dense, but smaller, and not scale-like.—*H. Harveiana*, *Lindley*, *ib.*

HAB. Frequent in moist sandy places on the Cape Flats, especially after burning, both forms intermixed; sometimes on old thatched roofs near Rondebosch; fl. Sept.—Oct.; *Bolus*, 7022; *Herb. Norm. Austr.-Afr.*, 410; also on Table Mountain, at 2500 ft.; apparently widely diffused throughout the South-western Region.

A robust, rough plant, usually somewhat harsh to the touch, with apple-green flowers, and generally growing somewhat abundantly in

patches wherever it is found. The greatest enthusiast would scarcely call it pretty, and, like many plain-featured plants, it is always there,—in its season; not tantalizing the botanist, like the coy beauties of the fields, by a total disappearance for several seasons, but ready to be gathered and studied any year it may be needed.

PLATE 23.—A. Var. SCABRA. Fig. 1, sepals $\times 4$ diameters; 2, 3, lip $\times 4$; 4, flower $\times 4$; 5, petals $\times 4$; 6, column, front view; 7, column, tilted back, to show stigma; 8, pollinia with single gland; 10, section of leaf; 11, leaf-scales of upper surface; 12, section of flower through the middle, showing *a*, anther, *s*, stigma; 15, a lip with seven lobes, variously enlarged.

B. Var. HIRSA. Fig. 9, section of leaf, magnified; 13, a flower, side view $\times 3$; 14, a flower, front view $\times 3$.

3. *Holothrix condensata*, Sonder, in *Linnaea*, vol. xix. (1847), p. 76.—Three to six in. high, all parts, except the flowers, pilose with fines preading hairs; leaves ovate-orbicular, subacute, patent, somewhat fleshy, 1–2 in. long; scape robust, usually curved; spike about half as long as the scape, dense, secund; flowers quite glabrous, 3–5 lines long; bracts ovate-acuminate, shorter than the ovary; sepals ovate, acute, oblique at base; petals narrow-oblong, obtuse, half as long again as the sepals; lip equalling the petals, with an oblong concave limb, three-cleft at the apex, the lobes equal, blunt, and spreading, with a straight thin spur at base about half its own length; clinandrium very broadly rounded at the apex; the single gland of the pollinia with three sharp teeth; ovary much curved; capsule straight, erect, 3–4 lines long.

HAB. Clefts of rocks with a south aspect, Table Mt., 2800 ft., &c.; fl. Dec.; Bolus, 4905, &c.

The petals and lip are a greenish-yellow. It is well distinguished from *H. villosa* by its thrice larger flowers, more robust habit, more fleshy leaves, and less soft pubescence. The actual size of the plant, like that of *H. villosa*, is extremely variable, but it is usually much shorter than the last-named.

PLATE 22.—Fig. 8, flower, side view $\times 3$ diameters; 9, lip, column, and ovary, $\times 6$; 10, column, viewed from below, the clinandrium partially opened to show the anther, mag.; 11, the pollinia and gland, mag.

4. *Holothrix parvifolia*, Lindley, *Gen. & Sp. Orch.* (1835), p. 283.—Erect, slender, retrorsely hirsute on the scape, sparingly hispid on the other parts, except the petals, which are glabrous, 4–8 in. high; leaves one or two, roundish, very thick and fleshy, coarsely hirsute, withered during flowering, apparently not more than 4 or 5 lin. long; scape straight, somewhat stout, spike rather lax, the flowers turned every way, and usually deflexed; bracts ovate, acute, tipped near the apex with about three twisted hairs nearly as long as the bract; side sepals obliquely ovate, the middle one oblong, acute; petals linear-

oblong, bent, very obtuse; lip somewhat funnel-shaped, with incurved sides, shortly 3-lobed (or sometimes obscurely 5-lobed), lobes ovate, subobtusate, the middle lobe a little longer and wider than the others and upturned at the point, spur tapering, usually decurved, sometimes nearly straight, the whole about 6 lin. long (the middle apical lobe about three-quarters of a line, the spur about $1\frac{3}{4}$ lin. long); clinandrium oblong, or conical truncated, very obtuse, with two deltoid teeth at the base, papillose; pollinia attached to a single gland; ovary ovate, bent. *Orchis hispida*, Linnæus the younger, Suppl. (1781), p. 40; *O. hispida*, Thunberg, Prodr. Plant. Capens. (1794), p. 4; Flor. Cap. (ed. 1823), p. 6. *Habenaria hispida* A. Sprengel

HAB. "On the summit of Table Mountain, and on rocks on the western side of the same mountain," Thunberg; on the lower plateau of Table Mt., above Klansbosch, at about 2400 ft., Jan. 1, 1887, E. Bolus, No. 7034 (in herb. Bolus and herb. Kew).

The petals are a dull ochraceous yellow. I describe from several living specimens from the last-named station, which have been dissected and compared by Mr. N. E. Brown, of Kew, with Lindley's type-specimen, which he had previously compared with Thunberg's type-specimen of *Orchis hispida*, and found all to be identical. The flower figured in 'Icones Plantarum,' t. 103 B, and cited by Lindley, certainly does not belong to this species. Harvey (Gen. of S. A. Plants, ed. i., p. 321) observed: "*H. villosa* and (perhaps) *H. gracilis* appear to me to border too closely on *H. parvifolia*, which varies in different soils and situations, and has as often two leaves as one." Having carefully dissected and drawn the first and last of these species, I have no doubt they are quite distinct. *H. villosa* differs by its softer and longer pubescence, its more slender scape, the longer linear segments of its lip, different petals, and much more sharply pointed conical clinandrium,—a totality of characters of irresistible weight. Bentham (Gen. Plant., iii., 624) thought that *Monotris secunda*, Lindley, which is only known from a single specimen, might be identical with this species.

PLATE 24.—Figs. 1, 2, flower, side and front views $\times 4$ diameters; 3, sepals $\times 6$; 4, petals, $\times 6$; 5, 6, lip $\times 6$; 7, bract $\times 4$; 8, column, front view, magnified; 10, pollinarium, magnified.

5. *Holothrix gracilis*, Lindley, in *Comp. Bot. Mag.*, vol. ii. (1836), p. 207.—Nearly a foot high, pilose, with spreading hairs; leaves two, ovate, pitted above; spike thin, subsecund; bracts ovate-acuminate, shorter than the ovary, covered with long rigid hairs; flowers glabrous; side sepals shortly toothed; petals linear, channelled, smooth; lip cleft into three linear, channelled, smooth segments, with a conical horizontal spur curved at the extremity equal in length to the sepals.

HAB. "Table Mountain," Drège, 1253 a.

This species is unknown to me, except from the poor specimen of Drège in Lindley's herbarium, and the drawing of the flower made by Lindley. The plant is thin and weak, but the lip is very distinct by its long narrow linear segments.

6. *Holothrix villosa*, Lindley, in *Comp. Bot. Mag.*, vol. ii. (1836), p. 207.—Four to twelve inches high, all parts except the flower clothed with long fine and very soft spreading hairs; leaves ovate, acute, patent, thin, 1–1½ in. long; scape very slender, usually curved; spike narrow, 1–2 in. long, usually one-fifth to one-sixth the length of the scape, dense, spreading in all directions or sometimes subsecund; flowers quite glabrous, somewhat papillose, 2 lin. long, bracts ovate acute, shorter than the ovary; sepals broadly ovate, the middle one nearly orbicular; petals linear, obtuse, broader at the base, about as long as the sepals; lip ovate, concave, cut for nearly half its length into three linear obtuse spreading lobes, with a short, straightish, somewhat conical spur, the whole not exceeding 2 lin. long; rostellum developed into a cushion-like ring, nearly encircling the base of the clinandrium.

HAB. Rocky clefts in Table Mt., 2400 ft., fl. Nov., frequent, *Bolus*, 4655; Cape Flats, &c.—It also extends eastward to Mitchell's Pass, Swellendam, and the Sneeuwberg Mts., near Graaff Reinet.

The flowers are an ochraceous yellow, and very small, by which latter character, its softer longer pubescence, and its more slender habit it is readily known from *H. condensata*.

V.—SATYRIUM.

Thunberg ex Swartz, in Kongl. Vetensk. Acad. Nya Handl., vol. xxi. (1800), p. 214, not of *Linnaeus*; *Benth. & Hook. f., Gen. Plant.*, vol. iii. (1883), p. 629. (*Diplechthrum, Persoon, Syn.*, ii., (1807), 508; *Satyridium, Lindley, Gen. & Sp. Orch.* (1838), 345; *Aviceps, Lindley, Gen. & Sp. Orch.* (1838), 345).

Perianth ringent. Sepals subequal, together with the usually similar side petals forming the lower portion, and all more or less connate at base, spreading or reflexed, rarely erect; or rarely (in *S. pumilum*) the side sepals and petals united for the greater part of their length. Lip posticous (uppermost), sessile at the base of the column, erect, helmet- or hood-shaped, or rarely (in *S. striatum*) vaulted, undivided, produced at base into two descending spurs or sacs. Column erect, mostly included within the lip, short or much elongated, divided at the apex into two lobes, the upper one convex, or more rarely concave, bearing the pulvinate stigma on its anterior surface, the lower lobe anticous and forming the rostellum; rarely

(in *S. rhynchanthum*) the column undivided, with a terminal stigma, and a very short rostellum. Anther placed in front, hanging under the rostellum, or horizontal, the cells nearly parallel; caudicles of the pollinia attached to two glands which point forward, and are placed in recesses of the margin of the rostellum, or more rarely are turned backwards; or rarely (in *S. rhynchanthum*) the caudicles united to a single gland. Ovary and pedicel straight, never twisted.—Terrestrial herbs, with the leaves mostly radical, or on the lower part of the stem, reduced to sheaths on the upper portion. Spikes usually densely flowered; bracts membranaceous or leaf-like, frequently erect and imbricate in the early stage of flowering, at length reflexed. (Name from the *Satyri*, the rural demigods of the Greek mythology.)

The genus is very natural and distinct, and has experienced but few changes since its reformation by Thunberg and Swartz in the year 1800. The perianth is not, indeed, absolutely uniform, but the same general type is prevalent throughout. The lip is almost always galeate, or nearly so; in one species only (*S. striatum*, Thunberg), is it simply arched or vaulted. The other parts vary little in shape, but there are considerable differences in their degree of cohesion with each other, and in their setting. The column shows great differences in its length and curvature, in the shape of the stigmatiferous lobe, and of the rostellum.

In *S. rhynchanthum*, which was regarded by Lindley as the type of a distinct genus, *Satyridium*, the occurrence of a single gland (the only instance in the genus), combined with the anomalous structure of the column, seems to warrant its being regarded as a subgenus under that name.

In seeking for characters upon which to found divisions of the remaining species, and which should also embrace those species of the genus which lie beyond our limits, it soon became apparent that the differences in the column, though apparently constant in the species, and yielding excellent marks for specific distinctions, do not appear to be correlated with differences in the perianth or in vegetative characters, and therefore do not indicate natural groups. Lindley's divisions into *Calcaratæ* and *Saccatæ* are apparently the best and most useful for artificial sections, so long as no attempt is made to divide the former into subsections with long and short spurs. Then they break down. The length of the spur is variable even in the same species, and there is no broad division possible into long and short. There is a clear distinction, however, between the spurred and saccate species, because the shortest spurs are much longer than the longest saes, and the former always taper to the extremities, while the latter do not, and they do not in any way shade off one into the other. The

character of erect and reflexed bracts used by Lindley for a secondary division is inconvenient in use owing to the fact of the position of the bracts changing as the flowering proceeds, and in some cases it is not easy to decide whether the bracts are patulous or erect.

A better subdivision may be found in the leaves. I propose to take one group (*Humistratæ*), in which there are one, or more usually two, radical leaves, which lie flat upon and appressed to the ground; and a second (*Adscendentæ*), in which the leaves are mostly more than two, and are erect or ascending: in no species with which I am acquainted is there any doubt as to which of these two subdivisions it should be referred.

DISTRIBUTION.—About 57 described species are admitted. Of these our list includes 18 found on the Peninsula; 20 are scattered over the remainder of extra-tropical South Africa, chiefly along the coast districts to Natal; 5 are Angolan; 4 Abyssinian; 1 from Kilimanjaro Mt.; 6 from the Mascarene Islands; and 3 from British India. Besides the above there are several undescribed species from the Zambesi Region.

KEY TO THE SPECIES.

SUBGENUS I. EUSATYRIUM.

Caudicles of the pollinia each terminating in a separate gland.

§ 1. *Calcaratæ*. Lip with 2 spurs as long as, or longer than, its limb.

* *Humistratæ*. Radical leaf or leaves flat, and appressed to the ground.

- | | | |
|--|---------|-------------------|
| Flowers pink, large; very robust | .. .. . | S. CARNEUM 1. |
| Flowers white, or whitish. | | |
| Radical leaves 2; flowers white, or suffused with pink | .. .. . | S. CANDIDUM 2. |
| Radical leaf 1; flowers dirty white, tips withering | .. .. . | S. EMARCIDUM 3. |
| Flowers ochre-yellow. | | |
| Upper lobe of the column much longer than wide | .. .. . | S. BICORNE 5. |
| Upper lobe of the column wider than long | .. .. . | S. OCHROLEUCUM 6. |
| ** <i>Adscendentæ</i> . Radical leaves more or less ascending, or, if lying on the ground, not flat and appressed to it. | | |
| Flowers brilliant orange, or orange-red | .. .. . | S. CORIFOLIUM 7. |
| Flowers ochre-yellow, or greenish. | | |
| Upper lobe of the column much longer than wide | .. .. . | S. ODORUM 8. |
| Upper lobe of the column much wider than long | .. .. . | S. FOLIOSUM 9. |
| Flowers brownish or fulvous, petals much curved and ascending above the sepals | .. .. . | S. LUPULINUM 10. |
| Flowers white. | | |
| Side petals deflexed; upper lobe of column short | .. .. . | S. MARGINATUM 11. |
| Side petals ascending; upper lobe of column long | .. .. . | S. LIGULATUM 4. |
| Flowers rose-pink, small | .. .. . | S. HALLACKII 12. |

§ 2. *Saccatæ*. Lip with two sacs shorter than its limb.

Lip helmet-shaped; bracts reflexed.

Apex of the lip more or less deflexed in front S. BICALLOSUM 13.

Apex of the lip not deflexed.

Flowers pale yellow or white S. LINDLEYANUM 14.

Flowers dull red or dark brown.

Erect; leaves several, small S. BRACTEATUM 15.

Decumbent, weak; leaves 2 or 3, large .. S. SAXICOLUM 16.

Lip arched, not helmet-shaped; bracts erect S. STRIATUM 17.

SUBGENUS II. SATYRIDIUM.

Caudicles of the pollinia terminating in a single gland.

Only species S. RHYNCHANTHUM 18.

Subgenus I. EU-SATYRIUM.

1. *Satyrium carneum*, *R. Brown, in Hort. Kew, ed. 2, vol. 5 (1813) p. 196.*—Erect, robust, glabrous, 1–2 feet high. Radical leaves two, orbicular or ovoid, fleshy, appressed to the soil; cauline leaves several, ovate, acute, gradually reduced to leaf-like swollen sheaths; spike densely many-flowered, ovate or oblong, half to a third the length of the scape; bracts ovate, acute, membranous, erect, or the lower ones patulous, nearly equalling the flowers; side sepals falcate-oblong, acute, 7–8 lines long, middle sepal linear-acute, equal in length; petals oblong, abruptly acute, a little shorter than the sepals; all the segments deeply partite, ascending, and all, except the odd sepal, keeled below; lip galeate, oblong, with a free obtuse apex, scarcely keeled on the back, with filiform curved spurs $1\frac{1}{4}$ – $1\frac{1}{2}$ times as long as the ovary; rostellum oblong, narrowed in front, much shorter than the linear, arched and somewhat protruded stigmatiferous lobe of the column; ovary sharply ribbed, curved, 6–7 lines long. *Bot. Mag. t. 1512; Flore des Serres, 4, t. 329.*

HAB. Sandy soil extending from Wynberg southward, especially abundant about Fish Hoek and the neighbouring hills, from the sea-level up to 800ft. in elevation; flowering in the latter half of September and the earlier part of October. *Bolus, 4831, &c.*

This is the largest and finest species within our limits, easily distinguished by its size, its large pink flowers, and the long linear upper lobe of the column. It is a deserving favourite of Orchid-lovers, and was introduced into England by Masson, as far back as the year 1787, but the plate in the 'Botanical Magazine' gives a very poor idea of the size of its spike. How far it may extend eastward I do not know; but on the sandy dunes of St. Francis Bay, near Port Elizabeth, its place appears to be taken by *S. princeps*, a closely allied, but yet handsomer species, with deep carmine flowers, which was first sent to me in 1885, by Mr. Russell Hallack.

2. *Satyrium candidum*, Lindley in *Bot. Reg. for 1838, misc.* No. 153.

—Glabrous, robust, erect, 1–1½ feet high. Leaves 2, radical, ovate or subrotund, lying flat upon the ground, 4–5 in. long, succeeded by several loose sheaths; spike cylindrical, bracts oblong, subacute, reflexed. Side sepals oblong, subacute, horizontally spreading, the odd one with reflexed margins, obtuse, all nearly 5 lines long; petals nearly linear subulate, acute, much shorter than the sepals; lip galeate, roundish, inflated, with an obtuse reflexed point, the margin reflexed on the sides, a sharp keel along the back, and spurs nearly half as long again as the ovary; rostellum short and broad, three-toothed in front, tubercled at base; stigmatiferous lobe wider than the rostellum and wider than its length, rounded above and margined; ovary with 6 sharp ridges. *S. utriculatum*, Sonder in 'Linnæa,' vol. xix. (1847) 84.

HAB. Sandy flats eastward of Mowbray, Rondebosch, Wynberg, &c., and on Table Mountain up to 2400 feet; fl. Oct., frequent. Zeyher, 1558; *Herb. Norm. Austr.-Afr.*, 158; Bolus, 4331, &c. It is said to extend eastward to Genadendal, and northward to Riebeeck's Casteel.

The flowers are a pure white, or sometimes faintly suffused with pink, and have a strong and fragrant scent; hence it is a deserved favourite. It was flowered in England nearly fifty years ago by Sir John Herschel, who took it home with him on his return. When dried this species somewhat resembles *S. bicornis* (and more strongly *S. erectum*, though this latter does not come within our limits). In this state the student should observe the edges of the leaves and sheaths, which are quite smooth in this species, and the blunt-pointed galea, while in *S. bicornis* it is sharp. If still in doubt, the flowers, if soaked and dissected under the microscope, will immediately reveal the truth, by the widely different shape of the stigmatiferous lobe of their columns.

3. *Satyrium emarcidum*, Bolus in *Journ. Linn. Soc.*, vol. xxii.

(1885) p. 67.—Glabrous, erect, 4–7 in. high; radical leaf solitary, ovate or subrotund, acute, sheathing at base, appressed to the ground, 2–2½ in. long and wide, second leaf ovate, acute, ascending, uppermost passing into sheaths; spike densely 6–12-flowered, 1–2 in. long, bracts ovate, acute, reflexed, about as long as the flowers; side sepals cymbiform, incised on the outer margin, erect; odd sepal linear-oblong, acute, decurved, all about 3 lines long; petals ovate, acuminate, ascending, 3 lines long; lip galeate, ovate, with an acuminate reflexed point, 4 lines long, with filiform bluntish spurs about as long as the ovary; column curved; connective of the anther produced into a free subulate ascending point; rostellum umbonate at the apex, about as long as the oblong subemarginate stigma; ovary elliptical, ridged, about 3 lines long.

HAB. Sandy flat ground in Fish Hoek, north shores of False Bay, nearly on the sea-level; fl. Sept. *Bolus*, 4847, *Herb. Norm. Austr.-Afr.*, 159.

Colour of the flowers a dirty yellowish white, the segments soon withering at the tips. In the structure of its flowers this comes near to *S. ligulatum*, having, like it, all the parts except the middle sepal nearly erect. But it is well distinguished by the difference in the leaves and other characters given. It does not appear to be common, and I have only met with it sparingly at the place above named, about a mile from the sea-shore.

PLATE 27.—Figs. 1, 2, flower with bract, front and side views $\times 3$ diameters; 3, parts of the flower $\times 3$; 4, 5, column, front and side views, magnified.

4. *Satyrium ligulatum*, *Lindley, Gen. & Sp. Orch.* (1838), p. 342.—Glabrous, erect, 12-18 in. high; stem somewhat weak and flexuose, with 2-3 loose acuminate sheaths; leaves about 3, oblong-lanceolate, acute, somewhat waved, 6-8 in. long, laxly ascending or the lowest lying on the ground; spike rather narrow, closely 10-20-flowered; bracts oblong-lanceolate, acuminate, reflexed, a little longer than the flowers; side sepals ascending, lanceolate, acuminate, oblique, narrowed at the apex into a long linear obtuse twisted point, about 5 lines long; odd sepal lanceolate, subacute, with a sigmoid flexure, the point ascending; lip galeate, ovate, with an acuminate reflexed point, the spurs about as long as the ovary; petals somewhat resembling the side sepals in shape, but shorter, ascending; column very erect, the connective of the anther produced into a free subulate ascending point; rostellum very blunt, 2-tubercled at base, about half as long as the erect, oblong, stigmatiferous lobe, which is more than three times as long as its breadth.

HAB. In an old kraal on the lower plateau of Table Mountain, at about 2500 ft.; fl. Nov.—Dec. (1882). *Herb. Norm. Austr.-Afr.*, 332; *H. Bolus*, 4853; not common.—Extends to Tulbagh Kloof, Caledon (*Zeyher*, 3910), Knysna, and near Grahamstown (*MacOwan*, 693).

Colour of the flowers white. In floral structure this comes nearest to the preceding. Like it also this species is somewhat rare on the Peninsula, and I have only met with it on the one station recorded above.

PLATE 28.—Figs. 1, 2, flower, front and side views $\times 4$ diameters; 3, side sepal $\times 4$; 4, petal $\times 4$; 5, lip, flattened out $\times 4$; 6, 7, column, side and front views; 8, pollinium; 9, section of ovary,—variously magnified.

5. *Satyrium bicorne*, *Thunberg, Prodr. Plant. Capens.* (1794), p. 6.—A nearly glabrous erect herb, with a somewhat thin, rigid, and very straight scape, from 1-1½ feet high. Leaves two, radical, broadly ovate, subacute, sheathing at base, lying flat upon the ground, ciliate, 8-10-nerved, 4-5 in. long, 3-4 in. wide, succeeded by about 4 inflated, nearly vase-shaped sheaths; spike about half the length of the scape; bracts oblong, acute or subobtuse, reflexed; flowers somewhat distant;

side sepals broadly oblong, 3–3½ lines long, the odd one narrower, petals shaped like the side sepals but shorter, all spreading, convex above and deeply connate at base; lip helmet-shaped, subacute, the small point pushed forward, with filiform spurs 9–10 lines long, nearly half as long again as the ovary; rostellum oblong, with a single tooth in the middle of the front margin, deflexed, shorter than the linear-oblong emarginate stigmatiferous lobe of the column, which is about twice as long as its width; ovary oblong, sharply ribbed.—*Orchis lutea*, Buxbaum, Cent. 3 (1729), p. 6, t. 8. *O. bicornis*, Linnæus, Amœn. Acad. 6 (1764), 109. *S. cucullatum*, Swartz, Kongl. V. Acad. Handl. 21, 216, t. iii. f. C. a-e. Thunberg, Flor. Cap. (ed. 1823), p. 17. Bot. Reg. t. 416. Andrews, Bot. Repos. t. 315.

HAB. Heathy places on the Flats, and on the hills and mountain sides up to about 2500 ft.; fl. Sept.—Oct. *Bolus*, 4556; *Ecklon & Zeyher*, 1559, 4679; *Drège*, 8294, 8295.—Extends to the Caledon district (Appel's Kraal).

The flowers are scented, and of a dull ochre-yellow; the scape and bases of the sheath usually red or reddish. It is allied to *S. ochroleucum* and to *S. foliosum*. This species is one of the commonest of the genus, and may be found almost everywhere, though most abundant on the eastern side of the Peninsula. It was introduced into England by Masson about the year 1787. Buxbaum's figure of this and some others appear to be the earliest recorded of any South-African Orchids. It is not very like, but is cited by Linnæus.

6. *Satyrium ochroleucum*, *Bolus*, in *Journ. Linn. Soc.* vol. xxii. (1885), p. 66.—Glabrous, erect, rather weak, a span to a foot high. Leaves two, appressed to the soil, oval, subobtuse, or acute, many-nerved, sheathing at base, 3–4 in. long, 2–3½ in. wide, three uppermost gradually passing into leafy spreading sheaths; spike loosely many-flowered, 3–8 in. long, 1 in. wide; bracts lanceolate, reflexed, somewhat longer than the ovaries; side sepals oblong, subfalcate, obtuse, about 3 lines long; odd sepal and petals linear, obtuse, a little shorter; lip galeate, 3–4 lines long, with a narrow elliptical mouth, margin recurved, apex erect or reflexed, obtuse, minutely toothed, the spurs spreading, 5–6 lines long, slightly exceeding the ovary; rostellum oblong, narrowed in front; stigmatiferous lobe of the column semi-orbicular; ovary acutely ribbed, about 5 lines long. *Orchis bicornis*, Jacquin, Hort. Schoenbr. t. 179! (not of Linnæus); an excellent figure.

HAB. On the eastern slopes of the Devil's Peak, above Newlands, at about 1500 ft.; Oct. 27th, 1884. *A. Bodkin* (*Bolus*, 4982), *Herb. Norm. Austr.-Afr.*, 411; *Drège*, 1257 a.

The colour of the flowers is a pale ochre-yellow, like those of *S. bicorne*, and the whole plant has the pleasant odour of the sweet-

scented English Vernal Grass. It has somewhat the appearance of *S. bicornis*, but the habit is much laxer; the structure of the flowers, however, is much nearer to those of *S. candidum*, with which the plant was confused by Lindley. But *S. candidum* is more robust, and the flowers larger and always white, or a very pale rose. Small specimens very much resemble *S. humile*, Lindley, with the type of which I have compared it; but the present species differs by its relatively shorter and broader stigmatiferous lobe of the column and its shorter spurs. It does not seem to be common on the Peninsula, but I found it in some abundance near the Tulbagh Road Railway Station, on Oct. 3rd, 1884, where it was accompanied by a variety with a more robust habit and larger flowers, which were, however, identical in structure with the typical form.

PLATE 26.—Fig. 1, 2, flower, front and side view $\times 3$ diameters; 3, sepals and petals $\times 3$; 4, column, front view; 5, ditto, side view; 6, section of ovary; 7, rostellum viewed from above; all the latter variously magnified.

7. *Satyrium coriifolium*, Swartz, in *Kongl. Vetensk. Acad. Handl.* vol. xxi. (1800), p. 216.—Erect, robust, glabrous, $1\frac{1}{2}$ –2 ft. high. Lowest leaf short and scale-like, three succeeding oblong-lanceolate, acute, many-nerved, sheathing at base, rigid, leathery, spreading-erect, the upper 2–3 reduced to distant acuminate sheaths; spike cylindrical, many-flowered, bracts ovate-acuminate, reflexed, as long as, or somewhat longer than, the flowers; side sepals oblong, obliquely acute, deflexed, about 6 lines long; odd sepal linear, obtuse, equally long; petals linear, acute, equalling the sepals; lip galeate, inflated, nearly globose or compressed at the sides, with a free obtuse apex, spurs obtuse, about as long as the ovary; rostellum wide, 3-toothed in front, the sinuses very wide and round; stigmatiferous lobe of the column oblong, concave, scarcely longer than the rostellum; ovary short, the dorsal rib somewhat obsolete. *Orchis lutea caule purpureo*, Buxbaum, Cent. 3 (1729), p. 7, t. 10. *Orchis bicornis*, Linnæus, Spec. Plant. ed. 2. (1763) 1330. *S. erectum*, Lindley, in Gen. & Sp. Orch. (1838) p. 340, not of Swartz; Lodd. Bot. Cab. t. 104; Bot. Mag. t. 2172; Bot. Reg. t. 703.

HAB. On the Flats, from Rondebosch southward; and on the hills and mountain sides up to 600 or 700 ft.; fl. July–Nov.; Zeyher, 1555; Drège, 1256 b; Bolus, 4557.—Extends eastward to the Knysna (Burchell, 5551, 6067).

One of the commonest species on the Peninsula, and one which remains the longest in flower. It is especially abundant on the Flats, where insatiable flower-gatherers in spring carry off large bunches of the scapes. The flowers are a clear bright orange, more or less varying to or tinged with, a flame-coloured red. The colour seems constant, and easily distinguishes this species from any other, though I have seen plants from Diep River, which appeared to be hybrids

between this species and *S. carneum*, and which had salmon-coloured flowers only slightly modified in structure. The species is a very old one, and was perhaps cultivated in Europe prior to 1729, when Buxbaum's figure was published, although Loddiges says it was first introduced by Masson in 1787. There has been some confusion between it and *S. erectum*, Swartz (which does not occur within our limits); and I suspect that the plant under the latter name in Thunberg's 'Flora Capensis,' ed. 1823, p. 18, was really described from *S. coriifolium*. Thunberg calls the flowers "flavo aurantiaci" (yellow orange), and I know no other western species of this colour. He also adds that it is called by the colonists "Geele Trewa"; this species is called "Ewa Trewa," probably a corruption of the former. But the *S. erectum* of Thunberg's herbarium, which must be accepted as the final authority, we now know, from the examination of Mr. N. E. Brown, to be a very different and well-known plant, with rose-coloured flowers, common enough about Tulbagh, Stellenbosch, &c.

8. *Satyrium odorum*, *Sonder in Linnæa*, vol. xix. (1847), p. 86.—A lax-growing glabrous somewhat succulent herb, 1–2 ft. high. Scape weak, often bent at the base or above; lower leaves about 4, ovate, acute, sheathing at base, entire, loosely spreading, 4–6 in. long, 3–4 in. wide, in large specimens attaining to 10 in. or more in length, the upper much smaller; succeeded by two sheaths, united so as to form a shallow cup at base; spike laxly flowered, from 3–8 in. or more in length; bracts ovate, acuminate, reflexed, about as long as the flowers; sepals oblong, obtuse, spreading, about $3\frac{1}{2}$ lines long, the odd one a little smaller; petals oblong-obovate, very obtuse, $2\frac{1}{2}$ lines long; lip galeate, the mouth obovate, with an obtuse reflexed point, the margin in front reflexed, the back keeled, the whole, with the filiform spurs (which are longer than the ovary), about 1 in. long; rostellum ovate, very much rounded in front, the widely-separated sinuses which hold the glands, forming a single semi-orbicular lobe terminated by a sharp tooth on either side, bi-tuberculate at base; stigmatiferous lobe oblong, nearly square-topped, finely toothed towards the summit, almost twice as long as its width.

HAB. Under shrubs and in shady places, on the Flats, and also on the slopes of Table Mountain up to 2500 ft.; fl. Aug.—Oct.; *Ecklon & Zeyher*, 1557; *Drège*, 8291 a; *C. Wright*, 138; *Herb. Norm. Austr.-Afr.*, 157; *Bolus*, 4559.

This is one of the earliest-flowering of our Orchids; and not at all uncommon, though it seems chiefly to affect the eastern part of the Peninsula. The flowers are a pale green, with dull purple tips on the sepals and labellum; not at all pretty, but with a very strong and agreeable odour of cloves. The species is not easily mistaken for any other, and the peculiar form of the front of the rostellum, somewhat

resembling the blade of a cheesemonger's cutter, distinguishes it from its congeners on the Peninsula.

9. *Satyrium foliosum*, Swartz, in *Kongl. Vet. Acad. Handl.* vol. xxi. (1800), p. 216; *Thunb. Flor. Cap.* (ed. 1823), p. 18 (not of Lindley!).—Glabrous, erect, or decumbent, 9-15 in. high. Leaves ovate, acute, nerved, sheathing at base, erecto-patent, the two lower $1\frac{1}{2}$ -2 in. long, $1-1\frac{1}{4}$ in. wide, succeeded by about 4 spreading acute sheaths, the upper gradually smaller; spike linear, about half the length of the scape, not densely flowered; bracts lanceolate, acute, nerved, the lower reflexed, the upper erect, about as long as the flowers; flowers spreading, erect, the ovary and helmet very straight; sepals oblong, very obtuse, erosulate towards the apex, $3\frac{1}{2}$ lines long, the lateral widely spreading, the odd one narrower and a little shorter, the same shape as the petals, all strongly recurved; lip helmet-shaped, with a free, obtuse, erect, erosulate apex, and filiform spurs about 1 in. long, much exceeding the ovary; rostellum short and wide, 3-toothed, the middle rounded, the side ones acute, tubercled at base; stigmatiferous lobe wider than long, a little longer than the rostellum, margined, and notched at the top, the stigma very convex and bilobed; ovary linear, ribbed in front, convex at the back, about 8 lines long.

HAB. On a steep grassy bank, on the east side of Table Mountain, near the summit at about 3300 ft.; fl. Dec.—Jan., A. Bodkin, *Bolus*, No. 4858, *Herb. Norm. Austr.-Afr.*, 155.

The flowers are a pale ochre-yellow; the leaves bright green above, much paler below. The species is not by any means common, and does not seem to have been gathered since Thunberg's time, who did not name the station where he found it. The credit of its re-discovery is due to Mr. Bodkin, who found it in Jan., 1883, and I subsequently obtained it in 1884. It was unknown to Lindley, who called by this name the species which I have described as *S. Halluckii*. Thunberg's description, however, is excellent (though he stated the flowers to be "purplish," probably trusting to memory), and Mr. N. E. Brown, of Kew, identified the species at once amongst Thunberg's types. This has somewhat the habit and general appearance of *S. ochroleucum*, but it has not the large lower leaves of that species, the spurs are much longer, and the column different in shape.

10. *Satyrium lupulinum*, Lindley, *Gen. & Sp. Orch.* (1838), p. 338.—Glabrous, erect, 8-16 in. high. Stem straight, leafy, slender or stoutish; lower leaves 3, ovate, acute, waved, close together and sheathing at base, spreading, 2-4 in. long, $\frac{3}{4}$ -3 in. wide, succeeded by 2-3 more erect, sheath-like, acute, leaves; spike somewhat densely many-flowered, the bracts herbaceous, broadly ovate, acuminate,

reflexed, longer and wider than the flowers; sepals linear-oblong, subobtusate, strongly curved and bent downwards, the lateral about $4\frac{1}{2}$ lines long, the odd one smaller; petals somewhat rhomboidal or subfalcate, the upper half crisped, curved, and occupying an unusually large space between the sepals and the lip; lip galeate, narrow, the mouth ovate or oblong, with a nearly erect obtuse apex, the whole, with the filiform spurs (which are longer than the ovary) about 10 lines long; rostellum oblong, truncate, with a small straight-edged central lobe on the truncated margin; stigmatiferous lobe linear-oblong, wider at the rounded apex, about 3 times as long as its width.

HAB. Eastern slopes of Table Mountain above Klassenbosch and on Wynberg Hill, &c., at from 500 to 1200 feet above the sea; fl. Sept.—Oct., not very common. *Bolus*, 4553, &c.—Extends to the Houw Hoek Mts., and on the authority of a single specimen in Herb. Kew, to Algoa Bay, *Forbes*.

There are two varieties: one with dark brown, the other with tawny yellow flowers. I have found these growing together, and they do not seem otherwise to differ. In habit the present species resembles *S. foliosum*, but the bracts are very different. The large size of the latter compared with the flowers, and the set of the strongly-curved petals, so as to bring them entirely above the sepals, are the distinguishing characteristics of this species. Lindley describes the petals as sometimes minutely pubescent; I have never found them otherwise than glabrous. I have only gathered the plant on two or three spots; in some years it seems to be very scarce, or hardly to appear at all, and then very much dwarfed.

11. *Satyrium marginatum*, *Bolus*, in *Journ. Linn. Soc.*, vol. xx. (1884), p. 476.—Stem erect, nearly straight, distantly leafy, $\frac{1}{2}$ – $1\frac{1}{2}$ ft. high; leaves ovate-lanceolate, acute, sheathing at base, somewhat leathery, margined, faintly nerved, the upper smaller, the uppermost reduced to sheaths; spike many-flowered, 3–6 in. long, $\frac{1}{2}$ –1 in. wide; bracts oblong, obtuse or acute, erect, shorter than the flowers; side sepals oblong, obtuse, 4 lines long, the odd one as long but narrower and incurved at the apex; petals oblong-linear, obtuse, mucronulate, a little shorter than the sepals; lip galeate, obovate, with an acuminate reflexed point as long as the mouth, spurs filiform, equalling the ovary; column erect, then bent forward at the middle; rostellum 3-lobed in front, bituberculate at base; stigmatiferous lobe oblong, or nearly square; ovary 5–6 lines long, the posterior side convex, without rib.—*S. parviflorum*, Lindley, *Gen. & Sp. Orch.* (1838), not of Swartz.

HAB. Moist places on the Cape Flats below Claremont, &c., at 80 ft. alt.; fl. Oct.; *Ecklon*, 1561, 3913; *Drège*, 1260 a; *Pappe*, 65, 66; *Bolus*, 4550.—Extends eastward to the Hottentot's-holland range of mountains, and probably further.

Flowers nearly white, side sepals tinged with pink, the other parts with faint green lines; the whole plant generally dries a rusty brown.

This species was mistaken by Lindley for *S. parviflorum*, Swartz, which he had not seen; and his citation of Jacquin's figure in *Hort. Schönbr.*, t. 179, unfortunately added to the confusion, for that is very different even from his own description, and is our *S. ochroleucum*. The species varies very greatly in size, and in the length of the leaves, which are often much reduced; also in the width of the sepals and petals; but the erect and somewhat inflated bracts, and the very large free point of the galea are constant marks.

12. **Satyrium Hallackii**, *Bolus*, in *Journ. Linn. Soc.*, vol. xx. (1884), p. 476.—An erect, glabrous, robust herb, 9–18 in. high. Scape straight, thick, leafy; leaves ovate-lanceolate, acute, coarsely nerved, sheathing at base, erect and spreading, the lower 4–8 in. long, the upper passing into 3 or 4 very erect, acute, strongly-ridged sheaths; spike oblong, very densely many-flowered, 3–5 in. long; bracts lanceolate, the younger erect, the lower erect, then spreading, all longer than the flowers; side sepals oblong, subobtuse, a little longer than the narrower odd sepal; petals linear, obtuse, all the segments about 4 lines long; lip galeate, with a mouth wider than long, sharply keeled at the back, with a small acute reflexed point, spurs tapering, about 6–7 lines long, shorter than the ovary; rostellum with a lanceolate, acute, middle lobe in front, and a wide recess for the gland on each side, 2-tubercled at base; stigmatiferous lobe of the column short cushion-like, wider than its length, marginate at the top.—*S. foliosum*, and var. *helonioides*, Lindley! *Gen. & Sp. Orch.* (1838), p. 336, not of Swartz.

HAB. In sandy soil, Houts Bay, 100 ft., end of December, *Bodkin*.—"Cape Flats," *Pappe*, 651, *Zeyher*, 1556: apparently not frequent.—Extends eastward to Port Elizabeth, *Hallack*, a form with smaller flowers and relatively longer spurs.—(*Bolus*, 6092; *Burchell*, 4372, 4379.)

The flowers are a rosy pink. The species is quite distinct, and there is no other on the Peninsula in the least degree resembling its thick dense spike of pink flowers, which are as large as those of *S. marginatum*.

I described the species originally from specimens sent me by Mr. R. Hallack from Port Elizabeth. I have since seen plants from the Peninsula which have larger flowers and longer bracts; the foregoing description, as also the figure, is taken from the latter.

PLATE 29.—Figs. 1, 2, flower, side and front views $\times 2$ diameters; 3, sepals and petals, upper side $\times 2$; 4, ditto, under side $\times 2$; 5, column, with one gland removed; 6, ditto, side view; 7, section of ovary,—all the latter variously magnified.

13. **Satyrium bicallosum**, *Thunberg*, *Prodr. Plant. Capens.* (1794), p. 6; *ib.*, *Flora Cap.*, ed. 1823, p. 19; *Swartz*, *Kongl. Vet. Acad. Handl.*, vol. xxi. (1800), p. 216.—Glabrous, erect, usually very straight, 8–12 in.

high; leaves ovate, acute, cordate and sheathing at base, the margin wavy and reflexed, the lowest leaf patent $1\frac{1}{2}$ in. long, cauline 5 or 6, ascending, smaller, and gradually passing into bracts; spike cylindrical, densely many-flowered, usually about half the length of the scape; bracts leaf-like, ovate, acuminate, ascending, the lower ones always longer, the upper sometimes shorter than the flowers; side sepals broadly elliptical, very blunt, subfalcate, about 2 lines long; the odd sepal and petals ovate-oblong, blunt, revolute, a little smaller; lip galeate, oblong, mouth $2\frac{1}{2}$ lines wide and wider than long, depressed in the centre and the long blunt point deflexed in front, forming two circular entrances to the flower, with two short blunt sacs at base; column short, bent back and then upwards, sharply bilobed at the apex; anther slightly ascending, its apex turned to the front of the flower, the glands posterior and distant; rostellum triangular and very short, pushed by the anther upward so as to cover and conceal the stigma, with 2 large tubercles at base; stigmatiferous lobe of the column semi-orbicular, small; ovary elliptical, muricate on the ribs, about $1\frac{1}{2}$ lines long.

Var. *a.* THUNBERGIANUM.—All the bracts longer than the flowers; the deflexed point of the galea short, reaching less than half-way down to the base.

Var. *β.* OCELLATUM.—Upper bracts shorter than the flowers; deflexed point of the galea very long, reaching nearly to the base, and forming two circular entrances to the flower.

HAB. Both varieties on steep gravelly slopes on the mountains of the Peninsula, mostly on the eastern sides; also on the lower plateaux, alt. 600—2500 ft.; fl. Oct.—Nov. *Bolus*, 4554; *Herb. Norm. Austr.-Afr.*, 335.

The colour of the flowers in both varieties is whitish, suffused with yellow or greenish tints. The size of the flowers is somewhat variable. In the structure of the column this species differs from any other known to me. The anther, instead of hanging vertically under the rostellum with its glands pointing forward, as is the typical structure in the genus, appears as if pushed up against the apex of the column, so as to lie nearly horizontal, with the glands turned to the back of the flower, and the stigma completely covered and hidden from view. The economy of its fertilisation is a puzzle to me, for the appearance is as if the process were carefully prevented (just as Darwin observes is the case with *Masdevallia fenestrata*, but “which,” he adds, “proves that we do not know its structure”). But I have not had the opportunity of watching it, and have never seen any insect or trace of insect-work on the plant. In appearance it greatly resembles *S. Lindleyanum*, but the deflexion of the point of the galea will generally serve to distinguish it, independently of the great difference in the column.

PLATE 31.—Var. *a.* THUNBERGIANUM. Fig. 3, parts of the perianth $\times 4$ diameters. Var. *β.* OCELLATUM. The whole plant, nat. size. Figs. 1, 2, flower $\times 6$; 4, column,

front view, the anther removed and the rostellum pulled down to show the stigma; 5, 6, 7, column, front, side, and back views; all the latter variously magnified: *st*, stigmatiferous lobe of the column; *s*, stigma; *r*, rostellum; *a*, anther.

14. *Satyrium Lindleyanum*, *Bolus*, in *Journ. Linn. Soc.*, vol. xx. (1884), p. 474. — Glabrous, scape erect, leafy, a span high; leaves ovate, subacute, cordate, sheathing at base, margin waved and reflexed, ascending, the lower $1\frac{1}{2}$ –2 in. long, upper gradually smaller and passing into bracts; spike cylindrical, many-flowered; bracts broadly ovate, acuminate, spreading, exceeding the flowers; sepals ovate, obtuse, the odd one with revolute margins; petals trapezoid, very obtuse; lip galeate, crested, mouth wider than long, apex pointless, ciliate, with two nearly spherical small sacs at base,—all the segments about $1\frac{1}{2}$ lin. long; column erect, slightly bent in the middle, very short; rostellum very short, blunt and deflexed, 2-tubercled at base; stigmatiferous lobe obovate, pulvinate; ovary broad, ribbed, $1\frac{1}{2}$ lin. long. *S. bracteatum*, Lindley, *Gen. & Sp. Orch.* (1838), p. 342, not of Thunberg.

HAB. Sides of streams near Klaver Vley, on the hills behind Simon's Town, at about 800 ft. altitude, fl. Oct. *Bolus*, 4828; *Herb. Norm. Austr.-Afr.*, 404. North side of Table Mt., Jan., *Burchell*, 650.—Extends to Mitchell's Pass, near Ceres.

Flowers yellowish white, the crest of the galea and the sacs tinted with a red-brown. I found it abundant at the station above-named in Oct., 1885, but never gathered it elsewhere on the Peninsula.

PLATE 30.—Figs. 1, 2, flower, front and back views; 3, sepals and petals; 4, lip,—all $\times 6$ diameters; 5, 6, column, front and side views, magnified.

15. *Satyrium bracteatum*, *Thunberg*, in *Prodr. Plant. Capens.* (1794), p. 6; *ib.*, *Flor. Cap.* (ed. 1823), p. 18, not of Lindley; *Ker*, *Journ. Sci. R. Inst.*, vol. viii. (1820), t. 3, f. 1 (var. *lineatum*).

Var. β . LINEATUM. — Nearly glabrous, the bracts and nerves of the galea rigidly ciliate or subpapillose, erect, 3–9 in. high. Scape leafy, usually slender; lower leaves spreading, ovate-lanceolate, acute, 1–2 in. long, the upper passing into somewhat distant, spreading, leaf-like sheaths; spike somewhat dense, 1–3 in. long; bracts broadly ovate-acuminate, the lower reflexed, upper spreading, longer and wider than the flowers; sepals and petals rather deeply connate into a single piece, the two side sepals falcate, the odd one shorter, petals falcate, very obtuse, all about 2 lin. long; lip galeate, the mouth ovate, acute, the spurs very short and rounded; rostellum 3-toothed in front, the side-teeth widely spreading, each holding a gland at the extremity; 2-tubercled at base; stigmatiferous lobe oblong, longer than its width, emarginate, papillose; ovary densely papillose-ciliate along the ribs. *S. lineatum*, Lindley, *Gen. & Sp. Orch.* (1838), p. 343. Sheet β . of Thunberg's Herbarium.

HAB. In moist places on the Cape Flats near Rondebosch, Claremont, &c., alt. 50—100 ft., fl. Aug.—Sept.; Zeyher, 1562; Bolus, 3932.

Flowers about the colour of burnt sienna, with a stripe of raw sienna along each sepal and petal, and several on the lip, or more rarely dull ochre-yellow with reddish stripes.

Flowers darker and habit laxer.—On mountain sides, Bolus, 4904.

Var. γ . NANUM.—Smaller in all parts than the preceding, 2–3 in. high, leaves fewer, spike longer in proportion to the height of the plant, bracts strictly reflexed, perianth-segments less deeply connate, stigmatiferous lobe of the column wider than its length, and pilose at base.

Colour of the flowers dull red, with darker red stripes, arranged as in the preceding.

HAB. Near streams, Klaver Vley, behind Simon's Town, at about 800 ft.; fl. Sept. Bolus, 4820.

For the determination of these forms I am greatly indebted to the help of Mr. N. E. Brown, without which I could not have succeeded. Thunberg's Herbarium, carefully examined by that gentleman, contains three sheets marked *S. bracteatum*. Sheets *a* and *c* contain the plant described by Thunberg, Flor. Cap., p. 18, and is the same as *S. pictum*, Lindley. The flowers are glabrous, without papillæ on the nerves, and are described as white. I cannot find that this, the typical form, has been gathered on the Peninsula, nor have I ever seen more than a single dried flower sent me for dissection. The column of this is almost exactly the same as that of my 3932. Thunberg found it near Riebeck's Kasteel and Piquetberg in October. Sheet *b* contains plants which Mr. Brown identified with my Nos. 3932, 4820, and 4904, Zeyher's 1562, and with Lindley's *S. lineatum*. But amongst these are certainly two distinct forms, which I have characterised as above. The confusion of this species and its forms is greatly due to Lindley, who, without seeing Thunberg's types, described as *S. bracteatum* of Thunberg a distinct species (our *S. Lindleyanum*), and made two new species (*S. lineatum* and *S. pictum*) out of the true *S. bracteatum*. Our *S. saxicolum* may possibly be merely another form of this variable species, distinguishable by little more than its lax habit and larger lower leaves.

PLATE 32.—A, var. β . LINEATUM. Figs. 1, 2, flower, front and side views; 3, lip, front view; 4, sepals and petals,—all $\times 3$ diameters; 5, 6, column, front and side views; 7, pollinium, magnified. B, var. γ . NANUM. Figs. 8, 9, flower, front and side views, mag. 6 diameters; 10, 11, column, front and side views, $\times 10$.

16. *Satyrium saxicolum*, Bolus, in Journ. Linn. Soc., vol. xx. (1881), p. 474.—A dwarf, glabrous, weak, decumbent herb, 2–3 in. high; leaves 2–3, ovate, obtuse or subacute, clasping at base, 3-nerved, flaccid, pale green, spreading, and often revolute, $1\frac{1}{4}$ –2 in. long, the

upper smaller; spike 4-5-flowered, $\frac{3}{4}$ -1 in. long, bracts ovate-acuminate, reflexed, the lower ones somewhat longer than, the upper as long as, the flower; side sepals ovate-oblong, subfalcate, blunt, odd sepal oblong, blunt, all about $2\frac{1}{2}$ lin. long; petals oblong, a little shorter; lip galeate, narrowed to an acute point above, ridged and ciliate on the back, about $3\frac{1}{2}$ lin. high, spurs very short and blunt, less than a line long; column erect, bent towards the summit; rostellum spreading, 3-lobed, nearly as long as the stigma; stigma oblong, longer than wide, bitubercled at base; ovary suborbicular, roughly papillose on the ribs, about 2 lin. long.

HAB. In moist clefts of steep shaded rocks on the mountains of the Cape Peninsula from 1000 to 2400 ft., fl. Oct., *Drège*, 1259 b; *C. Wright*, 136; *Bolus*, 3855; *Herb. Norm. Austr. Afr.*, 156.

The flowers are a brown-yellow striped with deep red lines, the leaves sap-green, paler beneath. In floral characters it comes nearest to *S. bracteatum*, var. *lineatum*, differing chiefly in the more acute galea, shorter spurs, and longer stigma. But the habit is laxer, and the leaves much larger; it is also very exclusive in its habitat, while *S. bracteatum* affects open sunny flats and heathy mountain sides. In the dried state it bears a strong external resemblance to *S. pumilum*, but the flowers are very different. It is by no means an uncommon plant.

PLATE 4.—Fig. 1, flower, front view, $\times 4$ diameters; 2, ditto, side view, $\times 4$; 3, ovary, with column, front view, $\times 6$; 4, ditto, side view, $\times 6$; 5, stigma, with rostellum, magnified; 6, pollinium, mag.

17. *Satyrium striatum*, *Thunberg*, *Prodr. Plant. Capens.* (1794), p. 6; *ib.*, *Flor. Cap.*, ed. 1823, p. 19.—Glabrous, erect, 4-6 in. high; radical leaf subrotund, somewhat fleshy, sheathing at base, appressed to the ground, 8 lin. long and wide, second leaf ovate, acute, smaller, patent, third leaf bracteiform, cucullate; spike laxly 6-8-flowered, $1\frac{1}{2}$ -2 in. long, bracts rhomboidal or obovate, cucullate, thick, and subrigid, the lower cuspidate, nearly as long as, and almost enveloping the flower, 7-8 lin. wide; side sepals elliptical, spreading, recurved, $2\frac{1}{2}$ lin. long; odd sepal broadly ovate, obtuse, the sides deflexed, shorter than the others; petals lanceolate or ovate, subacute, about $1\frac{1}{2}$ lin. long; lip oblong, arched, but not galeate (*i. e.*, the sides scarcely inflexed), emarginate, very obtusely bisaccate at base, the sacs about $1\frac{1}{4}$ lin. long; column moderately curved forward; caudicles short, glands large orbicular; point of rostellum triangular, extending far beyond the glands and deflexed; stigmatiferous lobe oblong, bilobed, margined; ovary $2\frac{1}{2}$ -3 lin. long.

HAB. Sandy moist slopes on the Steenberg Mt., 1200 ft., Sept., *Bodkin*, *Bolus*, 4946, *Herb. Norm. Austr.-Afr.*, 317.—Extends northward to Stellenbosch and Piquetberg.

The stem is reddish, the lower leaf red below, dark green above, the flowers fulvous with red stripes, with a few glandular hairs at the base of the side sepals and petals. This well-marked species was not, so far as is known, gathered for upwards of a hundred years after Thunberg's time. It does not appear to be amongst Burchell's, Ecklon and Zeyher's, Drège's, Harvey's, or Pappe's collections, and it was unknown to Lindley. It was therefore with great pleasure that I received in Oct., 1883, three little plants sent to me by Miss Farnham from Vlaggeberg, near Stellenbosch, which I had little hesitation in identifying, from Thunberg's excellent description, with this species. This was confirmed by Mr. N. E. Brown, of Kew, who compared it with Thunberg's type, which, with all his orchids, had been sent over from Upsal to Kew for examination. A year later Professor Bodkin found it in abundance on the Steenberg, near the stream that runs down to the Silver-mine farm, and we were enabled to distribute it. Thunberg's original station was marked as "Streams about Piquetberg."

PLATE 33.—Fig. 1, flower and bract; 2, 3, galea, back and front view; 4, side sepals; 5, middle sepal; 6, side petals;—all magnified 4 diameters; 7, 8, column, side and front views $\times 6$; 9, pollinia, magnified.

SUBGENUS II. SATYRIDIUM.

18. *Satyrium rhynchanthum*, Bolus, in *Journ. Linn. Soc.*, vol. xix. (1882), p. 342.—A straight, erect, glabrous herb, from 6 in. to $1\frac{1}{2}$ ft. high. Leaves linear-lanceolate, acute, sheathing at base, the two or three lower more or less spreading, $1\frac{1}{2}$ –3 in. long, the upper more erect and gradually passing into sheathing bracts; spike from 2–6 in. long, somewhat lax; bracts ovate, acute, reflexed, rather shorter than the flowers; sepals free, spreading, the lateral obliquely oblong, the odd one narrower, oblanceolate, all obtuse, about 3 lin. long; petals like the middle sepal, but toothed towards the apex; lip scarcely galeate, the front part ovate in outline, with a long beaked point projecting forward, spurs thick, inflated, obtuse, shorter than the ovary; column projecting forward, the anther hanging vertically and nearly free in front, the caudicles united to a single gland which caps and terminates the column; rostellum very short, immediately behind and below the gland; stigma elliptical, umbonate, situate directly below the rostellum; ovary much compressed dorsally.—*Satyridium rostratum*, Lindley, *Gen. & Sp. Orch.* (1838), p. 345; Harvey, *Thes. Cap.*, vol. i., p. 55, t. 87.

HAB. In moist swampy places, amongst high grass or Restiaceæ on Table Mountain at 3000 ft., and on the Steenberg Mt. at 1100 ft.; fl. latter part of December; *Herb. Norm. Austr.-Afr.*, 331; Bolus, 4999.—The species extends eastward to Du Toit's Kloof, and to Hex River and Villiersdorp, flowering there in November.

The colour of the flowers is lilac, with large spots of dark purple on the front of the galea and the inside of the spurs; the anther bright carmine. The species is a very pretty and elegant one, unlike any other, and was regarded by Lindley as the type of a distinct genus. But, excepting the union of the caudicles of the pollinia into a single gland, the peculiar difference lies in the appearance of the column, and this is due merely to the pushing-up of parts (the gland, the rostellum, and the stigma), which are usually depressed or horizontal; the same relative position is maintained, but, instead of the rostellum and stigma facing the observer in front of the flower, they are hidden behind the anther. In uniting it with *Satyrium* I follow Bentham ('*Genera Plantarum*,' vol. iii., p. 629). The species is not a very common one on the Cape Peninsula, and was not indeed recorded there until its discovery by Prof. Bodkin in Dec., 1882. In 1884, however, it was tolerably plentiful on the Steenberg, by the "Silver-Mine" stream.

PLATE 25.—Fig. 1, flower, $\times 2$ diameters; 2, ditto, $\times 3$; 3, lip, $\times 4$; 4, sepals, $\times 3$; 5, petals, $\times 3$; 6, 7, 8, column, showing *g*, the gland, *s*, stigma; 9, apex of column showing pollen-granules adhering to the stigma, *s*, and the very short ridge-like rostellum above, *r*; 10, pollinia; 11, section of ovary; all the latter variously magnified.

VI.—DÍSA.

Bergius, in *Descr. Plant. Cap. B. Spei* (1767), 348; *Bentham & Hooker f.*; *Gen. Plant.*, iii. (1883), 630. (*Monadenia*, *Lindley, Gen. Sp. Orch.* (1838), 356; *Schizodium*, *ib.*, 358; *Penthea*, *ib.*, in part, *l. c.*, 360; *Herschelia*, *ib.*, 362.)

Sepals nearly equal in length, free; the odd one usually posticous, more rarely anticous, galeate, vaulted, or nearly flat, spurred, saccate, or umbonate. Petals very various in shape, usually much smaller than the sepals, and often included within the odd sepal, free or adnate to the column at base. Lip anticous or more rarely posticous, spreading from the base of the column and more or less adnate to it, various in shape, usually much smaller than the sepals (never spurred), sessile or clawed, the limb entire, variously cut, or deeply fringed. Column bilobed; rostellum large and erect, or small and depressed, subentire, three-toothed or bilobed at the apex with parallel or divaricate arms, tuberculate on either side at base, or with lateral folds, which are sometimes petaloid and project posteriorly under the clinandrium; stigma situate in front of, and separated from, the clinandrium by the rostellum, fleshy, usually cushioned, rarely depressed. Anther with the clinandrium ascending, horizontal or reflexed, adnate to the rostellum at base, the cells distinct and parallel; pollinia solitary in each cell, loosely granular, attached by longer or shorter caudicles

to one or to two distinct glands, which lie at the apex of, or on the arms of the rostellum. Capsule oblong, clavate or linear, erect.—Terrestrial herbs with undivided sessile tubers; leaves appearing with or before the flowers; scape herbaceous or somewhat rigid, leafy, or with the leaves reduced to bracts or sheaths; flowers solitary, loosely corymbose, racemose, or spiked, large or small. (Name unexplained; it has been suggested from *dis* (*dives*), rich, in allusion to the magnificence and beauty of the flower,—*Disa uniflora*, on which Berg founded the genus.)

To this genus, as defined by Bentham (*Gen. Plant.*, iii., 680), I have in the present work added Lindley's genera *Schizodium* and *Monadenia*. As thus constituted, it forms a large genus of more than one hundred species. I suppose the variety in the perianth to be only excelled, perhaps, by that of *Habenaria* or *Catasetum*, and to be scarcely equalled by that of any other genus in the vegetable world. Few systematic botanists, on seeing for the first time such species as *D. grandiflora*, *D. tenuifolia*, *D. Harveiana*, *D. atricapilla*, *D. tenuis*, *D. fasciata*, *D. sagittalis*, and *D. Charpentieriana*, would doubt their representing so many distinct genera, or would suppose that they could be properly united. Yet a consideration of the whole of the species leads to the conclusion that they cannot be conveniently separated.

A noteworthy characteristic of this genus is the degree of uniformity and comparative insignificance of the lip. Excepting in one group (*Herschelia*) of about twelve species, the lip is usually very small, and often much smaller than any of the sepals. In all these it is the odd sepal which, by the great variety in its shape and setting or position, and frequently by its large size, seems to fulfil the part which in many Orchids is played by the lip.

The most salient characters available for divisions are:—1, the position of the parts of the flower resulting from the twisting or non-twisting of the ovary and pedicel; 2, the shape of the odd sepal and its position, whether erect or reclined; 3, the number of the glands of the pollinia, though this is often unstable; 4, the time of appearance of the leaves, and their structure. Based upon these, the following sections are here adopted, some from Lindley and others now proposed for the first time.

§ 1. *Monadenia*, established as a genus by Lindley, is, as I have pointed out elsewhere, separable solely on the grounds of the caudicles of the pollinia terminating in a single gland, and of a slight modification of the rostellum. The former character is observable in the section *Herschelia*, where it is variable, as well as in the section *Amphigena*; and the rostellum is too variable, from species to species

throughout the genus, to warrant the maintenance of this group as a genus.

§ 2. *Eu-disa*, is united with the preceding by *D. polygonoides* (not within our limits) and *D. cylindrica*. It includes several species which Lindley placed under his section Repandra. The species, *D. maculata*, *D. lineata*, and *D. cylindrica*, are, owing to peculiarities of perianth or column, not very satisfactorily referred here, but it appeared undesirable to add to sections containing single species.

§ 3. *Vexillata*, includes a few species with a nearly flat or concave and very erect, odd sepal, and a petaloid appendage to the rostellum quite peculiar to this section.

§ 4. *Coryphæa*, a group of Lindley's, with subcorymbose flowers and low rostellum. The affinity between *D. Harveiana* and the two other species is not very obvious; nevertheless they are connected through *D. sagittalis*. Lindley placed all of these in this section.

§ 5. *Schizodium*, established by Lindley as a genus in 1838, has, I think, no valid floral character by which it can be maintained as distinct from *Disa*. The structure of the scape in this group is quite unique amongst South-African Orchids, and appears to afford a maximum of strength with a minimum of resistance to the wind on the wind-swept plains where these plants usually grow. It is rarely that they are found near the shelter of a bush, or on a mountain-side. In *D. obliqua* two flexures in the scape sometimes succeed each other at a right angle. The scape here may be compared with that of the still more delicate *Carpolyza spiralis* (Amaryllidaceæ), which is doubtless serviceable to the plant in the same manner.

§ 6. *Orthocarpa*, is formed partly from Lindley's genus, *Penthea*. It includes five Peninsular species characterised by an untwisted ovary, owing to which the flowers assume their normal position (as in *Satyrion*), and in which the odd sepal is usually hooded and reclinate; the flowers usually few and subcorymbose.

§ 7. *Vaginaria*, a section of a single species, is adopted from Lindley. Its ovary is straight, and it might have been united with the previous section; but is remarkable by its singular perianth, which resembles nothing else in the genus.

§ 8. *Herschelia*, was established by Lindley as a genus in 1838, upon the well-known species (*H. cælestis*), *D. graminifolia*, Ker. I have here regarded it as a section, and included also Lindley's section *Trichochila* (of *Disa*), chiefly characterised by a clawed lip. It now embraces a series of species very variable both in lip and column, and sometimes even varying as to the latter in the same species, but all agreeing in general habit. The two groups of Lindley are joined by such a species as *D. Charpentieriana*, where the rostellum has three teeth, and the gland is single, as in *Herschelia*; while the lip has the

long claw of *Trichochila*. In *D. lugens* I have found numerous specimens with one gland, and also with two; and while both Lindley and Reichenbach the younger have observed two glands in *D. graminifolia*, I have never seen more than one. This instability renders it desirable to unite these two groups, which will then form a fairly natural section.

§ 9. *Oregura*. This is a section of Lindley's, based upon a single species, to which a second, belonging to the eastern districts, has since been added.

§ 10. *Amphigena*, includes only a single species, which is sufficiently remarkable, by its connection with *Herschelia* in habit, with *Eu-disa* in its perianth, and with *Monadenia* in its single gland, to be kept distinct.

The foregoing sections will, I believe, be found to embrace all, or nearly all, the known species of this genus. There is, however, another section (*Aristaria*) proposed by Reichenbach the younger for a single species, with which I am insufficiently acquainted; but this section may hereafter prove to include the species placed by me in § *Amphigena*.*

DISTRIBUTION.—About 109 admitted species have been described (besides a few yet unpublished), of which, in addition to the forty-six here enumerated, there are about fifty-one distributed over the coast-district between Clanwilliam and Natal; four in Angola, three in Eastern Tropical Africa (Kilimanjaro Mt. and the highlands of Manganja); two in Abyssinia; and three in Madagascar.

§ 1. **Monadenia**, Lindley (as a genus), *Gen. & Sp. Orch.* (1838), p. 356.—Odd sepal posticous, galeate, erect, spurred at base. Petals erect, included or half-exserted. Lip entire, often fleshy. Rostellum margined by a membranous or tuberculated process on either side, and usually separated by a cleft from the stigma. Pollinia united to a single gland.—Spikes few or densely many-flowered, scapes and leaves herbaceous, the latter contemporary with the flowers.

Species 1 to 8.

§ 2. **Eudisa**.—Odd sepal posticous, usually galeate, rarely funnel-shaped, erect or horizontal, spurred, saccate, or muticous at base. Petals included within the odd sepal, erect or reflexed. Lip variously shaped. Anther usually reflexed, rarely almost erect. Rostellum ample. Glands of the pollinia 2.—Flowers solitary or spicate; leaves herbaceous, contemporary with the flowers.

Species 9 to 20.

* See note under description of *Disa tenuis*, page 173.

§ 3. **Vexillata**, *Bolus*, in *Journal of Linn. Soc.*, vol. xx. (1884) p. 479. — Odd sepal posticous, nearly flat, concave or slightly saccate, erect. Petals inarched, subexserted. Lip narrow, or rarely broad. Rostellum high, erect, protruded or reflexed, the arms usually divaricate, produced behind into a petaloid appendage embracing the anther. Anther long and narrow, ascending or reflexed.—Flowers distant, in lax racemes, or capitate-corymbose; leaves radical, herbaceous, contemporary with the flowers. Species 21 to 24.

§ 4. **Coryphæa**, *Lindley*, *Gen. & Sp. Orch.* (1838), p. 350. — Odd sepal posticous, galeate or subgaleate, erect, with a finely-tapering spur. Petals more or less exserted. Rostellum very low. Glands of the pollinia 2.—Slender plants with subcorymbose, large or small, flowers; membranous, often large, bracts; leaves herbaceous, contemporary with the flowers or (in *D. Harveiana*) withering early. Species 25 to 27.

§ 5. **Schizodium**, *Lindley* (as a genus), *Gen. & Sp. Orch.* (1838), p. 358. — Odd sepal posticous, erect, subgaleate, the upper part flattened and sometimes reflexed, obtusely spurred at base. Petals more or less exserted; lip dilated in the middle, mostly with a long beak-like point. Glands of the pollinia 2.—Slender herbs with racemose flowers, few radical leaves and thin wiry polished flexuose scapes. Species 28 to 33.

§ 6. **Orthocarpa**, *Bolus*, in *Journ. Linn. Soc.*, vol. xx. (1884), p. 480; *Penthea*, *Lindley*, *Gen. & Sp. Orch.* (1838) p. 360, in part.—Odd sepal anticous, usually hooded, rarely subgaleate, reflexed, without spur or sac. Petals reflexed, subexserted. Rostellum ample, erect. Glands of the pollinia 2.—Flowers subcapitate, capitate-corymbose or racemose; scapes leafy, or sheathed with leaf-like bracts; leaves herbaceous, contemporary with the flowers. Species 34 to 38.

§ 7. **Vaginaria**, *Lindley*, *Gen. & Sp. Orch.* (1838), p. 350.—Odd sepal anticous, together with the whole flower expanded and horizontal, shortly spurred. Rostellum low, deeply notched. Glands of the pollinia 2, distant.—Flowers solitary, or in few-flowered racemes; scapes leafy; leaves small. Species 39.

§ 8. **Herschelia**, *Lindley* (as a genus), *Gen. & Sp. Orch.* (1838), 362. *Trichochila*, *Lindley* (section), *l.c.*, p. 353.—Odd sepal posticous, galeate, erect, shortly spurred. Petals included within the galea. Lip either ovate, sessile, lacerate-fringed, crenate or subentire; or with a shorter or longer claw, dilated and variously cut at the extremity. Rostellum sometimes 3-toothed at the apex, the middle tooth situate behind and applied to the back of the gland; sometimes

with two short arms, as in *Fu-disa*; caudicles of the pollinia terminating in two distinct, contiguous or attached and separable glands, or in a single gland.—Flowers mostly blue or purple, in loose racemes; scapes slender, rigid; leaves radical, linear, wiry, contemporary with the flowers. Species 40 to 44.

§ 9. *Oregura*, *Lindley, Gen. & Sp. Orch.* (1838), p. 352.—Odd sepal posticous, galeate, horizontal or incumbent, with a long straight spur. Petals included within the odd sepal. Rostellum broad and low. Glands of the pollinia 2.—Flowers in loose spikes; scapes slender, rigid; leaves radical, linear, grass-like, appearing before the flowers, and withered during flowering. Species 45.

§ 10. *Amphigena*.—Odd sepal posticous, galeate, ascending. Petals erect, included. Rostellum destitute of appendage. Caudicles of the pollinia, terminating in a single large gland.—Flowers small, spiked; scape slender, wiry; leaves radical, linear, grass-like, springing from a basal sheath, appearing before the flowers, and withered during flowering. Species 46.

KEY TO THE SECTIONS OF DISA.

Odd sepal anticous.

- Odd sepal mostly hooded, rarely sub-galeate, not spurred .. ORTHOCARPA 6.
 Odd sepal flat, spurred VAGINARIA 7.

Odd sepal posticous.

Caudicles of the pollinia terminating in a single gland.

- Leaves synanthous, free, radical, linear HERSCHELIA 8.
 Leaves hysteranthous, enclosed at base in a single sheath,
 wiry AMPHIGENA 10.
 Leaves synanthous, free, radical and cauline, herbaceous,
 expanded MONADENIA 1.

Caudicles of the pollinia terminating in two distinct glands.

- Odd sepal concave and umbonate, or nearly flat VEXILLATA 3.
 Odd sepal galeate, hooded, fornicate, or funnel-shaped.
 Leaves hysteranthous (linear, grass-like).. . . . OREGURA 9.

Leaves synanthous.

Petals more or less exerted.

- Spur acute, stem straight CORYPHEA 4.
 Spur obtuse, stem flexuose at the nodes SCHIZODIUM 5.

Petals included within the odd sepal.

- Leaves wiry, lip more or less incised HERSCHELIA 8.
 Leaves not wiry, lip entire EUDISA 2.

§ 1. *Monadenia*.

Spur of the odd sepal shorter than the limb.

- Spur dorsally compressed, emarginate; plant robust *D. MULTIFLORA* 1.
 Spur cylindrical, tapering; plant very small *D. PYGMÆA* 2.

Spur of odd sepal as long as or longer than the limb.

- Spur inflated, short and blunt *D. CERNUA* 3.
 Spur filiform, shorter than or equalling the ovary.
 Flowers very small; less than $\frac{1}{2}$ in. long *D. MICRANTHA* 4.
 Flowers mediocre or large; more than $\frac{1}{2}$ in. long.
 Bracts herbaceous.
 Flowers deep red, or purplish *D. OPHRYDEA* 5.
 Flowers yellow *D. AFFINIS* 6.
 Bracts membranous, reticulated *D. RETICULATA* 7.
 Spur filiform, longer than the ovary *D. RUFESCENS* 8.

1. *Disa multiflora*.—Glabrous, stout, erect, 7–10 in. high; stem short, leafy; leaves crowded, linear-lanceolate, acuminate, involute, sheathing at base, 2–3 in. long; spike cylindrical, densely many-flowered, 4–5 in. long, $\frac{1}{2}$ –1 in. thick, with ovate acuminate bracts as long as, or sometimes much longer than, the flowers; side sepals oblong, obtuse, recurved, about $2\frac{1}{2}$ lines long; odd sepal arched, limb broadly oblong, obtuse, apiculate, as long as the side sepals, with an inflated, dorsally compressed, obtuse, emarginate spur of about $1\frac{1}{2}$ lin. long; petals falcate, acute, fleshy, small; lip tongue-shaped, or linear-oblong, a little narrowed in the middle, 3 lines long; column ascending, with a high rostellum; its arms produced forward and backward; stigma large, sloping. *Monadenia multiflora*, Sonder, in *Linnæa*, vol. xix (1847), p. 101.

HAB. Sandy places on the flats near Claremont, and on the lower slopes of Table Mountain above Wynberg, up to 600 ft.; fl. Nov., *Bolus*, 4885; near Hout's Bay, fl. Oct., *Dr. Marloth*, in herb. *Bolus*, 4972; *Zeyher*, 1564, *ex parte*.

The odd sepal is a dull red, the rest of the flower a pale yellow. Most nearly allied to *M. micrantha*, from which it differs by its usually shorter stem, denser spike, larger flowers, proportionately shorter, more inflated and more obtuse spur, more obtuse side sepals, and very different column. It is not at all a common plant on the Peninsula.

2. *Disa pygmæa*, *Bolus*, in *Journ. Linn. Soc.*, vol. xxii. (1885), p. 72.—Erect, glabrous, 2–4 in high; scape slender at base, leafy below; lowest leaves 1–2, reduced to sheaths, upper 3–5, ovate, acute, or sometimes lanceolate, acuminate, sheathing at base, erect-spreading, faintly 3–5 nerved, $\frac{1}{2}$ –1 in. long; spike dense, 8–24 flowered, about three-fourths of the length of the entire plant; bracts ovate, obtuse, as long as the flowers, or lanceolate, acuminate, exceeding the flowers; flower, with ovary, $3\frac{1}{2}$ – $4\frac{1}{2}$ lines long; side sepals ovate, very obtuse, spreading-recurved, 2– $2\frac{1}{2}$ lines long; odd sepal arched, oblong, obtuse,

apiculate, spur terete, incurved, obtuse, usually somewhat inflated, $1\frac{1}{2}$ lines long, shorter than the ovary, the whole with spur $3\frac{1}{2}$ –4 lines long; petals somewhat triangular, acute, lobed at the posterior angle, nearly as long as the odd sepal; lip oblong, obtuse, narrowed at base, deflexed, $1\frac{1}{2}$ lines long; rostellum longer than the short rounded stigma, the lateral processes wholly turned back towards the anther; ovary short, obovate, covered with hyaline pustules.

HAB. In sandy places on the Muizenberg Mountain, towards the Steenberg, at about 1300 ft., fl. Nov., *Bodkin*; *Herb. Bolus*, No. 4970.

Sepals dull red, petals and lip pale yellow. Allied to *M. micrantha*, which is itself a variable plant, but the columns appear to be different, and the caudicles of the pollinia in this seem to be always as long as the pollinia,—if, indeed, this be a trustworthy character. It appears to be somewhat rare; I never gathered it, and am indebted to Prof. Bodkin, its discoverer, for living specimens.

PLATE 17.—Figs. 1, 2, flowers, side and front views; 3, odd sepal; 4, side petal; 4*, ditto, from another flower; 5, side sepal; 6, column, front view; 7, ditto, side view; 8, ditto, with ovary, back view; 9, pollinia; 10, lip:—all variously magnified.

3. *Disa cernua*, Swartz, in *Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 211.—Glabrous, erect, 10–18 in. high; stem mostly robust, leafy; leaves 4–6, linear-lanceolate, acute, sheathing at base, 3–5 in. long, passing gradually into loose sheaths; spike usually densely many-flowered, about half the length of the plant, 1– $1\frac{1}{2}$ in. thick; bracts lanceolate, veined, shorter than the flower; side sepals oval, subobtuse, veined, recurved, nearly 5 lines long; odd sepal with an arched oval limb, obtuse or emarginate, 5 lines long, with an inflated or bag-like, very obtuse, veined, pendulous spur, shorter than the ovary; petals obliquely ovate, with a wide base; lip narrow, tongue-shaped, obtuse, deflexed, as long as the sepals; rostellum ascending, with lateral wings which project for a short distance and are then reflexed; stigma somewhat narrowed in front.—Thunberg, *Flor. Cap.*, ed. 1823, p. 12. *D. prasinata*, Ker, in *Bot. Reg.*, iii. (1817), t. 210. *Monadenia prasinata*, Lindley, *Gen. & Sp. Orch.* (1838), 358. *M. inflata*, Sonder, in *Linnæa*, vol. xix. (1847), p. 102.

HAB. Lower slopes of the Lion's Head Mountain, facing the sea, 200 ft., fl., Sept., *Bolus*, 4973. Near Wynberg, *Zeyher*, 1569.—Extends eastward to Montagu Pass, George, 1200 ft., Oct., *E. W. Young*.

The flowers seem to vary somewhat in colour; those I have seen on the Peninsula have greenish yellow sepals, and deep red or purple petals and lip; the latter is occasionally yellow. The species is easily distinguished by its robust habit, combined with its large inflated spur. Sonder's name and description were appropriate and accurate; Thunberg describes the spike as "nodding at the apex," but I have

never observed any approach to this habit, nor does Sonder mention it. The figure in the 'Botanical Register,' if I am right in quoting it as a synonym, gives but a poor idea of the plant as it grows wild.

4. *Disa micrantha*.—Glabrous, erect, 6–18 inches high. Stem leafy, short or elongate; leaves numerous, linear, acuminate, erect or laxly spreading, 2–6 in. long; upper gradually smaller; spike cylindrical, $2\frac{1}{2}$ –6 in. long; bracts ovate-acuminate, or with fine hair-like points, usually longer and sometimes much longer than the flower, or the uppermost about equalling the flower; side sepals falcate-ovate, acute, about $1\frac{1}{2}$ lines long; odd sepal arched, with an oblong sub-acute limb about 2 lines long, and a straight tapering spur, $1\frac{1}{2}$ –2 lines long, always shorter than the ovary; petals obliquely falcate, acute, fleshy; lip linear-oblong, obtuse, fleshy and thickened at the apex, $1\frac{1}{2}$ lines long; rostellum low, with short arms; caudicles scarcely any, sometimes absent; stigma square-shaped, hollowed. *Monadenia micrantha*, Lindley, in Gen. & Sp. Orch. (1838), p. 357.

HAB. Sandy moist places on the Flats and on the mountain-sides up to 3500 ft., fl. Sept.-Nov., Bolus, 3859; Drège, 1261; Ecklon & Zeyher, 4680.—Extends eastward to Grahamstown (Mac Owan, 381; Burchell, 4015, 6139), and northward to various localities.

Side sepals yellow, tipped with red; odd sepal dull red; petals and lip yellow. This is the commonest species of the group, and is readily distinguished by its minute flowers from every other, except *D. pygmaea*. It varies in the length of the bracts, and in the length and thickness of the spur, which is sometimes short and somewhat inflated. Such forms approach *D. multiflora*, but the flowers are always much smaller.

5. *Disa ophrydea*.—Glabrous, erect, 6–16 inches high; stem elongate, stout or slender, thinly leafy; leaves 2 or 3, mostly at the base, linear, acute, involute; 2–4 in. long; spike variable, usually about half as long as the plant, and somewhat distantly flowered; bracts ovate, acute, nearly as long as the flowers; side sepals ovate-oblong, obtuse, widely-spreading, about 5 lines long; odd sepal with an arched cuneate-obovate obtuse limb, a little longer than the sepals, spur filiform, about 1 inch long, equalling the ovary; petals falcate, acute, oblique at base; lip tongue-shaped, obtuse, about $\frac{1}{2}$ inch long; rostellum high, with prominent reflexed side ridges; stigma umbonate, prominent. *Monadenia ophrydea*, Lindley, Gen. & Sp. Orch. (1838), p. 358. *M. lancifolia*, Sonder, in Linnæa, vol. xix. (1847), p. 100.

HAB. In moist places on the plateaux of Muizenberg and Table Mountain, &c., 1400–2500 ft., fl. Oct., Zeyher, 3924; Bolus, 4538; Herb. Norm. Austr.-Afr., 171.

The stem, bracts, and sepals are a more or less deep red, the petals and lip a very dark red purple. In general habit this comes nearest

to *D. reticulata*, but it may be usually known by its fewer and shorter leaves, different bracts, looser spike, larger deep-coloured flowers, and much larger and higher rostellum. It does not seem to be abundant, but patches of ten or a dozen plants may occasionally be found in places which have been moist all the winter.

6. *Disa affinis*, *N. E. Brown, in Gardeners' Chron.*, vol. xxiv. (1885), p. 402.—Glabrous, usually decumbent, 1–1½ feet high; lowest leaf elliptical, subobtuse, many-nerved, sheathing at base, spreading, 4–8 in. long, 2–2½ in. wide, the upper (1–2, rarely 3) gradually smaller, acute, mucronate, passing into 4–5 submembranous appressed sheaths; bracts broadly ovate, acuminate, membranous, netted-veined, a little shorter than the ovary, and closely enwrapping ovary and spur; spike loose, 3–5 in. long; side sepals oblong, subacute, 3-nerved, spreading, 2½–3 lines long; odd sepal with an arched obtuse limb, 5 lines long, with a filiform dependent spur 1 in. long, equalling or a little shorter than the ovary; petals obliquely ovate, sub-falcate, generally emarginate, 3-nerved, a little shorter than the odd sepal; lip oblong, very obtuse, or narrowed at the apex, about 4 lines long; arms of the rostellum turned backward, scarcely exceeding the prominent large rounded stigma, and separated from it by a deep excavation. *Monadenia rufescens*, Lindley, in *Gen. & Sp. Orch.* (1838), p. 356, excluding synonyms. *M. comosa*, Reichb. f. *Linnæa*, vol. xx. (1847), 687.

HAB. In clefts of rocks, and shady places on the eastern mountain-sides of the Peninsula, 1400 to 2500 ft., fl. Sept.—Oct., frequent, *Bolus*, 4555; *Herb. Norm. Austr.-Afr.*, 170.—Extends to Clanwilliam and Swellendam (*Burchell*, 7321, 7357; *Zeyher*, 3925).

The leaves are a sap-green, the sepals sulphur-yellow, the petals bright golden. One of the most distinct species of this group, and readily known by its large broad lower leaves, its lax, often weak habit, and the pale colour of the whole plant, both when living and in the dried state. The column is also well-marked. The sepals are thin, the petals thicker but scarcely fleshy, as in most of this section. It loves the steep sides of rocky hills or crags which are turned away from the sun, and often nestles amongst high grass or under shrubs.

7. *Disa reticulata*, *Bolus, in Journ. Linn. Soc.*, vol. xxii. (1884), p. 73.—Erect, or slightly decumbent, glabrous, 4–12 in. high; scape leafy, usually slender at the base; lower leaves linear-lanceolate, acuminate, sheathing at base, erect, the upper gradually smaller, ovate-lanceolate, reaching a little below the base of the spike; spike rather lax, about half as long as the plant; bracts broadly ovate, with a long twisted point, membranous, netted-veined, enwrapping spur and ovary, a little longer than the flower; side sepals oblong, obtuse,

deflexed, faintly 3-nerved, 3 lines long; odd sepal arched, obovate, obtuse, 4 lines long, the filiform acute spur 5 lines long, or somewhat shorter than the ovary; petals falcate-ovate, subacute, fleshy, $2\frac{1}{2}$ lines long; lip tongue-shaped, obtuse, fleshy, deflexed, $2\frac{1}{2}$ -3 lines long; rostellum erect, wider than long, tubercled on either side, with a shallow cleft between it and the short obtuse stigma.

HAB. Moist places on Table Mountain, and on the Constantia Mountain, 2000 to 2800 ft., fl. Dec., infrequent, *Bolus*, 4897, 4988.

The flowers have a yellowish ground, with dull red on the edges, and back of the odd sepal; the lip, and sometimes the whole flower, darker; leaves dark green. I have never found it elsewhere than on the mountains.

PLATE 16.—Figs. 1, 2, flower, side and front views, $\times 3$ diameters; 3, odd sepal, $\times 3$; 4, side petal, $\times 3$; 5, 6, column, side and front views; 7, bract:—all the latter variously magnified.

8. *Disa rufescens*, Swartz, in *Kongl. Vet. Acad. Handl.*, vol. xxi. (1800), p. 210.—Glabrous, erect, slender or robust, 6-18 inches high; leaves several at the base of the stem, lanceolate, acute, expanded, sheathing at base, suberect, $1\frac{1}{2}$ -3 in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide; passing gradually into sheaths with short, free, spreading or appressed, points; spike somewhat lax, from a fourth to a half the length of the plant; bracts broadly ovate, acute, acuminate, or cuspidate, nearly as long as the flowers; side sepals obliquely ovate, subobtuse, spreading-recurved, veined, about $3\frac{1}{2}$ lines long; odd sepal with an arched oblong obtuse limb, and a somewhat thick, filiform, obtuse dependent spur 8-9 lines long, and exceeding the ovary; petals fleshy, falcate, emarginate; lip ovate, or tongue-shaped, very obtuse, about as long as the sepals; rostellum with an obtuse ridge on either side, separated by a more or less deep cleft from the stigma, which is excavated on the summit of a prominent column.—Thunberg, *Flor. Cap.*, ed. 1823, p. 13. *Monadenia macrocera*, Lindley, *Gen. & Sp. Orch.* (1838), p. 358. *M. leptostachya*, Sonder, in *Linnæa*, vol. xix. (1847), p. 101.

HAB. Moist sandy places on the Flats, 100 ft., Sept., *Bolus*, 4551; on the lower plateau of Table Mountain, 2500 ft., fl. Oct., 4969; grassy banks near the summit, 3300 ft., Jan., 4903?; *Zeyher*, 1570.

Colour of the sepals yellowish, of the petals dark red. In the form from the highest elevation (if I am right in regarding it as a form of the present species) the sepals are greenish-yellow with reddish tips, the lip the same, the petals yellow. This species is very variable in size, some specimens being very puny, others large and robust. Its most usual characteristic appears to be its short tufted leaves, which are usually broad and flat, though in small and poorly-grown specimens these sometimes become narrow and involute. Its nearest allies are

D. ophrydea, from which it may readily be known by its paler and smaller flowers; and *D. reticulata*, from which it differs by its thicker and less acuminate bracts, and longer and thicker spur.

§ 2. *Eudisa*.

Flowers solitary, blue.

Odd sepal long-spurred D. LONGICORNU 9.

Odd sepal without spur D. MACULATA 10.

Flowers 1-4, very large and showy D. UNIFLORA 11.

Flowers in loose few-flowered spikes, small; spur of galea obtuse, inflated D. OCELLATA 12.

Flowers in dense or many-flowered spikes.

Spur of the odd sepal $\frac{1}{2}$ in. long.

Odd sepal obtuse, lip obovate D. CORNUTA 13.

Odd sepal acute, lip oblong or lanceolate D. ZEMULA 14.

Spur of the odd sepal less than $\frac{1}{2}$ in. long.

Spur intrusely set, straight and thin; flowers large D. TENUICORNIS 15.

Spur tapering, acute; flowers very small D. TENELLA 16.

Spur very short and obtuse.

Flowers tawny-yellow and white; rostellum with a medial tooth D. TABULARIS 17.

Flowers lilac or purple; rostellum not toothed in the middle D. OBTUSA 18.

Flowers, and the whole plant, green or dull greenish-yellow D. CYLINDRICA 19.

Spur none D. LINEATA 20.

9. *Disa longicornu*, *Linnaeus, the younger, in Suppl. to Syst. Veg.* (1781), p. 406.—Glabrous, decumbent, 4-6 in. long; leaves 3 to 5, chiefly at the base of the stem, oblong, acute, or acuminate, petiolate, sometimes waved, laxly spreading, 2-3 in. long; stem clothed with 2-3 loose, membranous, acute, veined sheaths; bract like the sheaths, but loosely spreading from the base, or reflexed, about as long as the ovary; flower solitary; side sepals oblong, subobtuse, mucronulate, spreading, about $1\frac{1}{4}$ in. long; odd sepal galeate, somewhat funnel-shaped, with a very wide mouth, erect or turned backwards, about 1 in. high, with a tapering decurved spur, curved and obtuse at the apex, about $1\frac{1}{2}$ in. long; petals linear, acuminate, with an obtuse decurrent lobe on the outer side, turned backwards into the spur of the galea and reaching nearly to its apex, $1\frac{1}{2}$ in. long; lip ovate, acute, with a prominent midrib 1 in. long; anther resupinate; rostellum low, the arms nearly parallel; ovary straight, clavate, scarcely an inch long. *D. longicornis*, Thunberg, Prodr. Fl. Cap. (1794), p. 4; *ib.*, Flor. Cap., ed. 1823, p. 8.

HAB. Amongst moss or grass in clefts of steep rocks (*Krantzes*) on the sides turned from the sun, where the water drips in early summer, on Table Mountain, in several places, from 2100 to 3000 ft., fl. Dec.—Jan., Thunberg, *Bolus*, 4818; *Herb. Norm. Austr.-Afr.*, 161.

Colour of the flower a lilac-blue, the anther carmine. This is a very interesting and distinct species, and cannot be mistaken for any other. It is by no means uncommon, and indeed I have seen it growing in profusion in some seasons on the precipice sometimes called "Tremble Krantz." Possibly it was here where Thunberg found it in Jan., 1773. I do not know whether he was its first discoverer, but his account is so interesting to the local botanist that I venture to transcribe it:—

"Having got to the top," he says, "we were recompensed for our trouble by a great number of rare plants, especially of the *Orchideæ*, as they are called, which I never afterwards could meet with either here at other seasons, or indeed at all on any other mountain. Among these the *Orchis grandiflora*, or *Disa uniflora* (BERGH *Plantæ Capenses*) was conspicuous by its beautiful flowers; of the *Serapias tabularis* [*Eulophia tabularis*] we found only one specimen; the *Serapias melaleuca* [*Disa melaleuca*] was distinguished by its black and white flowers, the most uncommon in nature; and with great difficulty, and at the hazard of my life, I got for the first and last time the blue *Disa longicornis*, which is as beautiful as it is singular in its form. This last plant grew in one spot only, on a steep rock, and so high up, that in order to come at it after we had clambered up the side of the rock as high as we could, I was obliged to get upon the shoulders of M. SONNERAT, when, with a long stick, I beat down five of these plants, the only specimens that were then in bloom. M. SONNERAT, who before had not had an opportunity of collecting as many plants at the foot of the mountain as I had, made, in this one day only, a collection of 300 different species; but was so singularly unfortunate, though he had brought with him three pairs of shoes for this excursion, as to return to town barefooted. . . . Your thin French pumps are by no means suited for excursions upon the mountains, which require shoes made of waxed leather with thick soles." (Travels: English ed. (1795), vol. i., p. 220).

The other Orchids mentioned by Thunberg have been found elsewhere, but like him I have never found the present species except on Table Mountain.

PLATE 6.—Fig. 1, odd sepal, side sepals, and lip; 2, flower with sepals removed; 3, one of the petals, all of the natural size; 4, column \times 3 diameters; 5, pollinium, magnified.

10. *Disa maculata*, *Linnaeus, the younger, Suppl. to Syst. Veg.* (1781), p. 407, *not of Harvey*.—Glabrous, a span high; stem decumbent, slender, one-flowered; leaves 2–3, linear-lanceolate, acute, herbaceous, 2–3 in. long, succeeded by about three lanceolate, acute, scarious sheaths, closely enwrapping the stem; side sepals ovate, acuminate, spreading, 8–9 lines long; odd sepal somewhat funnel-

shaped, acute, obtuse or scarcely saccate at base, mouth about 7 lines long, 5 lines wide; petals linear, reflexed, ascending at the apex; lip lanceolate, 7 lines long; anther horizontal; rostellum erect, bifid; stigma umbonate, 3-lobed. Thunberg, Prodr. Pl. Cap. (1794), p. 4; *ib.*, Flor. Cap., 1823, p. 14. *Schizodium maculatum*, Lindley, Gen. & Sp. Orch. (1838), p. 360.

HAB. In moist clefts of rocks, Muizenberg, several places, alt. 1200—1600 ft., fl. Nov., Prof. Bodkin, Bolus, 4843; *Herb. Norm. Austr.-Afr.*, 160.—Extends to Roodesand Mts. (Thunberg) and Houw Hoek Mts.

Flowers pale blue, faintly striped with green, the minute petals yellow with purple stripes, stigma dark purple; sheaths minutely red-spotted. An elegant little species, apparently unknown since Thunberg's time, and for the re-discovery of which we are indebted to Prof. Bodkin. There were no specimens in Herb. Kew until his were sent. It does not appear to have any near allies.

PLATE 7.—Fig. 1, odd sepal, side view, $\times 2$ diameters; 2, side sepal, $\times 2$; 3, lip $\times 2$; 4, petals, with column, magnified; 5, column, front view, mag.

11. *Disa uniflora*, Bergius, *Descr. Plant. e Cap. B. Spei.* (1767), 348, t. 4, f. 7.—A robust, glabrous, decumbent herb, 1–2 ft. high; scape simple, leafy; leaves 5–7, linear-lanceolate, acuminate, sheathing at base, laxly spreading or suberect, 5–8 in. long, the upper smaller, distant, and gradually passing into sheathing bracts; raceme laxly 1–2, rarely 3-flowered; bracts lanceolate-acuminate, erect, longer than the ovary; side sepals ovate-oblong, acuminate, spreading, $2\frac{1}{2}$ –3 in. long; odd sepal hooded, ovate, acute, with a conical straight spur dependent from the base, the whole about 3 in. long; petals somewhat obovate, arched and toothed in front and folded under the anther behind, 1 in. long; lip linear-lanceolate, acuminate, deflexed, $\frac{3}{4}$ in. long; rostellum erect and arching forward, with short divaricate arms; anther long and narrow, turned back and ascending; stigma umbonate, 3-lobed; ovary cylindrical. *D. grandiflora*, Linnæus fil., *Suppl.* (1781), 406; Thunberg, *Flor. Cap.* (ed. 1823), 7; Ker, *Journ. Sci. & Arts*, vol. 4 (1818), t. vi., f. 1; *Bot. Reg.* (1825), t. 926; Lindley, *Sertum Orchid.* (1838), t. 49; *Bot. Mag.*, t. 4073; *Fl. des Serres*, vol. 2, t. 160; R. Trimen, in *Journ. Linn. Soc.*, vol. 7 (1864), 144.

HAB. Margins of streams (which frequently become dry in the summer) on Table Mt., from about 1100 to 3300 ft., fl. Jan.—March, Bolus, 4662; *Herb. Norm. Austr.-Afr.*, 559.—Extends eastward to the Hottentot's Holland range of mountains (at Du Toit's Kloof, &c.); Cold Bokkeveld on the Gydouw Mt.; and northward has been reported from the Cederbergen.

The colour of the side sepals is a brilliant carmine, the remaining parts blush-coloured, with delicate carmine veins on the inside of the back sepal, and bright orange tints on the upper part of the petals. I describe the Peninsular form; but there is a variety found near

Du Toits' Kloof which has the sepals and galea tinged with orange. This beautiful flower is the object of universal admiration, and the name which has been given to it, the "Pride of Table Mountain," indicates the honour in which it is held. It is, indeed, the queen of terrestrial orchids in the Southern Hemisphere, as *Cypripedium spectabile* may be said to reign, though with less magnificence, in the Northern. The first mention hitherto discovered of this plant is in the *Historia Plantarum* of our old English botanist, John Ray, in the third volume of which, published in 1704, p. 586, it is enumerated as "Orchis Africana flore singulari herbaceo, D. Oldenland Mus. Pet. 280," and, after a brief description, Ray adds that he received a dried specimen from D. Petiver amongst other rare plants sent by D. Oldenland. This, however, was before the time of Linnæus. The first botanist to describe and publish it under the Linnean binomial system as *Disa uniflora* was Bergius in 1767. Linnæus the younger, with the laxer notions which prevailed in his day in regard to the law of priority in nomenclature, thinking that Bergius' name was inappropriate (since the plant has usually more than one flower), changed the name to *Disa grandiflora*. By the latter name the species has been so long and widely known that to revert to the older one will cause inconvenience for a time. But Bergius not merely established the species, he also founded the genus upon this species, which has always been recognised; and, besides, gave an adequate figure, which left no sufficient reason for disregarding his name. Botanists are bound to admit such a claim, even at the cost of inconvenience. The earliest record of the flowering of this plant in Europe appears to have been in the Bot. Register for 1825, when it was figured from life. It is still abundant on Table Mountain, although of late years large quantities of the tubers have been annually exported to Europe, and much needless destruction, arising from wasteful gathering by unskilled hands, resulted. But the summit of the mountains being Crown-land, the Government has recently intervened, and restricted the removal of tubers within reasonable limits; so that, if this supervision be continued, there will be little reason to fear the extinction of this truly noble species.

12. *Disa ocellata*, Bolus, in *Journ. Linn. Soc.*, vol. xx. (1884), p. 477.—Glabrous, erect, 6-9 in. high; stem leafy, flexuose; leaves 3-4, linear, acute, $1\frac{1}{2}$ -3 in. long; spike laxly 8-13-flowered, 3-5 in. long; bracts leaf-like, acuminate, the lower ones longer than the flowers; side sepals oblong, oblique or subfalcate, acute, 5 lines long; odd sepal galeate, acute, with a roundish mouth, 5 lines long, spur obtuse and somewhat inflated at the base, $1\frac{1}{2}$ lin. long; petals oblong-falcate, the points turned forward, adnate to the column at base; lip

linear, acute, nearly three lines long; rostellum short without arms, with two lateral, ciliolate tubercles between it and the side petals; anther horizontal; ovary 5 lines long. *D. maculata*, Harvey, in Hook. Lond. Journ. Bot., vol. i. (1842), p. 15, not of Linnæus fil.

HAB. Grassy places on Table Mt., below, and not far from, Maclear's Beacon, at about 3300 ft. Fl. late in Nov. and beginning of Dec., somewhat rare; *Harvey*, *Bolus*, 4849!

The leaves are a dark green; the older flowers point upwards, the younger downwards; sepals a dull ochraceous yellow, and the odd sepal has two brown, eye-like, dorsal spots; the sepals and lip project forward. The rostellum with its fleshy side appendages, the absence of arms, and the consequent close approximation of the glands, shows an affinity with the section *Monadenia*, but the structure of the perianth is very different. It is closely allied to *D. uncinata* in habit and structure, but is at once distinguished by the pointed galea; the last-named, however, does not occur within our limits.

PLATE 5.—Fig. 1, flower, front view, $\times 4$ diameters; 2, ditto, side view, $\times 4$; 3, odd sepal from above, $\times 4$; 4, side sepal, $\times 4$; 5, lip, $\times 4$; 6, column with petals, front view, $\times 10$; 7, ditto, side view, $\times 10$; 8, pollinia, mag.

13. *Disa cornuta*, Swartz, in *Kongl. Vetensk. Acad. Nya Handl.*, vol. xxi. (1800), p. 210.—An erect, stout, glabrous herb, 12–18 in. high; scape densely leafy; leaves lanceolate, acuminate, undulate, sheathing at base, erect-spreading, the lower 4–8 in. long, the upper passing gradually into sheathing bracts; spike many-flowered, 5–9 in. long, $1\frac{1}{2}$ – $2\frac{1}{2}$ in. wide; bracts lanceolate-acuminate, somewhat longer than the flowers; side sepals very broadly oblong, or nearly square with rounded corners, apiculate, deflexed, about 6 lines long; odd sepal galeate, horizontal, much inflated, obtusely pointed, the spur immediately deflexed, the whole about $1\frac{1}{4}$ in. long; petals falcate, upcurved at the apex, rounded and somewhat eared at base; lip broadly obovate, very obtuse, convex on the upper surface, spreading, 4–5 lines long; anther very short and rounded, horizontal; rostellum short; ovary 3-angled. Thunberg, *Flor. Cap.* (1823), 7; *Orchis cornuta*, Linnæus, *Sp. Plant.*, ed. 2 (1763), 1330; *Satyrium cornutum*, Thunberg, *Prodr. Pl. Cap.* (1794), 7.

HAB. Amongst bushes on the sandy downs eastward of Cape Town, also on the mountain sides and tops up to the summit of Table Mt. (3560 ft.), fl. Oct.—Dec., according to altitude. Frequent, but nowhere abundant in one locality. *Burchell*, 538; *Bolus*, 4505; *Herb. Norm. Austr.-Afr.*, 565. — The species extends eastward to Port Elizabeth and Grahamstown (*Burchell*, 3680, 3856, 4030).

Leaves often somewhat glaucous; the odd sepal a dull leaden purple; the sepals nearly white; the lip whitish below, the upper half of the upper surface a deep velvety purple. The species is a handsome

one, and remarkable for its great vertical and horizontal range. It is very distinct from any other except the following.

14. *Disa aemula*, Bolus, in *Journ. Linn. Soc.*, xxii. (1885), p. 69. —An erect, stout, glabrous herb, $1\frac{1}{2}$ –2 ft. high; scape densely leafy; leaves lanceolate, acuminate, undulate, sheathing at base, erect-spreading, the lower 6–8 in. long, the upper passing gradually into sheathing bracts; spike many-flowered, 9–12 in. long, 1 – $1\frac{1}{2}$ in. wide; bracts lanceolate, very acuminate, somewhat exceeding the flowers; side sepals falcate-oblong, acute, about 7 lines long; odd sepal galeate, horizontal, acute and notched at the apex, spur filiform, spreading and deflexed at the apex, the whole about $1\frac{1}{3}$ in. long; petals almost exactly those of the preceding species; lip oblong, or oblong-lanceolate, entire, obtuse, ascending from the base and then deflexed, about 5 lines long; anther nearly horizontal; rostellum short; ovary obtusely 3-angled. *D. macrantha*, Swartz, in *Kongl. Vet. Acad. Handl.*, vol. 21 (1800), p. 210 ??; Thunberg, *Flor. Cap.* (1823), p. 8 ??.

HAB. "Sands about Salt River, near Cape Town," *Dr. Harvey*.—Also found near Tygerberg, fl. Nov., *MacOwan*; and near Groenekloof, Oct., *Bolus*, No. 4330.

Coloured very much like the preceding, except on the lip, which is a dingy yellow variously marked with brown blotches, or a large cross; the leaves are a more glaucous green, but also, like *D. cornuta*, banded with red spots on the under surface towards the base.

This species has long been confused in herbaria with the last-named, the resemblance being sufficiently close to escape detection, especially when dry, without careful examination. The differences may be summed up as follows: the spike of the present species, though dense, is usually more slender and more acuminate than in *D. cornuta*; the bracts are narrower and more acuminate; the odd sepal less inflated and acute, though minutely notched (not obtuse); the spur horizontal for some distance (not immediately deflexed); the side sepals are narrower and more acute; the labellum oblong or nearly so (not broadly obovate); colour as above, while in *D. cornuta* the upper half is invariably a uniform deep velvety purple.

It is an interesting question whether this is the *D. macrantha* of Swartz. It agrees partly, but not entirely, with his description; but, since there is no authentic specimen of that species in Thunberg's herbarium, and no other plant, so far as is known, which agrees with his description, a new name for the present plant was an unavoidable necessity, notwithstanding the suspicion I feel that this may be a form of Thunberg's plant. The name *D. macrantha* was subsequently applied by gardeners to a very different plant, viz., *D. crassicornis*, Lindley (*D. megaceras*, Hook. f., *Bot. Mag.*, t. 6529), a native of the Eastern Province and Natal.—*D. aemula* is certainly rare on the

Peninsula; I have never yet gathered it here, but I include it without hesitation on the authority of Dr. Harvey, and have little doubt that it will again be detected within our limits.

15. *Disa tenuicornis*, Bolus, in *Journ. Linn. Soc.*, vol. xxii. (1885), p. 68.—Glabrous, erect, 6–15 in. high; stem leafy, covered with imbricating sheaths; leaves lax, linear, acuminate, loosely sheathing at base, erect, the lower sometimes narrowed in the middle, 3–5 in. long, the upper gradually smaller, scarcely reaching to the base of the spike; spike somewhat dense, in length from a third to half the height of the plant; bracts ovate, with a long curved cusp, membranaceous, netted-veined, about as long as the flowers; odd sepal galeate, incumbent, obovate, obtuse, apiculate, 7 lines long, with two sacs at base, from between which protrudes a straight filiform spur about $2\frac{1}{2}$ lines long; side sepals falcate-ovate, acute, oblique at base, bent downwards, 5 lines long; petals minute, oblong, horizontal, with an ascending lobe at the top, adnate to the column; lip subulate, widened above the base, acute, 5 lines long; rostellum short, erect, entire, the glands of the pollinia close together, with a tubercle on either side; anther horizontal; stigma hollowed; ovary cylindrical, 5–6 lines long.

HAB. In clefts of rocks on the lower plateau of Table Mt., near the Breakfast Camp on the Hout's Bay Stream, at a height of 2500 ft., flowering in Oct. Bolus, No. 4967; *Herb. Norm. Austr.-Afr.*, 407.

Flowers white, the galea spotted, and the other parts margined with blood-red, with which also the ovaries, bracts, and rachis of the spike are more or less tinged. The species is very distinct, in general habit most nearly resembling luxuriant specimens of *D. tabularis*, Sonder, but readily distinguished from that by its twice larger flowers, and its thin, straight, intrusely-set spur. This species was first seen by me in the year 1884, and for a long time I could find no previous record of its discovery. In 1888, however, I found a drawing of a somewhat poor specimen amongst a collection of very interesting water-colour drawings made by Masson at the Cape between 1787–95, and preserved in the British Museum, South Kensington. There was, however, no record upon it of the station where it was found. It is strange that it was never gathered by Sparrman, Thunberg, Burchell, Drège, Ecklon, Harvey, or Pappe,—all of whom collected on Table Mt.

PLATE 14.—Figs. 1, 2, flowers, front and oblique view, $\times 3$ diameters; 3, odd sepal, $\times 3$; 4, lip, $\times 3$; 5, side sepal, $\times 3$; 6, side petal; 7, column with side petals; 8, ditto, side view, with one petal removed, all variously magnified.

16. *Disa tenella*, Swartz, in *Kongl. Vet. Acad. Handl.*, vol. xxi. (1800), p. 212.—Glabrous, erect, 2–5 in. high; stem leafy; leaves mostly radical, many, from a broad sheathing base, narrow, linear,

twisted, erect or spreading, 1–2 in. long, the upper gradually shorter and passing into leafy bracts, of which the lower are much longer than, and the upper about as long as the flowers; spike somewhat dense; side sepals oblong, very obtuse, 2–2½ lines long; odd sepal galeate, the limb ovate, subacute, with a conical, straight, tapering spur, about as long as the limb, the whole about 4 lines long; petals obliquely falcate-ovate, acute; lip linear-oblong, obtuse, 2 lines long; glands of the pollinia approximate; stigma round, margined. Thunberg, *Flor. Cap.*, ed. 1823, p. 11; *Orchis tenella*, Linnæus the younger, *Suppl.* (1781), p. 400; *Satyrium tenellum*, Thunberg, *Prodr. Pl. Cap.* (1794), p. 5.

HAB. "On the eastern side of Table Mt., near Constantia," also, "var. *lutea*, on the Cape Flats, near Wynberg," *Ecklon & Zeyher*, according to Sonder, in *Linnaea*, vol. xix., p. 98.—Extends eastward to Tulbagh, and, according to Lindley, to Uitenhage.

The flowers are reddish, and very fragrant with the scent of daisies. There is a variety with yellow flowers. I have found neither on the Peninsula, though I have gathered it in the Tulbagh Valley, and I include it on the entirely trustworthy authorities above named. My description is from living plants sent by Miss M. F. Farnham from Stellenbosch, which were distributed in the *Herb. Norm. Austr.-Afr.* under No. 309. The species is quite distinct, and not likely to be confused with any other, except perhaps *D. brachyceras*, Lindley, which has a similar habit, but a short blunt spur. The latter does not occur within our limits.

17. *Disa tabularis*, Sonder, in *Linnaea*, vol. xix. (1847), p. 99.—Glabrous, erect, 5–14 in. high; leaves densely clothing the stem, erect, linear-lanceolate, acuminate, passing into lanceolate bracts, as long as or a little longer than the stem; spike densely many-flowered, half as long as the plant, ¾–1 in. wide, bracts leaf-like, about as long as the flowers; side sepals oblong, spreading, about 3 lines long; odd sepal galeate, mouth oval or orbicular, 2½ lines wide, obtuse, the margin sometimes spreading, spur very obtuse, ¾ line long; petals oblong, suddenly knee-bent in the middle, 2-toothed at the apex; lip linear, acute, deflexed, 2½ lines long; rostellum wide and low, with an acute middle lobe longer than the arms and turned back over the anther, a small tubercle on either side between the petals and the column; stigma with the two anterior lobes cut and folded in front.

HAB. Grassy slopes on the north-eastern corner of Table Mt., alt. 3300 ft.; also on the lower plateau at 2500 ft., fl. Oct.—Dec., *Harvey*; *Bolus*, 4819; *Herb. Norm. Austr.-Afr.*, 406.

Flowers tawny yellow with darker spots on the back of the odd sepal, and on the margins of the sepals; petals yellow. Allied to *D. obtusa*, and generally difficult to distinguish in the dried state, when

the middle tooth of the rostellum and the fold in the stigma are not easily detected. It is much less common than *D. obtusa*.

PLATE 15.—Figs. 1, 2, flower, front and side views, $\times 4$ diameters; 3, side sepal, $\times 4$; 4, lip, $\times 4$; 5, petal, $\times 6$; 6, ditto, from another plant, $\times 6$; 7, 8, column and petals, front and side view, magnified; 9, column, side view, mag.

18. *Disa obtusa*, Lindley, *Gen. & Sp. Orch.* (1838), p. 355.—Glabrous, erect, 5–10 in. high; stem sparingly leafy; leaves linear, acute, sheathing at base, erect, $1\frac{1}{2}$ –3 in. long; spike densely many-flowered; bracts ovate-acuminate, the lower longer, the upper shorter than the flowers; side-sepals oblong, obtuse, spreading, 2 lines long; odd sepal galeate, obtuse, 2 lines wide; spur obtuse, about $\frac{3}{8}$ line long; petals oblong, knee-bent in the middle, adnate to the column at base; lip linear, subacute, deflexed, $1\frac{1}{2}$ lines long; anther resupinate; rostellum erect, arms somewhat divaricate, tuberculate between the column and petals on either side.

HAB. In shallow, moist valleys of the mountains of the Peninsular range, in several places, alt. 800–2400 ft.; fl. Nov.—Dec.; Sieber; Wright; Bolus, 4549; *Herb. Norm. Austr.-Afr.*, 336.

Flowers generally whitish, with lilac spots and stripes; petals yellow; rostellum and stigma white; it varies to darker colours, with lilac ground, and purple spots and stripes. Allied to the preceding. The capsules in this species frequently untwist, and become straight after maturity, the withered flower then standing with its helmet facing the axis of the spike. Darwin has noticed the same untwisting in the ovary of *Malaxis paludosa* ('Fertilisation of Orchids,' ed. 2, p. 131). This is one of the commonest of the small *Disa* near Cape Town, and in some years is abundant.

PLATE 34. — Fig. 1, flower $\times 4$ diam.; 2, odd sepal $\times 6$; 3, side sepals $\times 6$; 4, side petals $\times 6$; 5, lip $\times 6$; 6, 7, column, side and front view, magnified.

19. *Disa cylindrica*, Swartz, in *Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 213.—Erect, glabrous, 5–12 in. high; scape laxly leafy; leaves lanceolate, acute, waved, erect or ascending, sheathing at base, 2–3 in. long; spike cylindrical, densely or loosely many-flowered, usually about one-third of the length of the scape; bracts lanceolate, acute, leaf-like, about the length of the flowers, or longer or shorter; side-sepals obliquely oblong, acute, apiculate, 3-nerved, recurved, or erectly spreading, 3–4 lines long; odd sepal cucullate, acute or obtuse, with a dorsal point near the apex, shortly saccate at base, the sac mostly about a line long and as thick, the whole as long as the side sepals, and adnate to them shortly above the base; petals erect, obliquely lanceolate, subacute, cordate on the anterior margin, fleshy, adnate to the column at base; lip linear, obtuse, thick and fleshy, about 2 lines long; rostellum subovate, erect, without arms,

the glands approximate near the apex, tuberculate on either side near the middle. — Thunberg, Flor. Cap., ed. 1823, p. 13; *Satyrium cylindricum*, Thunberg, in Prodr. Plant. Capens. (1794), p. 5.

HAB. On the lower plateau of Table Mountain, above Klassenbosch, &c., 2400—3500 (?) ft.; fl. Oct.—Jan.; *Bolus*, 4537.

This species seems to vary considerably in the density and number of flowers on the spike, in the size of the flowers, and in the length of the odd sepal and its spur, in some forms the latter becoming almost obsolete, while at its longest it is only shortly conical. Usually the whole plant, stem, leaves, and flowers, is of a uniform dull-yellow tinge; sometimes, but less commonly, it is a bright sap-green; the surface is minutely papillate, and hence slightly rough to the touch. The rostellum is somewhat different from that of any other species, and the perianth appears to form a connecting-link between this and the section *Monadenia*.

There has been some confusion between this species and *D. bracteata*, Swartz. The latter is thus characterised (Kongl. Vet. Acad. Handl., xxi., p. 211):—“Galea obtuse, spur oblong, deflexed; lip linear, wider at the apex; spike cylindrical; bracts erect, longer than the flowers.” But there is no specimen extant in Thunberg’s or Swartz’s herbarium; and the words “spur oblong, deflexed” emphatically separate it from all forms of the present plant, of which a type exists in Thunberg’s herbarium, and which well agrees with the original expression in Thunberg’s ‘*Prodromus*,’ p. 5, under *Satyrium cylindricum*, “galea unicallosa.” Lindley figured, in the ‘*Botanical Register*,’ vol. iv., t. 324, what he regarded as *Disa bracteata*, Swartz, from the latter’s description. The figure shows a plant clearly belonging to the section *Monadenia*, and it is probable that, whether Lindley named it rightly or not, Swartz’s *D. bracteata* did belong to that section.

20. *Disa lineata*, *Bolus*, in *Journ. Linn. Soc.*, vol. xxii. (1885), p. 74. —Glabrous, erect, 3 in. to a span high; stem laxly leafy; leaves 5–6, linear-lanceolate, acute, sheathing at base, ascending, 1–3 in. long, the upper passing into bracts; spike moderately-crowded, from one-third to half the height of the plant, 6–20-flowered; bracts ovate-lanceolate, acuminate, spreading-erect, mostly a little shorter than the flowers; flowers, with the ovary, about 7 lines long; side sepals lanceolate, sub-obtuse, at first spreading, but shortly erected, and closely appressed to the odd sepal, $3\frac{1}{2}$ lines long; odd sepal somewhat funnel-shaped, erect, acute, obtuse at the base (neither saccate nor spurred), with a narrow mouth, the margin somewhat wavy, $4-4\frac{1}{2}$ lines long; petals oblong, falcately incurved, turned backwards, toothed at the apex, $2\frac{1}{2}$ lines long; lip lanceolate, acute, crenulate or entire, $2\frac{1}{2}$ lines long, at first spreading, then shortly retracted within the galea, and closely covering

the stigma; rostellum very short, scarcely exceeding the stigma, separated from it by a deep cleft, the glands of the pollinia close together; anther horizontal; ovary $3\frac{1}{2}$ lines long.

HAB. In moist places with a western aspect on the Constantia Mt., behind Tokay, at about 2700 ft.; fl. Oct.; *A. Bodkin*; *Bolus*, 4966; *Herb. Norm. Aust. Afr.* 405.

The flowers have a dull yellow ground, the galea marked by definite purple lines; the sepals with purple spots; the lip purple, with a yellow apex and base. The galea resembles in shape that of *D. maculata*, Linn. f. (otherwise a very different plant), or that of some of the very shortly-saccate *Satyria*. The early closing of the flowers by the falling inwards of the lip, and the erection of the side-sepals is very curious, and I have not observed it in any other species. It is most nearly allied to *D. neglecta*, Sonder, which has flowers of only half the size, but which has not hitherto been detected on the Peninsula.

PLATE 18. — Fig. 1, flower, with bract; 2, odd sepal, side view; 3, side-sepal; 4, lip; 5, petals; 6, column, with petals and lip; 7, column, side view; 8, ditto, front view; 9, pollinium; all variously magnified.

§ 3. Vexillata.

Racemes long, distantly few-flowered.

- | | | | | |
|---|----|----|-------------|-----------------|
| Odd sepal obovate, obtuse; lip linear | .. | .. | D. RACEMOSA | 21. |
| Odd sepal obovate, obtuse; lip ovate-oblong | .. | .. | „ | VAR. ISOPETALA. |
| Odd sepal rhomboid-cuneate, subacute | .. | .. | D. VENOSA | 22. |

Racemes short, subcorymbose.

- | | | | | | | |
|-------------------------|----|----|----|----|---------------|-----|
| Flowers yellow | .. | .. | .. | .. | D. TENUIFOLIA | 23. |
| Flowers crimson or rosy | .. | .. | .. | .. | D. PATENS | 24. |

21. *Disa racemosa*, *Linnaeus the younger*, *Suppl. to Syst. Veg.* (1781), p. 406.—Glabrous, erect, 15–30 in. high; stem nearly straight, slender, distantly clothed with closely-wrapping sheaths, with shortly-spreading points; leaves 4–6, radical, linear-lanceolate, acuminate, laxly spreading; raceme distantly 4–9-flowered, subsecund; bracts broadly ovate, acute, erect, about as long as the ovary; side-sepals broadly elliptical, obtuse, mucronulate below the apex, spreading, about 10 lines long, 7–8 lines wide; odd sepal ovate, concave, obtuse, bluntly and widely saccate behind, just below the middle, about 9 lines long, 5 lines in depth; petals obliquely oblong, apex incurved, posterior margin erosulate, meeting and arching over the anther, adnate to the column at base; lip linear, acute, 5 lines long; column erect or ascending; rostellum with divaricate arms, bearing the glands at the apices, furnished posteriorly with a petaloid appendage reaching half-way up and closely embracing the anther; glands facing the front of the flower. *Bot. Mag.* (1888), t. 7021; *Satyrium secundum*, Thunberg, *Prodr. Pl. Cap.* (1794), p. 4; *D. secunda*, Swartz, in *Kongl. Vet. Acad. Handl.*, vol. xxi. (1800), p. 213; Lindley, *Gen. & Spec. Orch.* (1838), 348.

HAB. Moist grassy places on the eastern sides of Table Mountain, 800 ft., and on the lower plateau, 2500 ft.; fl. Dec.—Jan.; *Bolus*, 4888; *Zeyher*, 3915.—Extends eastward to Swellendam (*Burchell*, 7498) and to Grahamstown (*MacOwan* 387).

The colour of the flower is a beautiful rose, with darker, fine veins, the front edges of the petals crimson or purple, their inner surface yellow, with purple stripes, the column a pale purple. In habit and external appearance it closely resembles the following species.

I have seen a single plant with the general habit of this and the next species, but with flowers very different in their structure, and which, if they were constant, would constitute a very distinct species. This is uncertain, and it is safer to regard it for the present as a variety or sport:—

Var. ISOPETALA.—Side sepals ovate-oblong, acute; odd sepal ovate acute; petals ovate-oblong, nearly flat, erect, subobtusely veined, free at the base, nearly as long as the back sepal, 11 lines long, 6 lines wide; lip like the side-sepals, but obtuse, about 9 lines long, 5 lines wide; rostellum with two parallel, approximate, erect-recurved processes between its arms, in addition to the petaloid appendage below the anther, as in the typical form; stigma furnished at base with a petaloid, linear, emarginate, projecting appendage, $1\frac{1}{2}$ lines long.

HAB. Valley on the lower plateau of Table Mountain, above Klassenbosch, 2400 ft.; Jan. 5, 1885; *A. A. Bodkin* (No. 7033 in herb. *Bolus*).

Colour delicate rose, with darker tips to the side-sepals. There were three flowers on the scape, all of which appeared to have the same structure.

22. *Disa venosa*, Swartz, in *Konigl. Vetensk. Acad. Handl.* vol. xxi. (1800), p. 213, not of Lindley.—Glabrous, erect, 12–15 in. high; stem, leaves, sheaths, and bracts nearly as in the preceding, but mostly more slender and smaller; raceme distantly 2–4-flowered; side-sepals oblong, subacute, mucronulate, waved, horizontally spreading, about 10 lines long; odd sepal rhomboid-cuneate in outline, concave, acute, with a blunt dorsal sac 3–4 lines deep just below the middle; petals standing out in front of the back sepal, meeting and arching over the anther, oblong, incurved and toothed at the apex, adnate to the column at base, with a prominent lobe on the front margin; lip linear-subulate, acute, about 5 lines long; rostellum similar to the preceding, but the glands lateral, turned inwards and facing each other, with a petaloid appendage as in the preceding. *Thunberg*, *Flor. Cap.*, ed. 1823, p. 15.

HAB. Moist grassy places on the lower plateau of Table Mountain, 2400 ft.; fl. Dec.; *Bolus*, 4845.—Extends eastward to Du Toit's Kloof (*Drège*, 1239A) and Port Elizabeth.

Colour very nearly as in the preceding species, to which this bears a strong resemblance, but may always be distinguished by its narrower,

more angular, cuneate back sepal, its less rounded side-sepals, &c. It varies somewhat in the shape of the petals which I have described from the form on the Peninsula; those I have seen from Port Elizabeth are somewhat different and larger. It is a rather uncommon species here; I have never seen more than a few plants in any season, and in some years have failed to find it.—Lindley (Gen. & Sp. Orch., 351) mistook a very different species for this.

23. *Disa tenuifolia*, Swartz, in *Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 214.—Glabrous, erect, 3–10 in. high; stem straight or flexuous, distantly clothed with short leafy sheaths; leaves radical, many, setaceous, in a dense tuft, about $\frac{1}{2}$ in. long; flowers mostly 1 to 3, rarely 4–8, in a corymbose raceme, the pedicels widely spreading, bracts sheathing, acuminate, shorter than the ovary; side sepals ovate-falcate, acuminate, oblique at base, ascending, then spreading, about 10 lines long; odd sepal nearly flat, cordate, apiculate, shortly clawed, about as long as the side sepals; petals lanceolate, falcately incurved, acute; lip setaceous, deflexed, usually curled at the apex, about 7 lines long; stigma and rostellum nearly erect, the latter with divaricate arms and a petaloid appendage free at the apex, three-fourths of the length of the horizontal, acute anther. *Ophrys patens*, Linnæus, the younger, *Suppl.* (1781), 404; *Serapias patens*, Thunberg, *Prodr. Pl. Cap.* (1794), 3; *Disa patens*, Thunberg, *Flora Cap. ed.* 1823, p. 16, not of Swartz; *Penthea patens*, Lindley, *Gen. Sp. Orch.* (1838), p. 362.

HAB. Mountain-tops of the Cape Peninsula, from 800 ft. to 3550 ft.; fl. Dec.—Jan. Burchell, 656; Zeyher, 1580; Bolus, 3913.—Extends to Du Toit's Kloof, and Swellendam (Burchell, 7055, 7338).

This is one of the commonest of our Orchids, and has a wide vertical range extending to the very summit of Table Mountain. The colour of the flowers is a bright yellow. Large specimens with 6 to 8 flowers are very handsome, but are rarely seen; the smaller forms are abundant enough, and stud the mountain-tops in the dry mid-summer with their gay golden stars.

24. *Disa patens*, Swartz, in *Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 214, not of Thunberg.—Glabrous, erect, 4–7 in. high; stem covered with leaflike or sub-membranous, closely embracing sheaths, with acuminate, free, erect or spreading points; leaves radical, numerous, narrow-linear, acute, erect or laxly spreading, sheathing at base, 1–1 $\frac{1}{2}$ in. long; raceme somewhat corymbose, loosely 3–9-flowered; bracts lanceolate, acuminate, erect, about as long as the ovary; side sepals oblong, sub-obtuse, mucronulate below the apex, spreading, about 8 lines long; odd sepal subrotund, concave, apiculate, subsessile or unguiculate, erect, as long as the side sepals; petals linear-

falcate, obtuse, erect, incurved; lip setaceous, deflexed, 4-5 lines long; rostellum erect, the arms divaricate and arching forward over the stigma, with a broad petaloid appendage crisped at the margins, embracing the anther below and reaching higher than its sides; anther ascending, long and narrow; stigma pulvinate. *Orchis filicornis*, Linnæus, the younger, Suppl. (1781), 400; *D. filicornis*, Thunberg, Flor. Cap. ed. 1823, 17; *Penthea filicornis*, Lindley, Gen. Sp. Orch. (1838), 361; *P. reflexa*, Lindley, l. c., 361; *D. reflexa*, Reichenbach, the younger, in Flora (1865), p. 182.

HAB. Moist sandy places in the lower mountain-tops Muizenberg, &c., 1100—1300 ft.; fl. Oct.—Dec. Drège, 1233, &c.; Bolus, 3365; Zeyher, 3931; Herb. Norm. Austr.-Afr., 163.—Extends eastward to Villiersdorp and probably farther.

The side sepals are a bright reddish purple; the odd sepal and lip rose, with purple spots on the former; the petals yellow inside, edged and spotted with purple, the stigma a brown purple. The species is quite distinct from any other, and is abundant in some seasons. There is a form without any claw to the odd sepal; this Lindley distinguished as *Penthea reflexa*, but it does not appear to differ otherwise, judging from specimens which I gathered near Villiersdorp. I have not found this form on the Peninsula.

§ 4. *Coryphæa*.

Flowers lilac, large	D. HARVEIANA 25.
Flowers rosy, small.	
Leaves broad, glandularly hairy	D. GLANDULOSA 26.
Leaves narrow, glabrous	D. VAGINATA 27.

25. *Disa Harveiana*, Lindley, in Hook. Lond. Journ. Bot., vol. i. (1842), p. 15.—Erect, glabrous, 10-20 in. high; scape straight, nearly leafless; leaves at the base of the scape 2-3, linear, acuminate, weakly spreading and nearly withered when the flowers bloom, 5-7 in. long; sheaths membranous, netted-veined, covering and closely investing the scape, with short, free, acuminate points; bracts, lanceolate, acuminate, membranous, netted-veined, shorter than the ovaries, flowers 3-7 in a loose spreading raceme, on pedicels 3-4 lines long; side sepals oblong, somewhat obtuse, spreading deflexed, about 10-11 lines long; odd sepal subgaleate, the limb expanded, obovate, arched backward, with a spreading filiform spur exceeding the ovary, 1-1½ in. long; petals nearly linear, acute, eared at base, spreading outward at the apex; lip linear-lanceolate; rostellum low; anther resupinate.

HAB. Rocky clefts and ridges on Table Mountain, 1500-2500 ft.; most frequent on the lower plateau, at about 2500 ft., but scarcely abundant; fl. Dec.—Jan. Bolus, 3304; Herb. Norm. Austr.-Afr., 162.

Colour of the flowers a delicate lilac or French-grey, with purple

stripes on the petals and spots at the mouth of the galea. There is no other species on the Peninsula, so far as I know, like it, or for which it could be mistaken. Nevertheless as it is like *D. Draconis*, Swartz, which grows not far off, and may hereafter be found within our limits, I will summarize their chief differences. *D. Draconis* is larger and more robust, with larger, and always, so far as I have seen, cream-coloured flowers; the petals lanceolate and less spreading, the lip linear and very obtuse. In the dried state the two species are very easily confused. The recurved upper half of the galea in both is a character very unusual in the genus.

26. *Disa glandulosa*, Burchell, in Lindley, *Gen. & Sp. Orch.* (1838), p. 351.—Herbaceous, leaves and sheaths covered with glandular hairs, erect, 4–7 in. high; scape straight or flexuous, stout or slender, more or less thickly covered with sheaths; radical leaves 3 or 4, from ovate to broadly lanceolate, acute, narrowed and sheathing at base, 1–2 in. long; sheaths herbaceous, dense and leafy, or sometimes closely appressed; bracts similar but more acuminate, as long as the ovaries; raceme 2–12-flowered, somewhat corymbose, sometimes dense, or loosely spreading; side sepals broadly elliptical, very obtuse, convex, spreading, 4 lines long; odd sepal galeate, the limb ovate, very obtuse and wide-mouthed, with a conical, somewhat inflated spur compressed at the sides and half as long as the ovary; petals oblong, concave incurved; lip obovate-oblong, very obtuse, nearly 3 lines long; rostellum very low, scarcely rising above the stigma; anther horizontal; stigma deeply channelled in front.

HAB. Moist grassy ridges between rocks on Muizenberg, 1600 ft., and on Table Mountain, 3000 ft.; fl. Dec.—Jan.; not common. *Herb. Norm. Austr.-Afr.*, 169; *Bolus*, 4540.—Extends to the neighbourhood of Swellendam, where Burchell (No. 7337) first found it, in Jan. 1815.

Flowers rose-pink, with dark red spots at the base of the sepals and on the top of the petals. The habit is rather variable and but for the pubescence small specimens might be confused in the dried state with the next species, the flowers of which it somewhat resembles. The chief differences are there pointed out; and it may be added that the habitat of the two species is, so far as I know, quite distinct: the present being never found in the open, but always on steep and rocky mountain slopes.

PLATE 35.—Fig. 1, flower, side view, $\times 2$ diameters; 2, ditto, front view, $\times 3$; 3, parts of the flower, one petal viewed from the outer, one from the inner side, $\times 3$; 4, 5, column, side and front views; 6, pollinium; 7, glandular hairs from the leaf,—all variously magnified.

27. *Disa vaginata*, Harvey, in Hook. *Lond. Journ. Bot.*, vol. i. (1842), p. 15.—Glabrous, erect, slender, 3–5 in. high; leaves at the base

of the scape 3-4, ovate to lanceolate, acute, spreading, less than an inch long, passing gradually into rusty brown resin-dotted sheaths which clothe the scape; bracts lanceolate, as long as, and enveloping, the ovary; flowers 2-9, commonly 3-4, in a loose sub-corymbose raceme; side sepals broadly oblong, very obtuse, slightly concave, spreading, 3-4 lines long; odd sepal galeate, the limb ovate, acute, with an elliptical mouth, and a thin tapering spur half the length of the ovary; petals in the mouth of the odd sepal, oblong bent, truncate; lip obovate, truncate, spreading, about $2\frac{1}{2}$ lines long; rostellum a mere ridge, very low; anther horizontal; stigma pulvinate. *D. modesta*, Reichenbach, the younger, *Linnaea*, vol. xx. (1847), p. 690.

HAB. Moist places amongst Restios and shrubs on the lower plateau, Table Mountain, alt. 2500 ft.; and on Muizenberg, 1400 ft.; fl. Nov.—Dec., *Bolus*, 3898; *Herb. Norm. Austr. Afr.*, 164.—Extends to the Drakensteen Mountains, near Du Toit's Kloof, and to Villiersdorp.

The flowers are a rose-pink, with darker red spots on the petals and at the base of the galea. The species is nearest to *D. glandulosa* in the general structure of the flowers, but the habit is different. Reichenbach has a note (*loc. cit.*), on the composition of the contents of the minute brown cells which are scattered over the sheaths of the scape.

§ 5. *Schizodium*.

The following table is given to assist the student, but cannot be exclusively trusted for identification, since several of the species do not offer diagnostic characters capable of brief expression.

(* Flowers large).

Sepals oblong or roundish, very obtuse (pure white) *D. FLEXUOSA* 28.

(* * Flowers mediocre).

Sepals lanceolate or linear.

Sepals linear, much arched and acuminate *D. TORTA* 29.

Sepals lanceolate, acute; petals narrow, acute

Petals lobed in front at the base; spur short and thick . *D. INFLEXA* 30.

Petals rounded and fimbriate at base; spur long and thin

Scape much bent *D. OBLIQUA* 31.

Scape usually bent at the base only *D. BIFIDA* 32

(* * * Flowers small).

Sepals lanceolate; petals oblong, subtruncate *D. CLAVIGERA* 33.

28. *Disa flexuosa*, Swartz, in *Konigl. Vet. Acad. Handl.* (1800), p. 212.—Six to fifteen inches high; leaves about an inch long; scape 1-6-flowered; sepals subequal, 4-5 lines long, oblong or roundish, very obtuse, veined, odd sepal apiculate, reflexed at the sides, spur short, incurved, retuse at the apex; petals erect, from a dilated base, narrow-linear, acuminate, entire, as long as the sepals; lip ovate,

acute, entire, strongly crisped, with a sigmoid bend at the apex. Thunberg, Flor. Cap. ed. 1823, p. 9, *Orchis flexuosa*, Linnæus, Spec. Plant. ed. 3 (1764), p. 1331. *Satyrium flexuosum*, Thunberg, Prodr. Plant. Cap. (1794), 5. *Schizodium flexuosum*, Lindley in Gen. & Sp. Orch., p. 359.

HAB. Sandy places on the Cape Flats, ed. near Rondebosch, alt. 60 ft.; fl. Oct. (rare), Bolus.—Extends to Malmesbury (Zeyher, 3927); Paarl (*Herb. Norm.-Austr. Afr.*, 172); and Hex River Mountains (1600 ft., *W. Tyson*, 642).

The sepals are pure white, the petals and lip rich golden yellow with tawny spots. The flowers are striking and pretty, larger than those of any other species of this group, and very distinct in their appearance. I have only found it once within our limits, but it is very frequently met with near Paarl and Malmesbury.

29. *Disa torta*, Swartz, *K. Vet. Acad. Handl.* 21 (1800) 211.—Six to eight inches high; scape much bent, 1-4 flowered; peduncles lengthening, the older, including the ovary, 8-9 lines long; side sepals linear, much acuminate, with incurved margins, a tooth-like lobe on the upper margin near the base, 8-9 lines long; the odd sepal with a similar but shorter and recurved limb, produced at base into a compressed, horizontal or ascending spur, retuse at the apex and shorter than the limb; petals adnate to the column at base, linear-falcate above, the points turned backward and more or less deeply notched or cleft, knee-bent below, the lower portion widened with an erect ear-like lobe in front; lip somewhat fleshy, from a broad base sharply bent downward, the middle part ovate, margins incurved, erose, point filiform 2-4 lines long. *Orchis biflora*, Linnæus, Spec. Plant. ed. 2 (1763), 1330. *Satyrium tortum*, Thunberg, Prodr. Pl. Cap. (1794) 5. *Schizodium arcuatum*, Lindley, in Gen. & Sp. Orch. (1838), p. 359.

HAB. "On the summit of the mountain near Constantia, 2000 ft.; fl. Sept.," Krauss, 1326.—Extends to Stellenbosch, Wellington, Tulbagh, Caledon.

Colour of the flowers varying from pale lilac to rose-red, with darker, sometimes numerous, minute greenish spots or papillæ on the surface of the lip, and larger pale purple spots on the petals. If I am right in my identifications this is a very variable plant, and it is probable from the description that *S. longipetalum*, Lindley, *ib.*, is one of its numerous forms. Nevertheless, all are very distinct from any other species, and it may readily be known by its narrow arching sepals, longer than those of any other, and the long straight point of its lip. I have never seen it on the Peninsula, and insert it here on the authority of Dr. Krauss (*Beiträge zur Flora des Cap und Natalandes*, 1846, p. 157). My description is based upon living specimens collected by Miss Farnham near Stellenbosch, and numbered 5922 in my herbarium.

30. *Disa inflexa*, Mundt, in *Herb. Lehmann, ex Lindley, Gen. Sp. Orch.* (1838), 360.—Six to twelve inches high; scape not much bent, 2-3 flowered; peduncles and ovary erectly spreading, about 6 lines long; sepals oblong-lanceolate, obtusely acute, about 5 lines long; odd sepal with a similar but shorter and erect limb, spur horizontal or deflexed, straight, broad, very obtuse, 3-3½ lines long; petals erect, oblong, obliquely toothed at the apex, base dilated but not rounded on the anterior margin with a tooth-like lobe in front; lip somewhat broad at base, ovate in the middle, point filiform, deflexed, the whole about as long as the sepals. *Schizodium inflexum*, Lindley, in *Gen. & Sp. Orch.* (1838), p. 360.

HAB. Moist flat places on Table Mountain, from the lower plateau at 2500 ft. to the summit, 3550 ft.; fl. Nov.—Dec., *Bolus*, 3882; *Burchell*, 655.—Extends to Winterhoeksberg, Tulbagh, 800—5000 ft.; fl. Nov.—Jan. (*Ecklon & Zeyher* according to Sonder); Swellendam (*Burchell* 7307).

Colour of the flowers a delicate flesh tint, with carmine spots in four lines on the lip, and carmine points to the petals; the leaves are usually, at the time of flowering, a dull red. This species comes near to the two next, and is not always readily distinguishable. The chief differences are pointed out in the synoptical table above; it appears usually to grow at a higher elevation than its congeners.

PLATE 22.—Fig. 12, flower; 13, column with petals, *g*, gland, *s*, stigma: 14, column, side view; all variously magnified.

31. *Disa obliqua*.—Four to seven inches high; scape usually much bent, 3-6 flowered; peduncles erect, lengthening, the older together with the ovary about 9 lines long; side sepals narrow lanceolate, acuminate, about 5 lines long; odd sepal with a similar but shorter and more concave limb, bent forward; spur horizontal or ascending, generally forming a sharp angle with the limb of the odd sepal, thin, dorsally compressed, blunt and retuse at the apex, longer than the limb, the whole about 5 lines long; petals linear in the upper portion and curved backward, obliquely toothed at the apex, the base dilated, subrotund, fimbriate on the anterior, sharply knee-bent on the posterior margin; lip broadly ovate in the middle, with a long, blunt, much deflexed point, the whole about as long as the sepals. *Schizodium obliquum*, Lindley, in *Gen. & Sp. Orch.* (1838), p. 359. *S. obtusatum*, Lindley, *ibid* 359.

HAB. Moist places on the mountain-tops (especially in burnt places) Muizenberg, 1000—1200 ft., Table Mountain, 2300 ft.; fl. July—Aug., *Bolus*, 7037; *Herb. Norm. Austr.-Afr.*, 173.—Extends to Stellenbosch and Genadendal (*Zeyher*, 1571).

Flowers delicate flesh-colour with purple blotches on the lip, and similar stripes on the apex of the petals. Closely allied to the preceding and succeeding species; the sharp angle formed by the ascending spur is a good mark of distinction from *D. bifida*.

32. *Disa bifida*, Swartz in *K. Vet. Acad. Handl.*, vol. xxi. (1800), 212.—Seven to eleven inches high; scape usually bent at the base only, 2–4 flowered; peduncles erectly spreading, the older, together with the ovary, reaching an inch in length; side sepals oblong, obtusely acute, 6 lines long; odd sepal with a similarly shaped, or more obovate but shorter limb, spur horizontal or ascending, thin, obtuse and longer than the limb; petals erect, linear or oblong toothed or cleft at the apex, dilated at the base, and fimbriate on the rounded anterior margin (or sometimes glabrous with a tooth-like lobe in front?); lip like that of *D. inflexa*. *Satyrium bifidum*, Thunberg, Prodr. Pl. Cap. (1794), 5. *Schizodium rigidum*, Lindley, in Gen. & Sp. Orch. (1838), p. 360. *S. bifidum*, Reichenbach, f., Flora (1883), 460.

HAB. Moist sandy places on the Cape Flats near Rondebosch, 60 ft.; fl. end of Aug. to Sept., Bolus, 3742—Extends to Caledon and Babylon's Tower Mt. (Ecklon & Zeyher according to Sonder) Zeyher, 3929; Port Elizabeth, J. R. Holland.

Colour of the flowers and markings very similar to those of *D. inflexa*, but the leaves are pale glaucous green, and the spurs are always longer and thicker. From *D. obliqua* it may be usually distinguished by the broad, sweeping, dorsal curve formed by the union of the odd sepal and its spur, instead of an angle as exhibited by that species.

33. *Disa clavigera*.—Three to five inches high; scape 2–6 flowered; peduncles elongating, the lowest, together with the ovary, 7–8 lines long; side sepals oblong-lanceolate, acute, about $2\frac{1}{2}$ lines long; odd sepal with a similar but shorter and concave limb, spur horizontal or ascending, filiform, subinflated, retuse at the point, about as long as the limb; petals oblong, obliquely twisted, truncate and toothed at the top, not much dilated at base; lip broadly ovate in the middle with a short deflexed point. *Schizodium clavigerum*, Lindley, in Gen. & Sp. Orch. (1838), p. 360.

HAB. "In rocky places on Table Mountain, Sept." (Ecklon & Zeyher, according to Sonder).—Extends to Paarl and Grœnekloof, Drège; Stellenbosch, Miss Farnham!

Flowers a faint pink, with lilac spots on the lip and red tips to the petals and the lip. This species is readily distinguished by its small size in every part, besides other differences. I have never met with it on the Peninsula; but it is so well marked that I have little doubt that Sonder's identification and the locality are correct. My description is based upon living plants which were sent by Miss Farnham from Stellenbosch, and numbered 5923 in my herbarium.

§ 6. *Orthocarpa*.

- Lip trowel-shaped, somewhat lobed, obtuse D. ROSEA 34.
 Lip exactly oblong, obtuse.
 Flowers small, sepals white, petals yellow D. RICHARDIANA 35.
 Flowers large, sepals dull red, petals purple D. BODKINI 36
 Lip subulate, acute or acuminate.
 Flowers corymbose, sepals usually white, lip acute .. D. MELALEUCA 37
 Flowers at length racemose, sepals longitudinally bi-
 coloured, lip acuminate D. ATRICAPILLA, 38

34. *Disa rosea*, Lindley, *Gen. & Sp. Orch.* (1838), p. 350.—Glabrous, erect or subdecumbent, 3–6 in. high; scape slender, leafy, somewhat wiry, bent; leaves mostly 3, at the base of the scape, spreading, ovate-oblong, acute, sheathing at base, somewhat leathery, $1\frac{1}{2}$ – $2\frac{1}{4}$ in. long, succeeded by 4 or 5 lanceolate, acuminate sheaths; flowers 4–7 in a loose corymbose raceme, the lower ones on $\frac{1}{2}$ in. pedicels; bracts lanceolate, acute, a little longer than the pedicels and enwrapping them; side sepals elliptical, subacute, bent forward, 5–6 lines long; odd sepal hooded, oblong, acute, inflexed on the sides, bent forward, with a short rounded sac at the base, somewhat saddle-shaped above, about as long as the side sepals; petals small, rising under the odd sepal, ear-shaped, with two long, knobbed, incurved lobes, reaching nearly to the base of the sac of the odd sepal, adnate to the rostellum at the base; lip somewhat trowel- or tongue-shaped, obtuse, with two obtuse incurved lobes towards the base; rostellum very low; pollinia obovate, with very short caudicles and small glands; ovary long and slender.

HAB. Moist banks, ridges and clefts of rocks on Table Mountain, Muizenberg, &c., from 1400 to 3300 ft.; fl. Oct.—Dec., *Bolus*, 4562; *Herb. Norm. Austr.-Afr.* 319.—Extends eastward to the Houw Hoek Mountains, and probably further.

Flowers a delicate flesh-colour, or sometimes nearly white; leaves dark green above, a deep maroon beneath. A very graceful little species with a hood and lip unlike those of any other known to me. It is by no means uncommon.

35. *Disa Richardiana*, Lehmann ex Lindley, *Gen. & Sp. Orch.* (1838), p. 361.—Glabrous, herbaceous, 4–9 in. high; scape erect or decumbent, leafy; leaves 5–8, oblong-lanceolate, acute, sheathing at base, laxly spreading, the lower 1–2 in. long, the upper passing gradually into leafy sheaths; flowers 3 to 8, in a close corymbose head, 1 – $1\frac{1}{2}$ in. across: bracts lanceolate, acute, as long as the ovary and enwrapping it; side sepals obovate, very obtuse, spreading, concave and incurved at the apex, about $3\frac{1}{2}$ lines long; odd sepal ovate, hooded, horizontal, with a contracted mouth, very obtuse at the apex and base, about as long as the others; petals lying within the

hood, nearly oblong, narrow at base, with an oblique incurved lobe at the apex, $2\frac{1}{2}$ lines long; lip exactly oblong, truncate, mucronulate, up-curved, 2 lines long; anther horizontal; rostellum with distant spreading arms and an intermediate rounded lobe; ovary 5–10 lines long. *Penthea obtusa*, Lindley, Gen. Sp. Orch. (1838), 361.

HAB. On moist grassy banks on the eastern side of Table Mountain, near the summit, about 3400 ft.; also in rocky clefts on the lower plateau, alt. 2500 ft.; fl. Sept.—Oct., Harvey, 121; Bolus, 4846; Herb. Norm. Austr.-Afr., 168.

Sepals pure white, suffused with rose in bud, petals and lip golden yellow. A very well-marked species, bearing only a distant resemblance to *D. melaleuca* in miniature, and connecting that with *D. minor*. It is by no means common, and I have only gathered it in two places, one of which, from the description, must be exactly where Harvey obtained his specimens. It loves to grow with *D. rosea*; and I know not whether its pearly white flowers, or the delicate flesh-tints of the other, are the more beautiful jewels bespangling the grassy ridges which “stand up and take the morning” on the top of the grand old mountain.

36. *Disa Bodkini*, Bolus, in Journ. Linn. Soc., vol. xxii. (1885), p. 74.—Erect, robust, glabrous, 3–10 in. high; stem leafy, sometimes flexuous; leaves 6 to 8, from a wide sheathing base, linear, acuminate, erect, slightly flexuose, 3 to 5 in. long, the uppermost reaching beyond the head of flowers; bracts broadly ovate, acuminate, about as long as the flowers; flowers 1 to 6, crowded into a corymbose head, the larger heads $2\frac{1}{2}$ in. across, after flowering often running into a short spike; side sepals ovate-elliptical, somewhat acute, concave, erectly spreading, about 8 lines long; odd sepal concave but scarcely galeate, narrowed at the apex, slightly emarginate, about 8 lines long; petals oblong, falcately curved backwards and upwards, obtuse, fleshy, $3\frac{1}{2}$ lines long; lip oblong, very obtuse, fleshy, ascending, 5 lines long, $2\frac{1}{2}$ lines wide; rostellum erect, with parallel connate arms; anther, slightly curved downward; ovary straight, 5 lines long.

HAB. In moist places on Table Mountain, on the lower plateau behind Klassenbosch, alt. 2300 ft.; and in the long valley behind the upper plateau, 3000 ft.; fl. Nov. Bodkin! Bolus, 4968! Herb. Norm. Austr.-Afr., 333.

Colour of the sepals dull red, the petals and lip deep purple with orange tips. First found by Professor Bodkin in 1884. Nearest to *D. melaleuca*, but known from that by its relatively much larger and differently-shaped odd sepal, its wide obtuse lip and different colour. A very distinct species.

PLATE 13.—Fig. 1, flower $\times 2$ diameters; 2, ditto, side view, the side sepals being removed, $\times 2$; 3, side sepal $\times 2$; 4, lip $\times 2$; 5, petal $\times 2$; 6, column, with lip and petals $\times 4$; 7, column, showing one gland in position, the other removed $\times 4$; 8, pollinium, magnified.

37. *Disa melaleuca*, Swartz, in *Kongl. Vet. Acad. Handl.*, vol. xxi. (1800), p. 213; *Harvey, Thes. Cap.* i. (1859), 53, t. 84.—Erect, glabrous, 4–12 in. high; scape straight, clothed with 5–6 leafy sheaths; leaves crowded at the base of the scape, 6–8, lanceolate acuminate, with involute margins, 2–3 in. long, passing into similar but shorter sheaths with free spreading points; flowers in a somewhat crowded corymb 1–2 in. across, only slightly lengthening in fruit; bracts leaflike, shorter than the ovary; side sepals spreading, oblong, somewhat obtuse, with a sub-apical mucro, nearly equal-sided, about 7 lines long; odd sepal hooded, horizontal, compressed and keeled towards the apex, narrowed and adnate to the rostellum at the base, a little shorter than the sepals; petals oblong, lying inside the hood, incurved and toothed at the apex, not eared at the base; lip subulate, acute or acuminate, narrowed at the base; anther horizontal. *Ophrys bivalvata*, Linnæus, f., *Suppl.* (1781), 403. *Serapias melaleuca*, Thunberg, *Prodr. Pl. Cap.* (1794), 3.

HAB. Moist grassy places on Table Mountain, Muizenberg, &c.; common, 1300 to 3300 ft.; fl. Dec., *Burchell*, 651; *Bolus*, 4208, &c.—Extends eastward to Riversdale (*Burchell*, 6855), and northward to the Cederbergen.

The side sepals are pure white, the hood slightly green-tinted, the petals and lip deep brown or nearly black, with green tips and bases. Very fragrant with the odour of ripening apples. This species and the next are very distinct from any other in the genus. I have seen one or two plants in which the sepals were longitudinally divided in colour, one half being white, the other purple; such plants approached *D. atricapilla* in appearance, and were probably natural hybrids; but the structure of the hood and side petals was that of this species.

38. *Disa atricapilla*, *Bolus*, in *Journ. Linn. Soc.*, vol. xix. (1882), p. 344.—Erect, glabrous, 6–15 in. high; scape, leaves, and sheaths very similar to those of the preceding, but the leaves usually somewhat longer and more acuminate; flowers at first somewhat corymbose, finally lengthening (in specimens with fertilized ovaries) into a raceme, 2–3 in. long; bracts leaflike, shorter than the flowers; pedicels 3–5 lines long; side sepals spreading, ovate-oblong, emarginate, undulate, keeled beneath, unequal-sided, the back margin (next the lip) enlarged and recurved at the base, the apices upturned and incurved towards the odd sepal, about $\frac{1}{2}$ in. long; odd sepal horizontal, hooded, expanded at the base, towards the apex compressed, acute, and produced into a flattened keel below, a little longer than the sepals; petals horizontal, oblong, very obtuse, toothed and incurved at the apex, which is covered with short hairs on the outside, eared and adnate to the column at the base, shorter than the hood; lip subulate, acute, widened and toothed above the base, scarcely 5 lines

long; arms of the rostellum approximate, short; anther resupinate. *Penthea atricapilla*, Harvey, in Hook. Lond. Journ. Bot. (1842), i. p. 17.

HAB. Moist places amongst grass on the Muizenberg at about 1300 ft.; fl. Dec.; not common. *Bolus*, 4638; *Zeyher* (no station), 1579; *Herb. Norm. Austr.-Afr.*, 409.—Extends to Ceres, 1500 ft.; Gydouw, on the Cold Bokkeveld, 3000 ft.; and near Palmiet R.

The colouring is very peculiar. The side sepals are divided in this respect longitudinally into two parts, the anterior half being white, the posterior half black-purple on the outer or lower side, deep crimson on the upper; the hood greenish white and veined; the petals and lip pale green variously mottled with purple. Resembles *D. melaleuca*, with which it has been frequently confused in herbaria; in Linnæus's own herbarium, now in possession of the Linnean Society, it is so mixed. Dried specimens are often puzzling to distinguish, though the habit is a little different. But the colouring is so strikingly different that there is no possibility of confusing them in the living state. It is a much less common plant than *D. melaleuca*, with which also it frequently grows intermixed.

PLATE 10.—Fig. 1, flower viewed from above $\times 1\frac{1}{2}$ diameters; 2, ditto, side view $\times 1\frac{1}{2}$; 3, lip $\times 2$; 4, column with petals, front view $\times 2$; 5, ditto, side view $\times 2$; 6, pollinium, magnified.

§ 7. Vaginaria.

39. *Disa fasciata*, *Lindley, Gen. & Sp. Orch.* (1838), 350; *Harvey, Thes. Cap.* i. (1859), 54, t. 85. — Glabrous, erect or decumbent, 3–9 in. high; tubers the size of a small pea; scape straight or flexuous; leaves 2 or 3, ovate, acute, waved, sheathing at base, about $\frac{1}{2}$ in. long, passing upwards into loose sheathing bracts with acute spreading tips; floral bracts very broad, inflated, veiny, obtuse, mucronulate, shorter than the flowers; flowers 1–5, loosely racemose, or somewhat corymbose, on pedicels 3–4 lines long; side sepals oblong, nearly truncate, apiculate, about $\frac{1}{2}$ in. long; odd sepal cuneate or nearly obovate, with a short conical pendulous spur inflated at the mouth and suddenly contracted and tapering below, the whole about 10 lines long; lip broadly elliptical, about as long as the sepals; all the foregoing expanded and spreading horizontally; petals very small, ear-like, lobed at the apex and the base, lying flat upon the bases of the sepals, adnate to the column at base; rostellum very low, deeply emarginate; stigma somewhat excavate, lying upon the square elevated column.

HAB. In stony places on the southern and south-eastern slopes of the Constantia Mountain, at about 2700 ft.; fl. Oct.; *Bodkin*; *Bolus*, 4955; *Herb. Norm. Austr.-Afr.*, 320; also on the mountains south of Simon's Town, *Miller*; Table Mountain, rare, *Harvey*.—Extends eastward to the Houw Hoek Mountain.

The sepals and lip are a pure bright white, each with 2 or 3 small purple dots in the centre, as a foil to set off their brilliancy; the petals, with a white ground, are more richly spangled with dots of carmine, dark purple, and gold; leaves bright green above, crimson below; the sheaths along the scape are striped with bands of crimson, and the floral bracts veined with the same colour. This is one of the most beautiful and curious of all our small South-African Orchids. Harvey discovered only a single specimen, upon which Lindley's description was founded. But, in fact, Masson had already found and drawn it in 1787, as may be seen from an unfinished sketch in the British Museum. Then, like so many other Cape plants, it lay ungathered and unheard-of for fifty years, until Harvey recovered it. Nearly fifty years after Harvey I met with it growing abundantly on Constantia Mt., and at Houw Hoek, in the summer of 1884. The resemblance between its flowers and those of a species of *Adenandra*, which grew near it at the latter station, was very striking, and suggested a possible connection in the agency of their fertilization.

PLATE 36. — Fig. 1, flower, side view, nat. size; 2, lip $\times 1\frac{1}{2}$ diameters; 3, odd sepal $\times 1\frac{1}{2}$; 4, side sepal $\times 1\frac{1}{2}$; 5, column, with petals; 6, petal; 8, column viewed from front and above; 9, ditto, viewed from behind,—all the latter variously magnified.

§ 8. *Herschelia*.

Lip crenate, waved, or entire.

Lip oblong, reflexed; gland longer than broad D. GRAMINIFOLIA 40.

Lip ovate, incurved at the sides; gland broader than long D. PURPURASCENS 41.

Lip lacerate.

Spike 2—4-flowered; flowers nearly white D. BARBATA 42.

Spike 4—6-flowered; flowers blue; lip white D. VENUSTA 43.

Spike 6—15-flowered; flowers purple; lip green D. LUGENS 44.

40. *Disa graminifolia*, Ker, in *Journ. Sci. R. Inst.*, vol. vi. (1819), 44, t. 1, f. 2. — Glabrous, erect, 1–2 ft. high; leaves 4–6, radical, linear, grass-like, lax, shorter than the scape; scape slender, sheaths acute, membranous, closely clasping; raceme laxly 3–6-flowered; bracts lanceolate, acuminate, shorter than the ovary; odd sepal galeate, erect, wide-mouthed, emarginate, about 9 lines long, with a short inflated horizontal spur 2 lines long; side sepals oblong, obtuse, mucronulate below the apex, spreading, about 8 lines long; petals roundish-oblong and horizontal in the lower part, then suddenly bent upward at a right angle and dilated, the rounded cuneate extremities forming together a green eye-like centre to the flower; lip oblong, obtuse, waved, spreading, at length revolute; anther horizontal, short; gland single (or sometimes 2?), when single oblong, longer than wide; rostellum 3-toothed, erect; ovary clavate, 5–6 lines long. *Herschelia caelestis*, Lindley, *Gen. & Sp. Orch.* (1838), p. 362; Reichenbach the

younger, in 'Orchidiographiæ Europææ,' t. 2, f. 18, 19, 20 (analysis); Bolus, in Journ. Linn. Soc., vol. xix. p. 234 (analysis).

HAB. Mountain-sides and tops, Table Mountain, &c., 1200—3500 ft.; fl. Feb.—March, common; Bolus, 4884; *Herb. Norm. Austr.-Afr.*, 167. — Extends to Genadendal Mt., and probably further eastward.

The sepals are an intensely bright and beautiful blue; the petals usually purple below, with a green upper limb; the lip pale blue, or white, edged with dark blue or purple. Lindley described the flower as having two pollinary glands. Reichenbach ('De Pollinis Orchidearum Genesi,' p. 31) found specimens with both one and two glands. I have never been able to find more than one gland, although I have examined scores of flowers. On this variation Reichenbach (*loc. cit.*) observes:—"There are either two (or three?) genera with exactly the same external appearance and different gynostemia, or one genus with a 2- (or 3-?) morphous gynosteme." Lindley also describes a dorsal linear appendage, tuberculate on either side, and situate in front of the anther. An inspection of Lindley's drawing shews that this organ is that which I have called the middle lobe of the rostellum; while his middle lobe is apparently a fold of the rostellum drawn out in the dissection of the dried specimen, but which is quite invisible in the living state. It is one of the commonest species within our limits, has a rather long flowering period, and attracts universal observation by its beauty and brilliancy; so much so, that Lindley, in dedicating it to the great astronomer, Herschel (who also was a great orchid-lover and cultivator), felicitously speaks of it as "*species hæc pulcherrima colore cœli australis intensè cœruleo superbiens.*" It is very generally accompanied by *D. ferruginea*, Swartz. Its nearest ally seems to be *D. purpurascens*. In spite of repeated efforts, it does not appear to have been successfully grown in England; the drawing from which Ker's figure was taken was made at the Cape in Masson's time.

41. *Disa purpurascens*, Bolus, in Journ. Linn. Soc., vol. xx. (1884), p. 482.—Glabrous, erect, 16–18 in. high; leaves 6–8, radical, linear, grass-like, lax, shorter than the scape; scape flexuous, clothed with several acute membranous sheaths; raceme laxly 2–3-flowered; bracts broadly ovate, acute, membranous; side sepals ovate-oblong, acute, spreading, 9 lines long; odd sepal galeate, with a subrotund mouth, 7–8 lines across, subacute, with an ascending spur about 2 lines long; petals linear in the middle, dilated into a rounded toothed limb above, bent forward, expanded and crenulate below, adnate to the column, about 5 lines high; lip ovate, crenulate, with inflexed margins; anther deflexed; the single gland of the pollinia wider than long; rostellum 3-lobed, wider than long.

HAB. In Farmer Peck's Valley, Muizenberg, by a mountain stream, at 1100 ft. high; Nov., 1883; *Bolus!* 4893; hills behind Simon's Town; McKellar's farm, near Cape Point, Nov., *Dr. R. Marloth.*

Flowers blue-purple, except the upper limb of the petals and the spur, which are pale yellow; anther-cells pink. Nearly allied to *D. graminifolia*, but, besides the differences of structure given, it will be noted that the flowering season is quite different. The species seems to be confined to the southern part of the Peninsula; on the most northern station (the Muizenberg) I only found two specimens; near Simon's Town it is more frequent; and more abundant still further to the southward.

42. *Disa barbata*, Swartz, in *Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 212. — Glabrous, erect, 1–2 ft. high; leaves 4–6, all radical, linear, grass-like, lax, shorter than the scape; scape slender, subflexuous, distantly clothed with acute membranous sheaths; raceme laxly 1–4-flowered (mostly 2–3-flowered); bracts ovate, acute, shorter than the ovary; side sepals oblong, acute, spreading, about 10 lines long; odd sepal galeate, ovate, acute, including the conical flattened spur about an inch long; petals knee-bent in the middle, the upper part dilated, sub-bilobed, and toothed, the lower part rounded, obtuse; lip oval, lacerate-multifid with inflexed segments, deflexed, about 8–9 lines long; anther horizontal, the single gland triangular, emarginate at base; rostellum 3-lobed, erect; ovary terete, decurved.

HAB. Amongst Restiones and shrubs, Cape Flats, near Rondebosch, &c., frequent; fl. Sept.—Oct.; *Zeyher*, 1567; *Bolus*, 4857; *Herb. Norm. Austr.-Afr.*, 166.

The flowers are nearly white, the galea marked with pale blue veined lines, the side sepals tinged with pink on the thickened middle line below, the petals with pale purple veins, the lip pure white. The species (as it grows about Cape Town, at least) is very distinct from all others, and constant in its chief characters as above noted, the only variations I have noted being in the incision of the upper lobe of the petals. It is the earliest of this group to flower, coming out at the end of September and the first half of October.

PLATE 8.—Fig. 1, odd sepal (seen from below), side sepals (upper and under side), and lip $\times 1\frac{1}{2}$ diameters; 2, petal $\times 6$; 3, column, side view, $\times 6$; 4, ditto, front view, $\times 6$; 5, 6, pollinia, magnified.

43. *Disa venusta*, *Bolus*, in *Journ. Linn. Soc.*, vol. xx. (1884), p. 482.—Glabrous, erect, $1\frac{1}{2}$ – $2\frac{1}{2}$ ft. high; leaves 6–12, radical, linear, grass-like, subcomplicate, shorter than the scape, laxly spreading, 2 lines wide; scape slender, straight or flexuous at the top, the buds only nodding, distantly clothed with closely appressed, acute sheaths; raceme laxly 3–6-flowered; bracts broadly ovate, acute; side sepals oblong, acute, mucronate below the apex, deflexed, about 8 lines long,

3½ lines wide; odd sepal galeate, oval, with a scarcely acute point and a short flattened spur, about 9 lines long and 5-6 lines wide; petals bent at a nearly right angle, the upper part dilated and toothed at the apex (sometimes acutely bilobed), the lower part oblong and obtuse; lip ovate-oblong, lacerate into many obtuse, incurved segments, 6-7 lines long, 3-4 lines wide; rostellum 3-lobed, suberect; the single gland of the pollinia oblong, longer than wide, emarginate below; ovary bent, twisted; capsule erect, straight.

HAB. Amongst Restiones and shrubs on the Cape Flats, near Rondebosch, frequent; also sparingly on the mountain-sides up to 800 ft.; fl. Oct.—Nov.; *Burchell*, 151, 747; *Bolus*! 4566.—Extends, I believe, eastward to Grahamstown, and northward to the "High Veldt," between Pretoria and the Drakensbergen; the latter a form with a two-armed rostellum and two glands.

The sepals are a cheerful blue, with darker stripes on the galea; petals white, tinged with purple; lip creamy white; the spur greenish yellow, producing a resemblance to eyes when looking into the flower; anther-cells pink; stigma and rostellum white. It always flowers after *D. barbata* and *D. lugens*, and about the same time as *D. purpurascens*. Owing to its similarity to the first when in the dried state, it has long been confused with that species in herbaria. It is, however, quite distinct.

PLATE 9. — Fig. 1, lip $\times 2$ diameters; column, with side petals, front view $\times 3$; 3, column, side view, $\times 4$; 4, apex of rostellum, with gland, back view; 5, ditto, front view; 6, apex of rostellum, viewed obliquely, the gland removed; 7, pollinium; 8, leaf, cross section; 9, part of leaf,—all magnified.

44. *Disa lugens*, *Bolus*, in *Journ. Linn. Soc.*, vol. xx. (1884), p. 483. — Glabrous, erect, 1½-2 ft. high; leaves 6-12, radical, linear, grass-like, nerved and margined below, smooth above, laxly spreading, 8-15 in. long; scape clothed with several acute, membranous sheaths; raceme more or less flexuous, laxly 6-15-flowered, 6-10 in. long; bracts ovate, membranous, acute, shorter than the ovary; side sepals oblong, acute, spreading, 5 lines long; odd sepal galeate, with an ovate mouth, 4-5 lines wide, acute, with an ascending spur 2 lines long; petals falcate, acuminate bilobed, dilated and toothed at the base; lip oblong, lacerate-multifid, the segments often 2-4-lobed at the apex, 5-7 lines long, 4-6 lines wide; anther horizontal, the glands (one or two) oblong; rostellum 3-lobed, short, suberect; ovary curved, 8-12 lines long.

HAB. Sandy, heathy downs, eastward of Rondebosch and Claremont, alt. 60-80 ft.; fl. Nov.; *Bolus*, 3810; *Herb. Norm. Austr.-Afr.*, 494.—Extends eastward to Kuil's River, *Pappe*, 39, 377; *Ecklon*, 1566; and has also been found at Coldstream, near Grahamstown, *MacOwan*, *Galpin*.

The colour of the galea is a metallic greenish purple, sometimes a pale lilac; the side sepals and petals dull purple, the lip bright green. This species is by far the tallest and strongest of this section. The

leaves are generally broader than in the allied species. Small specimens have occasionally only four flowers, but generally they bear more than six, and frequently ten or twelve. In one season I saw a considerable number of specimens on which all the flowers, or so far as I examined them, had two pollinary glands.

In my herbarium is a single 2-flowered scape of a *Disa* belonging to this group, which was gathered on the slopes of the Devil's Peak, in the valley leading from Cape Town up to the neck between it and Table Mountain, in March, 1884, by Dr. R. Marloth. It has a 3-lobed galea, the middle lobe longer and subacute, the side lobes rounded and spreading; the lip appears to be oval, entire and straight; the petals similar to those of *D. graminifolia*, with which species it was found growing. I did not see the specimen until it was dried, and am unwilling to dissect or describe it until more shall be found. Meantime it is commended to the research of younger botanists and Orchid-lovers.

§ 9. *Oregura*.

45. *Disa ferruginea*, Swartz, in *Kongl. Vet. Acad. Handl.*, vol. xxi. (1800), p. 210.—Glabrous, erect, 10–15 in. high; leaves 4–8, radical, linear, grass-like, with reflexed margins, 5–10 in. long, withered before the period of flowering; scape erect, somewhat flexuous, clothed with several distant, clasping, acute, membranous sheaths; spike broadly ovate or pyramidal, usually somewhat dense, 2–3½ in. long; bracts ovate-acuminate, shorter than the flowers; side sepals oblong, acute, bristle-tipped on the underside shortly below the apex, ½ in. long; odd sepal galeate, ovate or funnel-shaped, acuminate, nearly straight on the dorsal ridge, horizontal, or the long tapering spur ascending, about 10 lines long; petals small and concealed within the galea, falcate, acuminate, broad and rounded at the base; lip lanceolate-acuminate, minutely waved, 6–7 lines long; rostellum broad and low; stigma umbonate, rounded in front; ovary slender, straight or curved. Thunberg, *Flor. Cap.* ed. 1823, p. 11. *Satyrium ferrugineum*, Thunberg, *Prodr. Plant. Cap.* (1794), p. 5. *D. porrecta*, Ker, in *Journ. Sci. R. Inst.*, vol. v. (1818), t. i., f. 1, not of Swartz; Hooker, *Icon. Plant.* (1840), t. 214 (where figs. *c.* and *d.* are erroneous).

HAB. Common on the plateaux of Table Mountain, from 1800 to 3500 ft. of elevation; fl. Feb.—April, various collectors; *Herb. Norm. Austr.-Afr.*, 165.—Extends eastward to the Hottentot's-holland Mountains (*Burchell*, 8199).

The bright orange-red flowers, and the long, thin, straight spur readily distinguish this species from any other. It is allied to the

Herschelia group, but the galea has a different and peculiar set and shape. As it is pretty common and flowers at about the same time as *D. uniflora* and *D. graminifolia*, it is a general favourite and much gathered for bouquets. On the mountains of the eastern districts (Cockscomb, Boschberg, Koudveld, &c.), this species appears to be replaced by the allied *D. Zeyheri*, Sonder, which is often mistaken for it. Reichenbach, the younger, in his 'Die Orchideen des Herbars Thunbergs' (Separat-Abdruck aus "Flora," in 1883, No. 29), says that the latter species is the same as *D. ferruginea*. But, according to Mr. N. E. Brown, who also examined Thunberg's Herbarium, this identification only applies to the plants on one of the two sheets marked *D. ferruginea*. *D. porrecta*, Swartz, *l. c.*, p. 211, must be a closely-allied species. Harvey (in Hook. Lond. Journ. Bot., vol. i. (1842), p. 15), believed that *D. ferruginea* and *D. porrecta* were identical, but there is no sufficient ground for this conjecture. Swartz describes them as different, and it is quite possible that *D. porrecta*, which was collected by Sparrman, was not gathered on Table Mountain at all. It no longer exists in Thunberg's herbarium, but we are bound to suppose that it is a good species which is rare, and which may yet be re-discovered, as so many others have been.

§ 10. Amphigena.

46. *Disa tenuis*, Lindley, in *Gen. & Sp. Orch.* (1838), p. 354.—Glabrous, erect, slender, 8–14 in. high; scape bent, leafless, clothed with distant sheaths terminating in fine hair-like spreading points; leaves 2–4, radical, tufted, narrow-linear, enclosed in a leaf-like sheath at the base, 3–4 in. long, appearing before the flowers and withered when they bloom; spike variable, mostly densely-flowered, 2–4 in. long, sometimes lax and distantly flowered; bracts ovate, acuminate, with long bristle-points, of variable length but mostly as long as the flowers; side sepals oblong, obtuse, suddenly contracted into a bristly point, about $1\frac{1}{2}$ lines long; odd sepal somewhat galeate, ascending or erect, acuminate, with a short conical, obtuse, ascending spur, the whole $2\frac{1}{2}$ lines long; petals erect, oblong, incurved at the top, serrulate on the front margin, little more than $\frac{1}{2}$ line long; lip linear, acute, serrulate, nearly 1 line long, or narrower and entire, $1\frac{1}{4}$ lines long; caudicles of the pollinia ending in a single, large, nearly square gland; rostellum low, without arms or ridges at the side; stigma depressed, margined. *D. leptostachys*, Sonder, in *Linnaea*, vol. xix. (1847), 98.

HAB. Amongst shrubs on the eastern slopes of the Devil's Peak, between the King's Blockhouse and the Waterfall, at about 1400 ft.; fl. May, *A. A. Bodkin*, (in herb. Bolus, 4874). Same place, *Dr. Pappe* (in the Cape Govt. Herb.). Also on the Flats, near Claremont, *MacOwan*, 2566; Kenilworth, near the Race-course, *Bolus*, &c., not common.—Extends eastward to Houw Hoek Mt., 1200–2000 ft.; fl. April, *Bolus*.

The colour of the flowers (of the form collected on the Peninsula), is greenish, with occasional purple spots. At Houw Hoek I found it with pale purple or rosy flowers, with darker purple spots; and at the same place another form, with a very long and distantly-flowered spike and greenish flowers. The tuber is irregular in shape and sometimes large, resembling those of the section *Herschelia*, and the leaves also are in some respects like those of the latter group. The species is very peculiar, utterly different in appearance from those of the section *Monadenia* (to which it seems otherwise to be allied by its single pollinary gland), and also different from any other *Disa*. To get the leaves, which may easily be overlooked, the collector must watch for the plant early in the season; the sheath at their base is singular, and I have not observed it in any other species.

VIII.—DISPĒRIS.

Swartz, in Kongl. Vetensk. Acad. Nya Handl., vol. xxi (1800), p. 218; *Benth. & Hook., f., Gen. Plant.*, vol. iii., p. 633. (*Dryopeia*, *Thouars, Orch. Iles. Afr.* (1822), t. 1—3; *Dipera, Sprengel, Syst. Veg.* 3 (1826), 676.)

Odd sepal posticous or sublateral, vaulted or galeate, sometimes saccate or with an ascending spur towards its summit, the narrow and acute, or more rarely wide petals, agglutinated to its anterior margins. Side sepals free, spreading horizontally, or ascending, or more or less connate at base, usually obliquely lanceolate, concave, dorsally saccate or spurred. Lip ascending along the face of the column and adnate to it, between the stigmas or the lobes of the stigma and between the arms of the rostellum, narrow below, dilated above into a variously-shaped, simple or bi-lobed limb. Column ascending, thick and fleshy; the rostellum produced in front into two rigid, cartilaginous, bent or twisted, more or less distant arms, which hold at their extremities the glands of the pollinia. Clinandrium nearly horizontal or ascending, anther-cells distinct, parallel, somewhat approximate; pollinia with the granules often (or always?) secund in a double row on the margins of the flattened, subrigid caudicles. Stigma bilobed and situate in front of the column, the lobes approximate, pulvinate, or two, lateral and distant. Capsule cylindrical, or trigonous, ribbed.—Terrestrial herbs, mostly glabrous and slender, with sessile or stalked tubers, and radical, or few and distant, narrow, or cordate and amplexicaul leaves. Flowers solitary, or few in loose racemes; bracts herbaceous, moderate or large. (Name from *δῖς*, twice, and *πυρεα*, a pouch, in allusion to the pouches of the side sepals.)

This genus is one of the most natural and sharply defined amongst

South-African Orchids. It is clearly intermediate between the subtribes *DISEÆ* and *CORYCIÆ*; yet if all the species should be found to have the same general structure as the ten or twelve which I have examined, it may hereafter be regarded as a distinct subtribe. Unlike the *CORYCIÆ*, its stigma usually stands exposed in front of the flower, and is only occasionally lateral or separated into two distinct stigmas. In so far it approaches the subtribe *DISEÆ*, and is indeed more like that group in the structure of its perianth than any other Corycioid genus. The two subtribes are connected through the present genus and *Brownleca*, in which, as in *Disperis*, the side petals adhere to the margins of the odd sepal, and the lip has a tendency to ascend in front of the column. The most striking characteristics of *Disperis* lie in the prominent cartilaginous arms of its rostellum; in the peculiar sacs in the side sepals present in most species, which appear to have been formed to accommodate the development of these rostellary arms, and over which the sacs exactly fit in æstivation; and in the extraordinary diversities in the shape of the lip. The latter alone afford excellent specific distinctions, although they are often very difficult of expression by written descriptions.

There are many species of this genus with which I am unacquainted in the living state, and of which a study from dried specimens cannot be entirely satisfactory. At present, therefore, no arrangement of the genus is proposed.

DISTRIBUTION.—About 31 species have been described, of which only 5 have been found on the Peninsula. Of the rest 2 are chiefly western; 11 are eastern, reaching to Port Natal; 4 belong to the Mascarene Islands; 4 to Abyssinia; 2 to the Kilimanjaro Region; and one each to Angola, the Comoro Islands, and Southern India (with Ceylon).

[A key to the species is omitted: it would be merely a repetition of the descriptions of the lip; and the species being few in number the student is referred to them.]

1. *Disperis capensis*, Swartz in *Konigl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 220, tab. iii., fig. F.—Erect, slender, 6–16 in. high; stem slightly flexuous, distantly 2-leaved, glabrous above, clothed with spreading hairs on its lower portion; leaves linear, acuminate, widening towards the sheathing base, nerved, 2–4 in. long; flower solitary; odd sepal somewhat oblong, broad and bilobed above, then suddenly contracted into a setaceous point as long as the limb, the whole 10–12 lines long; the cohering petals oblong, very obtuse, with a setaceous point near the apex 2 lines long, the whole about 5 lines long, the mouth of the galea nearly orbicular, about $\frac{1}{2}$ in. in diameter;

side sepals spreading, lanceolate, very acuminate, 12–14 lines long, the sac near the base, conical, very shallow; lip narrow below, somewhat spoon-shaped above, then bent forward and downward into a sigmoid flexure at the apex, either with or without a short dorsal lacerate appendage near the bend; arms of the rostellum short and somewhat approximate. *Arethusa capensis*, Linnæus, f. Suppl. (1781), 405; Thunberg, Prodr. Pl. Cap. (1794), p. 3. *Dipera capensis* and *D. tenera*, Sprengel, Syst. Veg. 3 (1826), 696; Ker, in Journ. Sci. R. Inst. Lond., vol. v. (1818), t. i., f. 2.

HAB. In heathy places and amongst Restiaceæ, on the Cape Flats, and on the mountain-sides and tops up to 3500 ft.; fl. July—Aug., *Burchell*, 8527; *Bolus*, 3735; *Herb. Norm. Austr.-Afr.*, 177.—Extends along the coast eastward as far as Port Elizabeth (*Burchell*, 5943).

The flowers vary from purple, which is darker on the edges, to lilac. There is also a variety with yellow or greenish flowers; in these the lip is narrower above and usually destitute of the dorsal appendage, though sometimes it is present in a very reduced form. The species is quite distinct by the long claw-like points to its sepals and the form of its lip, and cannot be mistaken for any other.

2. *Disperis paludosa*, *Harvey*, in *Hooker's Lond. Journ. Bot.*, vol. i. (1842), p. 14.—Tuber sessile, oblong, making runners; stem erect, 6–16 in. high, distantly 2–4-leaved, leaves linear-lanceolate, acute, sheathing at base, erect-spreading, 1–2 in. long; flowers 1–5, in a loose raceme; bracts broadly ovate or lanceolate, shorter than the ovary; odd sepal vaulted, lanceolate, acuminate, nerved, bent forward horizontally at the summit, the cohering petals semi-cordate, acute, waved, the mouth of the whole galea about 7 lines wide; side sepals lanceolate, spreading, deflexed at the acuminate points with a curved blunt spur near the base, about 7 lines long; lip ascending, with a narrow gland-fringed claw over the convex face of the column, reflexed, then shortly erect and produced into a horizontal saddle- or boat-shaped piece which projects forward into a beak-like point, and backward into a rounded, keeled, gland-bearing boss; arms of the rostellum large, distant, divaricately spreading; stigmas 2, lateral. *Harvey*, in *Thes. Cap.*, vol. ii. (1863), p. 30, t. 148.

HAB. In marshy places, Van Kamp's Bay (*Harvey*); on Table and Devil's Mountains in several places, 2400–2500 ft.; fl. Nov.—Dec., *Ecklon* (in 1813); *Bolus*, 4499; *Herb. Norm. Austr.-Afr.*, 339.—Extends to French Hoek.

The sepals are a bright purple, the petals rose-coloured with a bright green edge, spotted with white and carmine dots. A handsome plant, of which the smaller one-flowered specimens resemble *D. capensis*, but with very differently-shaped flowers. The peculiar habit of this plant is thus described by *Harvey*:—"It always grows in very moist spongy places; and like several other tuberous or fleshy-rooted

Cape endogens from similar situations (including *Disa grandiflora*), it throws out subterraneous fleshy runners, that form buds at a distance from the parent tuber, thus increasing after the manner of couch grass, although not so rapidly." I have never seen it in abundance but once, during a very wet season (in 1884), when on Nov. 29 it was growing in water near the Disa stream on Table Mountain above Klassenbosch. In drier seasons only a few scattered weakly plants are to be found. Harvey says it had been sent by Mr. Hutton from the eastern districts. This is probably a mistake. There are one or two species from that region which resemble it externally (such as *D. oayglossa*, &c.), and it is not easy to determine their differences from dried specimens. If *D. paludosa* extend to the eastern districts, it is most probable that we should have had it from some of the many collectors during the last forty-five years.

PLATE 19.—Figs. 1, 2, flowers, front and side views, $\times 2$ diameters; 3, column, side, 4 front, 5 back view; 6, pollinium; 7, petal; 8, odd sepal,—all the latter variously magnified.

3. *Disperis cucullata*, Swartz, in *Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 220.—Erect, 3–6 in. high; stem somewhat stout, flexuous, shortly pubescent, distantly 2-leaved; lower leaf ovate, upper narrower, acute, sheathing at base, 3-nerved below, pubescent on the nerves and ciliate, glabrous above, $\frac{1}{2}$ –1 in. long; flower solitary, very rarely 2-flowered, bracts ovate, leaf-like, usually shorter, sometimes longer than the flower; odd sepal galeate, conical, acute, the high ascending sac or summit rounded and laterally compressed, about 6 lines long, the cohering petals narrow-falcate, acuminate; side sepals ascending, lanceolate, acuminate, about 7 lines long, furnished about the middle with a sharply conical sac, 2 lines deep; lip ascending from a narrow claw, cruciform in the middle, with two short arms, thence dilated and somewhat goblet-shaped, the rim higher and acute in front, reflexed on the sides, and produced behind into a long, linear, straight piece, pubescent at the apex; arms of the rostellum distant, spreading, deflexed; pollinium long, granules numerous. Ker, in *Journ. Sci. R. Inst.*, vol. vi. (1819), t. i., f. 4.

HAB. South-western slopes of the Lion's Mountain, near Sea Point, 200 ft.; fl. Sept., *Bolus*, 4887; on the Steenberg, 800 ft.; fl. Sept.—Extends to Stellenbosch (*Herb. Norm. Austr.-Afr.*, 338), and Paarl: *Zeyher*, 3938, as to part.

Flowers green. A very distinct species, having little resemblance to any other on the Peninsula. So far as I know, it occurs only sparingly within our limits.

4. *Disperis secunda*, Swartz, in *Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 220.—Glabrous, erect, 3–8 in. high; leaves mostly 2, erect, linear, acute, sheathing at base, 2–4 in. long; raceme sub-

secund, loosely 3-9-flowered, the lower bracts leaf-like, longer (sometimes 2-4 times longer), the upper shorter than the flowers; odd sepal galeate, rhomboidal when viewed laterally, acute and deflexed in front, bluntly saccate behind, the cohering petals somewhat rhomboidal, acuminate, also deflexed; side sepals spreading, lanceolate, acute, with a blunt, nearly straight spur in the middle, about 4 lines long; lip with a narrow curved claw, produced close above the column into an appendage, the front part projecting forward, decurved, ovate, acute, concave, the posterior part ascending, linear, hispid at the obtuse apex; arms of the rostellum distant, divaricate, oblong, recurved; pollinia short, few-grained, caudicles flat; stigmas two, lateral, distant, placed behind the arms of the rostellum. Ker, in Journ. Sci. R. Inst., vol. v. (1818), t. 1, f. 3. *Orchis circumflexa*, Linnæus, Sp. Plant. ed. 2, (1763), 1344. *Arethusa secunda*, Thunberg, Prodr. (1794), 3.

HAB. Grassy and sandy places near Cape Town, 100-300ft.; fl. July-Sept., Zeyher, 3939; Drège, 8279; Bolus, 4817; on Muizenberg Mountain; fl. Oct., A. Bodkin.—Extends to Saldanha Bay and Drakensteenbergen.

Flowers a pale sap-green. A very distinct species, well characterised by the strongly deflexed hood, the point of which comes down so low as almost entirely to hide the lip and column. The species is by no means frequent on the Peninsula.

PLATE 11.—Fig. 1, flower, with bract $\times 3$ diameters; 2, odd sepal $\times 3$; 3, column with lip, viewed from the front obliquely; 4, ditto, viewed from behind obliquely; 5, lip, with appendage; 6, pollinia,—all the latter variously magnified.

5. *Disperis villosa*, Swartz, in Kong. Vet. Acad. Handl., vol. xxi (1800), p. 220.—Pubescent, slender, 3-6 in. high; leaves 2, usually distant, the lower ovate, the upper narrower, either petiolate or sheathing at base, 5-10 lines long; flowers 1-2, rarely 3, bracts leaf-like, complicate, small or large, and sometimes nearly equalling the flowers; odd sepal galeate, depressed, and nearly horizontal at the summit, saccate at base, 3-4 lines long, the cohering petals lanceolate, acuminate, lobed in front and adnate to the column at base; side sepals ascending, obovate, acute, with a conical sac just below the apex; lip with a long, narrow, linear claw, bent over and then behind the column, produced at the apex into a deflexed, somewhat swollen, beaked appendage; arms of the rostellum closely approximate, projecting, much twisted; pollinia with a long caudicle and few granules; ovary 3-gonous. Ker, in Journ. Sci. R. Inst. Lond., vol. vi. (1819), t. i., f. 5; Thunberg, Flor. Cap. ed. 1823, p. 25. *Arethusa villosa*, Linnæus, f. Suppl. (1781), 403.

HAB. In moist grassy places near Cape Town, Mowbray, Wynberg, &c., common; and on the sides of the Devil's Peak, 50-600 ft.; fl. Aug.-Sept., Bolus, 3966; Herb. Norm. Austr.-Afr., 178. — Extends to Drakensteenbergen, Paarl, Saldanha Bay, &c. Zeyher, 3937; Ecklon, 248; Drège, 481.

Flowers a dull canary-yellow. A pretty little species, well marked by its lip, which much resembles the curved head and neck of a swan, the head turned backward and downward beyond the apex of the clinandrium. This seems constant, and I know of no other species having a lip resembling it.

IX.—CORÝCIUM.

Swartz, in Kongl. Vetensk. Acad. Handl., vol. xxi. (1800), p. 220;
Bentham & Hooker, f., Gen. Plant., vol. iii. p. 633.

Odd sepal posticous, narrow, cohering with the larger, wide, concave or saccate petals, in a galeate piece; side sepals membranous, more or less connate. Lip adnate at its base to the column, the limb transversely lunate or bilobed, more rarely oblong or lanceolate, projecting forward or deflexed, produced above the junction with the column into a variously-shaped fleshy appendage. Column short, the rostellum produced transversely into two horizontal arms; stigma posticous, pulvinate, lunate, or bilobed, or two stigmas, lateral and distant. Anther-cells more or less distant, placed sometimes in front of, sometimes behind the arms of the rostellum, erect or ascending, the gland of the pollinium uppermost and supported by the arms of the rostellum. Capsule cylindrical, usually much narrowed towards the apex.—Terrestrial erect herbs, with undivided sometimes stalked tubers, leafy stems, narrow, flat or crisped leaves, and flowers in dense spikes. (Named from *καρύκος*, a leathern bag).

This genus is closely allied to *Pterygodium*, from which it chiefly differs by its side sepals being united for the greater part of their length, by its usually more contracted hood; and by the more reflexed appendage of the lip. The species are chiefly distinguished by the shape of the lip or its appendage.

DISTRIBUTION.—Eight species have been described (all exclusively South-African), and there are probably two others undescribed; of these four come within our limits, four are chiefly western, and two belong to the eastern districts.

KEY TO THE SPECIES.

Limb of the lip sessile, bilobed	..	..	..	..	C. BICOLORUM 1.
Limb of the lip sessile, lanceolate, or oblong	..	..	..	..	C. BIFIDUM 2.
Limb of the lip clawed.					
Appendage of the lip bifurcate behind	..	..	..	..	C. OROBANCHOIDES 3.
Appendage of the lip mucous behind	..	..	..	..	C. EXCISUM 4.

1. *Corycium bicolorum*, *Swartz, in Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 220.—Glabrous, erect, 6—15 in. high; stem leafy,

straight; leaves numerous, linear-lanceolate, somewhat complicate, acute, sheathing at base, faintly nerved, erect-spreading, 2–4 in. long; spike cylindrical, 2–6 in. long, about $\frac{3}{4}$ in. in diameter; odd sepal linear-oblong, obtuse; the connate sepals ovato-rotundate, emarginate, ascending; petals rounded, very concave, forming an inflated hood 2–2 $\frac{1}{2}$ lines wide, 1 $\frac{1}{2}$ lines high; limb of the lip very small, sessile, bilobed, lobes ovate, obtuse, the appendage sub-galeate, very round or dome-like on the summit, obtuse at either extremity, keeled below in front, with 2 projecting lateral points; rostellum horizontal, very short; stigma bilobed. Lindley, in Bauer's Ill. of Orch. Plants (1838), t. 15. *Ophrys bicolor*, Thunberg, Prodr. Plant. Cap. (1794), p. 2. *C. bicolor*, Thunberg, Flor. Cap. ed. 1823, p. 21.

HAB. On the slopes of the Lion's Head Mountain; fl. Oct. (1873), *Bolus*, 2856. "On the mountains near Cape Town," *Ecklon & Zeyher*, according to Sonder in the *Linnaea*, vol. xix. (1847), p. 111.—Extends to Tulbagh and Riversdale District (*Burchell*, 6605; *Zeyher*, 3952).

The colour of the flowers is a dull tawny yellow. The habit is usually taller and more slender, the spike denser, and the flowers smaller than in *C. orobanchoides*. It is also taller and has smaller flowers than *C. excisum*. The chief difference from either is in the lip. My description is from two plants gathered near Tulbagh and Artois, and drawn from life; but though neither exactly agrees with Bauer's fine figures, I can hardly doubt that they belong to the same species. Either Bauer's drawings were made from withered or dried specimens, or the plant he represented had undergone a certain modification by cultivation in England. Ker's figure in the *Journ. Sci. R. Inst.*, vol. vi., t. 1, f. 1, quoted by Lindley, *G. & Sp. O.*, 368, for this plant, belongs to *C. crispum*, Sw. There is a little uncertainty about the naming of my specimens, No. 2856, and my own set of them was unfortunately lost by shipwreck; so that I should have hesitated to insert the species here were it not for the confirmation afforded by Sonder's list of E. & Z.'s Orchids in the *Linnaea* (as above quoted). Sonder's list was probably revised by Lindley, and Reichenbach, the younger, in his 'Die Orchideen des Herbars Thunbergs,' confirms the identity of Lindley's plant with that marked *C. bicolor* in Thunberg's herbarium.

2. *Corycium bifidum*, Sonder, in *Linnaea*, vol. xix. (1847), p. 111.—Stem $\frac{1}{2}$ –1 $\frac{1}{2}$ ft. high; leaves distichous, very wide and sheathing at base, channelled, long-pointed, about 4 in. long, the upper shorter and reduced to scales; spike densely-flowered, cylindrical, 4 in. long; odd sepal oblong-linear; the connate side sepals bifid to the middle, the lobes somewhat divaricate, obtuse; petals ovate, concave or subsaccate, twisted towards the odd sepal, very shortly pubescent on the

outer surface; limb of the lip sessile, lanceolate, quite entire, shorter than the sepals, the appendage ovate, subacute. *C. ligulatum*, Reichenbach, the younger, in the *Linnæa*, xix. (1847), 375.

HAB. "On the mountains near Cape Town," *Ecklon & Zeyher*, according to Sonder as above.

"Flowers white, not larger than those of *C. bicolor*." A very distinct species, intermediate between *C. bicolor* and *C. microglossum*, Lindley. In the first-named the sepals are roundish, and slightly notched at the apex, whereas in this species they are divided nearly to the middle. The appendage of the lip is much smaller than in *C. microglossum*. The foregoing is taken from Sonder; I know nothing further of the plant, never having been fortunate enough to meet with it. Sonder was a very careful botanist, and I feel assured both that it is a well-marked species, and that it will yet reward some diligent or lucky collector. Reichenbach himself admitted the synonymy of his *C. ligulatum*, in Walpers' *Annales*, vol. i. (1849), p. 805. He describes the lip of his plant as "oblong, rather acute, sessile, keeled in the middle, membranous, the appendage erect, widely clawed at base, triangular, the upper angle entirely rounded, the lower keeled." He adds that the flowers appear to be white, and of the size of those of *C. excisum*, Lindley.

3. *Corycium orobanchoides*, Swartz, in *Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 222. — Glabrous, erect, 4–12 in. high; stem straight, leafy; leaves several, ensiform, acuminate, keeled, sheathing at base, 2–4 in. long; spike densely many-flowered, cylindrical or lanceolate, from $\frac{1}{2}$ – $1\frac{1}{4}$ in. wide; odd sepal lanceolate, channelled; the connate side sepals rounded, slightly emarginate; petals oblong, very concave, obliquely acute, with a large round blunt sac at base; limb of the lip projecting, clawed, cuneate-bilobed, exerted, the appendage rising shortly in front, blunt and keeled, then deflexed and deeply partite into two long forks behind; rostellum ascending, bearing the erect, distant anther-cells on the anterior surface of its arms; stigma horseshoe-shaped, pulvinate. Ker, in *Journ. Sci. R. Inst.*, vol. viii. (1820), t. 3, f. 3; Thunberg, *Flor. Cap.* ed. 1823, p. 20; Lindley, in *Bot. Reg.*, xxiv. (1838), t. 45. *Satyrium orobanchoides*, Linnæus, the younger, *Suppl.* (1781), 402; Thunberg, *Prodr. Pl. Cap.* (1794), p. 6.

HAB. In sandy places, near Cape Town, Rondebosch, &c., common, mostly under 100 ft. elevation; fl. Sept.—Oct., *Bolus*, 3935; *Herb. Norm. Austr.-Afr.*, 181. —Extends to Paarl and Somerset West; *Drège*, 4782; *Ecklon*.

The flowers are greenish yellow with crimson tips to the petals; the anther-cells are also crimson, and shew like minute eyes in the middle of the flower; the limb of the lip is white, with greenish

veins. The species is easily distinguished by its colouring, by the deeply saccate petals, and by the long forks of the appendage to the lip. The flowers exhale a heavy disagreeable scent. It is very frequent on the sandy downs, but does not seem to bear a higher elevation. The figure in the Bot. Register is, for the most part, excellent.

4. *Corycium excisum*, *Linlley, Gen. & Sp. Orch.* (1839), p. 368. —Glabrous, erect, 5–12 in. high; stem straight, leafy; leaves several, somewhat distant, from a broad-sheathing base narrow-linear, complicate, acute, erect or spreading, 1–2 in. long; spike densely flowered, oblong, 1–3 in. long, about $\frac{3}{4}$ in. wide; odd sepal linear-oblong, channelled; the connate side sepals roundish, emarginate, ascending; petals rounded, very concave, veined, the mouth of the hood wide and nearly square, the whole nearly 3 lines wide; limb of the lip projecting, long-clawed, then dilated, with a rounded, cuneate, emarginate extremity, the appendage viewed from the front cordate, vaulted with a projecting curved keel, sloping downward at the back without any projection; arms of the rostellum nearly horizontal, spreading on either side of the lip, and holding on their posterior surface the distant cells of the anther; glands of the pollinia with their viscid surface facing towards the back of the flower; stigmas two; ovary narrowed suddenly to the apex.

HAB. In a sandy field enclosed as an ostrich-camp near Rondebosch, 50 ft.; fl. Oct.—Nov., *Bolus*, 4832; *Herb. Norm. Austr.-Afr.*, 180; also on the Muizenberg Mt., 800 ft., Dec.—Extends to Tulbagh and Clanwilliam. *Zeyher*, 1576; *Drège*, 8283.

The hood of the flower is a light yellow, the lip and appendage greenish. The species may be readily distinguished from *C. bicolorum* by the long claw of the limb of the lip, and from *C. orobanchoides* by the absence of any tails to the appendage. It does not appear to occur frequently on the Peninsula.

PLATE 20. —Fig. 1, flower, front view $\times 6$ diameters. (Note, the two projecting arms between the anther-cells and the appendage to the lip have been inserted by an accident and should be deleted); 2, flower, viewed obliquely from behind $\times 6$; 3, column and lip, front view $\times 10$; 4, ditto, back view $\times 10$; 5, ditto, side view, the anterior side to the right $\times 10$; 6, a pollinium, mag. In the foregoing figures BS indicates the back, or odd sepal; SS, the connate side sepals; *a*, the anther; *g*, the gland of the pollinium; *s*, one of the stigmas separated from the other by the appendage of the lip. In figs. 1 and 3, L shews the limb of the lip; in figs. 4 and 5, L (by a mistaken lettering), indicates the appendage of the lip.

X.—PTERYGÒDIUM.

Swartz, in Kongl. Vetensk. Acad. Nya Handl., vol. xxi. (1800), p. 217, t. 3, fig. E; *Bentham & Hooker, f., Gen. Plant.*, vol. iii. (1838), p. 632. (*Ommatodium*, *Lindley, Gen. & Sp. Orch.* (1838), 365).

Odd sepal posticous, cohering with the larger petals into an erect, hood-shaped, or vaulted piece; side sepals free, of nearly the same shape and size as the odd sepal, spreading, ascending or reflexed. Lip adnate by its middle portion to the column, the limb deflexed, variously shaped, undivided, or 2-3-lobed, entire, crenate, or fringed, usually smaller than the petals, produced above the junction with the column into a variously-shaped, thick, fleshy appendage. Column short, the rostellum (or the connective of the anther?) produced transversely into two arms, each of which bears one of the distant cells of the anther on its outer margin or on its posterior face; pollinia solitary in each cell, granules cuneate, caudicle terminating in a gland, which is either uppermost, or, in one species, inverted and below, and the viscid disc of which usually faces towards the back of the flower. Stigma situate between the arms of the rostellum, horse-shoe-shaped, or stigmas two, more or less distant, cushion-like, soft and tuberculate. Capsule erect, cylindrical or obovate, sometimes triquetrous, the ribs often prominent.—Terrestrial, erect, glabrous herbs, with small, undivided, sessile tubers; stems leafy; flowers densely spiked, or in a loose few-flowered raceme, chiefly yellow, more rarely red or purple-coloured. (Name from *πτερυγώδης*, *wing-like*).

DISTRIBUTION.—Twelve species are known, all South-African, of which 8 occur on the Peninsula; 3 in the western districts; and 1 exclusively eastern, reaching to the Drakensbergen, north-west of Natal.

The sections of this genus proposed below are based upon three distinct types of perianth. The last, *Micranthum*, closely approaches the previous genus *Corycium*.

§ 1. **Eupterygodium.**—Flowers expanded; anther erect or ascending, the glands of the pollinia uppermost. Species 1 to 6.

§ 2. **Ommatodium.**—*Lindley (as a genus), Gen. & Sp. Orch.* (1838), p. 365.—Flowers expanded; anther inverted, the glands of the pollinia situate below. Species 7.

§ 3. **Micranthum.**—Flowers contracted, like those of *Corycium*; anther erect or ascending. Species 8.

KEY TO THE SPECIES.

(Flowers expanded, yellow.)

Limb of the lip rhomboidal, or linear, small.

- | | | |
|--|----|--------------------|
| Appendage of the lip saddle-shaped ; flowers small | .. | P. PLATYPETALUM 1. |
| " " fiddle-shaped, apex serrate | .. | P. CATHOLICUM 2. |
| " " " " entire .. | .. | P. ACUTIFOLIUM 3. |
| " " cruciform | .. | P. CRUCIFERUM 4. |

Limb of the lip rhomboidal, broad ; appendage cup-shaped P. VOLUCRIS 7.

Limb of the lip oblong, bilobed, wider than long.

- | | |
|---|-----------------|
| Appendage of lip short, broad, columnar ; flowers large | P. CAFFRUM 5. |
| " " long, narrow, lobed ; flowers small | .. P. ALATUM 6. |

(Flowers contracted, purple.)

- | | | |
|---|----|----------------|
| Appendage of lip bent forward, short and beaked | .. | P. CARNOSUM 8. |
|---|----|----------------|

§ 1. *Eupterygodium*.

1. *Pterygodium platypetalum*, Lindley, in *Gen. & Sp. Orch.* (1838), p. 366.—Two to six inches high ; stem slender, usually flexuous, distantly 1-2-leaved ; lower leaf linear-lanceolate, acuminate, 1-1½ in. long, upper smaller ; flowers 1-2, distant, about 6 lines long and 9 lines wide ; bracts ovate, acuminate, nearly as long as the flower ; odd sepal lanceolate, acuminate, very concave, or almost saccate towards the base ; side sepals concave, spreading horizontally ; petals nearly semiorbicular, bilobed on the upper margin, rounded below, very concave ; limb of the lip small, somewhat rhomboidal, acute, curved, the appendage produced above into two large ear-like lobes, thence bent back at a right angle and saddle-shaped, with distinct hanging flaps and a narrowed point ; arms of the rostellum horizontal ; stigmas 2, subdistant ; ovary obovate, trigonous, curved, with 3 prominent ribs. "*P. catholicum* var. *minor*," sheet a. in Thunberg's herbarium. *Arethusa alaris*, Thunberg, Prodr. Plant. Cap., p. 3.

HAB. Near the saddle between the eastern and western peaks of the Devil's Peak, *Pillans* ; on the mountain north of the Hout's Bay Neck, 1800 ft., fl. Sept., Dr. R. Marloth (No. 4945 in herb. Bolus) ; somewhat rare.— Extends to Du Toit's Kloof, Wellington, and Caledon. *Zeyher*, 3944 ; *Drège*, 8280.

The flowers are a pale sulphur-yellow. The peculiarly-shaped lip and its small size and delicate habit at once distinguish this interesting little species from any other. It seems to be scarce on the Peninsula, for during ten years of frequent botanical excursions I never found it.

2. *Pterygodium catholicum*, Swartz, in *Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 217.—Six inches to a foot high ; stem rather slender ; leaves 2, distant, the lower radical, oblong, obtuse, and apiculate, or acute, sheathing at base, usually waved or crisped, subglaucous, 2-4 in. long ; the upper cauline, much smaller ; raceme loosely 2-6-flowered, hood of the flower about 7 lines wide and long,

bracts lanceolate, acute, erect, nearly as long as the flowers; odd sepal obovate, subgaleate, with a sharp reflexed point; side sepals ovate, acuminate, spreading behind the hood; petals nearly semiorbicular, concave, margin a little waved; limb of the lip small, rhomboidal, acuminate, the larger appendage somewhat fiddle-shaped, the upper and narrower part (like the "handle") bent forward at its apex, and beset on the margin and face with six rows of teeth; the viscid disc of the pollinary gland facing the back of the flower; stigma horse-shoe-shaped. Ker, in Journ. Sci. R. Inst., vol. vi. (1819), t. i., f. 3. Orchidi affinis flore luteo &c. Buxbaum, Cent., vol. iii. (1729), p. 12, t. 21. *Ophrys catholica*, Linnæus, Sp. Plant., ed. 2 (1763), 1844. *Ophrys alaris*, Linnæus, the younger, Suppl. (1781), 404.

HAB. Moist places on the Cape Flats, 50 to 100 ft., common; more rarely on the lower mountain sides up to 800 ft., fl. Aug.—Sept., Zeyher, 3941, 3943; *Herb. Norm. Austr.-Afr.*, 174.—Extends eastward to Genadendal and Port Elizabeth.

Flowers pale sulphur-yellow, or very rarely the petals and lip orange-red, with a peculiar and not agreeable scent. This is one of the commonest of our orchids, and very regular in its appearance. There is little difficulty in distinguishing it in a living state, the only species which it resembles in external appearance being the one next described. It was probably introduced into Europe prior to 1729, Buxbaum's poor figure being apparently drawn from the living plant.

3. *Pterygodium acutifolium*, Lindley, *Gen. & Sp. Orch.* (1838), p. 366.—Six to twelve inches high; stem usually robust, leafy; leaves about 2, oblong, mostly acuminate, more rarely obtuse and apiculate, the lower 3–9 in. long, the upper distant and smaller, succeeded by 2–3 similar, distant, shorter, leaf-like sheaths; raceme 4–10-flowered, often close, bracts ovate, acuminate, a little longer than the ovary; perianth almost exactly as in the preceding species, but a little larger, and the appendage of the lip less distinctly fiddle-shaped, tapering more gradually towards the apex, which is traversed by two furrows and quite entire; arms of the rostellum ascending; stigma somewhat crescent-shaped.

HAB. Moist places on the mountain-tops, Muizenberg, 1400 ft., fl. Nov.; Table Mt., up to 3500 ft., fl. Dec., Bolus, 4334; *Herb. Norm. Austr.-Afr.*, 175.—Extends to Groene Kloof and Tulbagh. Zeyher, 1572; also 1573, *ex parte*.

The colour of the flowers is a deep bright golden yellow; this, and its more robust habit, more numerous and larger flowers, and differently shaped appendage to the lip, serve to distinguish it from *P. catholicum*, to which it is otherwise closely allied, and from the larger specimens of which it is not always easy, when in a dried state, to separate it. On the Peninsula, at least, the two species are divided by a considerable interval in the flowering period, and by a different zone of elevation.

This plant is a handsome one, and much less common than the preceding.

4. *Pterygodium cruciferum*, Sonder, in *Linnaea*, vol. xix. (1847), p. 109.—Six to nine inches high; stem leafy, somewhat bent; leaves usually 2, oblong-lanceolate, acute, nerved, sometimes twisted, erect or spreading, the lower 3–4 in. long, the upper smaller; raceme somewhat laxly 2–6 flowered, the hood of the flower about 8 lines long and broad, bracts broadly lanceolate, nearly as long as the flower; odd sepal lanceolate, acute, incurved above, concave at base; side sepals ovate-acuminate, concave, wide-spreading; petals nearly orbicular, very concave, and reflexed on part of the margin; limb of the lip linear, about 2 lines long, the appendage cruciform, erect, arms obtuse, ascending, apex channelled, reaching to the top of the hood; arms of the rostellum ascending or nearly horizontal; stigmas 2, distant; ovary obovate.

HAB. Amongst burnt shrubs on the slopes above Van Kamp's Bay, at about 300 ft., fl. Sept. (1884). *Bolus*, 4964; *Herb. Norm. Austr.-Afr.*, 316.—Extends to Swellendam and Uitenhage.

Flowers sulphur-yellow, not quite so large as those of *P. acutifolium*, which this species resembles in habit. Easily distinguished by the large cruciform appendage to the lip. I have only met with it once as above, where it grew in considerable quantity. I was indebted for the find to my friend Dr. Marloth, who first detected it, and with whom I afterwards visited the spot where it grew. In Burmann's herbarium, now in the De Lessertian herbarium, belonging to the City of Geneva, I had the pleasure of seeing there (in August, 1888) a sheet, of excellent specimens of this plant, marked "collect. 8 Octobr. 1695." There was no collector's name, but, as will be seen by a note in the Appendix, it was almost certainly either Oldenland or Hartog, and also almost certainly was gathered on the Cape Peninsula. These are probably the oldest herbarium specimens of Cape plants in existence. They are still more interesting as showing how long, in spite of the labours of numerous collectors, a species may remain ungathered, as in the case of this plant, which no one is known to have seen on the Peninsula between the year above-named, and that of its re-discovery by Dr. Marloth,—a period of 189 years!

PLATE 22.—Fig. 18, flower, front view, $\times 2$ diameters; 19, column with lip, side view, $\times 3$; 20, column, with lower part of the appendage to the lip, back view, mag.; 21, one of the pollinia, mag. In the foregoing, *a* indicates the anther; *g*, the gland of one of the pollinia; *s*, one of the stigmas.

5. *Pterygodium cafferum*, Swartz, in *Konigl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 218.—Five to ten inches high; stem leafy, nearly straight; leaves 3–4, the lowest oblong or ovate, acute or obtuse,

nerved, 2-3 in. long, the upper gradually narrower and more acute, passing into closely-appressed sheaths with free, membranous, acuminate points; raceme somewhat dense, in the larger specimens many-flowered and 4 in. long, bracts lanceolate, enwrapping the ovary, shorter than the flowers; sepals lanceolate, acuminate, concave, the lateral ascending and mostly hidden behind the petals; petals nearly semiorbicular, concave, the outer margin irregularly notched, the hood about 6 lines wide; limb of the lip somewhat oblong, bilobed, the margin rounded and crenulate, about 9 lines wide, 3-4 lines long, the appendage nearly square in section, arched at the apex, and hollowed below it in front into two depressions divided by a narrow septum; rostellum horizontal; stigmas two. Thunberg, *Flor. Cap.*, ed. 1823, p. 23; *Ophrys caffra*, Thunberg, *Prodr. Plant. Capens.* (1794), p. 2.

HAB. Open places at the foot of Table Mt., on the east side; also on the Muizenberg, 200-800 ft., fl. Nov., *Bolus*, in *Herb. Norm. Austr.-Afr.*, 176.—Extends to Somerset West, Paarl, and Groene Kloof. *Zeyher*, 3940; *Drège*, 1254.

The flowers are a bright but not deep yellow. The habit is like that of *P. acutifolium*, but the raceme is usually more numerous and densely flowered. In floral structure its nearest ally is *P. alatum*, to which, indeed, it is closely related; but the habit is entirely different. The likeness of the appendage of the lip to the column of some *Angræcum*, both in form and position, is very curious. Lindley speaks of a tooth or mucro between the lobes of the limb of the lip; this occurs in *P. alatum*, but I have not found it in this species. It is not frequent on the Peninsula; but when it occurs, is usually in numbers of one or two dozen plants.

PLATE 22.—Fig. 22, column, magnified, showing *a*, one of the cells of the anther, *g*, the gland, *s*, one of the stigmas.

6. *Pterygodium alatum*, Swartz, in *Konigl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 218.—Three to six inches high; stem leafy, somewhat slender, nearly straight; leaves 4-7, mostly radical, lanceolate, acuminate, spreading, sometimes waved and twisted, the lower 1-2 in. long, succeeded by 3-4 more erect, shorter, loose sheaths; raceme usually lax, 4-12-flowered, the flowers spreading, about 5 lines wide, bracts ovate, acute, as long as the ovary; sepals nearly equal and similar, lanceolate, acuminate; petals rhomboidal or cuneate-obovate, concave, the outer margins crisped, and irregularly crenulate; limb of the lip almost exactly like that of *P. caffrum*, but smaller, and with a sharp tooth-like point between the two lobes, the appendage erect, rather narrow, with two large lateral lobes and an arched summit hollowed in front; arms of the rostellum ascending; anther cells very short. Ker, in *Journ. Sci. R. Inst.*, vol. viii. (1820), t. 3, f. 2; Thunberg, *Flor. Cap.*, ed. 1823, p. 24. *Ophrys alata*, Thunberg, *Prodr. Pl. Cap.*, p. 2.

HAB. Grassy places, or near bushes, lower slopes of the Devil's Peak, near Wynberg, &c., 50–300 ft., fl. Sept., *Ecklon*, 673; *Bolus*, 3930, &c.—Extends to Stellenbosch (*Herb. Norm. Austr.-Afr.*, 337), Clanwilliam, and eastward to Voor-mansbosch, Swellendam.—*Zeyher*, 3948; *Drège*, 1255.

The flowers are pale sulphur-yellow, the whole plant becoming black in drying. Quite distinct in habit from any other, but otherwise closely allied to *P. caffrum*; the appendage to the lip, though more complex in structure, is formed upon the same general type as that of the last-named. It is not very common within our limits.

§ 2. *Ommatodium*.

7. *Pterygodium Volucris*, *Suartz*, in *Kongl. Vetensk. Acad. Handl.*, vol. xxi. (1800), p. 218.—Six to fourteen inches high; stem nearly straight, distantly leafy; lowest leaf radical, ovate or oblong, acute, subcordate and loosely sheathing at base, nerved, laxly spreading, 2½–4 in. long, the second often distant and smaller, succeeded by a single, loose, erect sheath; spike narrow, cylindrical, many-flowered, usually about half the length of the stem, bracts lanceolate, reflexed; flowers about 6 lines long and 4 lines wide; odd sepal linear-oblong, obtuse; side sepals oval, subobtuse, spreading, small; petals somewhat triangular, the upper margin turned down like a flap; limb of the lip broadly triangular, or subhastate, with a lobe on either side at the base, and a transverse flap-like process in front, the appendage goblet-shaped with a narrow stalk, the rim notched in front and sloping downward obliquely to the back; arms of the rostellum ascending high on either side of the appendage, carrying the erect, inverted, distant anther-cells, the glands of the pollinia situate at the base of the latter, and very near to the distant stigmas; ovary oblong, prominently ribbed. *Thunberg*, *Flor. Cap.*, ed. 1823, p. 22; *Ker*, in *Journ. Sci. R. Inst.*, vol. ix.³ (1820), t. 4, f. 1. *Ophrys Volucris*, *Linnaeus*, the younger, *Suppl.* (1781), 403. *Ommatodium Volucris*, *Lindley*, *Gen. & Sp. Orch.* (1838), p. 365.

HAB. In rather dry places at the foot of Table Mountain on the eastern side, 300 ft., fl. Sept.—Oct., *Bolus*, 4886.—Extends northward to the mountains of Namaqualand (about Klipfontein at 3000 ft.), and eastward to Swellendam.

The flowers are pale yellow, the habit that of some *Satyrium*. The structure of the appendage to the lip is peculiar, and the erect inverted anther induced *Lindley* to regard it as forming a distinct genus. This species is not very common on the Peninsula, but appears to be widely spread, and extends into a very dry region in Namaqualand, where the average rainfall probably does not exceed 5 in. yearly, and where I found it growing together with *Disperis purpurata*, *Reichb. f.*, var. *namaquensis* (*D. namaquensis*, *mihi*).

§ 3. *Micranthum*.

8. *Pterygodium carnosum*, *Lindley, Gen. & Sp. Orch.* (1839), p. 367.—Seven to fourteen inches high; stem leafy, straight or somewhat flexuous; leaves 4–5, from a broad sheathing base, linear, acuminate; spike densely many-flowered, 2–6 in. long, bracts ovate, acute, a little longer than the ovary; odd sepal ovate, subacute; side sepals ovate-oblong, subacute, ascending close under the hood; petals semiorbicular, very concave, the mouth of the hood about 3 lines wide; limb of the lip somewhat transversely crescent-shaped, the base wide, the points obtuse, notched in the middle, appendage galeate, bent forward and rounded in the middle, point beak-like, obtuse; rostellum with slightly ascending arms, anther-cells much curved outwardly; stigmas 2, distant, cushioned, tuberculated; a row of thick hyaline hairs at the base of the column on the posterior side.

HAB. Moist places on mountain-tops, Muizenberg, 1300 ft.; more rarely on Table Mt., up to 3550 ft., fl. Nov.—Dec., *Bolus*, 3879, 4547; *Herb. Norm. Austr.-Afr.*, 182.—Extends to Jonkershoek, Stellenbosch.—*Zeyher*, 3950.

The petals are a light or dark purplish colour, the limb of the lip nearly white. The small flowers are quite different from any others in the genus, and very much resemble in shape those of a *Corycium*, so that the plant is frequently mistaken by beginners for one of that genus. The basal tuft of hairs to the column is also unique; Lindley described the petals as pubescent, but I have only seen glabrous specimens. The whole plant turns very black in drying. The species is well-marked, and often abundant, especially on Muizenberg.

PLATE 12.—Fig. 1, flower, with ovary, front view, $\times 4$ diameters; 2, odd sepal with petals, expanded forcibly, back view, $\times 4$; 3, a petal, $\times 4$; 4, a side sepal, $\times 4$; 5, lip and column, viewed from above; 6, lip, side view; 7, column, the lip being removed, back view; 8, a pollinium and single granule,—all the latter variously magnified.

XI.—CERATÁNDRA.

Ecklon ex Lindley, Gen. & Sp. Orch. (1838), p. 363; *Bentham & Hooker f., Gen. Plant.*, vol. iii. (1883), p. 634.

Odd sepal posticous or anticous, narrow, cohering with the wider petals into a single concave, spreading, or deflexed, rarely erect piece; side sepals broad, free, erect or spreading. Lip adnate to the column between the arms of the rostellum, the limb lunate, hastate, or rhomboidal, nude or tuberculate, ascending or deflexed, swollen and bossy at the base, or more rarely produced above the junction with the column into a variously shaped fleshy appendage. Rostellum ascending, the lateral lobes produced into two erect, distant, nearly parallel, horn-like arms, or less commonly abbreviated and expanded laterally, each lobe bearing a cell of the erect, inverted anther along its outer

margin or posterior face; pollinia solitary in each cell, the gland situate at or near the apex of the rostellary arms. Stigma bilobed, or stigmas two, lateral, pulvinate, situate below (*i. e.*, at the apex of) the anther-cells. Capsule cylindrical, ribbed.—Terrestrial herbs, turning black in drying, with several cylindrical root-like, tomentose tubers, linear, setaceous, sheathing leaves, yellow, or white and red flowers in few-flowered loose racemes, dense spikes, or subcapitate; bracts shorter than the flowers. (Name from *κέρας*, a horn, and *άνθρωπος*, a man,—in allusion to the horn-like anther-cells.)

This genus is very closely allied to the preceding, and the only absolute distinction is the nearly flat, never hooded, cohering odd sepal and petals. These are mostly spreading or deflexed, and the appendage of the lip is sometimes obsolete, or nearly so; whereas in *Pterygodium* the cohering odd sepal and petals are always erect, and the appendage of the lip is invariably well-developed. The character of the elongated rostellary arms upon which Lindley chiefly relied is subject to exceptions; in three species, at least, it is wanting. Two of these, if they had hooded flowers, would be indistinguishable from *Pterygodium*, while the third species has a column very similar to that of *Corycium excisum*. There are, however, three species with which I am unacquainted in the living state. The Peninsular species fall into two sections, characterised by the arms of the rostellum being produced, or abbreviated.

DISTRIBUTION.—Seven species have been described, as here admitted, and there are two others as yet unpublished. All are natives of the South-Western Region of the Colony, except one which belongs to the Eastern districts.

KEY TO THE SPECIES.

* Arms of the rostellum laterally dilated, not elongated; appendage of the lip large.

Appendage of the lip with two long horns C. BICOLOR 1.
 ,, ,, without horns, expanded posteriorly .. C. HARVEYANA 2.

** Arms of the rostellum elongated, ascending; appendage of the lip small or none.

Lip anticous.

Side lobes of the limb of the lip obtuse; flowers mediocre, red and white C. GLOBOSA 3.

Side lobes of the limb of the lip acute; flowers small C. PARVIFLORA 4.

Lip posticous; flowers large, yellow C. CHLOROLEUCA 5.

1. *Ceratandra bicolor*, Sonder, according to Drège, in *Linnæa*, vol. xx. (1847), p. 220 (the name only); Bolus, in *Journ. Linn. Soc.*

vol. xx. (1884), p. 487.—From 4–12 in. high ; stem flexuous, distantly leafy ; leaves few, 1–2 in. long, the upper shorter ; raceme laxly 1–9-flowered, mostly 2–4 flowered, bracts much shorter than the ovary ; odd sepal posticous, resupinate, lanceolate, the cohering petals cuneate-obovate, crenulate on the rounded upper margin, about 5 lines long ; side sepals ovate, spreading-deflexed, 5 lines long ; limb of the lip somewhat lunate, the side lobes curved upward, crenulate, tuberculate in the middle on the upper surface, 4–5 lines long, appendage oblong, thence produced into two long linear, acuminate, approximate, erect then decurved horns, each with a short flap-like fold at its base ; arms of the rostellum rounded, ascending, but much shorter than the horns of the appendage. *C. Harveyana*, Sonder, in *Linnæa*, vol. xix., p. 108 (not of Lindley).

HAB. Amongst Restiaceæ, and especially after bush fires on the upper mountain-slopes and on the tops, Muizenberg Mt., 1300 ft. ; Table Mt., above Klassenbosch, 2300–2400 ft. ; fl. Dec.—Jan., *Bolus*, 4564 ; *Herb. Norm. Austr.-Afr.*, 340. — Extends to Tulbagh (*Zeyher*, 1574).

Sepals green, with reddish tips ; petals and lip yellow, with brown stripes on the latter. Allied to *C. Harveyana*, Lindley, but readily distinguished by the different limb of the lip, and the long horns of the lip-appendage. The rostellary arms are scarcely different from those of a *Pterygodium*. It is not frequent, but should be sought for after bush-fires. I found it growing in some abundance, together with a few plants of *C. Harveyana*, on Dec. 21, 1879 ; but for four succeeding summers I searched for it in the same place in vain ; the next summer (1884), Mr. Bodkin found it growing in profusion on the Muizenberg.

PLATE 21.—Fig. 1, flower viewed obliquely, $\times 1\frac{1}{2}$ diameters ; 2, column with lip, back view ; 3, lip ; 4, lip, side view ; 5, petal ; 6, odd sepal ; 7, column, front view ; 8, section of ovary,—all the latter variously magnified.

2. *Ceratandra Harveyana*, Lindley, *Gen. & Sp. Orch.* (1838), p. 365.—Six to seven inches high ; habit, leaves, and inflorescence as in *C. bicolor* ; odd sepal posticous, lanceolate, obtuse, ascending, the cohering petals obovate, clawed, irregularly lobulate and crenulate, about 5 lines long ; side sepals broadly oblong, concave, horizontally spreading, 4 lines long ; limb of the lip hastate, acute, tuberculate, about 2 lines long, the appendage at first oblong with incurved sides, then dilated into two incurved arms, thence produced into two large, rounded, approximate folds, which rise slightly above the wide-spreading rostellary arms, and extend behind and downward so as to cover the stigma ; arms of the rostellum wider than in *C. bicolor* ; ovary cylindrical, shortly pedicellate.

HAB. Same as *C. bicolor*, but only found hitherto on the Table Mt. station ; rare, *Bolus*, 4548.

Colour of the flower as in *C. bicolor*, except that the appendage of the lip is a deeper yellow, and the much smaller limb has no brown markings. A very curious and well-marked species, allied to *C. bicolor*, but readily distinguished by the posteriorly-developed lip-appendage and the absence of horns. Harvey inclined to make a distinct genus of it under the name *Calota*; Lindley, however, rightly included it in the present genus.

3. *Ceratandra globosa*, Lindley, *Gen. & Sp. Orch.* (1838), p. 364.—Ten to twelve inches high; the thickish tubers at the base of the stem crowned by a short tuft of withered leaves: leaves 1–3 in. long, the upper gradually smaller; spike crowded, subcapitate, hemispherical, 6–10-flowered; odd sepal posticous, lanceolate, the cohering petals broadly and obliquely ovate, subcordate, shortly acute, slightly waved on the outer margin, about 3 lines long; side sepals ovate, acute, concave, ascending, a little shorter than the petals; lip anticous, depressed ovate, twice as wide as its length, shortly acute, clawed at base, the claw deflexed, the limb upturned, appendage none; arms of the rostellum incurved, tapering upward, with two large, flattened, approximate tubercles at their base on the posterior side.

HAB. In grassy places on Table Mt. on the eastern side, about 3000 ft., Dec. 21, 1879, *Bolus*, 4565; not frequent.—Extends to Du Toit's Kloof and the Cederbergen. *Drège*, 1243.

Sepals dull red, the petals and lip white. Quite distinct from any other species on the Peninsula with which I am acquainted, though allied according to description to the succeeding. The form of the lip and column as drawn by me from Table Mountain specimens agrees fairly well with a drawing in Lindley's herbarium made from *Drège's* specimens, No. 1243, except that in the latter the lip is less wide in proportion to its length than in mine.

4. *Ceratandra parviflora*, Lindley, *Gen. & Sp. Orch.* (1838), p. 364.—“Leaves rough on the margins, the uppermost smaller; spike subglobose; petals with their anterior margin produced into an obtuse angle; lip transversely rhomboidal, angles acute, claw cuneate, without appendage; the narrow arms of the stigma [rostellum] distant, horseshoe-shaped.”

HAB. “On Table Mountain, 24th Jan., 1811, *Burchell*, No. 560”; also 652.—Extends to “summit of craggy peak on great mountain near Swellendam, 15th Jan., 1815,” *Burchell*, 7336.

The above description is drawn from Lindley; what he regarded as arms of the stigma in this genus Bentham has termed lobes of the rostellum, and there is no doubt that the structure is a modification of the same organ we regard as the rostellum in *Satyrium*, *Disa*, &c.

I have never collected the plant, and only know it from a small specimen and a drawing in Lindley's herbarium. From this it seems very near to *C. globosa*, the chief point of difference being the sharp side angles of the lip in this species, whereas in *C. globosa* they are very obtusely rounded. Lindley also says it is very like the latter, but that the flowers are only half the size, and the shape of the parts different.

5. *Ceratandra chloroleuca*, *Mundt, ex Lindley, Gen. Sp. Orch.* (1838), p. 364.—Glabrous, erect, 8–18 in. high; stem mostly flexuous, leafy; leaves numerous, $1\frac{1}{2}$ –3 in. long; flowers many in a loose or dense oblong spike; odd sepal anticous, lanceolate, the cohering petals falcate-lanceolate, obtuse, with a flap-like incurved lobe on the outer margin, nearly $\frac{1}{2}$ in. long; side sepals ascending, obliquely ovate, acute, about 4 lines long; lip posticous, the limb lunate, with obtuse, subhastate side lobes, shortly acute, tuberculate on the upper surface, appendage oblong, channelled and bossy at the apex, scarcely reaching beyond the point of attachment, and much shorter than the rostellary horns, which are long, narrow, and nearly parallel. *Francis Bauer*, Ill. Orch. Pl. (Genera), t. 16. *Ophrys atrata*, Linnæus, Mant. Pl. (1767), p. 121; Thunberg, Prodr. Pl. Cap. (1794), p. 2. *Pterygodium atratum*, Swartz, in Kon. Vet. Acad. Handl., vol. xxi. (1800), p. 218; Thunberg, Flor. Cap. ed. 1823, p. 24; *Ceratandra auriculata*, Lindley, Gen. Sp. Orch. (1838), p. 364.

HAB. Moist places on the sandy downs, and on the mountain-tops, 50–3500ft.; fl. Oct.—Nov., frequent, *Bolus*, 4546.—Extends to Paarl, Malmesbury, &c. *Burchell*, 6900, 7151; *Drège*, 1241; *Zeyher*, 1577.

The sepals are a greenish yellow; the petals, lip, and rostellary arms, bright deep yellow. This is the only species on the Peninsula which, so far as I know, has a posticous lip. In that character, and also in habit, it agrees with *C. grandiflora* (an eastern species). The long rostellary arms combined with the very much abbreviated appendage of the lip, serve to distinguish it from any other species. Lindley distinguished *C. auriculata* upon Burchell's 6900, as having auricled side sepals, and an obtuse lip with a differently-shaped tubercle ("appendage," as he terms it). The first character is a mistake, the drawing clearly shewing a petal and not a side sepal; the latter characters are variable in the species.

NOTE RESPECTING BURMANN'S HERBARIUM.

SINCE the greater part of these sheets have passed through the press, I have seen at Geneva, by the courtesy of Herr Joh. Müller, the Curator, the herbarium of the Burmanns, father and son, of Amsterdam, and to which reference has already been made on page 186. It contained about twenty Cape Orchids, mostly in an excellent state of preservation, although the notes upon two of the sheets shews them to be nearly 200 years old. These were probably collected by Oldenland. Amongst them I identified the following:—

Bartholina pectinata.

Holothrix squamulosa, H. parvifolia.

Satyrium coriifolium, S. bicornis, S. bracteatum, S. bicallosum.

Disa patens (marked "coll. 28 Sept., 1695"), *D. melaleuca, D. atricapilla.*

Pterygodium catholicum, P. cruciferum (marked "coll. 8 Oct. 1695)."

ERRORS AND OMISSIONS.

Page 91. Insert—

HARTOG, Johan. A collector in charge of the East India Company's Garden in Cape Town, towards the end of the 17th Century, mentioned by Boerhaave (Index alter, &c.).

OLDENLAND, Hendrik Bernhard. I am indebted for the following reference to this old botanist and collector, to my friend, Professor MacOwan* :—“ Francis Valentyn, the historian of the Dutch East Indies, in his ‘Beschrijving van de Kaap der Goede Hoop,’ p. 22, says, ‘Ik heb eenen *Herbarius vivus* gezien die de Heer H. B. Oldenland, een fraai Botanicus, dien ik als opziender van de Compagnies Tuin hier in 't jaar 1695 gekend heb, had bij een gezamelt, en die wel in 13 of 14 deelen in folio met een zeer fraai beschrijving van yder plant in 't Latyn bestont.’”† What became of these volumes? Do they still exist as such? or were the sheets incorporated with Burmann's herbarium? Oldenland was probably the collector of the Orchids in the last-named herbarium, and on this assumption I have included his name here.

Page 97. Insert—

RIDLEY, H. N. A Monograph of the genus *Liparis*. In the Journal of the Linnean Society (Bot.), vol. xxii. (1887), pp. 244–297.—Three South-African species are enumerated.

Page 109, line 15 from the bottom. Erase *Cymbidium Buchananii*, Reichb., f., from the synonymy of *Eulophia aculeata*, Spr. The identity is at least doubtful, and needs further investigation.

Page 116, line 11 from the top, add as a synonym—

Habenaria hispida, A. Sprengel, in *Tentamen Supplementi ad Syst. Veg. Linnæani*, Goettingæ, 1828, p. 27.

* Transactions of the South-African Philosophical Society, vol. iv. (1887), p. 33.

† “I have seen here a *Herbarius vivus*, which Mr. H. B. Oldenland, an excellent botanist whom I knew in the year 1695 as superintendent of the Company's Garden, had collected, and which consisted of 13 or 14 folio vols., with a good description of each plant in Latin.”

INDEX.

(*Synonyms, and names mentioned incidentally, without descriptions, are printed in italic.*)

- Amphigena, § of Disa, 139
APOSTASIA, 77
ARETHUSA *alaris*, Thunb., 184
 capensis, Linn., 176
 ciliaris, Linn. f., 111
 secunda, Thunb., 178
 villosa, Linn., 178
 Australia, connection with Cape Flora, 80
 Orchid Flora of, 81
 Orchids of, 79, 80
 Western, Orchids of, 81
 Auge, J. A., 90
AVICEPS, Lindl., 117
- BARTHOLINA**, R. Br., 111
 Burmanni, Ker, 111
 Ethelæ, Bolus, 112
 pectinata, R. Br., 111
 Bauer, Franz, Illustrations, &c., 93, 96
 Bentham, Hongkong Flora, 81
 Bergius, C. W., 90
 P. J., Descriptions, 93
 Bibliography of S. A. Orchids, 93
 Bolus, H., on Cape Orchids, 93
 Botanical Cabinet, 96
 Magazine, 93
 Register, 94
 Botanist's Repository, Andrews', 93
 Bowie, James, 90
 Brown, R., Hortus Kewensis, 93
 N. E., Terrestrial Orchids, 93
BUCCULINA, Lindl., 112
 Burchell, W. J., 90
 Burmann's Herbarium, 194
 Buxbaum, J. C., Centuriæ, 93
- Cameroon Mts., 82
 Cape Peninsula, climate of, 79
 description of, 78, 79
 Flora of, 79
 richness in Orchids, 82
CERATANDRA, Eckl., 189
 auriculata, Lindl., 193
 bicolor, Sond., 190
 chloroleuca, Mundt, 193
 globosa, Lindl., 192
 grandiflora, Lindl., 193
 Harveyana, Lindl., 191
 Harveyana, Sond., 191
 parviflora, Lindl., 192
 Chili, Orchid Flora of, 81, 82
 Collectors of Orchids in C. Peninsula, 90
 Colour of Orchid Flowers, 84
 Coryciæ, 80
CORYCIUM, Swtz., 179
 bicolor, Thunb., 180
 bicolorum, Swtz., 179
 bifidum, Sond., 180
 crispum, Swtz., 180
 excisum, Lindl., 182
 ligulatum, Reichb. f., 181
 microglossum, 181
 orobanchoides, Swtz., 181
 Coryphæa, § of Disa, 138
CYMBIDIUM *aculeatum*, Swtz., 109
 Buchanani, Rehb. f., 195
 pedicellatum, Swtz., 109
 plicatum, Harv., 109
 tabulare, Swtz., 108
 ustulatum, Bolus, 110
CYPRIPEDIEÆ, 75, 77
CYRTOPERA, Lindl., 104
 flava, 105
 pedicellata, Lindl., 109
 plantaginea, 105
- Darwin on Orchidæ, 76, 78
DIPERA, Spreng., 174
 Capensis, Spreng., 176
 tenera, Spreng., 176
DIPLECTHRUM, Pers., 117
DISA, Berg., 134
 æmula, Bolus, 150
 affinis, N. E. Br., 143
 atricapilla, Bolus, 166
 barbata, Swtz., 170
 bifida, Swtz., 163
 Bodkini, Bolus, 165
 brachyceras, Lindl., 152
 bracteata, Swtz., 154
 cernua, Swtz., 141
 clavigera, Bolus, 163

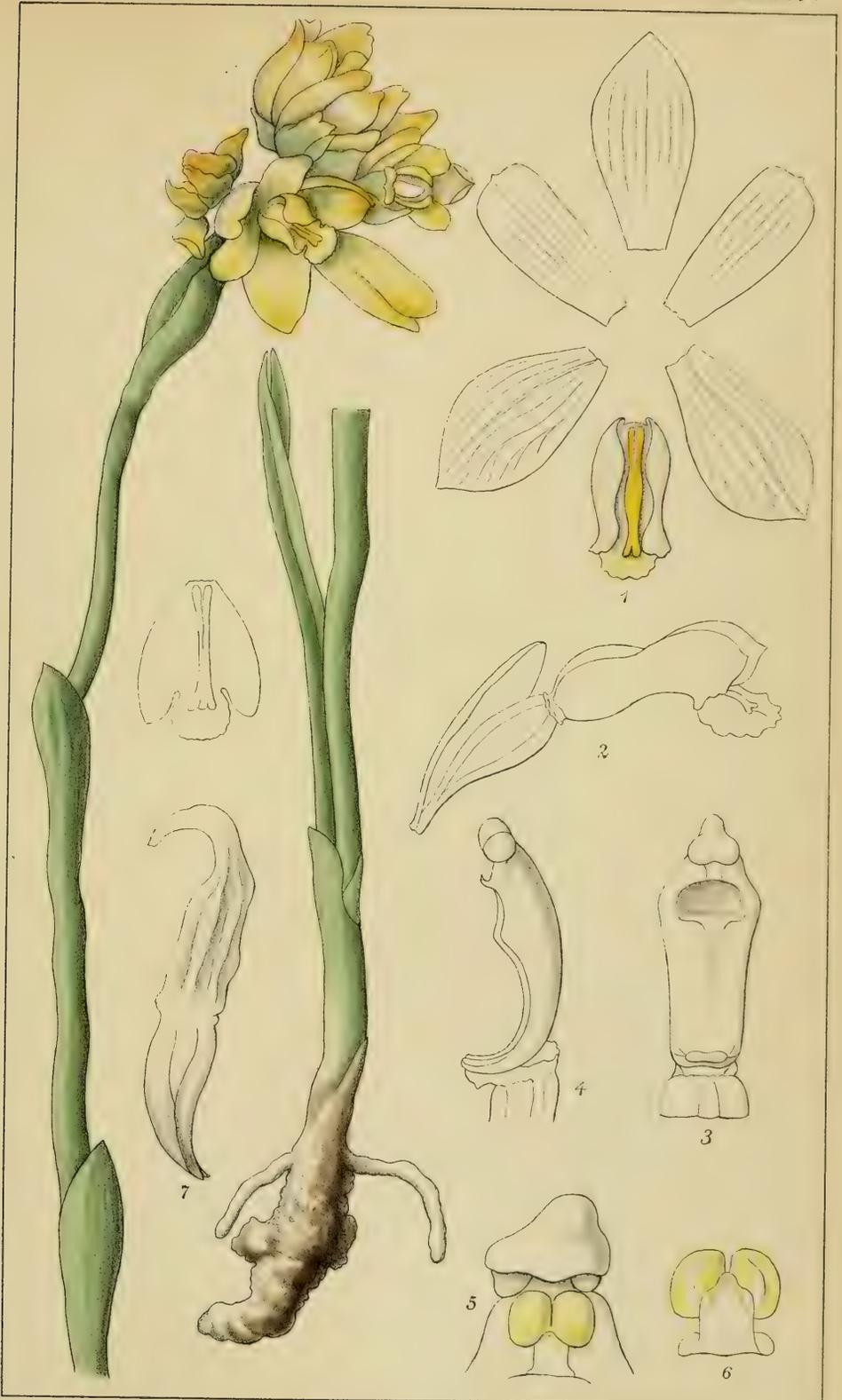
- cornuta*, Swtz., 149
crassicornis, Lindl., 150
cylindrica, Swtz., 153
Draconis, Swtz., 159
fasciata, Lindl., 167
ferruginea, Swtz., 172
flicornis, Thunb., 158
flexuosa, Swtz., 160
glandulosa, Burch., 158
graminifolia, Ker, 168
grandiflora, Linn. f., 87, 147
Harveiana, Lindl., 158
inflexa, Mundt, 162
leptostachys, Sond., 173
lineata, Bolus, 154
longicornis, Thunb., 145
longicornu, Linn. f., 145
lugens, Bolus, 171
macrantha, Swtz., 150
maculata, Harv., 149
maculata, Linn. f., 146
megaceras, Hook. f., 150
melaleuca, Swtz., 166
micrantha, Bolus, 142
minor, Reichb. f., 165
modesta, Reichb. f., 160
multiflora, Bolus, 140
neglecta, Sond., 155
obliqua, Bolus, 162
obtusa, Lindl., 153
ocellata, Bolus, 148
ophrydea, Bolus, 142
patens, Swtz., 157
patens, Thunb., 157
porrecta, Ker, 172
porrecta, Swtz., 173
prasinata, Ker, 141
purpurascens, Bolus, 169
pygmæa, Bolus, 140
racemosa, Linn. f., 155
reflexa, Reichb. f., 158
reticulata, Bolus, 143
Richardiana, Lehm., 164
rosea, Lindl., 164
rufescens, Swtz., 144
secunda, Swtz., 155
tabularis, Sond., 152
tenuicornis, Bolus, 151
tenuifolia, Swtz., 157
tenella, Swtz., 151
tenuis, Lindl., 173
torta, Swtz., 161
uncinata, Bolus, 149
uniflora, Berg., 147
vaginata, Harv., 159
venosa, Swtz., 156
venusta, Bolus, 170
Zeyheri, Sond., 173
- Disæ, abundance of seed in, 88
 DISPERSIS, Swtz., 174
 Capensis, Swtz., 175
 cucullata, Swtz., 177
 paludosa, Harv., 176
 secunda, Swtz., 177
 villosa, Swtz., 178
- Distribution of genera and species, 82
 Drège, J. F., 90
 Drège, Zwei Pflanzengeographische
 Documente, 94
DRYOPEIA, Thouars, 174
- Ecklon, C. F., 91
 Edwards, S., Botanical Register, 94
 Elevation above sea-level, 83
 Errors and omissions, 195
 Eu-disa, § of *Disa*, 137
 EULOPHIA, R. Br., 104
 aculeata, Spreng., 109
 cochlearis, Lindl., 107
 lamellata, Lindl., 107
 micrantha, Lindl., 108
 plicata, Bolus, 109
 sphærocarpa, Sond., 106
 tabularis, Bolus, 108
 tristis, Spreng., 106
 ustulata, Bolus, 110
 Eupterygodium, § of *Pterygodium*, 183
 Ewa Trewa, 125
- Fertilisation of *Bartholina pectinata*, 85
 Disa grandiflora, 87
 Disperis Capensis, 86
 Disperis villosa, 87
 Orchids, 85
 Pterygodium catholicum, 87
 Fitzgerald's Australian Orchids, 81
 Flora of the Cape Peninsula, 79
- Geele Trewa, 125
 Genera of S. A. Plants, Harvey, 94
 Gibert's Montevidean Flora, 80
 Gussone, Flora of Sicily, 81
- Habenaria hispida*, A. Spreng., 195
 Hartog, Joh., 195
 Harvey, W. H., 91
 works of, 94
 Hemsley on Insular Floras, 81
HERSCHELIA, Lindl., 134
 celestis, Lindl., 168
 Herschelia, § of *Disa*, 138
 HOLOTHRIX, L. C. Rich., 112
 condensata, Sond., 115
 gracilis, Lindl., 116
 Harveiana, Lindl., 114
 Mundtii, Sond., 113
 parvifolia, Lindl., 115
 squamulosa, Lindl., 114
 villosa, Lindl., 117
 Homologies of parts of Orchid-flowers, 76
 Hong Kong, Flora of, 81
- Insects, fertilisation by, 78
 Insular Floras, paucity of Orchids in, 81
- Jacquin, N. J., 94
 Journal of Science and Arts, 94
- Ker, J. B., 95
 Key to the Genera, 102

- Krauss, F., 91, 95
- LATHRISIA*, Swtz., 111
- Limodorum triste*, Thunb., 106
- Lindley, J., works of, 95
- Linnaeus, C., works of, 96
- LIPARIS, L. C. Rich., 103
- Bowkeri*, Harv., 103
- Capensis*, Lindl., 103
- Gerrardi*, Reichb. f., 103 [80
- Liparis, common to Cape and Australia,
- LISSOCHILUS*, R. Br., 104
- arenarius*, 105
- Loddiges, Conrad, 96
- Madeira, Flora of, 81
- Malaxis paludosa*, 153
- Masdevallia fenestrata*, 129
- Masson, F., 91, 95
- Micranthum, § of Pterygodium, 183
- Monadenia, § of Disa, 137
- MONADENIA, Lindl., 134
- comosa*, Reichb. f., 143
- inflata*, Sond., 141
- lancifolia*, Sond., 142
- leptostachya*, Sond., 144
- macrocera*, Lindl., 144
- micrantha*, Lindl., 142
- multiflora*, Sond., 140
- ophrydea*, Lindl., 142
- prasinata*, Lindl., 141
- rufescens*, Lindl., 143
- MONOTRIS, Lindl., 112
- secunda*, Lindl., 116
- Montevideo, Orchid Flora of, 80
- Müller, F. von, on Australian Flora, 81
- Norman, on the Flora of Madeira, 81
- Odour of Orchid-flowers, 84
- Oldenburg, D., 91
- Oldenland, H. B., 195
- Ommatodium, § of Pterygodium, 183
- OMMATODIUM, Lindl., 183
- Volucris*, Lindl., 188
- Ophrydeæ on Cape Peninsula, 80
- small number of in Australia, 79
- Ophrys alaris*, Linn. f., 185
- alata*, Thunb., 187
- atrata*, Linn., 193
- bicolor*, Thunb., 180
- bivalvata*, Linn. f., 166
- Caffra*, Thunb., 187
- catholica*, Linn., 185
- muscifera*, 88
- patens*, Linn. f., 157
- Volucris*, Linn. f., 188
- Orchideæ, number of species of, 75
- chief characters of, 75
- Darwin upon, 76
- in relation to the Flora of the Cape Peninsula, 79
- Orchis bicornis*, Linn., 123, 124
- bicornis*, Jacq., 123
- biflora*, Linn., 161
- Burmanniana*, Linn., 111
- circumflexa*, Linn., 178
- cornuta*, Linn., 149
- filicornis*, Linn. f., 158
- flexuosa*, Linn., 161
- grandiflora*, 146
- hispida*, Thunb., 116
- hispidula*, Linn. f., 116
- lutea*, Buxb., 123
- lutea caule purp.*, Buxb., 124
- mascula*, 86
- pectinata*, Thunb., 111
- tenella*, Linn. f., 152
- Oregura, § of Disa, 139
- Orthocarpa, § of Disa, 138
- ORTHOCHILUS, Hochst., 104
- Pappe, Dr. K. W. L., 91
- PENTHEA, Lindl., 134
- atricapilla*, Harv., 157
- filicornis*, Lindl., 168
- obtusa*, Lindl., 165
- patens*, Lindl., 157
- reflexa*, Lindl., 158
- Period of flowering, 88
- Proteaceæ, 80
- PTERYGODIUM, Swtz., 183
- acutifolium*, Lindl., 185
- alatum*, Swtz., 187
- atratum*, Swtz., 193
- caffrum*, Swtz., 186
- carnosum*, Lindl., 189
- catholicum*, Swtz., 184
- cruciferum*, Sond., 186
- platypetalum*, Lindl., 184
- Volucris*, Swtz., 188
- Reichenbach, H. G., fil., works of, 96
- Restiaceæ, 80
- Rostellum of Orchids, 77
- SACCIDIUM, Lindl., 112
- Satyræ, abundance of seed in, 88
- SATYRIDIUM, Lindl., 117, 133
- rostratum*, Lindl., 133
- SATYRIUM, Thunb., 117
- aculeatum*, Linn. f., 109
- bicallosum*, Thunb., vars., 128
- bicorne*, Thunb., 122
- bifidum*, Thunb., 163
- bracteatum*, Thunb., var., 130
- bracteatum*, Lindl., 130
- candidum*, Lindl., 121
- carneum*, R. Br., 120
- coriifolium*, Swtz., 124
- cornutum*, Thunb., 149
- cuellatum*, Swtz., 123
- cylindricum*, Thunb., 154
- emarcidum*, Bolus, 121
- erectum*, Lindl., 124
- erectum*, Swtz., 125
- ferrugineum*, Thunb., 172
- flexuosum*, Thunb., 161
- foliosum*, Swtz., 126
- foliosum*, Lindl., 128

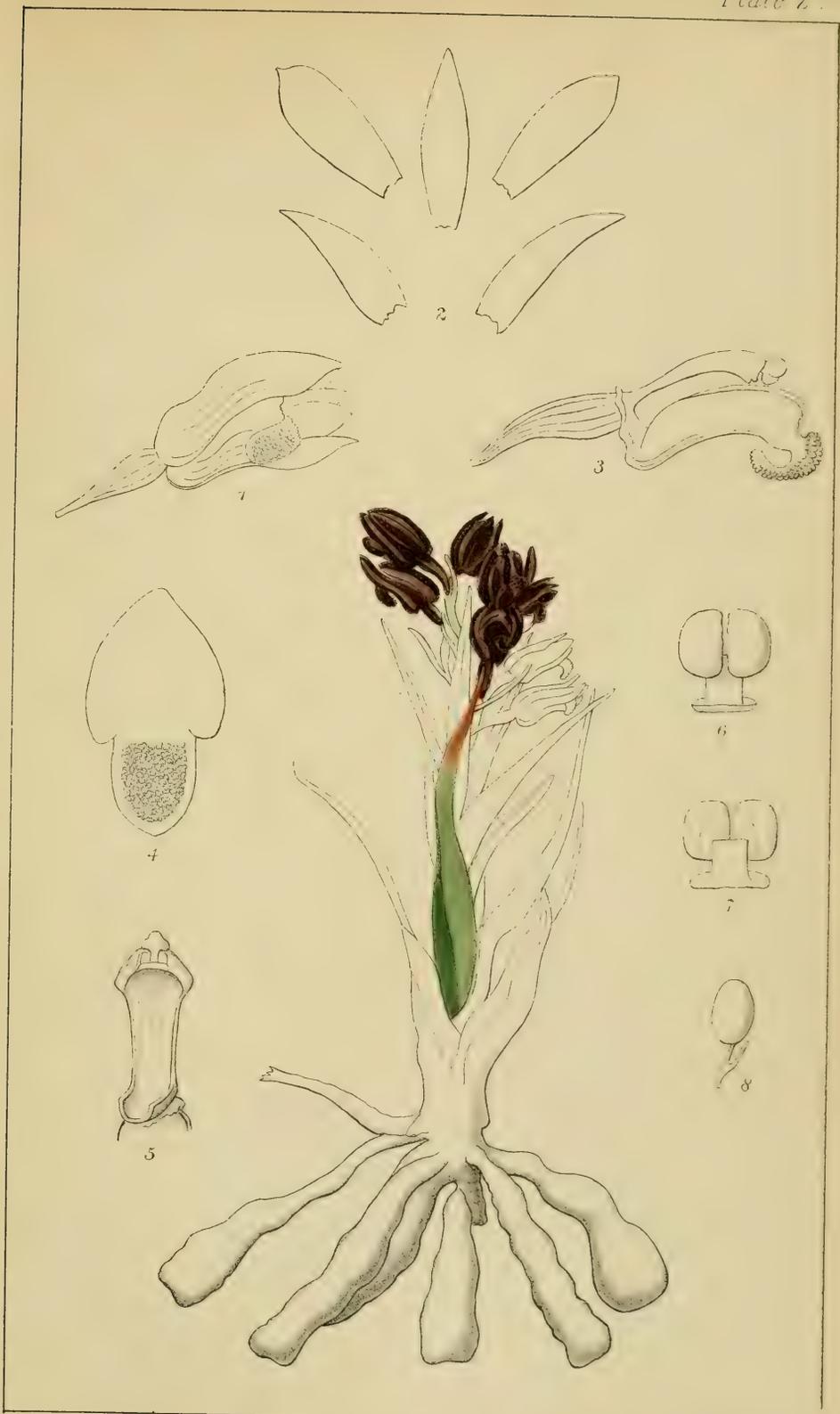
- Hallackii**, Bolus, 128
ligulatum, Lindl., 122
Lindleyanum, Bolus, 130
lupulinum, Lindl., 126
marginatum, Bolus, 127
ochroleucum, Bolus, 123
odorum, Sond., 125
orobanchoides, Linn. f., 181
parviflorum, Lindl., non Swtz., 127
pictum, Lindl., 131
princeps, Bolus, 120
pumilum, Thunb., 132
rhynchanthum, Bolus, 133
saxicolum, Bolus, 131
secundum, Thunb., 155
striatum, Thunb., 132
tabulare, Linn. f., 108
tenellum, Thunb., 152
tortum, Thunb., 161
triste, Linn. f., 106
utriculatum, Sond., 121
SCOPULARIA, Lindl., 112
Schizodium, § of *Disa*, 138
SCHIZODIUM, Lindl., 134
arcuatum, Lindl., 161
bifidum, Reichb. f., 163
clavigerum, Lindl., 163
flexuosum, Lindl., 161
inflexum, Lindl., 162
maculatum, Lindl., 147
obliquum, Lindl., 162
obtusatum, Lindl., 162
rigidum, Lindl., 163
 Seasons of flowering, 88
- Section of Orchid-flower, 76
 Seed, abundant in *Disæ* and *Satyria*, 88
Serapias melaleuca, Thunb., 146, 166
patens, Thunb., 157
tabularis, Thunb., 108, 146
 Sicily, Orchid Flora of, 81
 Sonder, W., works of, 97
 Sparrman, A., 91
 Spiral vessels of Orchid-flowers, 76
 Sprengel, K., works of, 97
Sturmia Capensis, Sond., 103
 Suppressed stamens of Orchids, 77
 Swartz, Olof, works of, 97
 Sydney, N. S. W., Orchids of, 81
- Terrestrial Orchids of S. Africa, 93
Thesaurus Capensis, Harvey, 94
 Thunberg, C. P., collections of, 92
 works of, 97
 Trimen, R., on *Disa grandiflora*, 87
 papers by, 98
TRYPHIA, Lindl., 112
- Vaginarium, § of *Disa*, 138
 Vegetative reproduction of Orchids, 87
 Verreaux, the younger, 92
Vexillata, § of *Disa*, 138
- Weale, J. P. M., papers by, 97
 Wright, C. S., collections of, 92
- Zeyher, K. L. P., 92
 Zwei Pflanzengeographische Documente,
 Meyer & Drège, 94

LIST OF PLATES.

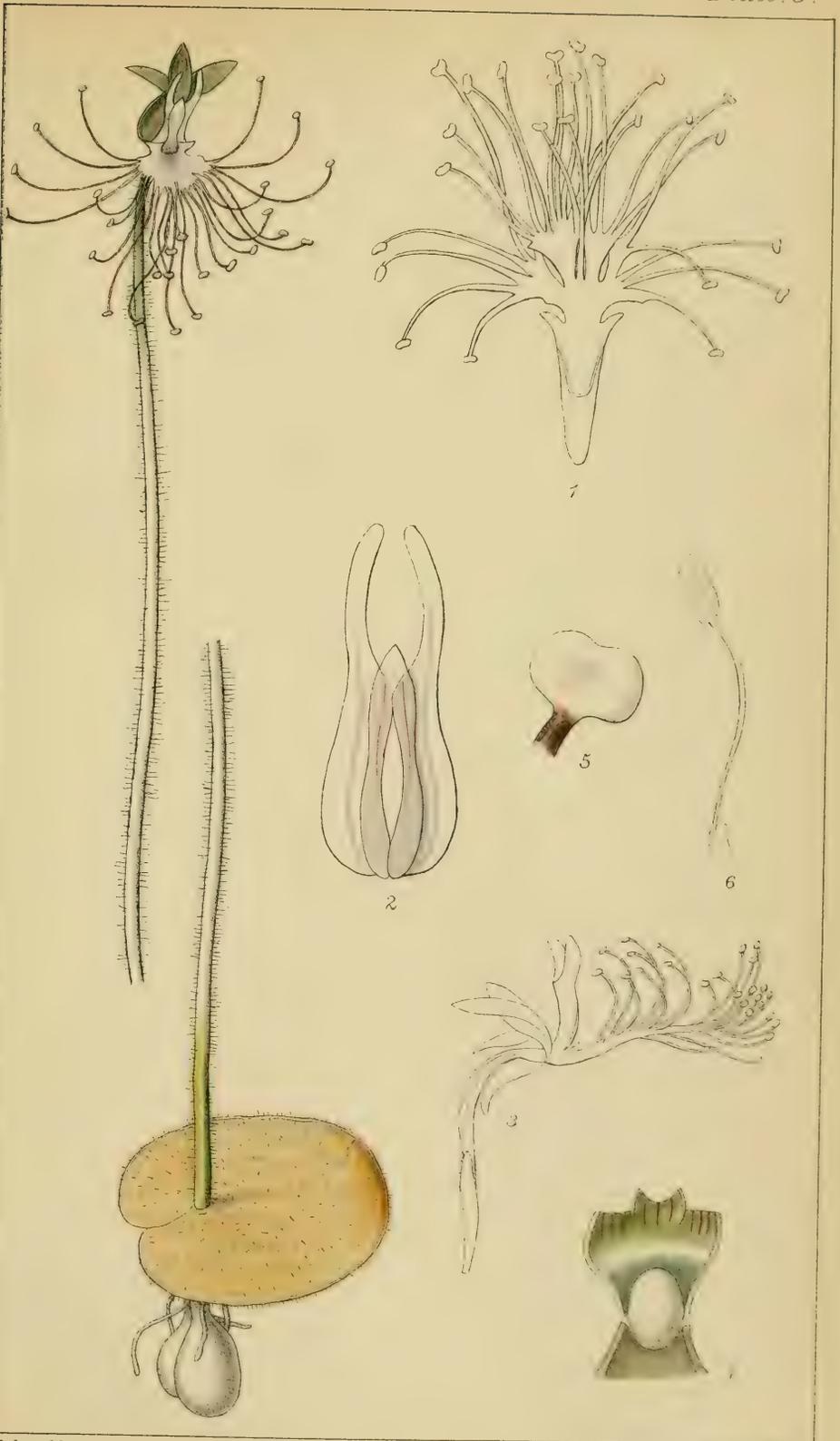
- PLATE 1. EULOPHIA TABULARIS, *Bolus*.
 (Erroneously lettered *Cymbidium tabulare*, Swartz.)
 " 2. " USTULATA, *Bolus*.
 (Erroneously lettered *Cymbidium ustulatum*, *Bolus*.)
 " 3. BARTHOLINA ETHELÆ, *Bolus*.
 " 4. SATYRIUM SAXICOLUM, *Bolus*.
 " 5. DISA OCELLATA, *Bolus*.
 " 6. " LONGICORNU, *Linn. f.*
 " 7. " MACULATA, *Linn. f.*
 " 8. " BARBATA, *Swartz*.
 " 9. " (§ HERSCHELIA) VENUSTA, *Bolus*.
 " 10. " ATRICAPILLA, *Bolus*.
 " 11. DISPERIS SECUNDA, *Swartz*.
 " 12. PTERYGODIUM CARNOSUM, *Lindley*.
 " 13. DISA BODKINI, *Bolus*.
 " 14. " TENUICORNIS, *Bolus*.
 " 15. " TABULARIS, *Sond.*
 " 16. " RETICULATA, *Bolus*.
 " 17. " PYGMÆA, *Bolus*.
 " 18. " LINEATA, *Bolus*.
 " 19. DISPERIS PALUDOSA, *Harvey*.
 " 20. CORYCIUM EXCISUM, *Lindley*.
 " 21. CERATANDRA BICOLOR, *Sond.*
 " 22. SOUTH-AFRICAN ORCHIDÆÆ.
 " 23. HOLOTHRIX SQUAMULOSA, *Lindley*.
 " 24. " PARVIFOLIA, *Lindley*,
 " 25. SATYRIUM RHYNCHANTHUM, *Bolus*.
 " 26. " OCHROLEUCUM, *Bolus*.
 " 27. " EMARCIDUM, *Bolus*.
 " 28. " LIGULATUM, *Lindley*.
 " 29. " HALLACKII, *Bolus*.
 " 30. " LINDLEYANUM, *Bolus*.
 " 31. " BICALLOSUM, *Thunberg*.
 " 32. " BRACTEATUM, *Thunberg*.
 A, var. *lineatum*; B, var. *nanum*.
 " 33. " STRIATUM, *Thunberg*.
 " 34. DISA OBTUSA, *Lindley*.
 " 35. " GLANDULOSA, *Burchell*.
 " 36. " FASCIATA, *Lindley*.



CYMBIDIUM TABULARE, SWARTZ.



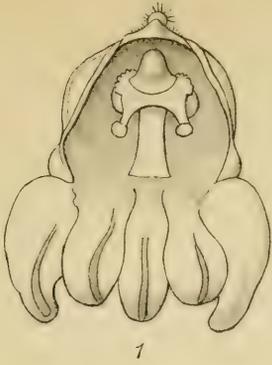
CYMBIDIUM USTULATUM, Bolus.



Bolus, del. 30. 11'83.

BARTHOLINA ETHELÆ. BOLUS.

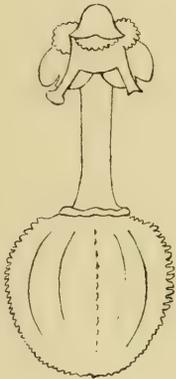
Harvard Bot. Garden



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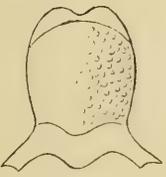
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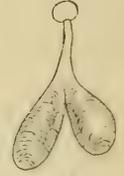
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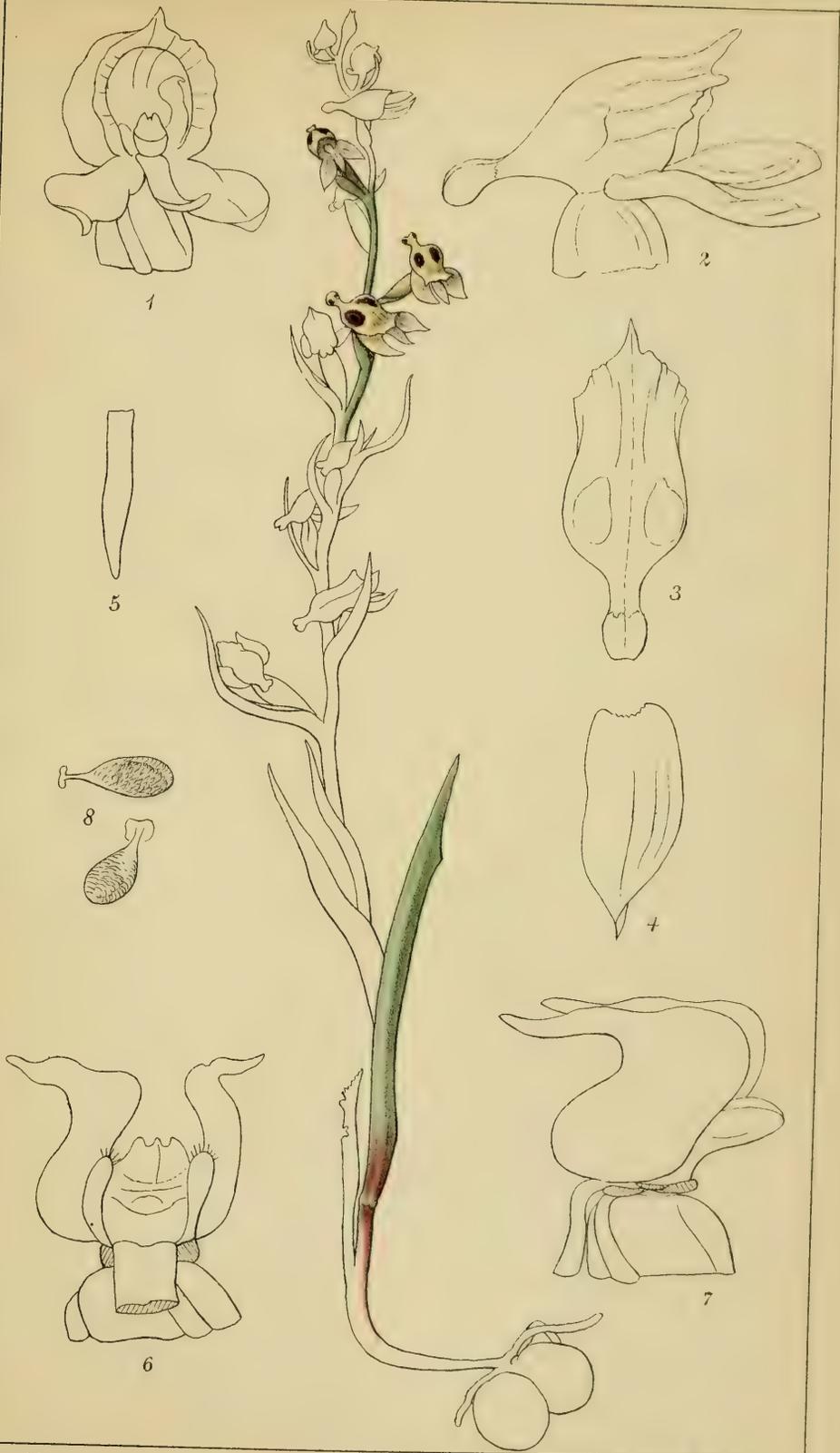


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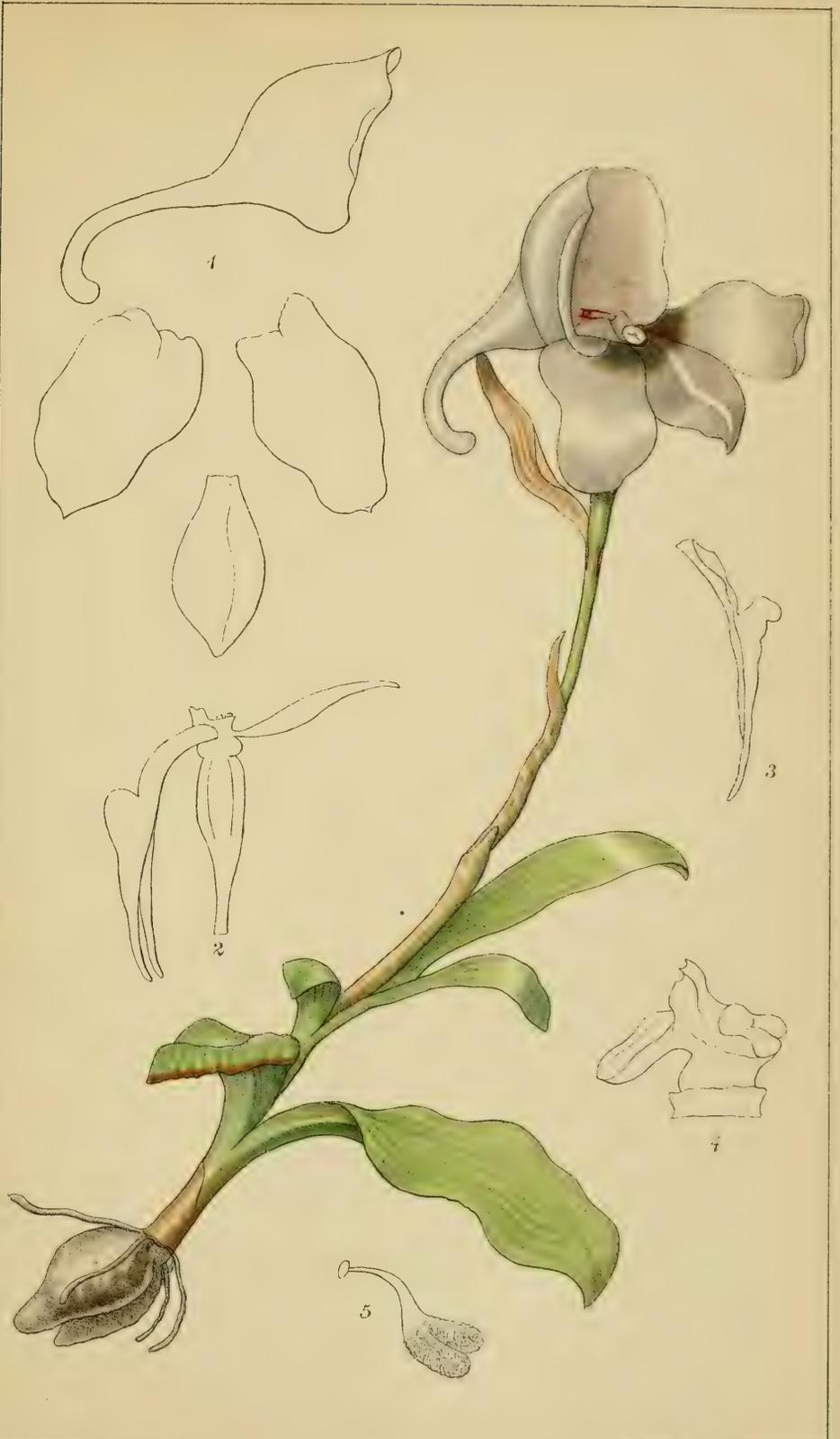


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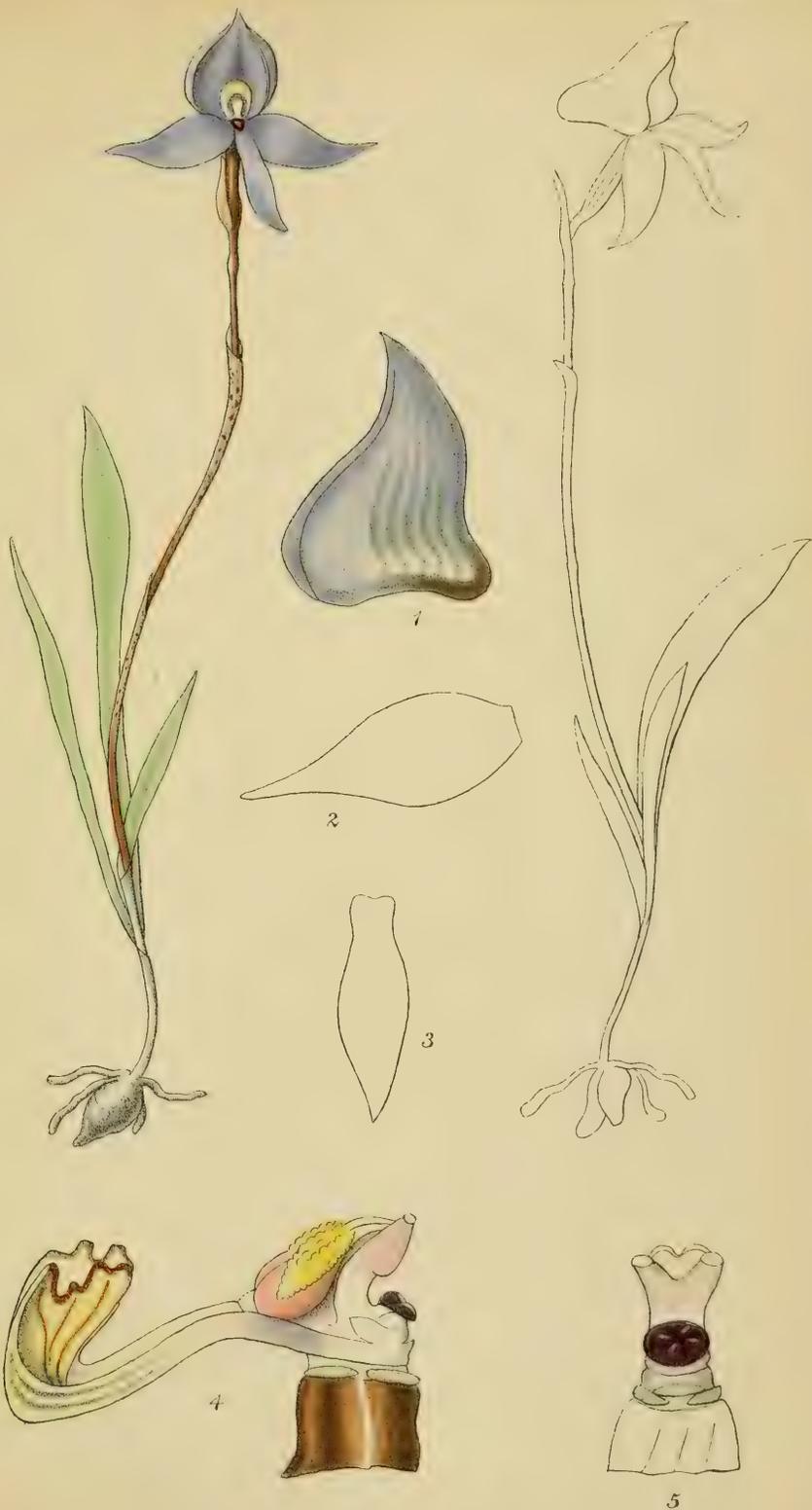




DISA OCELLATA, Bolus.



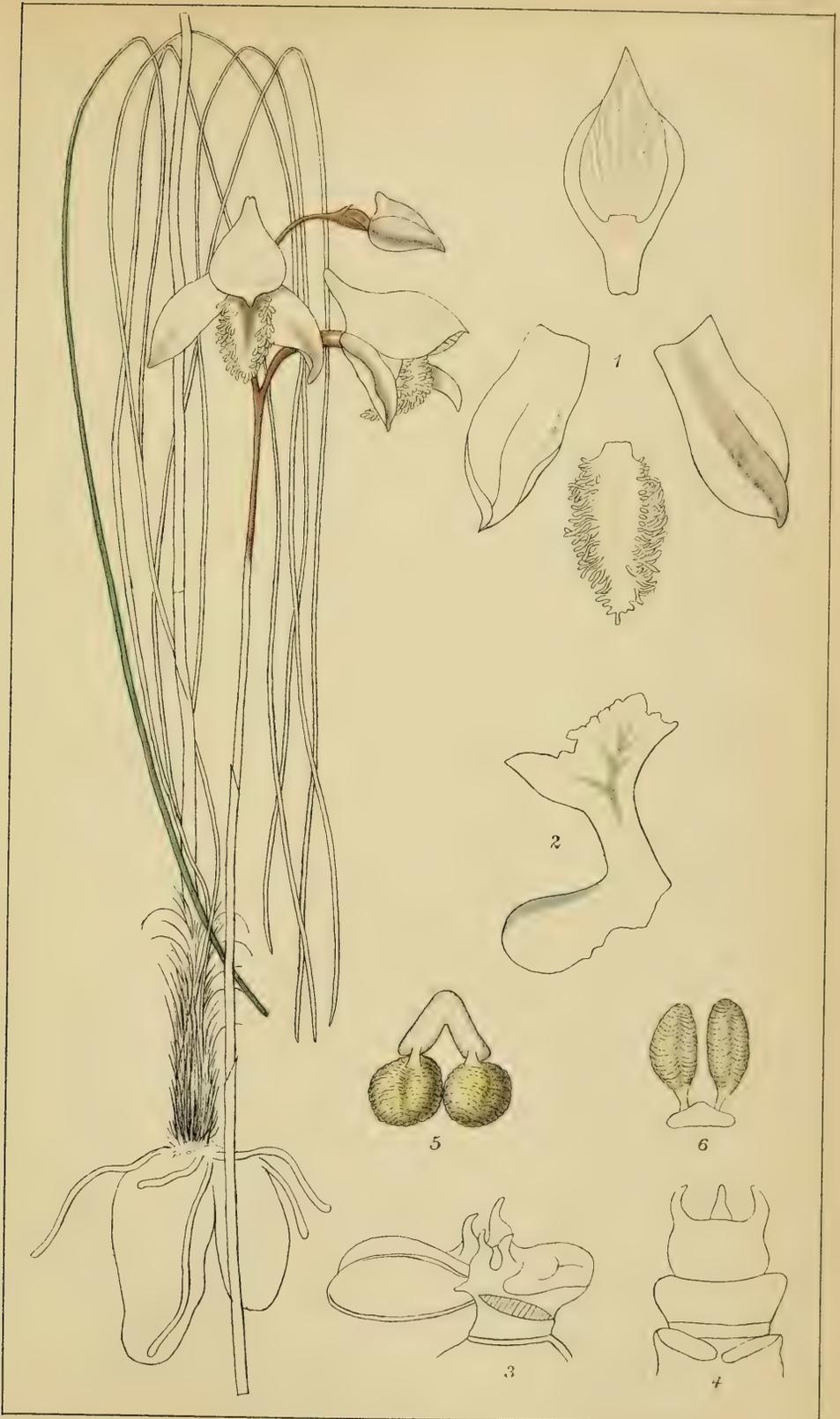
DISA LONGICORNIS, THUNB.



H. Bolus del. 1.11.'82.

Hanhart imp

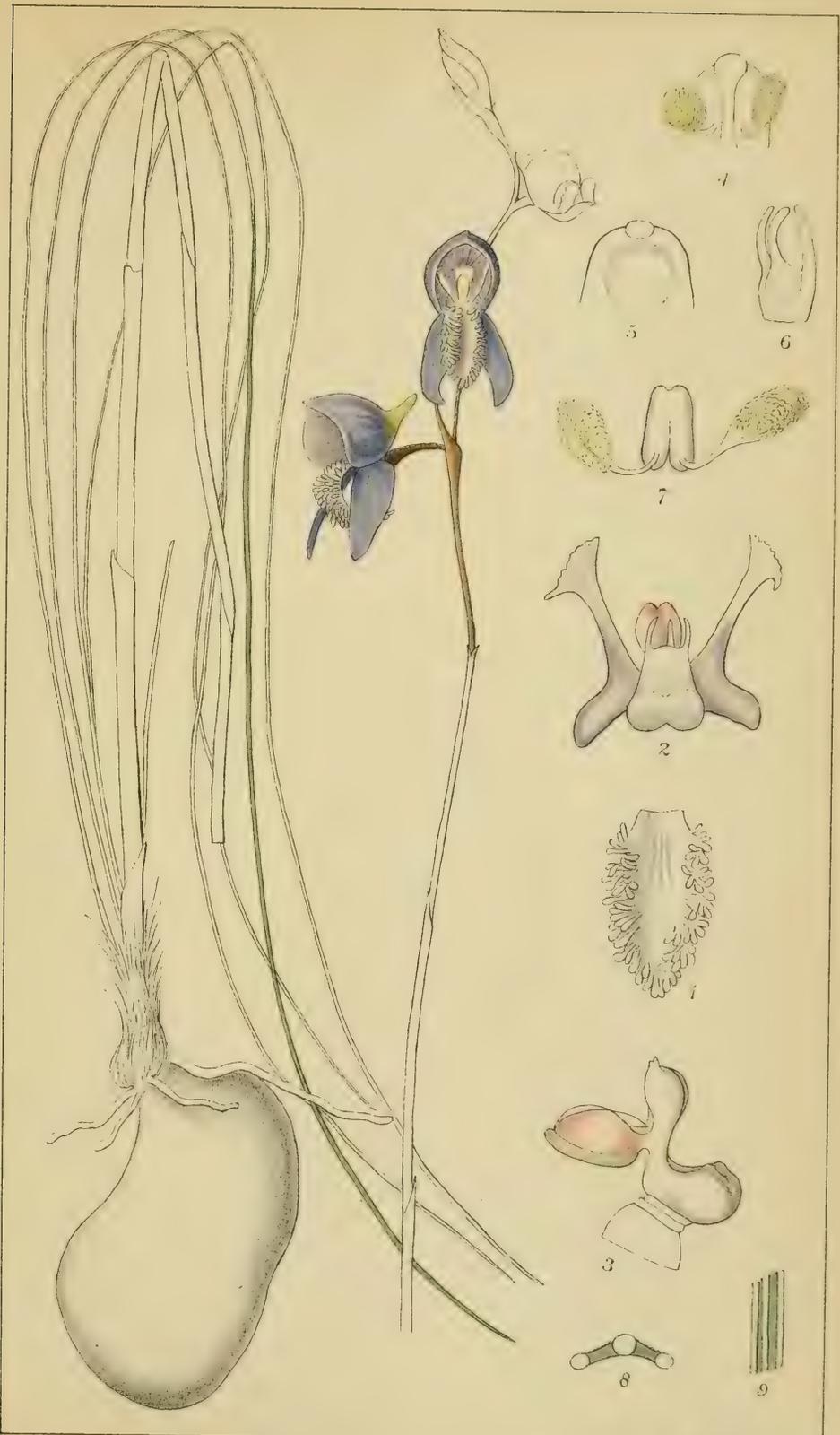
DISA MACULATA, LINN. F.



Bolus del. 8.10.'82.

Hanhart imp.

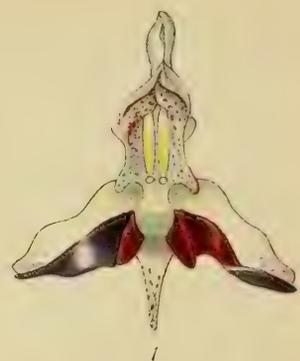
DISA BARBATA, SWARTZ.



H. Bolus del. Oct. 1880.

Hanhart imp.

DISA (Herschelia) VENUSTA, Bolus.



1



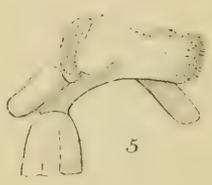
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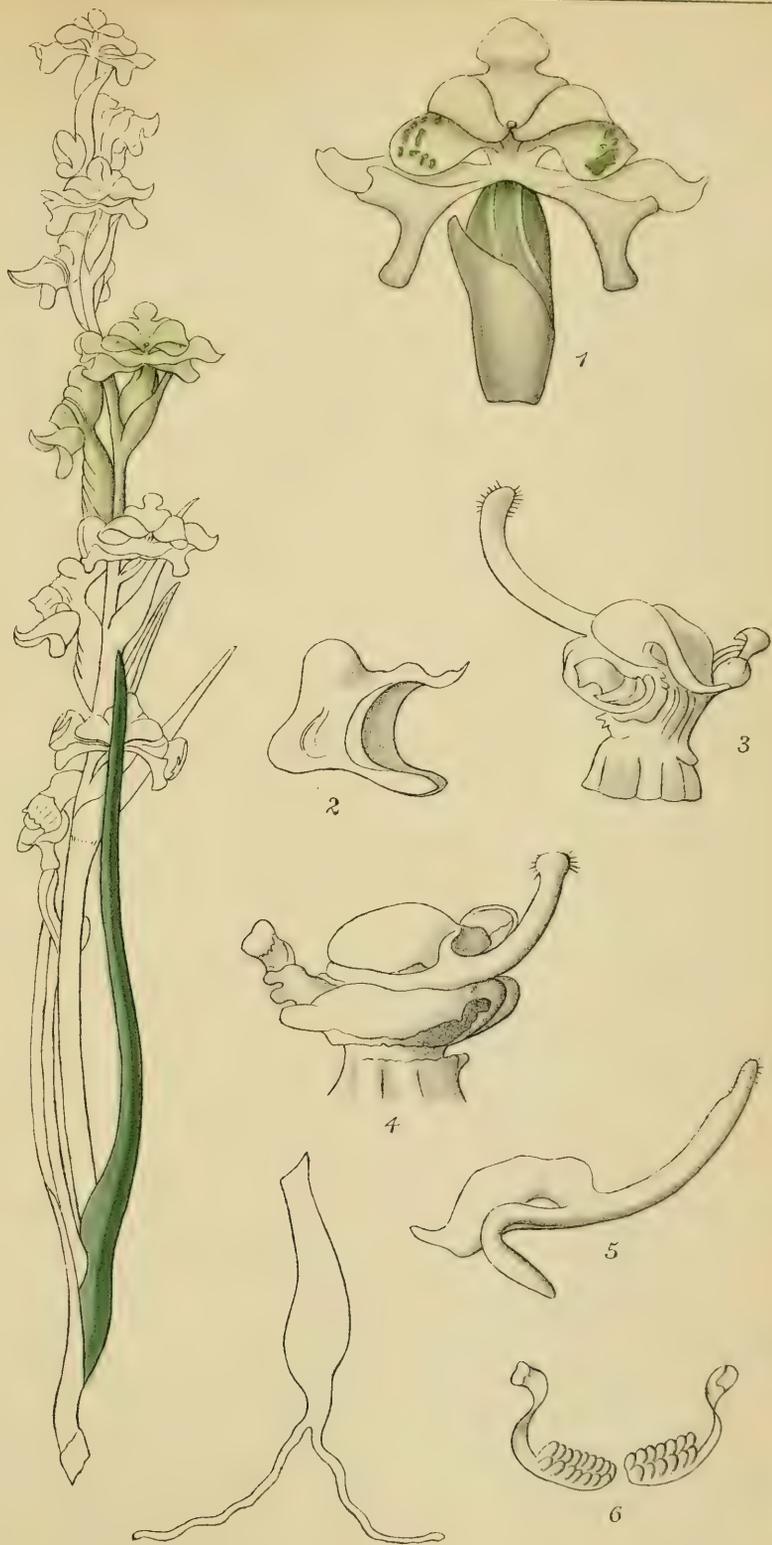


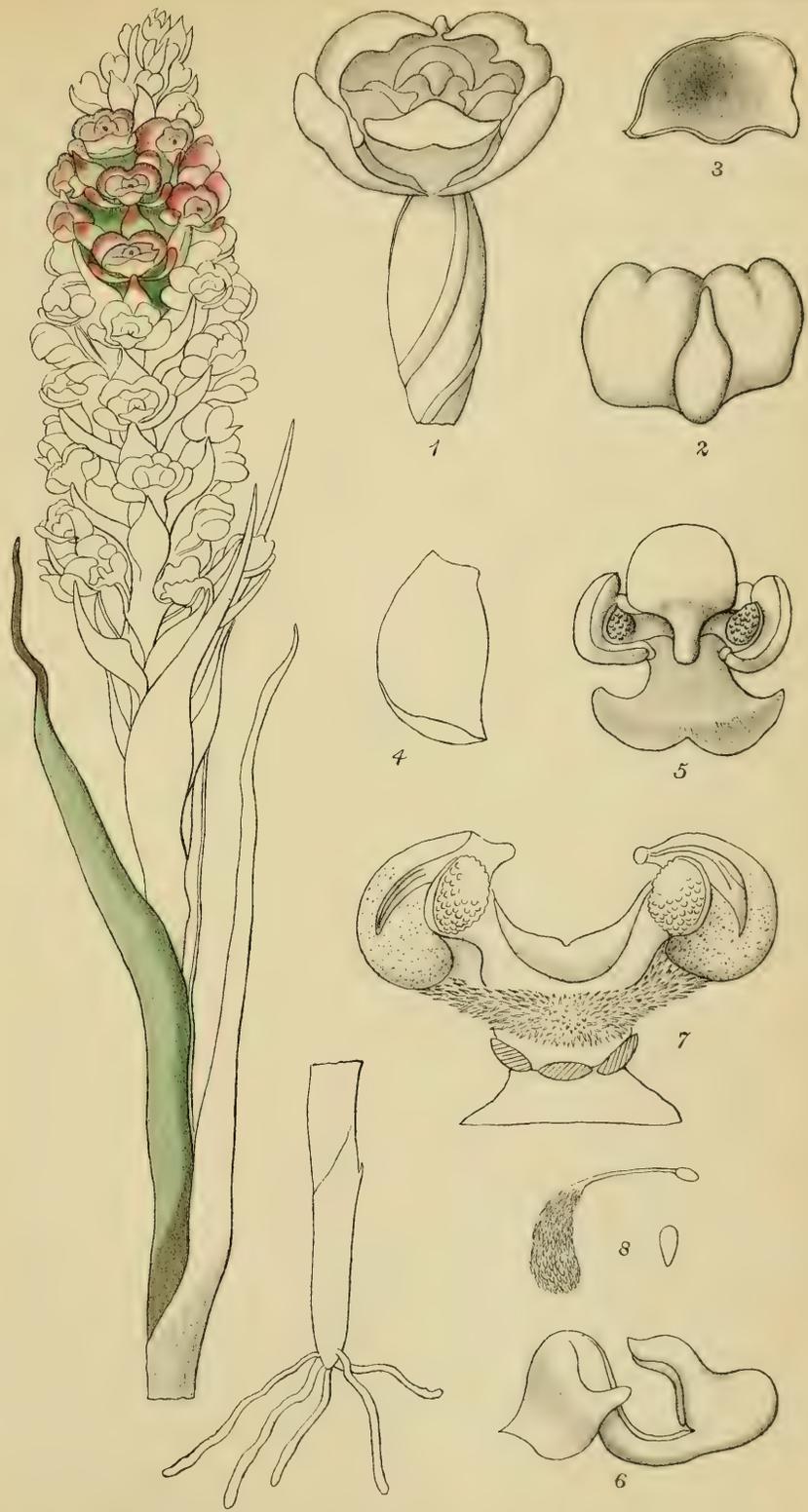
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Bolus del. et sculp.

Hort. bot. imp. Vind.

DISA ATRICAPILLA, Bolus.





Holus del. 30.11.82.

Hanhart imp

PTERYGODIUM CARNOSUM, LINDL.



H. Bolus, del. 9.11.'84

Hanhart imp.

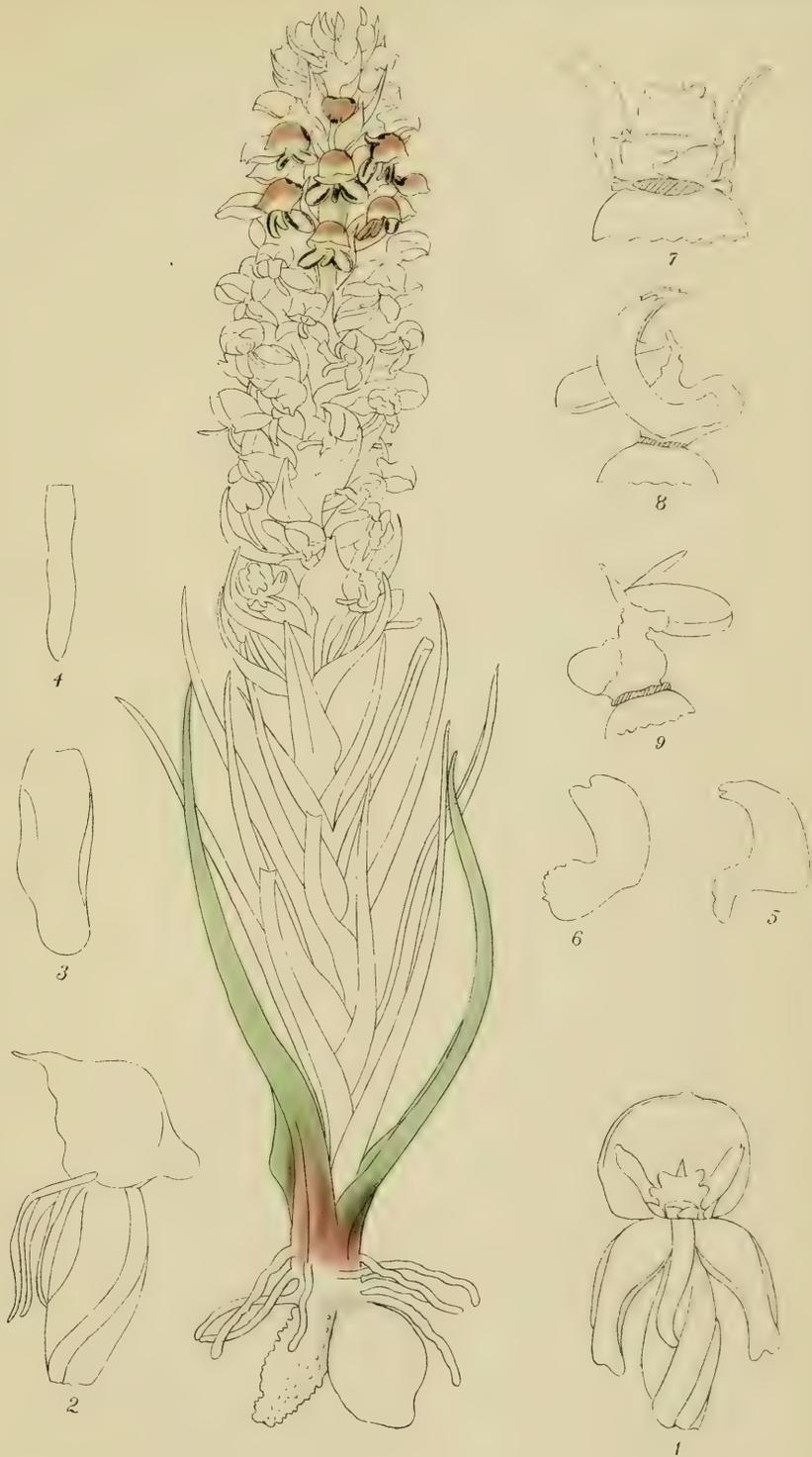
DISA BODKINI, Bolus.



Bolus, del. 21.10.84

Hanhart, imp.

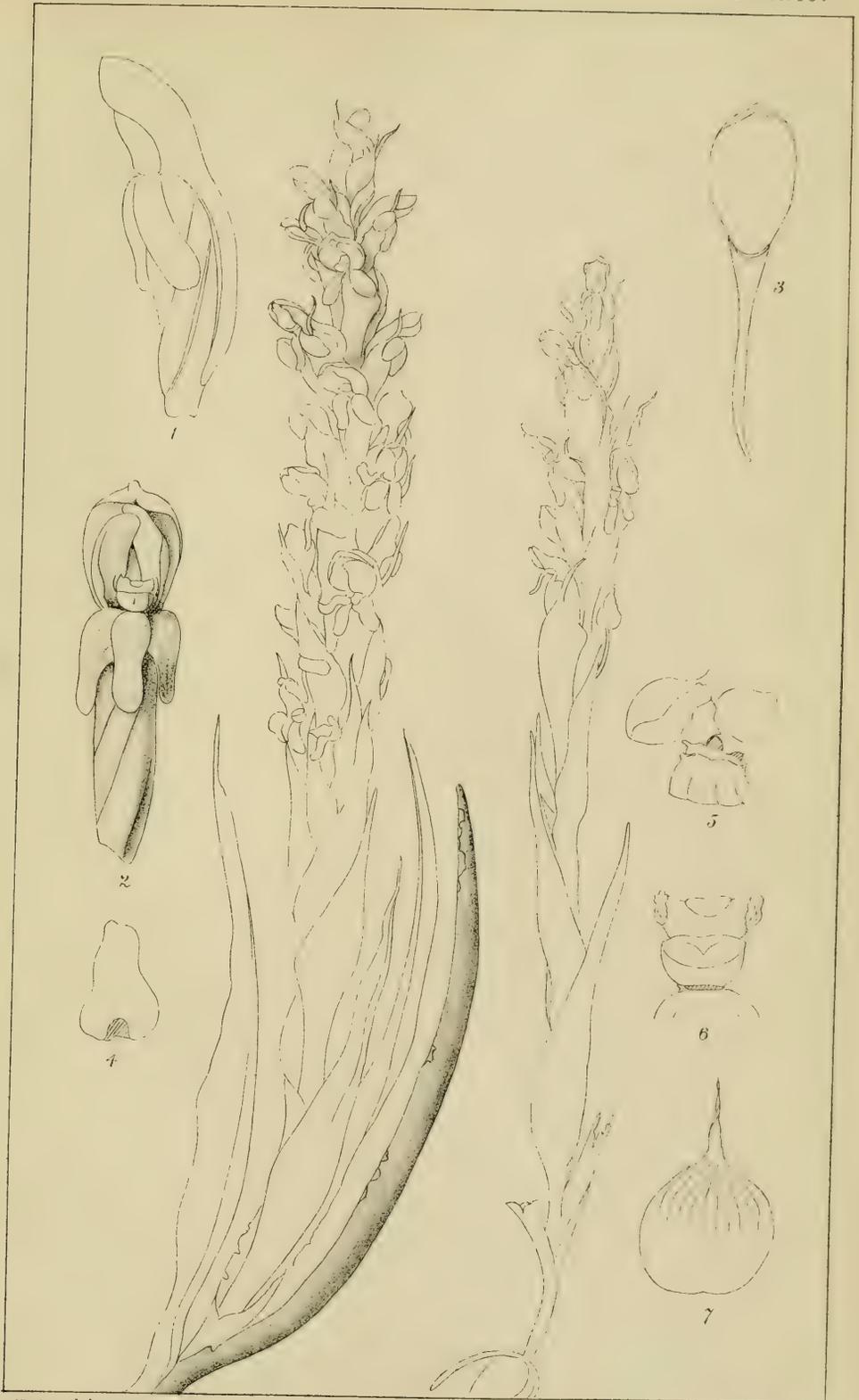
DISA TENUICORNIS, Bolus.



H. Bolus. del. s. 12. 1881.

Hanhart imp

DISA TABULARIS, SOND.



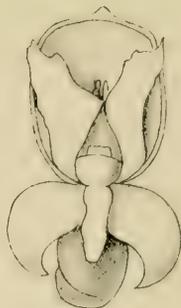
Bolus. del. 21. 12. 84.

Hannart imp.

DISA RETICULATA, Bolus.



1



2



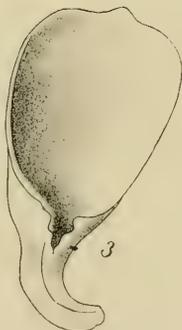
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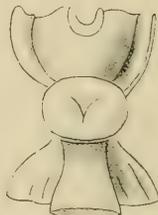
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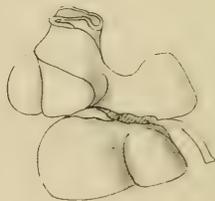
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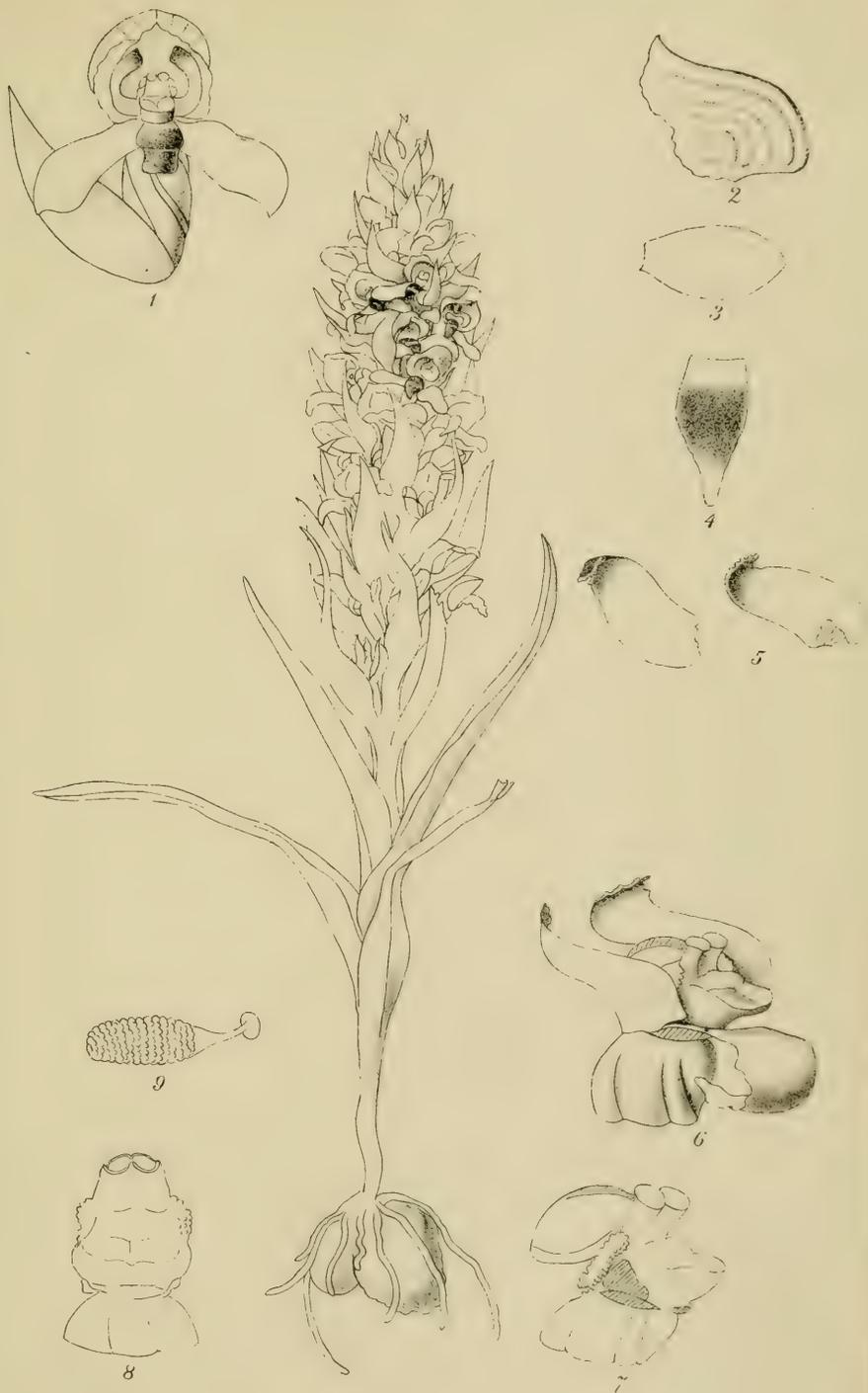


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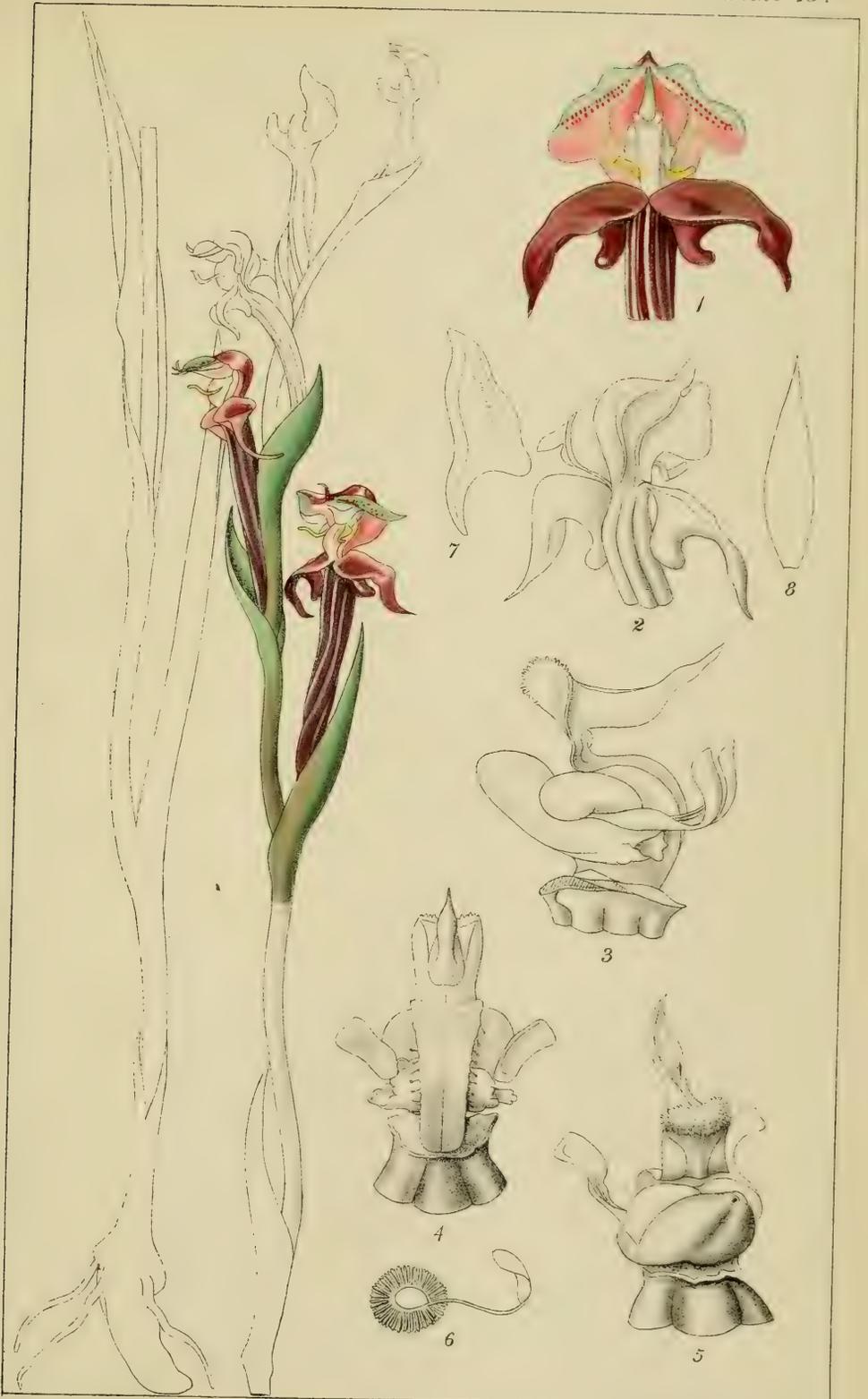
DISA PYGMÆA, Bolus.



H. Bolus. del. 13. 9 '85

DISA LINEATA, Bolus.

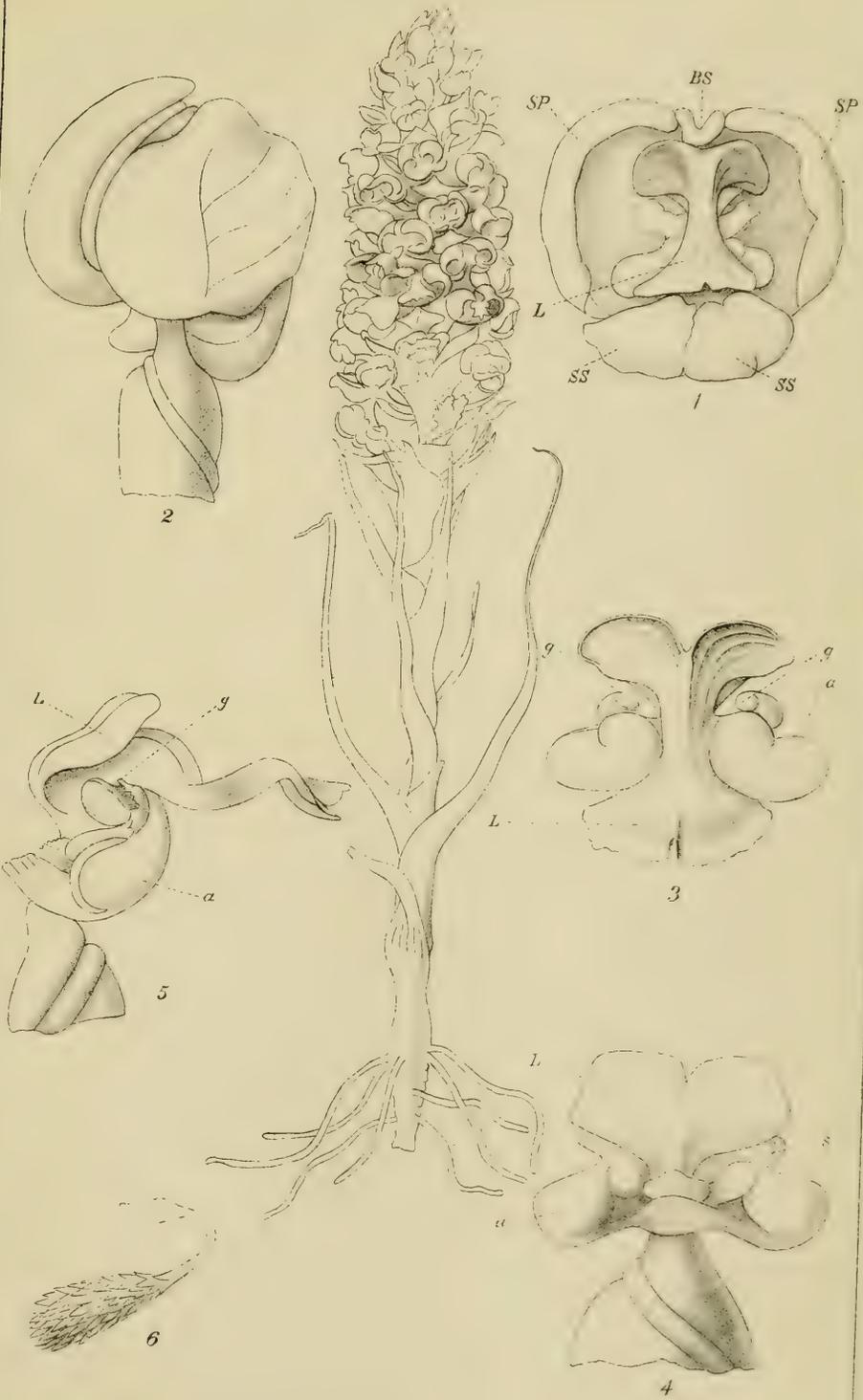
Hanhart imp.

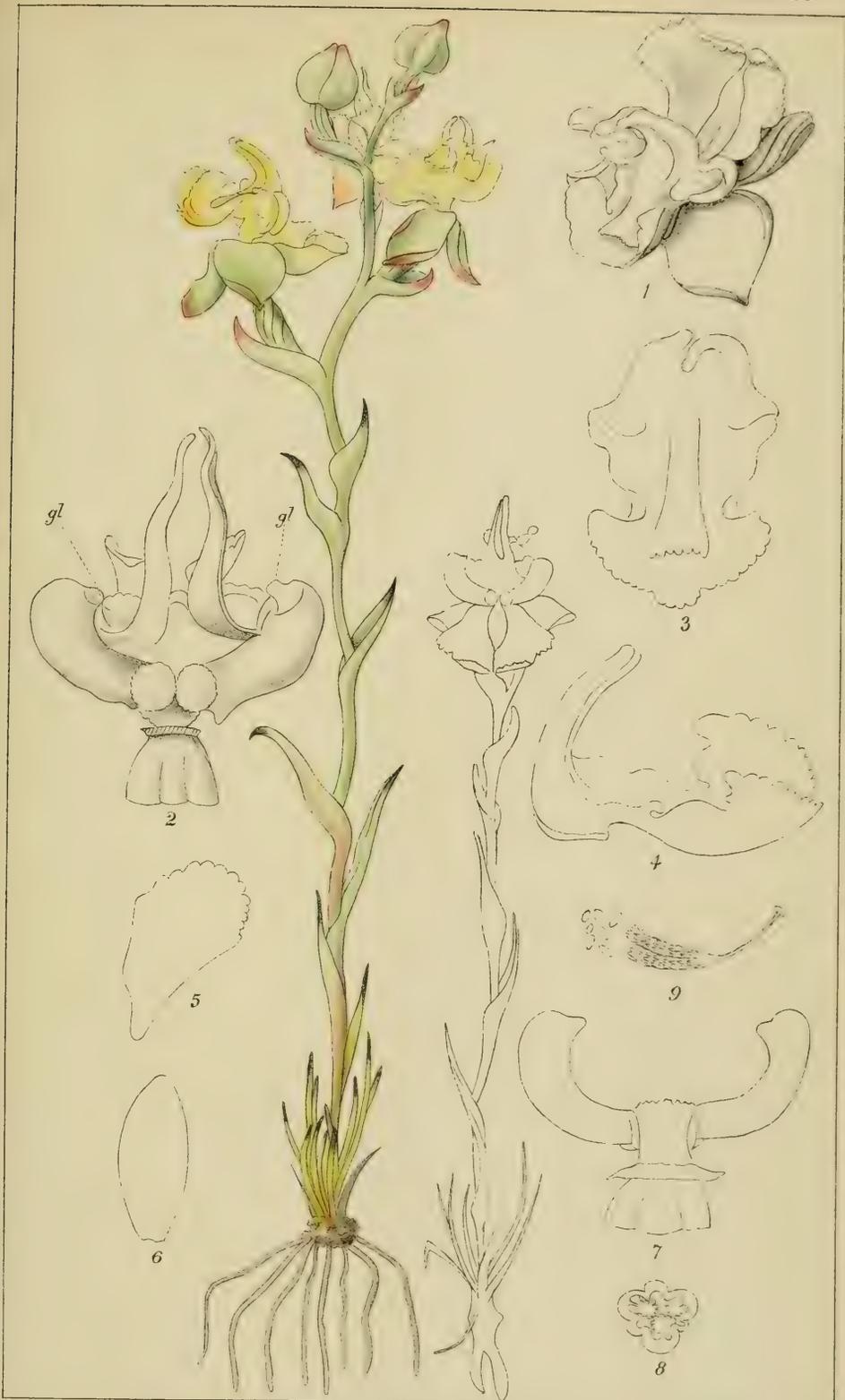


Bolus del. 30.11.'84.

Hanhart, imp.

DISPERIS PALUDOSA, HARV.

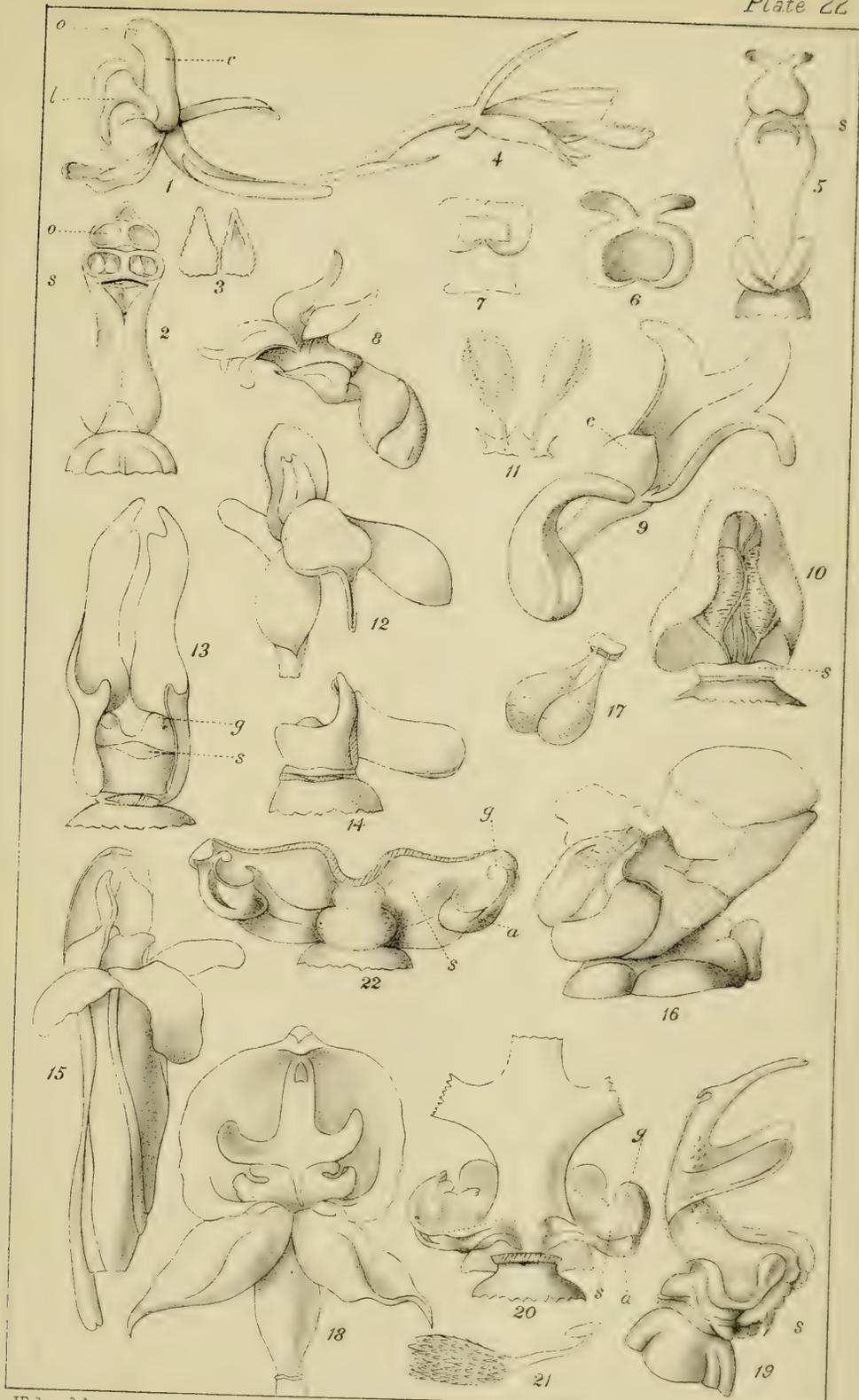




Holus, del. 20.12.'84.

Hanhart, imp.

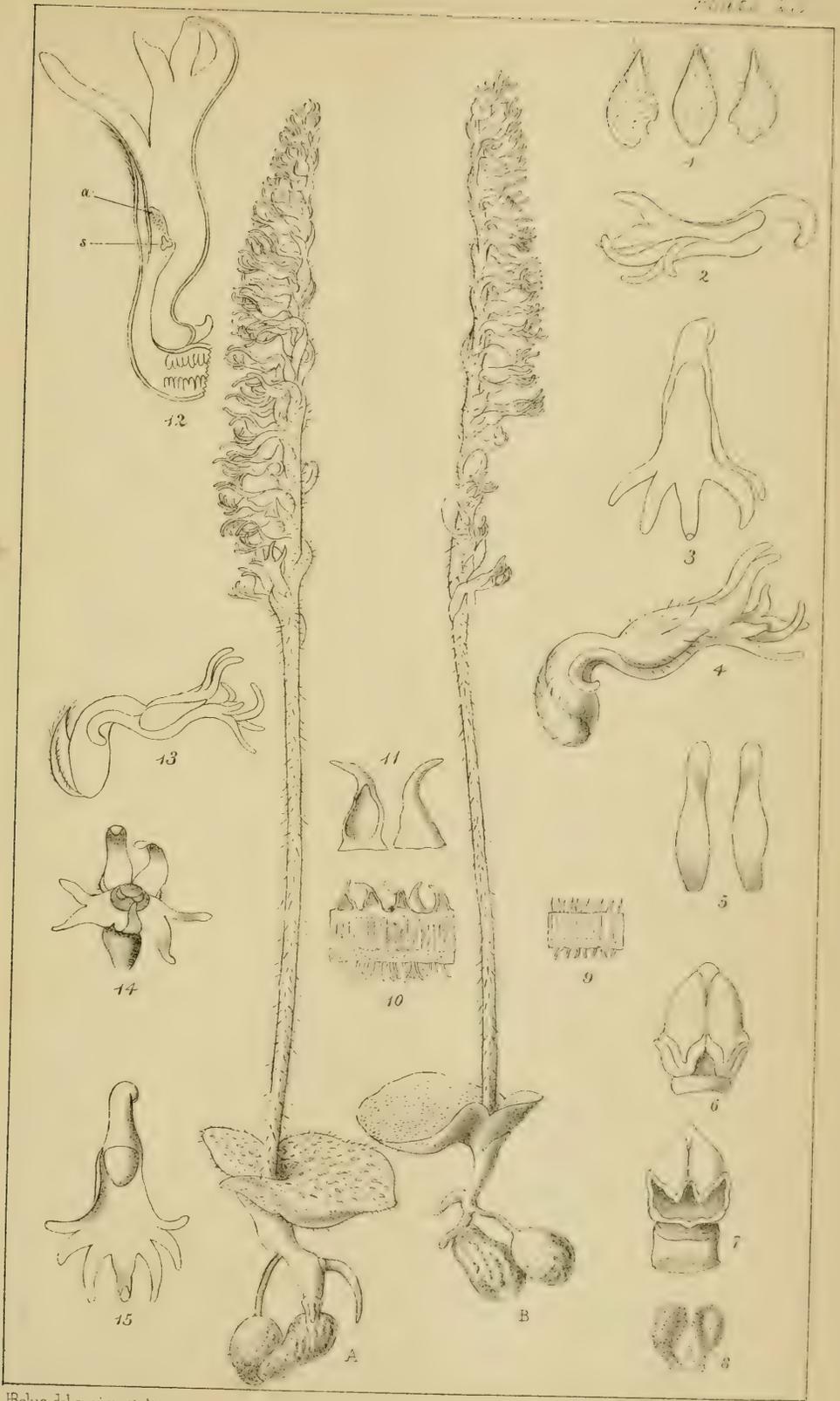
CERATANDRA BICOLOR, SOND.



Holus del. 1885

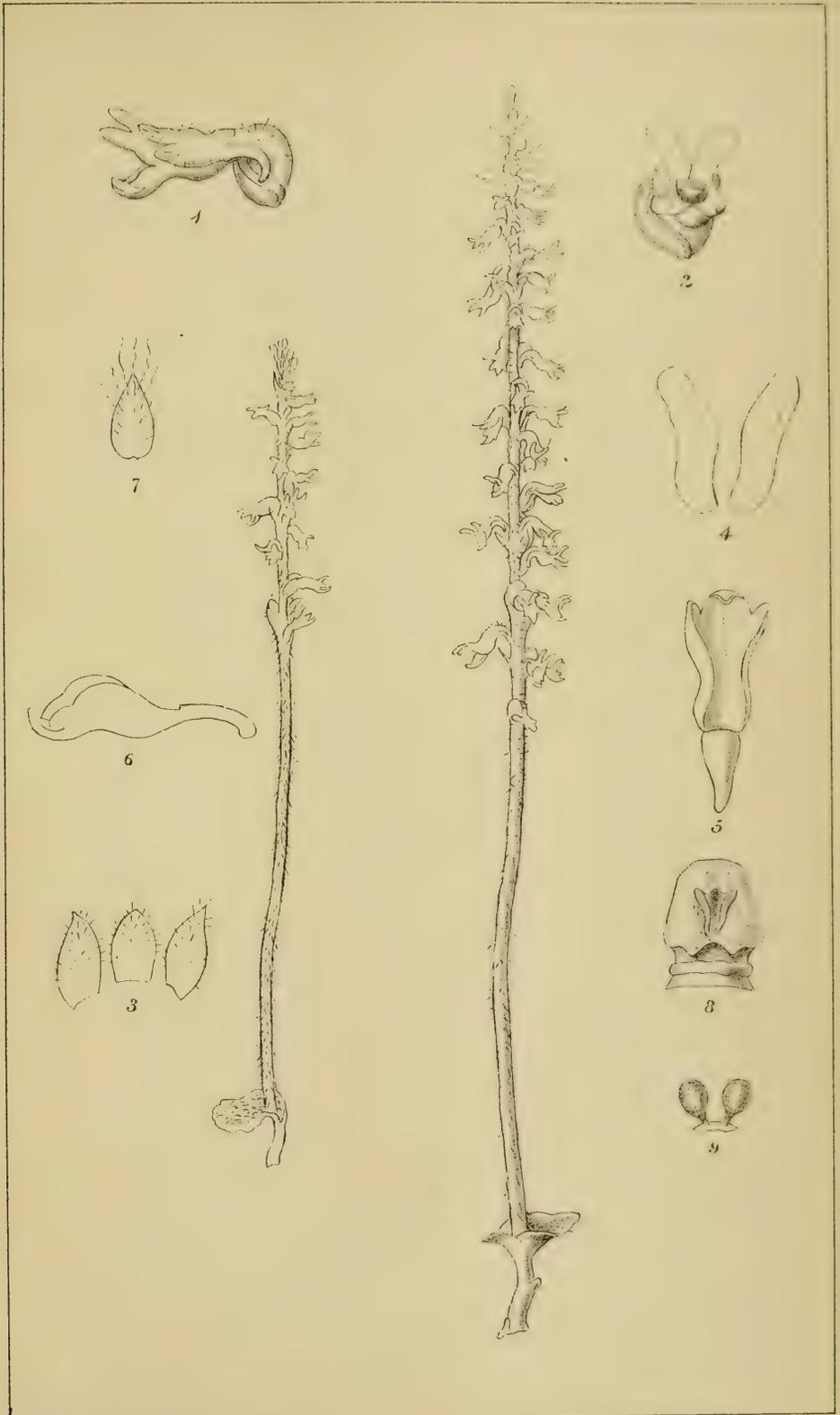
Fischart imp

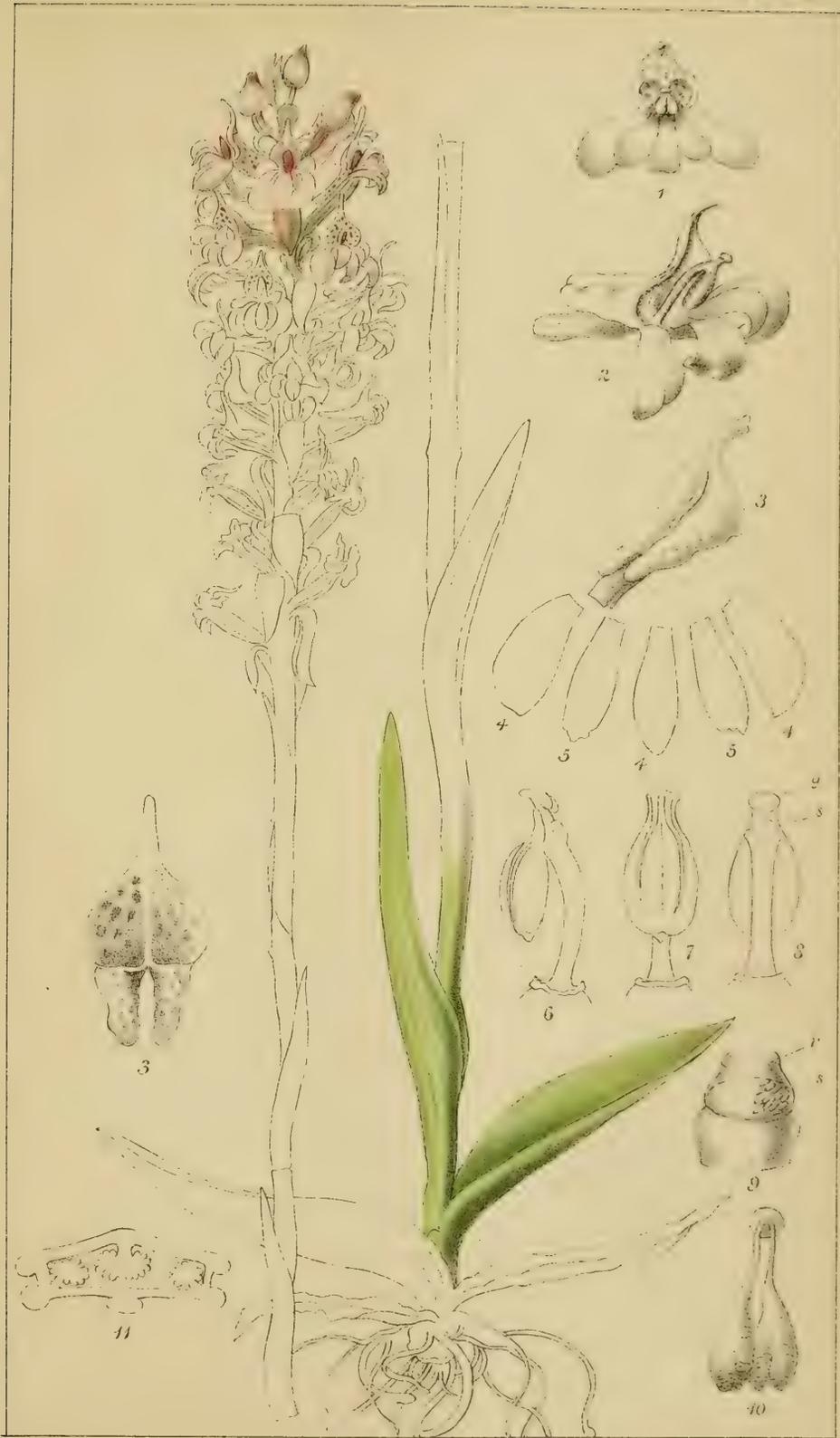
SOUTH AFRICAN ORCHIDÆ.



Bolus de lex vivo. 26 x 85.

HOLOTHRIX SQUAMULOSA, LINDLEY.

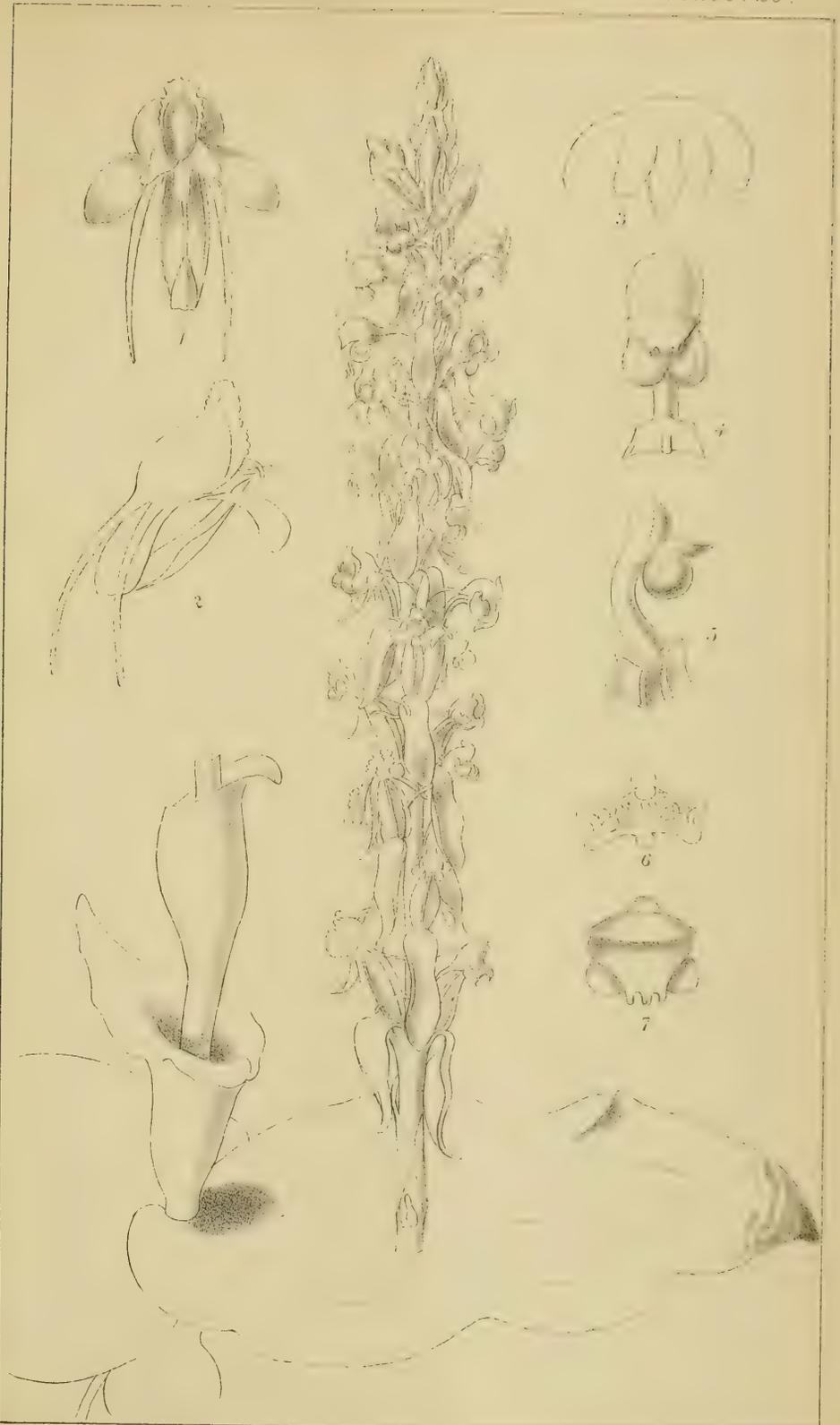




Bolus, del. 20.12.84.

Hanhart intp.

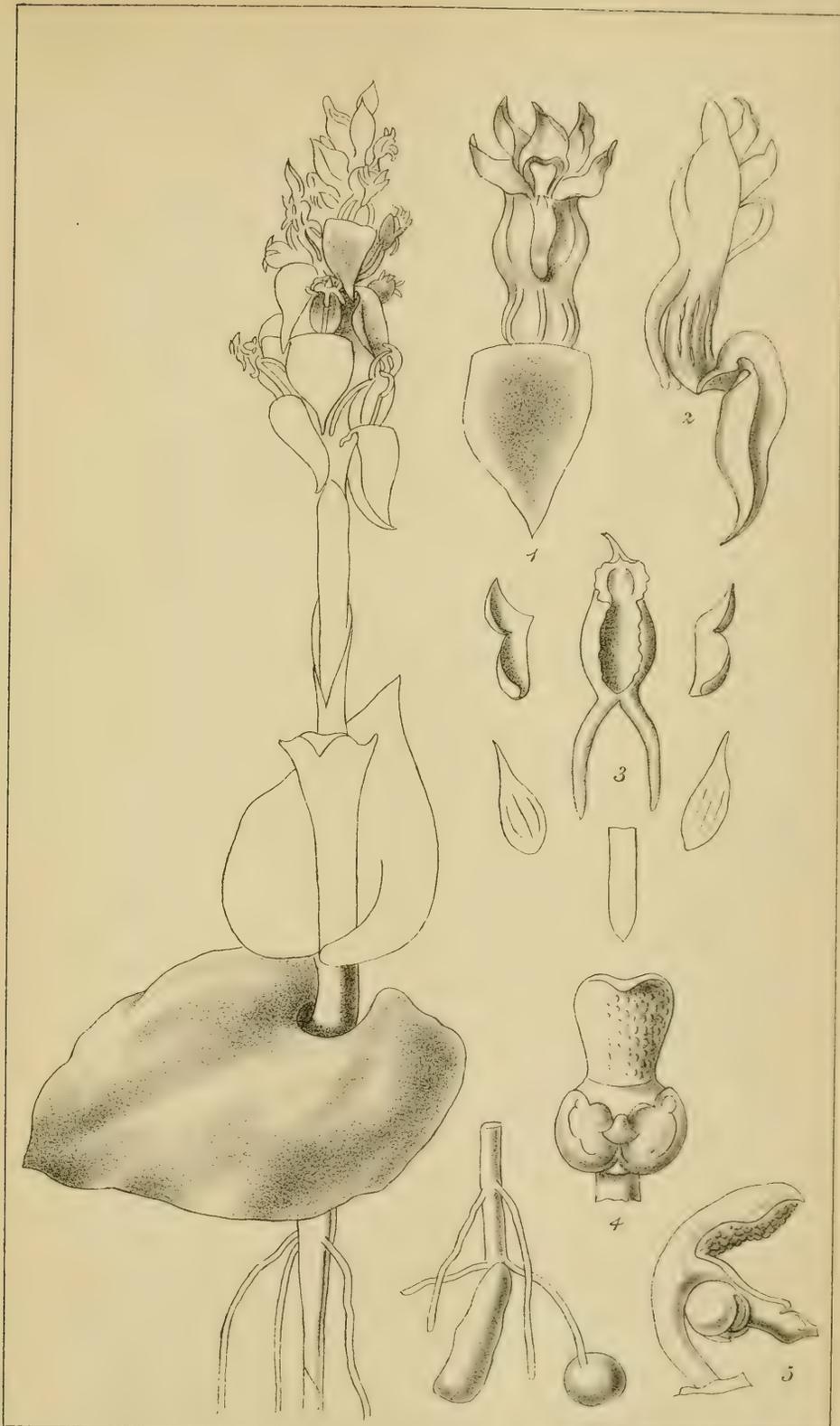
SATYRIUM RHYNCANTHUM, BOLUS.



Bolus, del. g. 10' 84.

Hanhart imp.

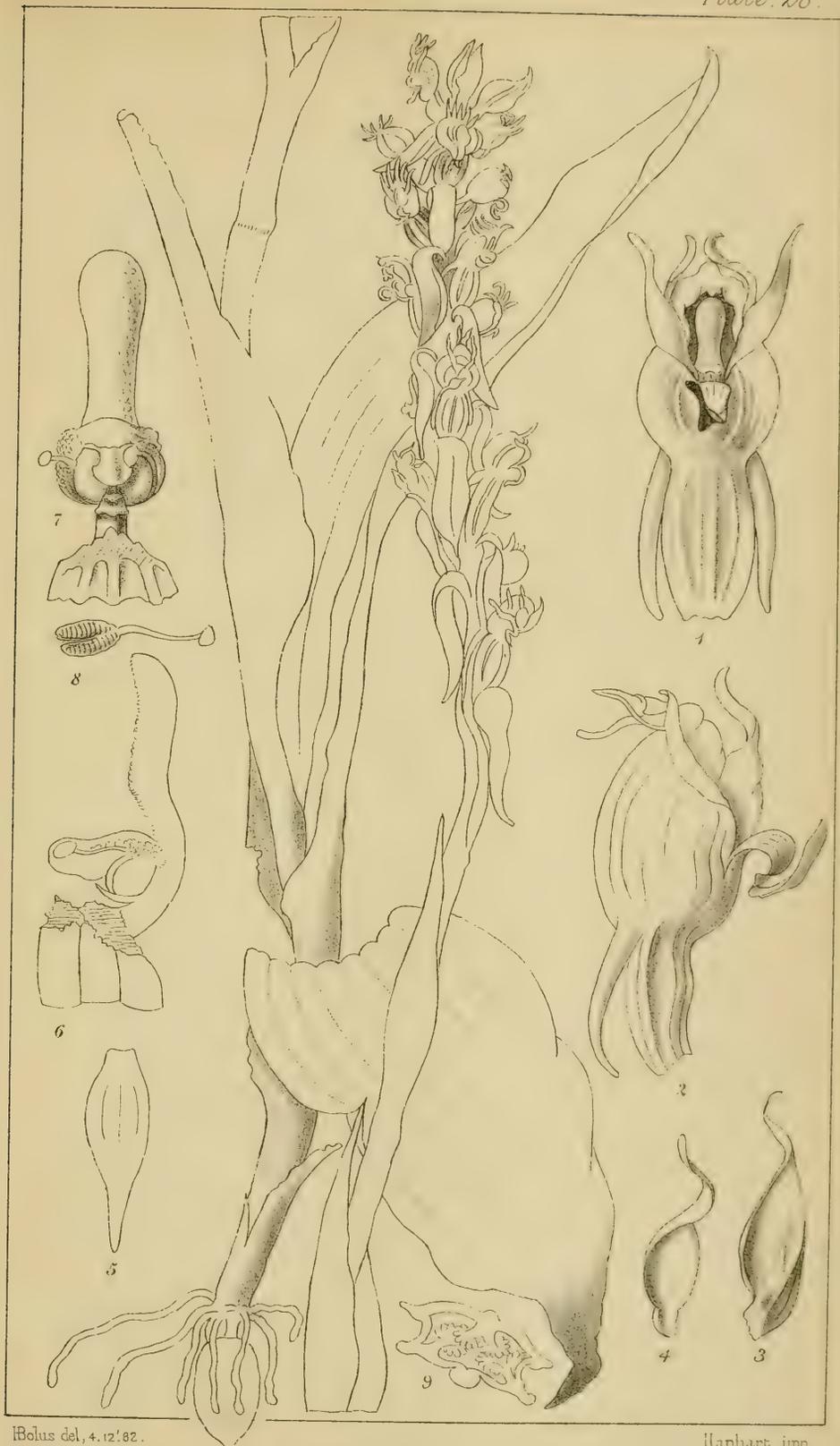
SATYRIUM OCHROLEUCUM, BOLUS.



Bolus del, 26. 9. '82.

Hanhart imp.

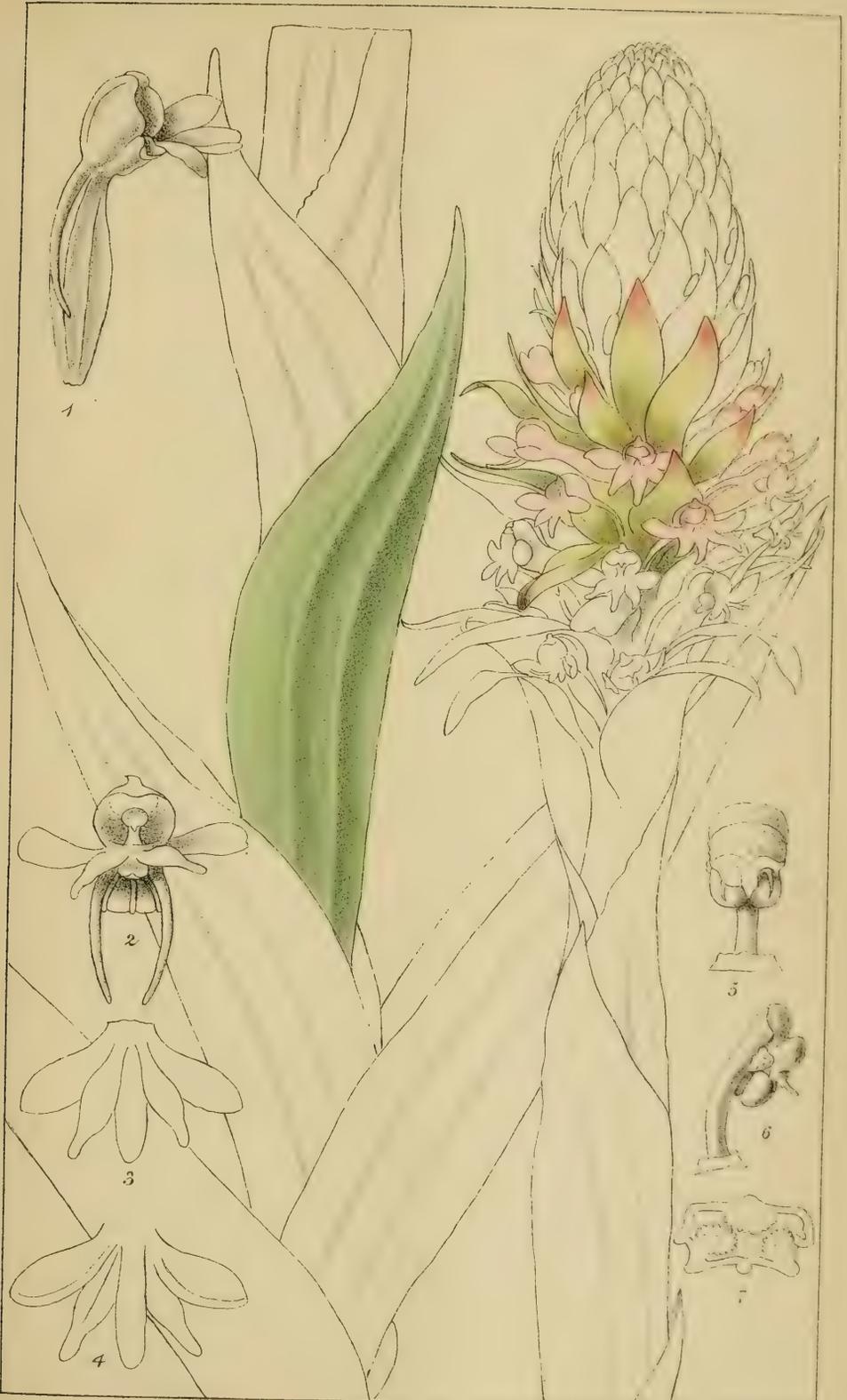
SATYRIUM EMARCIDUM, BOLUS.



Holus del, 4. 12. 82.

Hanhart imp.

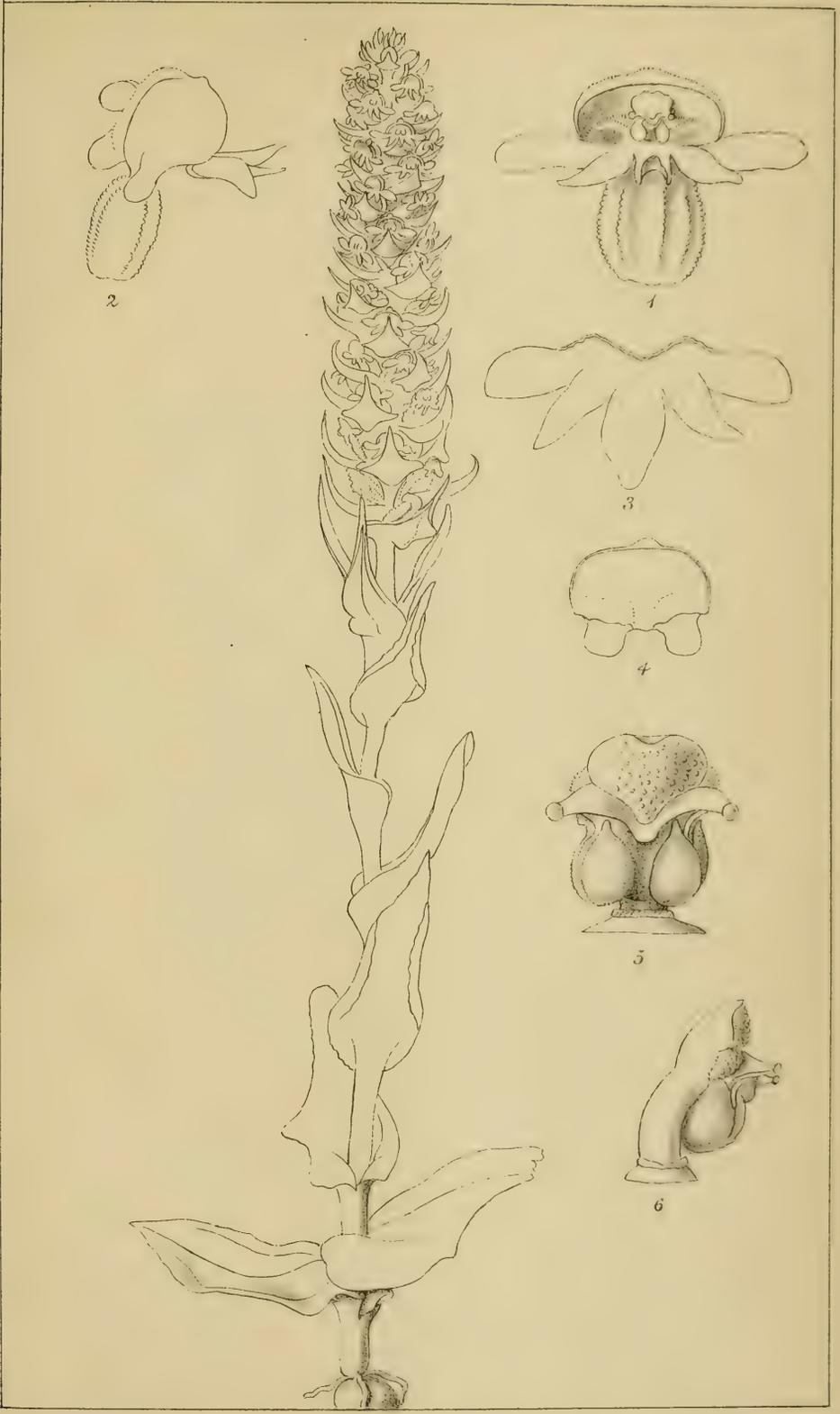
SATYRIUM LIGULATUM, LINDLEY.



Bolus del., ex vivo. 30. 12. 1886.

SATYRIUM HALLACKII, BOLUS.

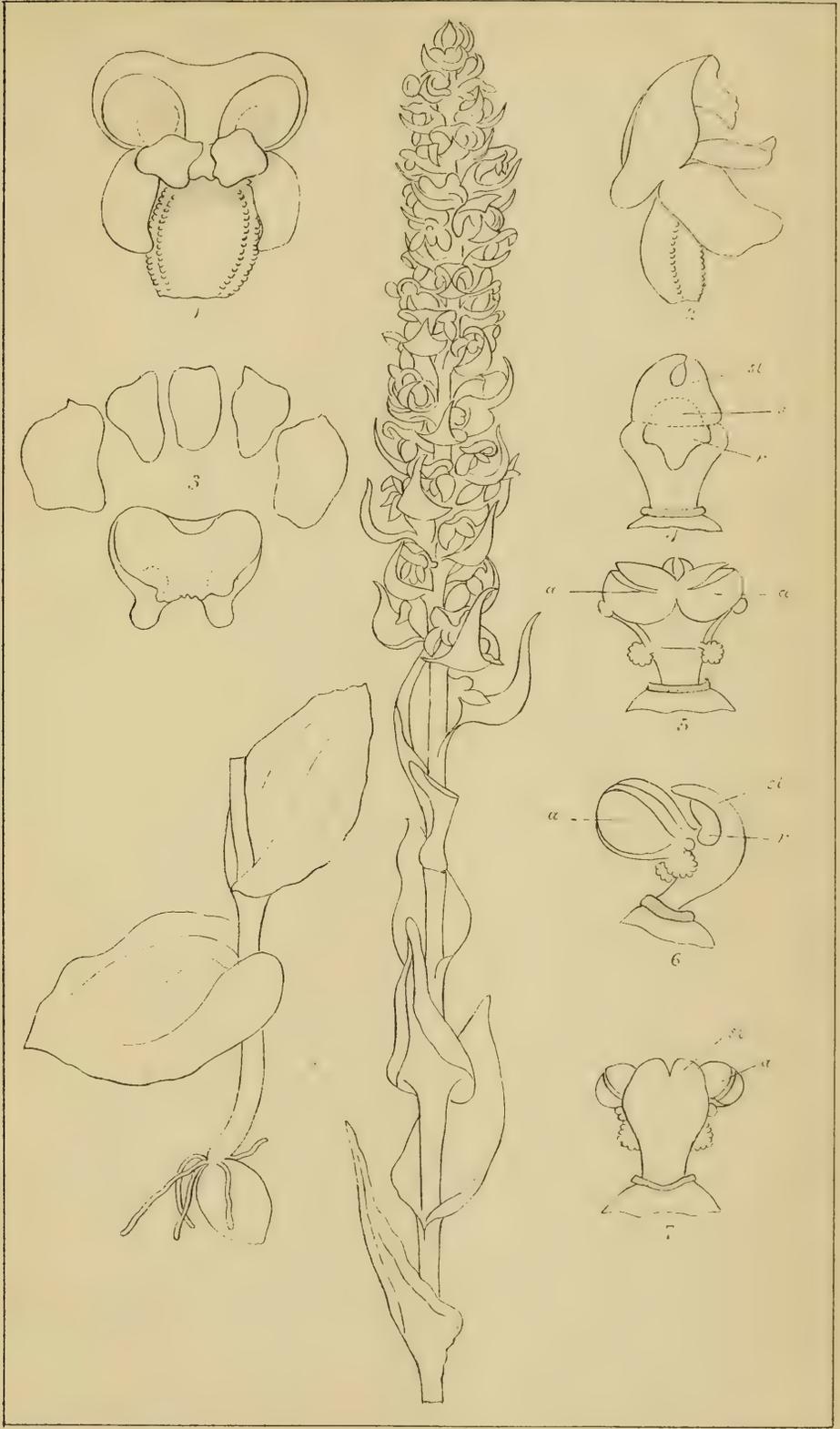
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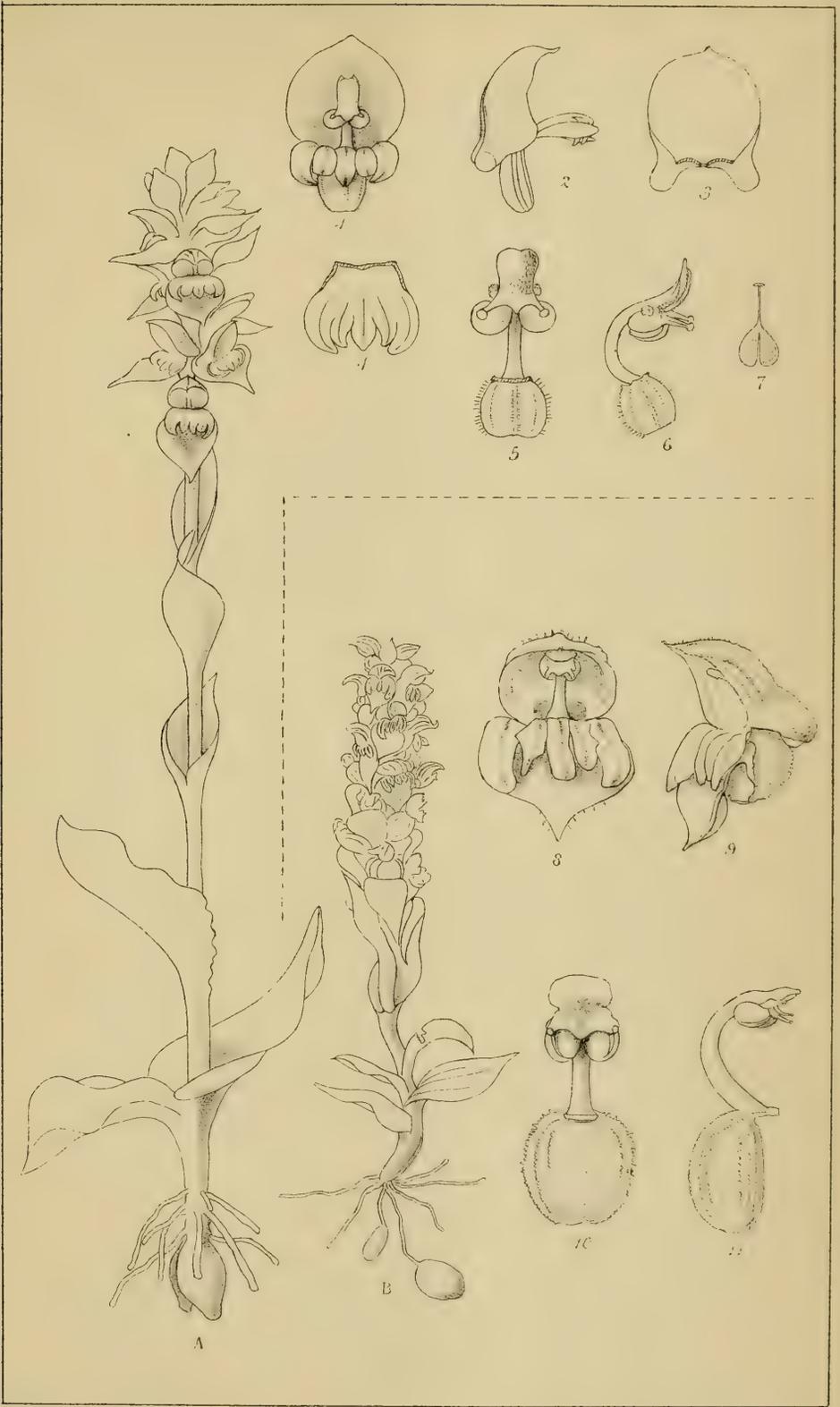
Bolus, del. ex vivo. 2. XI. 1895.

Hanhart imp.

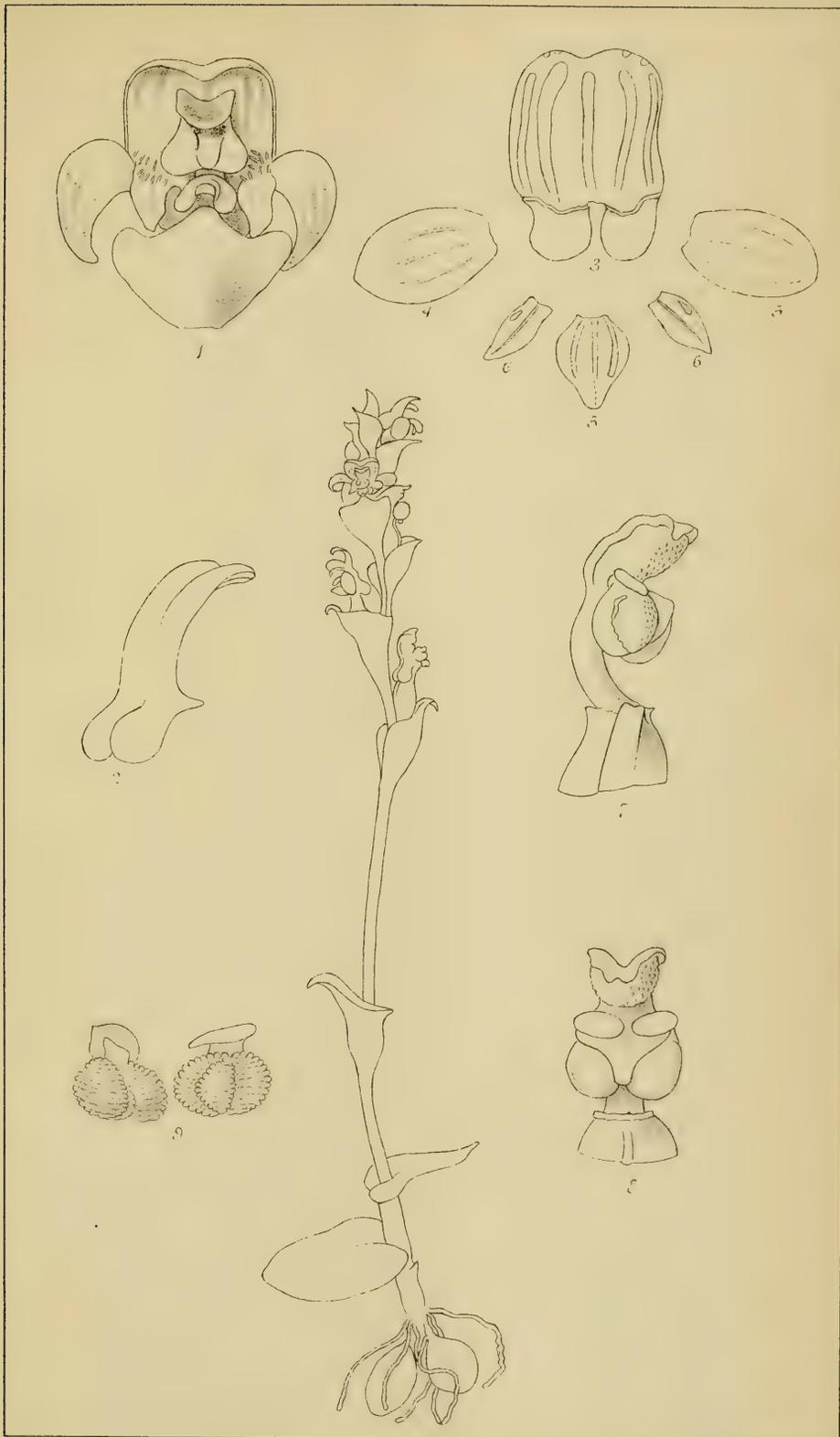
SATYRIUM LINDLEYANUM, BOLUS.



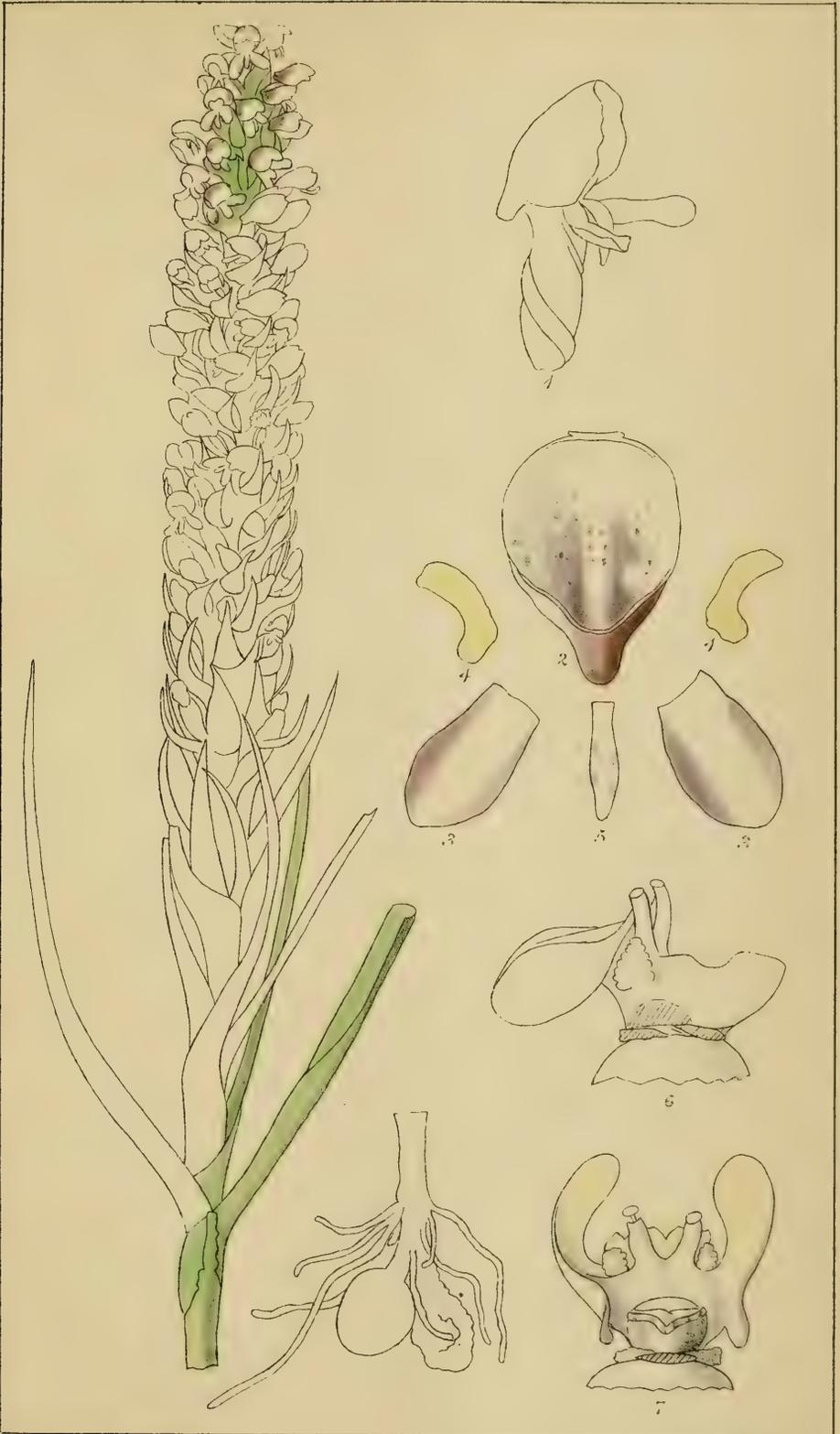
SATYRIUM BICALLOSUM, THUNBERG.



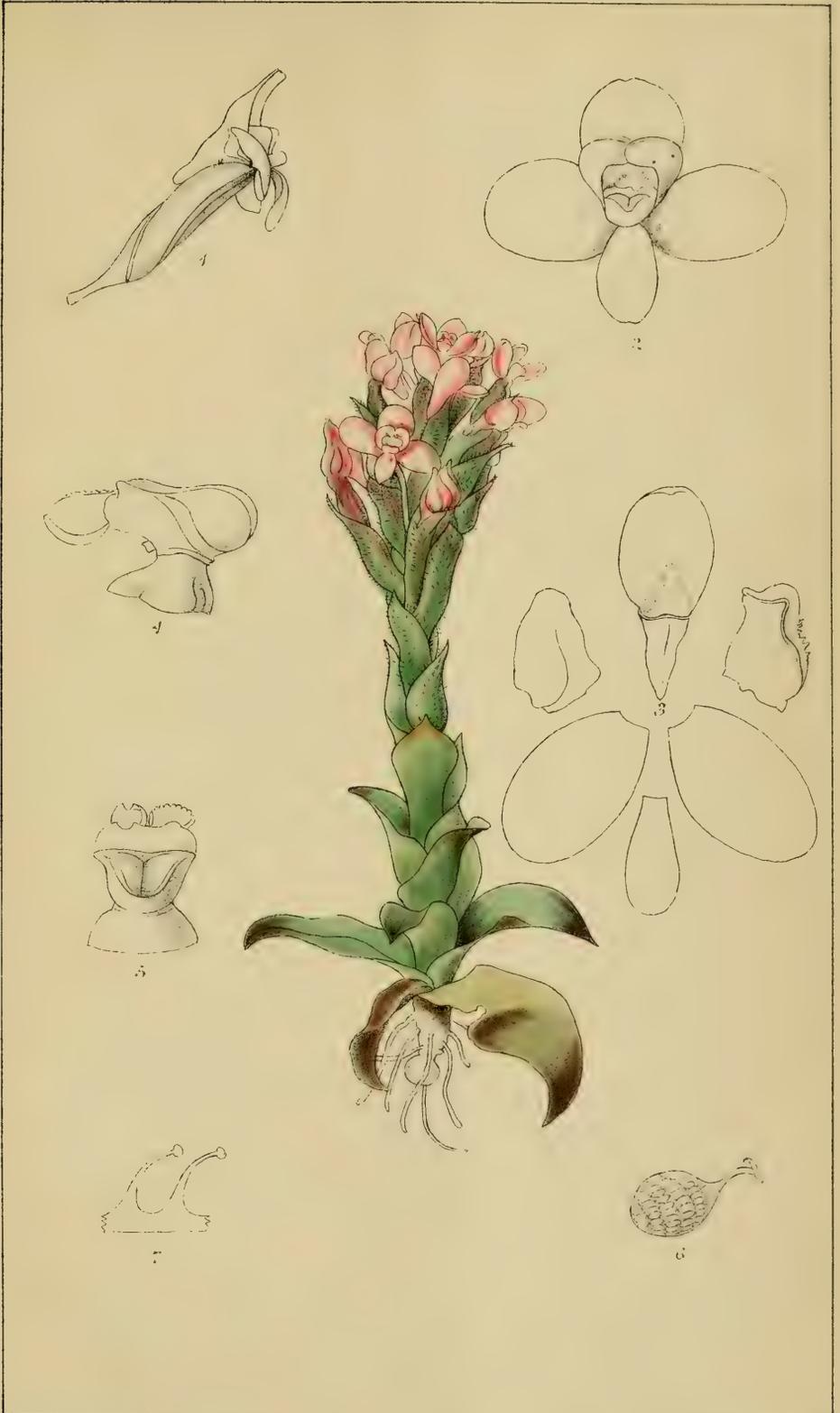
SATYRIUM BRACTEATUM, THUNBERG.
A. var. lineatum. B. var. nanum.

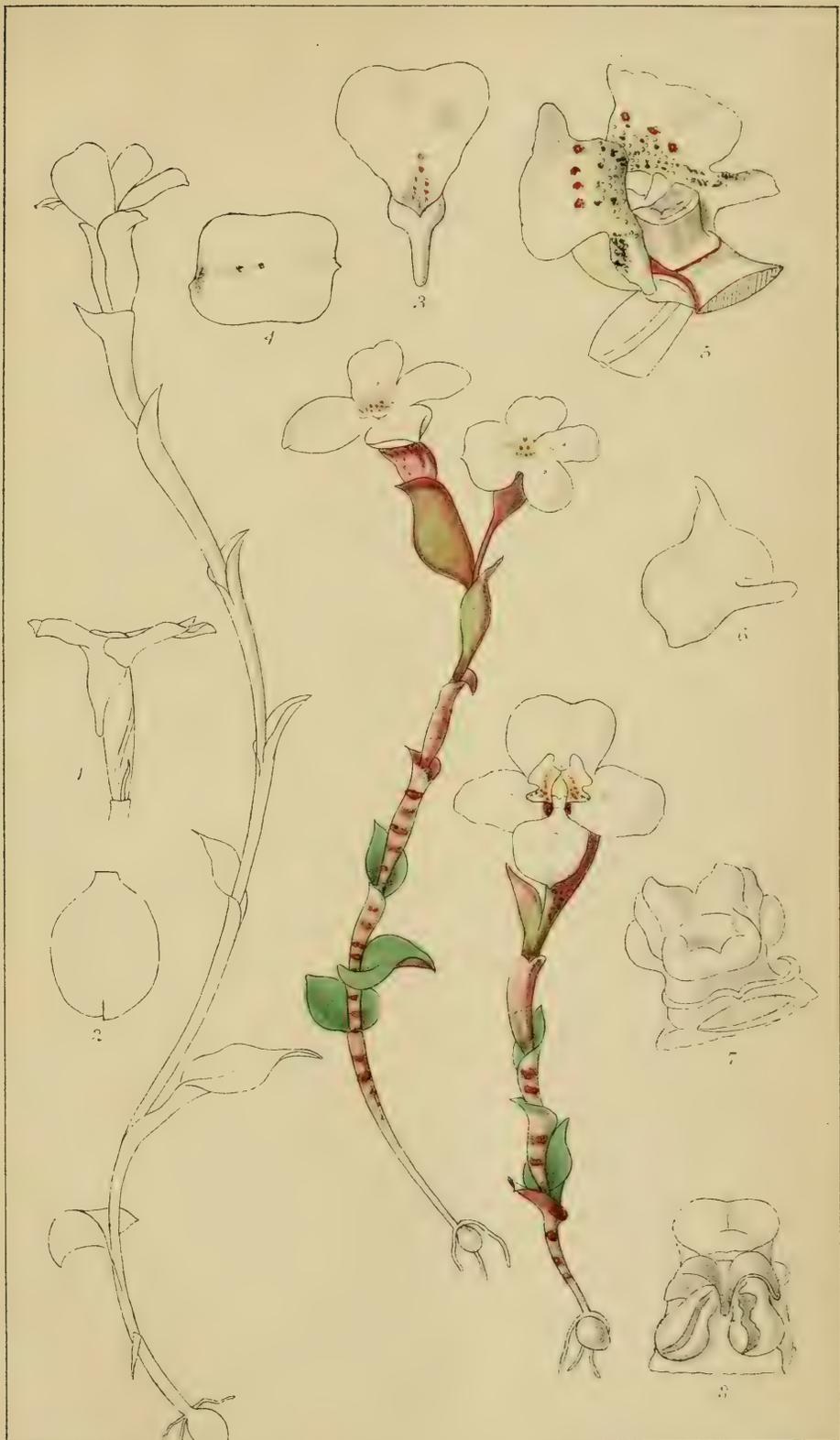


SATYRIUM STRIATUM THUNBERG.



DISA OBTUSA, LINDLEY





DISA FASCIATA, LINDLEY.



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96

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Bolus, Harry/The orchids of the Cape Pen



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