



AUSTRALIAN
ORCHIDS.

FITZGERALD.

A U S T R A L I A N O R C H I D S .

BY

R. D. FITZGERALD, F.L.S.

VOLUME I.



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THIS WORK
ON THE
AUSTRALIAN ORCHIDS

IS

Dedicated to the Memory

OF THE LATE

CHARLES DARWIN,

AS A TOKEN OF

THE VENERATION IN WHICH THAT GREAT NATURALIST AND FEARLESS EXPOUNDER OF SCIENCE IS HELD

BY

THE AUTHOR.





SYNOPSIS.

Genus.	By whom named.	Where and when named.	Colony.	Species.	Why so named.	By whom named.	Where and when named.	Colony.	How fertilized, by insects or self.	Terrestrial or Epiphytal.	Australian Orchids.			
											Vol.	Part.	No. of Plate.	
Acianthus ακη (akē) a point and ανθος (anthos) a flower.	R. Brown	Prodromus 1810.	N.S.W., V., S.A., Q., T.	caudatus ...	Tailed, from the length of the petals and sepals.	R. Brown	Prod., 321, 1810	N.S.W., T. ...	Ina. ...	Terres..	I	7	9	
				exsertus.....	Protruding, from the bending forward of the column.	"	"	N.S.W., V., S.A., W.A.	"	"	"	I	1	5
				fornicatus ...	Forked, from the form of the sepals.	"	"	N.S.W., Q. ...	"	"	"	I	1	5
Adenochilus	Hooker ...	1853	N.S.W.	Norteni.....	Norton's, discovered by James Norton, Sydney.	Fitzgerald	Aus. Orch., Vol. I, Part 2, 1876.	N.S.W.	"	Ter. near Epiphy.	I	2	2	
Bolbophyllum ... βολβος (bolbos) a bulb and φυλλον (phylon) a leaf.	Thouars...	Hist. des Plantes, Orchidées, t. 95, 1822.	N.S.W., Q. ...	Shepherdi ...	Shepherd's, named in honor of J. W. Shepherd, of Sydney.	Mueller ...	Frag., III, 40, 1862, dedicated, 1859.	N.S.W., Q. ...	"	Epiphy.	I	5	10	
Caladenia	R. Brown	Prod., 1810.	N.S.W., V., S.A., W.A., Q., T.	alba	White, from the colour of the flower.	R. Brown	Prod., 323, 1810	N.S.W.	"	Terres..	I	7	1	
				arenaria.....	Belonging to sand, found growing on sand-hills.	Fitzgerald	Aus. Orch., Vol. I, Part 7, 1882.	"	"	"	"	I	7	8
				carnea	Pinkish, from the colour of the flower.	R. Brown	Prod., 324, 1810	N.S.W., Q., V., S.A., T.	"	"	"	I	7	1
				clavigera ...	Club-bearing, the sepals being clavate.	A. Cunningham	Lindl., Gen. and Sp. Orch., 422.	N.S.W., V., T.	"	"	"	I	2	3
				cerulea	Light-blue, from the colour of the flower.	R. Brown	Prod., 324, 1810	N.S.W., V. ...	"	"	"	I	5	8
				concolor ...	One coloured, stem and flower being red-brown.	Fitzgerald	Aus. Orch., Vol. I, Part 7, 1882.	N.S.W.	"	"	"	I	7	8
				cucullata ...	Hooded, the dorsal sepal hooding the column.	"	Aus. Orch., Vol. I, Part 2, 1876.	"	"	"	"	I	2	4
				deformis ...	Deformed, the sepals differing in shape from other Caladenias (?)	R. Brown	Prod., 324, 1810	N.S.W., V., W.A., T.	"	"	"	I	5	8
				dilatata	Dilated, from the broad lobes of the labellum.	"	Prod., 325, 1810	N.S.W., W.A., S.A.	"	"	"	I	3	2
				dimorpha ...	Two-shaped, being found of two forms.	Fitzgerald	Aus. Orch., Vol. I, Part 1, 1875.	N.S.W.	"	"	"	I	1	3
				filamentosa	With filaments, from the long points of the sepals and petals.	R. Brown	Prod., 324, 1810	N.S.W., S.A., W.A., T.	"	"	"	I	7	9
				tessellata ...	Tessellated, the labellum being paved with calli.	Fitzgerald	Aus. Orch., Vol. I, Part 2, 1876.	N.S.W.	"	"	"	I	2	3
				testacea.....	Tiled, from crowded calli or colour of flower (?)	R. Brown	Prod., 324, 1810	N.S.W., V., T.	"	"	"	I	2	4
				Patersoni	Paterson's, in honor of the collector (in Tasmania).	"	"	N.S.W., T. ...	"	"	"	I	3	2
Calanthe.....	R. Brown	Bot. Reg., 573.	N.S.W., Q. ...	veratrifolium	Veratrum-leaved, leaves being like those of a veratrum.	"	Bot. Reg., 573 ...	N.S.W., Q. ...	Ter. near Epiphy.	I	4	4		
Calceana	"	Prod., 329, 1810.	N.S.W., Q., V., W.A., T.	major.....	Larger, the larger of the New South Wales species.	"	Prod., 329, 1810	N.S.W., Q., V., T.	Terres..	I	6	1		
				minor	Smaller, the smaller of the New South Wales species.	"	"	N.S.W., T. ...	"	"	I	6	1	
Calochilus	"	Prod., 320, 1810.	N.S.W., Q., V., T.	campestris..	Dwelling in a plain, being found on plains.	"	Prod., 320, 1810	N.S.W., Q., T.	Self...	"	I	4	6	
				paludosus ...	Marshy, being found in marshes	"	"	N.S.W.	"	"	I	4	6	
Chiloglottis	"	Prod., 323, 1810.	N.S.W., Q., V., T.	formicifera..	Ant-bearing, from form of gland on the labellum.	Fitzgerald	Aus. Orch., Vol. I, Part 3, 1877.	"	Insa. ...	"	I	3	9	
				trapeziforme	Trapezium, shaped, from the form of the labellum.	"	Aus. Orch., Vol. I, Part 3, 1877.	"	"	"	I	3	9	
Cleisostoma	Blume ...	Flora Nederland Indic, 362, 1825.	N.S.W., Q. ...	erecta.....	Erect, from the erect habit of the plant.	"	Aus. Orch., Vol. I, Part 4, 1878.	"	"	Epiphy.	I	4	5	
				tridentatum	Three-toothed, from the form of the centre lobe of the labellum (?)	Lindley ...	Bot. Reg., 1838	N.S.W., Q. ...	"	"	I	5	9	
Cœlandria	Fitzgerald	Aus. Orch., Vol. I, Part 7, 1882.	Q.	Smillie	Smillies, in honor of Mrs. E. J. Smillie, South Australia.	Mueller ...	Frag., Vol. VI, 94 1867.	Q., N.A.	"	"	I	7	2	
Corysanthes	R. Brown	Prod., 328, 1810.	N.S.W., Q., V., S.A., W.A., T.	bicalcarata..	Two-spurred, the labellum having two spurs.	R. Brown	Prod., 328, 1810	N.S.W., Q. ...	Terres..	I	2	10		
				fimbriata ...	Fimbriate, from the fringed margins of the labellum.	"	"	N.S.W.	"	"	I	1	4	
				pruinosa ...	Frosty, from the surface of the lower side of the leaf resembling hoar-frost.	A. Cunningham	Lind., Gen. and Sp. Orch., 393.	"	"	"	I	1	4	
				unguiculata.	Like a little finger-nail, from the shape of the flower (?)	R. Brown	Prod., 328, 1810	"	"	"	I	2	10	
Cryptostylis	"	Prod., 317, 1810.	N.S.W., Q., V., W.A., T.	erecta.....	Erect, the labellum being erect.	"	Prod., 317, 1810	"	"	"	I	3	8	
				leptochila ...	Narrow-lipped, from the strap-shaped labellum.	Mueller ...	Fl. Aus., Vol. VI, 334, 1873.	"	"	"	I	3	8	
Cyrtostylis.....	"	Prod., 322, 1810.	N.S.W., Q., V., S.A., W.A., T.	reniformis ...	Kidney-shaped, from the shape of the leaf.	R. Brown	Prod., 322.....	N.S.W., V., S.A., W.A., T.	"	"	I	4	8	
Dendrobium	Swartz ...	Hortus Kewensis 1799.	N.S.W., Q., V., T.	emulum ...	Emulous, rivalling other Dendrobiums (?)	R. Brown	Prod., 333, 1810	N.S.W., Q. ...	"	Epiphy.	I	2	5	
				Beckleri.....	Beckler's, after Beckler, a naturalist and collector in Australia.	Mueller ...	Frag., Vol. V, 95, 1866.	N.S.W.	"	"	I	7	6	
				canaliculatum.	Channelled, from the form of the leaf.	R. Brown	Prod., 333, 1810	Q.	"	"	I	3	6	
				cucumerinum	Like a cucumber, from the form of the leaf.	" W. S. Macleay" (Mueller).	"	N.S.W.	"	"	I	6	3	
				falcorostris	Falcon-beaked, from the form of the labellum.	Fitzgerald	Aus. Orch., Vol. I, Part 5, 1879	"	"	"	I	5	4	

Genus.	By whom named.	Where and when named.	Colony.	Species.	Why so named.	By whom named.	Where and when named.	Colony.	How fertilised, by insects or self.	Terrestrial or Epiphytal.	Australian Orchids.						
											Vol.	Part.	No. of Plate.				
Dendrobium —continued.	Swartz	Hortus Kewensis 1799.	N.S.W., V., T.	monophyllum	One-leaved, the pseudo-bulb generally having only one leaf.	Mueller	Frag., Vol. I, 189, 1859.	N.S.W.	Ins.	Epiphy.	I	6	9				
				Moorei	Moore's, in honor of C. Moore, Director of Botanical Gardens, Sydney.	"	Frag., Vol. VII, 29, 1870.	"	"	"	"	I	7	10			
				phalaenopsis	Like a butterfly, from the appearance of the flowers.	Fitzgerald	Gard. Chron., Vol. XIV, 38, 1880	Q.	"	"	"	"	I	7	5		
				rigidum	Rigid, from the habit of the plant.	R. Brown	Prod., 333, 1810	Q., N.A.	"	"	"	"	I	4	7		
Dipodium	R. Brown	Prod., 331, 1810.	N.S.W., V., S.A., T.	punctatum	Spotted, the flowers being spotted with purple.	"	Prod., 331, 1810	N.S.W., Q., V., S.A., T.	"	Ter. near Epiphy.	I	7	4				
Diuris	Smith	Trans. Lin. Soc. IV, 222, 1798	N.S.W., V., S.A., W.A., T.	aqualis	Equal, from the equality of the three lobes of the labellum.	Mueller	Fl. Aus., Vol. VI, 328, 1873.	N.S.W.	"	Terres.	I	2	6				
Dipodium δῖς (dis) double and ποδος (podos) of a foot.	R. Brown	Prod., 331, 1810.	N.S.W., V., S.A., T.	dendroboides	Dendrobium-like, flowers being like a dendrobium.	Fitzgerald	Aus. Orch., Vol. I, Part 7, 1882	"	"	"	"	I	7	3			
				elongata	Lengthened, from the great length of the sepals.	R. Brown	Prod., 316, 1810	N.S.W., V.	"	"	"	"	I	4	9		
				maculata	Spotted, from the brown marks on the flowers.	Smith	Exot. Bot., Vol. I, 57, t. 30.	N.S.W., Q., V., S.A., T.	"	"	"	"	I	2	6		
				pedunculata	Peduncled, the flowers being on long pedicels.	R. Brown	Prod., 316, 1810	N.S.W., V., S.A., T.	"	"	"	"	I	7	3		
Galeola galea a leather helmet.	Loureiro	Prod., 326, 1810.	N.S.W., V., Q.	secundiflora	Flowers on one side, from the form of the raceme.	Fitzgerald	Aus. Orch., Vol. I, Part 4, 1878	N.S.W.	"	"	"	I	4	9			
				cassythoides	Cassytha-like, being like a dodder-laural.	A. Cunningham	Lindl., Bot. Reg., 1828.	N.S.W., Q., V.	"	Ter. near Epiphy.	"	"	I	3	10		
Glossodia γλῶσσα (glossa) a tongue and εἶδος (eidos) like.	R. Brown	Prod., 326, 1810.	"	major	Larger, being the larger of the New South Wales species.	R. Brown	Prod., 326, 1810	N.S.W., Q., V., S.A., T.	"	Terres.	I	4	2				
Lyperanthus λίπαρος (liparos) shining and ανθος (anthos) a flower.	"	Prod., 325, 1810.	N.S.W., V., W.A., T.	minor	Smaller, the smaller species in New South Wales.	"	" 1810	N.S.W., Q., V., S.A.	"	"	"	I	4	2			
				ellipticus	Elliptical, from the form of the leaves.	"	Prod., 325, 1810	N.S.W.	"	"	"	"	I	1	6		
				nigricans	Becoming black, from the plant blackening in drying.	"	"	N.S.W., V., W.A., T.	"	"	"	"	I	4	10		
Orthoceras ὀρθος (orthos) straight and κερας (ceras) a horn.	"	Prod., 317, 1810.	N.S.W., V., S.A.	suaviolens	Sweet-scented, the flower having a sweet perfume in bright sunshine.	"	"	N.S.W., V., T.	"	"	"	I	4	10			
				strictum	Contracted, from the narrow shape of the flower.	"	Prod., 317, 1810	N.S.W., V., S.A.	"	Self.	"	"	I	3	1		
Prasophyllum πρασος (prasos) green and φυλλον (phyllon) a leaf.	"	Prod., 318, 1810.	N.S.W., Q., V., S.A., W.A., T.	fimbriatum	Fimbriate, from the hairs of the labellum.	"	Prod., 319, 1810	N.S.W.	Ins.	"	"	I	5	1			
				flavum	Yellow, from the colour of the flower.	"	Prod., 318, 1810	N.S.W., S.A., T.	"	"	"	"	I	3	7		
				nigricans	Turning black, from the flowers blackening in drying.	"	Prod., 319, 1810	N.S.W., S.A., T.	"	"	"	"	I	5	1		
				striatum	Streaked, the flowers being streaked with purple.	"	Prod., 318, 1810	N.S.W.	"	"	"	"	"	I	3	7	
Pterostylis πτερος (pteros) a wing and στῦλος (stylos) a column	"	Prod., 326, 1810.	N.S.W., Q., V., S.A., W.A., T.	acuminata	Acuminate, the labellum being pointed.	"	Prod., 326, 1810	"	"	"	"	I	5	7			
				Baptistii	Baptist's, from the name of the collector, J. Baptist.	Fitzgerald	Aus. Orch., Vol. I, Part 1, 1875	"	"	"	"	"	I	1	2		
				barbata	Bearded, labellum being bearded.	Lindley	Gen. and Sp. Orch., 388.	N.S.W., V., S.A., W.A., T.	"	"	"	"	"	I	7	7	
				coccinea	Red, from the colour of the flower.	Fitzgerald	Aus. Orch., Vol. I, Part 4, 1878	N.S.W.	"	"	"	"	"	I	4	3	
				concinna	Neat, from the delicate form of the plant.	R. Brown	Prod., 326, 1810	N.S.W., V.	"	"	"	"	"	I	6	4	
				curta	Short, from the form of the galea.	"	"	N.S.W., V., S.A., T.	"	"	"	"	"	I	5	6	
				cycnocephala	Swan's-head, the appendage to the labellum being like a swan's head.	Fitzgerald	Aus. Orch., Vol. I, Part 2, 1876	N.S.W.	"	"	"	"	"	I	2	7	
				Daintreyana	Daintrey's, having been discovered by E. Daintrey, Sydney.	Mueller	Fl. Aus., Vol. VI, 360, 1873.	"	"	"	"	"	"	"	I	6	7
				hispidula	Rather rough, from the roughness on stem and flowers.	Fitzgerald	Aus. Orch., Vol. I, Part 6, 1880	"	"	"	"	"	"	"	I	6	5
				longifolia	Long-leaved, from the form of the leaves.	R. Brown	Prod., 327, 1810	N.S.W., V., S.A., T.	"	"	"	"	"	"	I	1	1
				Mitchelli	Mitchell's, from the name of the discoverer, Sir Thomas Mitchell.	Lindley	Mitch. Trop. Aus., 365.	N.S.W., Q., V.	"	"	"	"	"	"	I	6	6
				mutica	Changeable, being a variable plant.	R. Brown	Prod., 323, 1810	N.S.W.	"	"	"	"	"	"	I	2	7
				nutans	Nodding, from the drooping of the flowers.	"	Prod., 327, 1810	N.S.W., Q., S.A., T.	"	"	"	"	"	"	I	6	5
				obtusa	Obtuse, from the blunt point of the labellum.	"	"	N.S.W., T.	"	"	"	"	"	"	I	6	7
				ophioglossa	Adder-tongued, labellum being forked.	"	Prod., 326, 1810	N.S.W., Q.	"	"	"	"	"	"	I	6	4
				parviflora	Small-flowered, from the size of the flowers.	"	Prod., 327, 1810	N.S.W., Q., V., T.	"	"	"	"	"	"	I	7	7
				pedoglossa	Rudder-tongued, labellum being like an ancient rudder.	Fitzgerald	Aus. Orch., Vol. I, Part 3, 1877	N.S.W.	"	"	"	"	"	"	I	3	5
				pedunculata	Peduncled, the flowers being on pedicels.	R. Brown	Prod., 327, 1810	N.S.W., T.	"	"	"	"	"	"	I	5	6
				reflexa	Reflexed, from the point of the labellum being curved.	"	"	N.S.W., V., W.A.	"	"	"	"	"	"	I	5	7
				rufa	Red, from the colour of the flower.	"	"	N.S.W.	"	"	"	"	"	"	I	2	8
striata	Striate, the flowers being streaked with green.	Fitzgerald	Aus. Orch., Vol. I, Part 3, 1877	"	"	"	"	"	"	"	I	3	5				
squamata	Scaly, from the numerous bracts on the flower-stem.	R. Brown	Prod., 327, 1810	"	"	"	"	"	"	"	I	6	6				
truncata	Cut-short, from the truncate form of the galea.	Fitzgerald	Aus. Orch., Vol. I, Part 4, 1878	"	"	"	"	"	"	"	I	4	3				
Woollii	Woolli's, from the discoverer, Dr. Woolli, Richmond.	"	Aus. Orch., Vol. I, Part 2, 1876	"	"	"	"	"	"	"	I	2	8				
Saccolabium saccus a sack and labium a lip.	Lindley	"	N.S.W., Q.	Hillii	Hill's, from the discoverer, Walter Hill, Director of the Botanical Gardens, Brisbane.	Mueller	Frag., Vol. I, 192, 1859.	N.S.W., Q.	"	Epiphy.	I	2	9				
Sarcocylus σαρκῆ (sarx) flesh and χείλος (cheilos) a lip.	R. Brown	Prod., 332, 1810.	N.S.W., Q., T., V.	divitiflorus	Rich-flowered, from number and beauty of the flowers.	"	Fl. Aus., Vol. VI, 292, 1873.	"	"	"	"	I	6	10			
				falcatus	Falcate, from the sickle-form of the leaves.	R. Brown	Prod., 332, 1810	N.S.W.	"	"	"	"	"	I	5	3	
				Fitzgeraldii	Fitzgerald's, from the name of the discoverer, R. D. Fitzgerald, Sydney.	Mueller	Frag., Vol. VII, 97 and 115, 1870	"	"	"	"	"	"	"	I	3	3
				Hillii	Hill's, in honor of W. Hill, Director of the Botanic Gardens, Brisbane.	"	Frag., Vol. II, 94, 1860.	N.S.W., Q.	"	"	"	"	"	"	I	5	5
				montanus	Mountain, found growing on the mountains.	Fitzgerald	Aus. Orch., Vol. I, Part 5, 1879	N.S.W.	"	"	"	"	"	"	I	5	3

* As observed by A. G. Hamilton, at Guntawang.

Genus.	By whom named.	Where and when named.	Colony.	Species.	Why so named.	By whom named.	Where and when named.	Colony.	How fertilized, by insects or self.	Terrestrial or Epiphytal.	Australian Orchids.		
											Vol.	Part.	No. of Plate.
Sarcochilus..... —continued.	R. Brown	Prod., 332, 1810.	N.S.W., T., V.	olivaceus ...	Olive-like, leaves being like those of an olive (?)	Lindley ..	Bot. Reg., 1839, Misc. 32.	N.S.W., Q. ...	Ins....	Epiphy.	I	5	5
				parviflorus	Small-flowered, probably smallest known when named.	„ ...	Bot. Reg., 1838, Misc. 34.	N.S.W., V., T.	„ ...	„ ...	I	3	4
Spathoglottis..... σπαθη (spathē) a spathe and γλώσσα (glōssa) a tongue.	Blume ...	Bijdragen, 400, 1825	Q.	Pauline.....	Paulin's, in honor of Mlle. Paulina Richemond of Paris.	Mueller ...	Frag., Vol. VI, 95, 1867.	Q.	Self or Ins.	Ter. near Epiphy.	I	6	8
Spiranthes σπειρα (spira) a screw and ανθος (anthos) a flower	L. C. Richard	Mems. du Museum Paris, IV 40, 1818	N.S.W., V., T.	Q.	Australis ...	R. Brown	Prod., 319, 1810	N.S.W., V., T.	Self...	Terres.	I	2	1
Tholymitra θηλυς (thēlus) female and μιτρα (mitra) a cap.	Forster	N.S.W., Q., V., S.A., W.A., T.	carnea	Pink, from the colour of the flower.	„	Prod., 314, 1810	N.S.W., V., T.	„ ...	„ ...	I	6	2
				circumsepta	Inclosed, from the wings of the column surrounding the stigma.	Fitzgerald	Aus. Orch., Vol. I, Part 4, 1878.	N.S.W.	„ ...	„ ...	I	4	1
				longifolia ...	Long-leaved, from the long leaves on the flower-stem.	Forster ...	Char. Gen., 98, t. 49.	N.S.W., S.A., V., T.	„ ...	„ ...	I	6	2
				media	Intermediate (between T. ixioides and T. canaliculata?)	R. Brown	Prod., 314, 1810	N.S.W., T. ...	„ ...	„ ...	I	4	1
				megcalyptra	Large-hooded, the hood of the column being larger than in others.	Fitzgerald	Aus. Orch., Vol. I, Part 5, 1879.	N.S.W.	Ins....	„ ...	I	5	2
				nuda	Naked, the central lobe of the hood being smooth.	R. Brown	Prod., 314, 1810	N.S.W., W.A.	Self...	„ ...	I	5	2
				pauciflora ...	Few-flowered, producing generally only one flower.	„	„	N.S.W., S.A., W.A.	„ ...	„ ...	I	6	2

SYNOPSIS OF DISTRIBUTION.

Genus.	Species.	Sub-locality.	Locality.	Colony.	Collector.	Time of flowering.	Localities recorded in the <i>Flora Australiensis</i> .	Australian Orchids.		
								Vol.	Part.	No. of Plate.
Acianthus	caudatus	Hunter's Hill	Sydney	N.S.W.	Fitzgerald	August	Tasmania, J. D. Hooker	I	7	9
		Kurradjong	Blue Mountains	"	"	"	"	"	"	"
	exsertus	Pye's Creek	Parramatta	"	Dr. Woolls	"	"	"	"	"
"	"	Hunter's Hill	Sydney	"	Fitzgerald	March	Victoria, Windee River, Robertson; Seeler's Cove, Mueller; Portarlington, Robertson	I	1	5
		Mount Wilson	Blue Mountains	"	"	14 March	"	"	"	"
			Parramatta	"	Dr. Woolls	"	"	"	"	"
"	fornicatus		Spencer's Gulf	W.A.	Tepper (Mueller)	"	"	"	"	"
		Hunter's Hill	Sydney	N.S.W.	Fitzgerald	Feb. and March	Queensland, Brisbane River, Mueller; Rockingham Bay, Dallachy; Mount Wheeler, Thozet	I	1	5
		Ballina	Richmond River	"	"	April	"	"	"	"
"	"	Mount Wilson	Blue Mountains	"	"	23 February	"	"	"	"
			Cooyal	"	A. G. Hamilton	20 April	"	"	"	"
			Guntawang	"	"	June to Sept.	"	"	"	"
Adenochilus	Nortoni	Mount Victoria	Blue Mountains	"	Bell	27 June	"	"	"	"
		Woodford	"	"	Dr. Woolls	"	"	"	"	"
		Katoomba	"	"	Fitzgerald	December	"	"	"	"
Bolbophyl- lum.	Shepherdi.			"	"	"	"	"	"	"
		Redbank Creek	Macleay River	"	"	October	New South Wales, Hastings and Clarence Rivers, Beckler; Hunter River, Leichhardt; Illawarra, Shepherd	I	5	10
			Pictou	"	"	November	"	"	"	"
Caladenia	alba	Bellenden	Ker Ranges	Q.	Mueller	October	"	"	"	"
		Hunter's Hill	Sydney	N.S.W.	Fitzgerald	August	"	"	"	"
		Pye's Creek	Parramatta	"	"	"	"	"	"	"
"	arenaria	Deniliquin Station	Liverpool	"	Canon King	"	"	"	"	"
			Deniliquin	"	Fitzgerald	25 September	"	"	"	"
			Bethunga	"	"	1 October	"	"	"	"
"	"	Cunningham Plains	Murrumburrah	"	"	5	"	"	"	"
		Baudesert Hills (very local)	Guntawang	"	A. G. Hamilton	Oct. to Nov.	"	"	"	"
			Yass	"	C. Jenkins	9 October	"	"	"	"
"	carnea	Hunter's Hill	Sydney	"	Fitzgerald	September	New South Wales, Richmond River, Henderson; New England, C. Stuart; Twofold Bay, Mueller. Queensland, Keppel and Shoalwater Bays, R. Brown; Brisbane to Wide Bay, Leichhardt and Mueller; Rockhampton, O'Shanesy; Nerook Creek, Bowman; Darling Downs, Law; Mount Elliott, Fitzalan. Victoria, Glenelg to Gippsland, Mueller and Robertson. South Australia, Glenelg to St. Vincent's Gulf, Mueller; Kangaroo Island, Waterhouse. Tasmania generally, J. D. Hooker	I	7	1
		Pye's Creek	Parramatta	"	"	25 October	"	"	"	"
		Mount Wilson	Blue Mountains	"	"	23 August	"	"	"	"
"	"	Deniliquin Station	Deniliquin	"	"	25 September	"	"	"	"
			Bethunga	"	"	1 October	"	"	"	"
		Cunningham Plains	Murrumburrah	"	"	2	"	"	"	"
"	"	Mount Lofty Range	Adelaide	S.A.	"	24	"	"	"	"
			Hobart	T.	F. J. Paterson	3 November	"	"	"	"
				"	"	"	"	"	"	"
"	clavigera		Bethunga	N.S.W.	Fitzgerald	1 October	New South Wales, Bathurst, A. Cunningham; Victoria, Ballarat, Glendinning, Malden, Mrs. Nott. Tasmania, Circular Head, Gunn; Tasman River, Archer; Flinder's Island, Milligan	I	2	3
		Beaudesert Hills	Guntawang	"	A. G. Hamilton	Sept. to October	"	"	"	"
			Mudgee	"	Dr. Woolls	"	"	"	"	"
"	"	Reedy Creek	Jugiong	"	G. Sheaffe	28 September	"	"	"	"
			Yass	"	C. Jenkins	9 October	"	"	"	"
			Hobart	T.	F. J. Paterson	3 November	"	"	"	"
"	caerulea	Hunter's Hill	Sydney	N.S.W.	Fitzgerald	"	New South Wales, New England, C. Stuart; Twofold Bay, Mueller. Victoria, north of Wombeyne River.	I	5	8
			Cootamundra	"	"	23 August	"	"	"	"
			Guntawang	"	A. G. Hamilton	Aug. to Oct.	"	"	"	"
"	"		Liverpool	"	Canon King	"	"	"	"	"
			Parramatta	"	Dr. Woolls	"	"	"	"	"
		Murray River	To S. A. boundary	V.	Nancarrow (Mueller)	"	"	"	"	"
"	concolor		Albury	N.S.W.	Wood	10 October	"	"	"	"
			Molong	"	Dr. Ross	20 "	"	"	"	"
			Boorowa	"	G. Sheaffe	30 "	"	"	"	"
"	cucullata		Guntawang	"	A. G. Hamilton	13 "	"	"	"	"
		Biraganbil Hills (very local)		"	"	"	"	"	"	"
				"	"	"	"	"	"	"
"	deformis		Cootamundra	"	Fitzgerald	23 August	New South Wales, Albury, Beattie. Victoria, Portland, Allitt; Port Phillip, Gunn and Adamson; Mangatta Range and Genoa River, Mueller; Ararat, Green; Burra Burra, Hinteracker. Tasmania generally, J. D. Hooker; Port Dalrymple, R. Brown; Flinder's Island, Milligan; South Australia, the Murray to St. Vincent's Gulf, Mueller; York Peninsula, Fowler; Biscuit Flat, Schulzen	I	5	8
			Boorowa	"	G. Sheaffe	20 September	"	"	"	"
		Cunningham Plains	Murrumburrah	"	D. H. Campbell	15 "	"	"	"	"
"	"	Mahogany Creek	York	W.A.	Fitzgerald	26 August	"	"	"	"
				"	"	"	"	"	"	"
				"	"	"	"	"	"	"
"	dilatata	Hunter's Hill	Sydney	N.S.W.	"	October	"	"	"	"
		Round Swamp	Urana	"	"	24 August	"	"	"	"
		Cunningham Plains	Murrumburrah	"	"	2 October	"	"	"	"
"	"		Guntawang	"	A. G. Hamilton	Sept. to Nov.	"	"	"	"
			Molong	"	Dr. Ross	November	"	"	"	"
			Boorowa	"	G. Sheaffe	3 October	"	"	"	"
"	"		Bunbury	W.A.	Fitzgerald	September	"	"	"	"
		Dardanup	Adelaide	S.A.	"	24 October	"	"	"	"
		Mount Lofty	Bowenfels	N.S.W.	"	October	"	"	"	"
"	dimorpha	Hassan's Walls	Blue Mountains	"	"	25	"	"	"	"
		Mount Wilson	"	"	"	1 September	"	"	"	"
		Mount Victoria	"	"	"	6 October	"	"	"	"
"	filamentosa		Bowral	"	G. Sheaffe	August	Tasmania, Port Dalrymple, Paterson and R. Brown; George Town, Archer; Southport, C. Stuart. Western Australia, Rivoli Bay, Mueller.	I	7	9
			Mudgee	"	Dr. Woolls	August	"	"	"	"
			Boorowa	"	G. Sheaffe	10 September	"	"	"	"
"	"		Warrah	"	E. Merewether	15 September	"	"	"	"
			Guntawang	"	A. G. Hamilton	Aug. to Sept.	"	"	"	"
		Swan River	Perth	W.A.	Fitzgerald	July	"	"	"	"
"	tessellata	Champion Bay	Gairdton	"	"	August	"	"	"	"
		Mount Lofty Range	Adelaide	S.A.	Prof. R. Tate	"	"	"	"	"
		Hunter's Hill	Sydney	N.S.W.	Fitzgerald	September	"	"	"	"
"	"	Cunningham Plains	Murrumburrah	"	D. H. Campbell	15	"	"	"	"
			Bowral	"	G. Sheaffe	25 October	"	"	"	"
			Sydney	"	Fitzgerald	August	Victoria, Port Phillip, Gunn; Tasmania, Port Dalrymple, R. Brown; Southport, C. Stuart.	I	2	4
"	testacea	Hunter's Hill	Blue Mountains	"	"	25 October	"	"	"	"
		Mount Wilson	"	"	"	"	"	"	"	"
				"	"	"	"	"	"	"
"	Pateroni		Bethunga	"	Fitzgerald	25 August	Tasmania, Port Dalrymple, Paterson	I	3	2
			Boorowa	"	G. Sheaffe	20 October	"	"	"	"
			Kempsey	"	Fitzgerald	January	Queensland, Rockingham Bay, Dallachy; Brisbane River, Mueller.	I	4	4
Calanthe	veratrifolium	Macleay River	Illawarra	"	"	December	"	"	"	"
		Bulli Pass	Bellenger River	"	"	"	"	"	"	"
		Cudgen	Tweed River	"	"	20	"	"	"	"

Genus.	Species.	Sub-locality.	Locality.	Colony.	Collector.	Time of flowering.	Localities recorded in the <i>Flora Australiensis</i> .	Australian Orchids.			
								Vol.	Part.	No. of Plate.	
Calanthe	<i>veratrifolium</i> <i>continued.</i>	Richmond River	Ballina	N.S.W.	Fitzgerald	November					
		Hastings River	Port Macquarie	"	G. Sheaffe	December					
Caleana	major	Hunter's Hill	Conjola	"	Dr. Woolls	5 January	<i>New South Wales</i> , New England, C. Stuart; <i>Queensland</i> , Moreton Bay, Mueller; <i>Victoria</i> , Mount Sturgeon, Mount Abrupt and Latobe River, Mueller; Mount William, Sullivan; Gippsland, Walter. <i>Tasmania</i> , Rocky Cape, Gunn; Cheshunt, Archer; Southport, C. Stuart; South Huon, Oldfield; N. W. Bay, Milligan.	I	6	1	
		Mount Wilson	Blue Mountains	"	Fitzgerald	Oct. and Nov.					
		Katoomba	"	"	"	22 December					
		Woodford	"	"	"	30 October					
		"	"	"	"	4 "					
	"	minor	Hunter's Hill	Parramatta	"	Dr. Woolls	4 January				
	"	"	"	Kurrajong	"	"	17 December				
	"	"	"	Lithgow	"	Wilkinson	"				
	"	"	"	Chiltern	V.	Eustace (Mueller)	"				
	"	"	"	Sydney	N.S.W.	Fitzgerald	November	<i>Tasmania</i> , Hobart, Gunn	I	6	1
Calochilus	campestris	Biraganbil (very rare)	Lithgow	"	Wilkinson	17 December					
		"	Guntawang	"	A. G. Hamilton	November					
		Hunter's Hill	Sydney	"	Fitzgerald	October	<i>Tasmania</i> , Rocky Cape and Woolnorth, Gunn; Port Sorell, Archer; Huon River, Oldfield; Oyster Cove, Milligan; Southport, C. Stuart. <i>Queensland</i> , Shoalwater Bay, R. Brown	I	4	6	
		Mount Wilson	Blue Mountains	"	"	25 "					
		"	"	Lithgow	"	Wilkinson	27 "				
	"	"	"	Boorowa	"	Sheaffe	31 "				
	"	"	"	Nowra	"	"	1 September				
	"	"	"	Guntawang	"	A. G. Hamilton	September				
	"	"	"	Hobart	T.	F. J. Paterson	26 November				
	"	paludosus	Hunter's Hill	Condamine River	Q.	C. Hartmann (Mueller)	"	<i>New South Wales</i> , Hunter River, R. Brown	I	4	6
Chiloglottis	formicifera	Mount Wilson	Sydney	N.S.W.	Fitzgerald	October					
		"	Blue Mountains	"	"	25 "					
		"	Newcastle	"	E. Merewether	29 August					
		"	Kurrajong	"	Fitzgerald	5 September					
		"	Liverpool	"	Canon King	September					
	"	trapeziforme	"	"	"	"	4 October				
	Cleisostoma	erecta	Beraganbil Hills	Bowral	"	G. Sheaffe	6 "				
			"	Guntawang	"	A. G. Hamilton	September				
			Mount Eliza	Howe's Island	"	Fitzgerald	December				
			"	Macleay River	"	"	November	<i>New South Wales</i> , Hastings and Clarence Rivers, Beckler; New England, C. Stuart; <i>Queensland</i> , Brisbane River, Hill and Bailey; Wide Bay, Leichhardt	I	4	5
"			"	"	"	December					
"		tridentatum	Bulli Pass	Ilawarra	"	"	20 November				
"		"	Pittwater	Broken Bay	"	"	2 December				
"		"	Stone-quarry Creek	Pictou	"	"	10 "				
"		"	"	Bowral	"	G. Sheaffe	"				
"		"	"	Mount Dromedary	"	Miss M. Bate (Mueller)	"				
Coelandria	Smillia	Bent's Basin	Nepean River	"	Dr. Woolls	"					
		"	Towoomba	Q.	C. Hartmann (Mueller)	"					
		"	Possession Isld.	"	Captain Broomfield	16 October	<i>Queensland</i> , Rockingham Bay, Dallashy	I	7	2	
		"	Torres Straits	"	Sir W. Macarthur	"					
		"	Cairns	"	W. Hill (Mueller)	"					
	Corysanthes	bicalcarata	Hunter's Hill	Sydney	N.S.W.	Fitzgerald	June	<i>Queensland</i> , Brisbane River, Hill; Rockhampton, Thozet	I	2	10
			Bald Hill	Kurrajong	"	"	10 "				
			Woodford	Richmond River	"	"	9 May				
			"	Blue Mountains	"	W. S. Campbell	3 "				
			"	Parramatta	"	Dr. Woolls	"				
Cyrstostylis	fimbriata	Hunter's Hill	Sydney	"	Fitzgerald	June					
		Redbank Creek	Pictou	"	"	July					
		Pittwater	Broken Bay	"	"	June					
		"	Yass	"	S. A. Fox	8 September					
		"	Sydney	"	Fitzgerald	June					
	pruinosa	unguiculata	Hangry Hill	Moruya	"	Bell	27 June				
			Lane Cove	Stroud	"	R. W. Thompson	30 September				
			Long Bay	Sydney	"	Fitzgerald	July				
			"	"	"	"	20 July				
			"	"	"	"	December				
Cryptostylis	erecta	Hunter's Hill	Blue Mountains	"	"	10 December					
		Mount Wilson	Newcastle	"	E. Merewether	14 November					
		"	Blue Mountains	"	Fitzgerald	20 December	<i>New South Wales</i> , Springwood, R. Cunningham; Kurrajong, Mrs. Calvert.	I	3	8	
		"	"	"	"	10 "					
		"	"	"	"	2 January					
	leptochila	reniformis	Hunter's Hill	Moruya	"	G. Sheaffe	1 December				
			Redbank Creek	Sydney	"	Fitzgerald	July	<i>New South Wales</i> , Twofold Bay, Mueller. <i>Tasmania</i> (generally), J. D. Hooker. <i>Victoria</i> , Wendu Vale, Robertson; Portland, Allitt; Station Peak, Mueller. <i>South Australia</i> , Encounter Bay, Mueller. <i>Western Australia</i> , Vain River, Oldfield; Rottenest Island, Preiss.	I	4	8
			Mount Melville	Pictou	W.A.	Fitzgerald	10 July				
			St. Werburghs	Guntawang	"	A. G. Hamilton	September				
			Fresh-water Bay	Albany	"	"	13 July to 20 Sep.				
Dendrobium	semulum	Mount Lofty	Hay River	"	"	September					
		Macleay River	Perth	"	"	August					
		Cudgen	Freemantle	"	"	October					
		Wallis Creek	Adelaide	S.A.	"	September	<i>New South Wales</i> , New England, C. Stuart; Hastings River, Beckler; Richmond River, Henderson; <i>Queensland</i> , Brisbane River, Bailey.	I	2	5	
		"	Kempsey	N.S.W.	"	"					
	Beckleri	canaliculatum	Clybucca Creek	Macleay River	N.S.W.	Fitzgerald	November	<i>New South Wales</i> , New England, C. Stuart.	I	7	6
			Hastings River	Port Macquarie	"	"	"				
			"	Rockingham Bay	Q.	Carron	"	<i>Queensland</i> , Endeavour River, Banks and Solander.	I	3	6
			"	"	"	"	"				
			"	"	"	"	"				
Dipodium	punctatum	Camden Park	Camden	N.S.W.	Fitzgerald	"					
		Stonquarry Creek	Pictou	"	"	"					
		Brownlow Hill	Camden	"	Dr. Woolls	"					
		"	Towoomba	Q.	C. Hartmann (Mueller)	"					
		"	"	"	"	"					
	falcorostris	monophyllum	Mount Banda	Macleay River	N.S.W.	Fitzgerald	"				
			Banda	Twced River	"	"	March	<i>New South Wales</i> , Clarence River, Beckler. <i>Queensland</i> , Brisbane River, A. Cunningham and W. Hill; Glasshouse Mountain, Bryerley	I	5	4
			Cudgen	"	"	"	"				
			Richmond River	Ballina	"	"	"				
			"	"	"	"	"				
Diuris	Moorei	Mount Gower	Howes Island	"	"	April to Aug.					
		"	Cairns	Q.	Captain Broomfield	"					
		"	Rockingham Bay	"	F. Bailey (Mueller)	January	<i>Queensland</i> , Endeavour River, Banks and Solander	I	7	5	
		"	"	"	"	"					
		"	"	"	"	"					
	phalanopsis	rigidum	Hunter's Hill	Daintree River	N.S.W.	W. Hill (Mueller)	December	<i>New South Wales</i> , Hastings and Clarence, Beckler; New England, C. Stuart, Armidale, Perrott. <i>Queensland</i> , Brisbane River, Mueller; Condamine River, Leichhardt; Rockhampton, O'Shanesy; Bardekin River and Mount Elliott, Fitzalan. <i>Victoria</i> , Upper Yarra and Dandenong Range, Mueller; Glenelg River, Robertson. <i>Tasmania</i> , Circular Head, Gunn; Port Sorell and Cheshunt, Archer	I	7	4
			Mount Wilson	Macleay River	"	"	November				
			"	Blue Mountains	"	E. Merewether	11 January				
			"	Richmond	"	Dr. Woolls (after a drought)	28 May				
			"	"	"	"	"				
aequalis	(squamatum?)	Mount Lofty	Parramatta	"	Dr. Woolls	9 January					
		"	Adelaide	S.A.	Driffild	Nov. to Jan.					
		"	Guntawang	N.S.W.	A. G. Hamilton	"					
		"	"	"	"	"					
		"	"	"	"	"					

SYNOPSIS OF DISTRIBUTION—continued.

Genus	Species	Sub-locality	Locality	Colony	Collector	Time of flowering	Localities recorded in the <i>Flora Australiensis</i> .	Australian Orchids.		
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Diuris	dendroboides elongata	Cunningham Plains	Murrumburrah	N.S.W.	Fitzgerald	2 October	New South Wales, Clarence River, Wilcox Ranges, M'Arthur; Mudgee, Dr. Woolls; Murrumbidgee, Nolan. Victoria, Port Phillip, Gunn and Mueller; Wendu Vale, Robertson; Yarra, Mount Alexander, Mount Abrupt, Mueller; Gippsland, Walter	I	7	3
		Hunter's Hill	Guntawang	"	A. G. Hamilton	September				
		Newport	Sydney	"	Fitzgerald	"				
		Cunningham Plains	Pittwater	"	"	"				
			Murrumburrah	"	"	2 October				
			Albury	"	"	10 "				
			Bowral	"	G. Sheaffe	6 "				
			Yass	"	C. Jenkins	9 "				
			Barny Downs Creek	"	Drummond	25 "				
			Guntawang	"	A. G. Hamilton	Sept. to Decr.				
			Parramatta	"	Dr. Woolls	"				
			Hunter's Hill	"	Fitzgerald	September				
			Bowenfels	"	"	"				
			Cootamundra	"	"	23 August				
			Bethungra	"	"	1 October				
	Mount Victoria	"	"	3 November						
	Guntawang	"	A. G. Hamilton	Sept. and Oct.						
	Lithgow	"	Wilkinson	6 November						
	Newcastle	"	E. Merewether	29 August						
	Reedy Creek	"	G. Sheaffe	28 September						
	Jugiong	"	C. Jenkins	9 October						
	Yass	"	Dr. Woolls	"						
	Parramatta	"	F. J. Paterson	"						
	Hobart	T.	Fitzgerald	October						
	Wee Wa	N.S.W.	"	24 September						
	Cunningham Plains	"	"	2 October						
	Boorowa	"	G. Sheaffe	29 September						
	Reedy Creek	"	"	28 "						
	Jugiong	"	"	Aug. to Sept.						
	Guntawang	"	A. G. Hamilton	9 October						
	Yass	"	C. Jenkins	"						
	Willawarin	"	"	November						
	Murrumbidgee River	"	Fitzgerald	12 March						
	Hunter's Hill	"	Dr. Woolls	"						
	Hastings River	"	"	October						
	Sydney	"	Fitzgerald	November						
	Port Macquarie	"	"	October						
	Liverpool	"	Canon King	October						
	Paterson River	"	R. W. Thompson	30 September						
	Source of Marana River	Q.	C. Barber (Mueller)	"						
Glossodia	major	Hunter's Hill	Sydney	N.S.W.	Fitzgerald	July and Aug.	New South Wales, N. W. Interior, Fraser; New England, C. Stuart; Twofold Bay, Mueller; Victoria, Glenelg River, Robertson; Portland, Allitt; Port Phillip, Mueller; Ballarat, Glendinning. Tasmania (generally), J. D. Hooker; South Australia, Bugle Ranges, Mueller; Encounter Bay, Whittaker.	I	4	2
		Mount Wilson	Blue Mountains	"	"	25 October				
			Bethungra	"	"	1 "				
			Brugong	"	"	28 September				
			Cootamundra	"	"	1 October				
			Guntawang	"	A. G. Hamilton	Aug. to Oct.				
			Marimbula	"	C. Brown	27 September				
			Reedy Creek	"	G. Sheaffe	28 September				
			Bowral	"	"	6 October				
			Cunningham Plains	"	D. H. Campbell	15 September				
			Yass	"	C. Jenkins	9 October				
			Mount Lofty	S.A.	Fitzgerald	24 October				
			Hobart	T.	F. J. Paterson	"				
			Hunter's Hill	N.S.W.	Fitzgerald	July and Aug.				
			Mount Lofty	"	Prof. Tate	"				
Lyperanthus	ellipticus	Sailor's Bay	Sydney	"	Fitzgerald	December	New South Wales, New England, C. Stuart; Twofold Bay, Mueller. Victoria, Genoa River, Mueller. Queensland, Moreton Bay, Leichhardt.	I	1	6
		Mount Victoria	Blue Mountains	"	"	November				
		Katoomba	"	"	"	December				
		Woodford	"	"	"	November				
		Hunter's Hill	Sydney	"	"	August				
			Albury	W.A.	"	September				
			Mahogany Creek	"	"	"				
			Perth	"	"	"				
			Dardenup	Bunbury	"	September				
			Marbleup	Wilson's Inlet	"	"				
			Mount Lofty	Adelaide	S.A.	24 October				
			Hunter's Hill	Sydney	N.S.W.	September				
			Lithgow	"	Wilkinson	27 October				
			Boorowa	"	G. Sheaffe	30 "				
			Newcastle	"	E. Merewether	29 August				
	Guntawang	"	A. G. Hamilton	Sept. to Oct.						
	Beaudesert Hills (rare)	"	"	"						
	Parramatta	"	Dr. Woolls	"						
	Hunter's Hill	"	Fitzgerald	December						
	Mount Wilson	"	"	25 October						
	Blue Mountains	"	"	"						
	Lithgow	"	Wilkinson	8 January						
	Moruya	"	G. Sheaffe	1 December						
Prasophyllum	fimbriatum	Five Dock	Sydney	"	Fitzgerald	March	New South Wales, Berrima, Mrs. Calvert; Durval, Leichhardt; New England, C. Stuart. Tasmania, Cheshunt, Archer; Oyster Cove, Milligan; Huon River, Oldfield; Southport, C. Stuart. South Australia, Port Lincoln, R. Brown. Tasmania, Oyster Cove, Milligan; Southport, C. Stuart.	I	5	1
		Mount Wilson	Blue Mountains	"	"	April				
			Parramatta	"	"	14 March				
			Lawson	Blue Mountains	"	December				
			Mount Wilson	"	E. Merewether	11 January				
			Hunter's Hill	"	"	"				
			Mount Wilson	"	"	"				
			Springwood	"	"	"				
			Hunter's Hill	"	"	"				
			Wentworth	"	"	"				
			Mount Wilson	"	"	"				
			Kiama	"	G. Sheaffe	14 "				
			Hunter's Hill	"	Fitzgerald	7 April				
			Sydney	"	"	May				
			Goonamatta	"	"	April				
	Port Hacking	"	"	"						
	Liverpool	"	Canon King	2 March						
	Lithgow	"	Wilkinson	10 March						
	Hunter's Hill	"	Fitzgerald	"						
	Hen and Chicken Bay	"	E. Merewether	29 August						
	Newcastle	"	Fitzgerald	1 October						
	Cootamundra	"	"	"						
	Hobart	T.	F. J. Paterson	3 November						
	Port Phillip	V.	Mueller	"						
	Hassan's Walls	Bowenfels	N.S.W.	Fitzgerald	"					
	Hunter's Hill	Sydney	"	"						
	Guntawang	"	A. G. Hamilton	July						
	Liverpool	"	"	June to Sept.						
	Parramatta	"	Canon King	"						
	Grampians	"	Dr. Woolls	"						
		"	Sullivan (Mueller)	"						

Genus.	Species.	Sub-locality.	Locality.	Colony.	Collector.	Time of flowering.	Localities recorded in the <i>Flora Australiensis</i> .	Australian Orchids.		
								Vol.	Part.	No. of Plate.
Pterostylis <i>continued.</i>	curta	Hunter's Hill	Sydney	N.S.W.	Fitzgerald	August	<i>New South Wales</i> , Twofold Bay, Mueller.	I	5	6
		Mount Wilson	Blue Mountains	"	"	25 October		Victoria, Wendu Vale, Robertson; Melbourne, Adamson; Darabin Creek and Mount Disappointment, Mueller. <i>Tasmania</i> generally, J. D. Hooker; Port Dalrymple, R. Brown. <i>South Australia</i> , Barossa, Lofty, and Bugle Ranges, Mueller.		
		Woodford	"	"	"	5 September				
			Guntawang	"	A. G. Hamilton	July to Oct.				
			Merimbula	"	C. Brown	27 September				
			Newcastle	"	E. Merewether	29 August				
			Bowral	"	G. Sheaffe	6 October				
			Liverpool	"	Canon King	"				
	cycnocephala	Deniliquin Station	Deniliquin	"	Fitzgerald	25 September				2 7
		Cunningham Plains	Murrumburrah	"	"	2 October				
			Boorowa	"	G. Sheaffe	4				
			Guntawang	"	A. G. Hamilton	Aug. to Oct.				6 7
	Daintreyana	Berry's Bay	Sydney	"	E. Daintrey	May				
		Gore's Creek	"	"	Fitzgerald	"				6 5
	hispidula	Hunter's Hill	"	"	"	"				
		Springwood	Blue Mountains	"	"	April				
		Mount Wilson	"	"	"	14 March				
		Ham Common	Richmond	"	Dr. Woolls	15 May				
	longifolia	Hunter's Hill	Sydney	"	Fitzgerald	August	Victoria, Forest Creek, Mount Disappointment, Wilson's Promontory, and Nangatta Range, Mueller; Grampian Hills, Fisher; Gippsland, Walter. <i>Tasmania</i> generally, J. D. Hooker. <i>South Australia</i> , Mount Lofty Range, Mueller.	I	1	1
		Stone-quarry Creek	Picton	"	"	September				
		Mount Wilson	Blue Mountains	"	"	25 October				
		Bulli Pass	Illawarra	"	"	5 September				
			Boorowa	"	G. Sheaffe	4 October				
			Newcastle	"	E. Merewether	29 August				
		Ham Common	Richmond	"	Dr. Woolls	15 May				
			Moruya	"	Bell	27 June				
		Biraganbil Hills*	Guntawang	"	A. G. Hamilton	June to Aug.				
			Liverpool	"	Canon King	"				
			Parramatta	"	Dr. Woolls	"				
	Mitchelli		Cootamundra	"	Fitzgerald	23 August	Victoria, Mount Kennedy, on the Maranos, Sir T. Mitchell.	I	6	6
			Guntawang	"	A. G. Hamilton	Sept. to Nov.				
			Rockhampton	Q.	Dr. Woolls	"				
	mutica	Hunter's Hill	Sydney	N.S.W.	Fitzgerald	October				2 7
		Cunningham Plains	Murrumburrah	"	"	2				
			Liverpool	"	"	September				
			Guntawang	"	A. G. Hamilton	Aug. to Sep.				
			Lithgow	"	Wilkinson	21 November				
			Warrah	"	E. Merewether	15 September				
			Jugiong	"	G. Sheaffe	28				
	nutans	Reedy Creek	Sydney	"	Fitzgerald	June	Victoria, Portland Bay, Mueller; E. Gippsland, Walter. <i>Queensland</i> , Brisbane River, Moreton Bay, Bailey. <i>Tasmania</i> generally, J. D. Hooker; Port Dalrymple, Paterson. <i>South Australia</i> , Mount Gambier, Mueller (some of the above may refer rather to <i>P. hispidula</i>).	I	6	5
		Bulli	Illawarra	"	"	"				
		Newport	Pittwater	"	"	"				
		Mount Wilson	Blue Mountains	"	"	"				
			Newcastle	"	E. Merewether	29 August				
			Bowral	"	G. Sheaffe	6 October				
	obtusa	Hunter's Hill	Sydney	"	Fitzgerald	March	<i>New South Wales</i> , C. Stuart. <i>Tasmania</i> , in the north generally, J. D. Hooker; Southport, C. Stuart.	I	6	7
		Mount Wilson	Blue Mountains	"	"	23 February				
		Redbank Creek	Picton	"	"	30 March				
		Newport	Pittwater	"	"	"				
		Gibben	Port Hacking	"	"	April				
		Ham Common	Richmond	"	Dr. Woolls	"				
	ophioglossa	Hunter's Hill	Sydney	"	Fitzgerald	March	<i>Queensland</i> , Port Curtis, R. Brown; Brisbane River, Mueller.	I	6	4
		Bald Head	Richmond River	"	"	April				
	parviflora	Long Bay	Sydney	"	"	March	<i>New South Wales</i> , Aitken Creek, A. Cunningham. <i>Queensland</i> , Brisbane River and Moreton Island, Mueller. <i>Victoria</i> , Wilson's Promontory, Mueller. <i>Tasmania</i> , Port Dalrymple, R. Brown; Huon River, Oldfield; Hobart, J. D. Hooker; Ches-hunt, Archer.	I	7	7
		"The Points"	Picton	"	"	April				
		Hassan Walls	Bowenfels	"	"	March				
		Mount Wilson	Blue Mountains	"	"	14 March				
			Bowral	"	G. Sheaffe	April				
	pedoglossa	Long Bay	Sydney	"	Fitzgerald	June				3 5
	pedunculata	Hunter's Hill	"	"	"	September	<i>New South Wales</i> , Grose River, Miss Atkinson. <i>Tasmania</i> generally, J. D. Hooker; Port Dalrymple, R. Brown.	I	5	6
		Mount Wilson	Pittwater	"	"	"				
			Blue Mountains	"	"	25 October				
			Newcastle	"	E. Merewether	29 August				
			Bowral	"	G. Sheaffe	6 October				
	reflexa	Hunter's Hill	Sydney	"	Fitzgerald	March	<i>New South Wales</i> , New England, C. Stuart; Mudgee, Taylor. <i>Victoria</i> , Grampians and Wimmora, Mueller; Little River, Fullagar; East Gippsland, Walter. <i>Western Australia</i> , Vasse River, Oldfield; Hampden, Clarke; Grenough Flats, C. Gray.	I	5	7
		Mount Wilson	Blue Mountains	"	"	14 March				
		Bushranger's Cave	Picton	"	"	April				
	Var. A	Biraganbil	Guntawang	"	A. G. Hamilton	April to June				
	Var. B	Beadesert Hills	"	"	"	"				
			Moruya	"	Bell	27 June				
			Freemantle	W.A.	Fitzgerald	22 July				
		Freshwater Bay	Perth	"	"	August				
		Mount Lofty	Adelaide	S.A.	"	September				
	rufa	Hunter's Hill	Sydney	N.S.W.	"	November				2 8
			Guntawang	"	A. G. Hamilton	Sept. to Nov.				
			Boorowa	"	G. Sheaffe	30 October				
			Lithgow	"	Wilkinson	17 November				
	striata	Reedy Creek	Jugiong	"	G. Sheaffe	28 September				3 5
	squamata	Round Swamp	Urama	"	Fitzgerald	1 November				6 6
			Cootamundra	"	"	November				
	truncata	Beadesert Hills	Guntawang	"	A. G. Hamilton	Sept. to Nov.				4 3
	Woolsi	Ham Common	Mittagong	"	E. Daintrey	"				2 8
			Richmond	"	Dr. Woolls	"				
			Molong	"	"	"				
		Beadesert Hills	Guntawang	"	A. G. Hamilton	Oct. to Nov.				
			Boorowa	"	G. Sheaffe	23 November				
			Gulgong	"	Wilkinson	10 November				
Saccolabium	Hillii	Cudgin	Tweed River	"	J. Guilfoyle	October	<i>New South Wales</i> , Clarence River, Beckler. <i>Queensland</i> , Brisbane River, Mueller and Bailey.	I	2	9
Sarcochilus	divitiflorus	Dongay Creek	Macleay River	"	Fitzgerald	November				6 10
			Bellinger River	"	"	"				
			Brisbane River	Q.	F. M. Bailey (Mueller)	"				
	falcatus	Clybuca Creek	Macleay River	N.S.W.	Fitzgerald	"	<i>New South Wales</i> , Hunter, Paterson, and Williams Rivers, R. Brown.	I	5	3
		Minnamurra River	Kiama	"	"	"				
		Hastings River	Wollongong	"	"	"				
			Port Macquarie	"	"	"				
			Mount Dromedary	"	O. Reader (Mueller)	"				
	Fitzgeraldi	Naroo Falls	Bellinger River	"	Fitzgerald	"				3 3
		Mount Warning	Tweed River	"	J. Guilfoyle	"				
	Hillii	Stone-quarry Creek	Picton	"	Fitzgerald	"	<i>New South Wales</i> , Camden River, and Parramatta, Dr. Woolls; Hastings and Clarence Rivers, Beckler. <i>Queensland</i> , Brisbane River, W. Hill; Rockhampton, Thozet and O'Shanesy.	I	5	5
		Bell Bird Creek	Nepean River	"	"	25 September				
	Montanus	Mount Banda	Macleay River	"	"	October				5 3
		Mount Wilson	Blue Mountains	"	"	November				
		Mount Tomah	"	"	"	"				
	olivaceus	Taylor's Arm	Bellinger River	"	"	October				
			Nambucca River	"	"	November	<i>New South Wales</i> , Hastings and Clarence Rivers, Beckler. <i>Queensland</i> , Rockingham Bay, Dallashy; Moreton Bay, W. Hill.	I	5	5
		Bulli Pass	Illawarra	"	"	"				

* With smooth labellum.

SYNOPSIS OF DISTRIBUTION—continued.

Genus.	Species.	Sub-locality.	Locality.	Colony.	Collector.	Time of flowering.	Localities recorded in the <i>Flora Australiensis</i> .	Australian Orchids.		
								Vol.	Part.	No. of Plate.
Sarcochilus <i>continued.</i>	olivaceus ... <i>continued.</i>	Yarraba	Macleay River Mount Dromedary	N.S.W. "	Fitzgerald	November				
		parviflorus	Redbank Creek	Picton	"	Fitzgerald	October	Victoria, Apollo Bay, Mueller; Dandenong Range, Taylor; Tasmania, Emu Bay, Black River, Circular Head, Great Swanport, Gunn and Milligan.	I	3
Spathoglottis	Paulinae ...	Hunter's Hill	Sydney	"	"	November				
		New Port	Pitt Water	"	"	"				
Spiranthes ...	Australis ...	Mount Tomah	Blue Mountains Melbourne	" V.	" "	" "				
		Fern-tree Gully	Cape Sidmolth Cape Granville	Q. N.S.W.	Dr. Curdie (Mueller) ... Ready (Mueller)	February	Queensland, Rockingham Bay, Dallashy	I	6	8
Thelymitra	carnea	Hunter's Hill	Bellinger River Lake George ... Macleay River ... Bowenfels	N.S.W. " " " " " "	Fitzgerald	March	New South Wales, Blue Mountains, Miss Atkinson; New England, C. Stuart; Clarence River, Beckler; Richmond River, Fawcett. Victoria, Mitta Mitta, Broadribb, and Snowy Rivers, Lake Omco, Mueller; Portland, Crouch. Tasmania, Circular Head, Gunn; Cheshunt, Archer; Swanport, Story.	I	2	1
		Condamine River Sydney	Sydney	N.S.W.	C. Hartmann (Mueller) Fitzgerald	September ...	Victoria, Wendu Vale, Robertson, Port Phillip, C. French. Tasmania, Hobart, Gunn; Georgetown, and Cheshunt, Archer; Southport, C. Stuart.	I	6	2
"	circumsepta longifolia ...	New Port	Pitt Water	"	"	"				
		Mount Wilson ...	Blue Mountains Parramatta	" "	Dr. Woolls Fitzgerald	25 October				
"	nuda	Mount Tomah	Blue Mountains Sydney	" "	" "	December ... September ...				
		Hunter's Hill	Bethungra	"	"	1 October	New South Wales, Illawarra, Backhouse; Victoria, Forest Creek, Mount Disappointment, Wilson's Promontory, Nangatta Range, Mueller; Grampians, Fisher; E. Gippsland, Walter. Tasmania (generally), J. D. Hooker.	I	4	1
"	media	Hunter's Hill	Lithgow	"	"	6 November				
		Mount Lofty ...	Guntawang	"	Wilkinson A. G. Hamilton	Sept. & Oct. 24 October				
"	megecalyptra	Hunter's Hill	Adelaide	S.A.	Fitzgerald	October				
		Deniliquin Station	Deniliquin	N.S.W.	(T. <i>ixioides</i> of Hooker) Fitzgerald	25 September ...				
"	pauciflora ...	Marbleup	Guntawang	"	A. G. Hamilton	Sept. to Oct.				
		St. Werburgh	Boorowa	"	G. Sheaffe	30 October				
"	nuda	Hunter's Hill	Yass	"	C. Jenkins	9 October				
		Albany	Sydney	"	Fitzgerald	September ...				
"	pauciflora ...	Wilson's Inlet	Albany	W.A.	"	20 "				
		Hay River	Albany	"	"	30 "				
"	pauciflora ...	The Bows	Northampton ...	"	"	8 October				
		Mount Lofty ...	Adelaide	S.A.	"	25 August				
"	pauciflora ...	Hunter's Hill	Sydney	N.S.W.	"	24 October				
		Mount Wilson	Blue Mountains	"	"	23 September ...				
"	pauciflora ...	Mount Lofty	Adelaide	S.A.	"	25 October				
		Albany	Albany	W.A.	"	24 "				
"	pauciflora ...	Hunter's Hill	Sydney	N.S.W.	"	20 September				
		Mount Wilson	Blue Mountains	"	"	25 October				
"	pauciflora ...	Mount Lofty	Adelaide	S.A.	"	24 "				
		Albany	Albany	W.A.	"	20 September				

PART 1.

JULY, 1873.



AUSTRALIAN ORCHIDS.



AN expression by Mr. Darwin of regret that he had not an opportunity of examining an Orchid with an irritable labellum, and a reference to our Australian genus *Caleana* in the very interesting and instructive treatise on the Fertilization of Orchids by that great naturalist, has been my inducement to study the family with more than ordinary zeal, in the hope of adding, as it were, a single stone to the great pile constructed by the boldest speculator of the age.

Mr. Darwin's proposition regarding "the contrivances by which Orchids are fertilized" is, that they "have for their main objects the fertilization of each flower by the pollen of another flower." As far as I could investigate the subject in Australia, I have not been able altogether to verify this proposition; for though the great majority appear to be frequently impregnated by pollen brought from other flowers, I believe they are also frequently fertilized by their own; and, again, there are others always self-impregnated, such self-fertilized species (not dependent on insects) always producing a far greater proportion of seed. So important a difference might well be expected to coincide with generic

NOTE.

THE order of publication is not intended to be that of final arrangement; information therefore respecting fertilization and other points that might appear at first to be omitted, will be found under the species intended to represent groups, or under those more directly experimented upon, as in many cases the processes are similar, and repetition would be unnecessary. Localities, unless where incidentally referred to, or where species have been personally found by the author, will be omitted, as it is intended to give a comparative list of distributions at the close of the work, when it is hoped the present publication may have directed more local attention to the subject, and more information may consequently be collected.

Although it is extremely desirable that species should retain the names first bestowed upon them, in the present state of our knowledge of this Order it is impossible altogether to obtain such a result, considering that the original descriptions are often very meagre—that the specimens by which such descriptions could alone be checked are not now in the Colony—that in their comparison for the "Flora Australiensis" Mr. Bentham had not the advantage of examining them in a fresh or growing state, and that consequently a number of names have been suppressed by him, without any further description by which they could be re-established if necessary, or distinguished from really new forms.

One of the objects of the present publication is to give an accessible basis of reference; and should it be found from it that, owing to the above causes, the original naming has occasionally been abandoned, it may here be stated that such renaming is not intentional but unavoidable, and a matter of regret to the author.

Now examine another species of the same genus, *Thelymitra carnea*. The flowers are of a bright pink. Here are the extended arms—the shield-like stigma—the sticky rostellum and the pollen masses behind the glutinous stigma; but there is a slight modification: the pollen masses are not only behind but over the stigma, and crumble upon it whilst yet in the bud, thereby fertilizing the flower, which *seldom* opens, and *never* until after fertilization. What has become of the picture of design? For what is the colour in the flowers, seeing that they so rarely open, and then to no purpose? For what are the arms? What use is the rostellum? Without their aid, *T. carnea* is far more fertile than *T. ixioides*; in fact, every flower produces seed. Why are all those parts, so necessary to *T. ixioides*, present in *T. carnea*? Can they be accounted for by any other explanation than relationship through inheritance?

The flowers of many Orchids that would otherwise remain open for a long time (in some cases even for a month), if not fertilized, wither in a few hours after the pollen has been placed on the stigma. This fact might lead to the conclusion that the flower of *T. carnea* does not open, or rarely opens for a short time, simply because it has not time before the withering effects following fertilization (which has taken place in the bud) has reached it. To a certain extent this may be the case, but it is contradicted by what occurs in that of *T. longifolia*. *T. longifolia* is also fertilized in the bud, yet on fine bright days it opens for *an hour*. Is this useless opening also to be referred to inheritance?

In some Orchids there is a dependence on insects, and an elaboration of detail that ends in their being almost condemned to barrenness; others comparatively simple, though also dependent on insects, are very much more prolific, that is, many of the flowers produce seed. *Dendrobium* appears to be only occasionally fertilized, as it were by accident.

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AN expression by Mr. Darwin of regret that he had not an opportunity of examining an Orchid with an irritable labellum, and a reference to our Australian genus *Caleana* in the very interesting and instructive treatise on the Fertilization of Orchids by that great naturalist, has been my inducement to study the family with more than ordinary zeal, in the hope of adding, as it were, a single stone to the great pile constructed by the boldest speculator of the age.

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Can there be a more perfect example of predetermined design? The bright colour to attract the insect—the arms to guide it—the projecting rostellum for it to touch—the viscid matter on the rostellum to adhere to the visitor—and the expanded shield-like stigma, covered in its turn with gum to lay hold of the pollen, when the insect either returns its head in search of honey or visits another flower, perhaps on the same spike. What trace is there of development? It is a well-adapted whole: a whole well-adapted to one end.

Now examine another species of the same genus, *Thelymitra carnea*. The flowers are of a bright pink. Here are the extended arms—the shield-like stigma—the sticky rostellum and the pollen masses behind the glutinous stigma; but there is a slight modification: the pollen masses are not only behind but over the stigma, and crumble upon it whilst yet in the bud, thereby fertilizing the flower, which *seldom* opens, and *never* until after fertilization. What has become of the picture of design? For what is the colour in the flowers, seeing that they so rarely open, and then to no purpose? For what are the arms? What use is the rostellum? Without their aid, *T. carnea* is far more fertile than *T. ixioides*; in fact, every flower produces seed. Why are all those parts, so necessary to *T. ixioides*, present in *T. carnea*? Can they be accounted for by any other explanation than relationship through inheritance?

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A splendid specimen of *D. Hullii*, in the Botanic Gardens, produced in 1872, from sixty pseudo-bulbs, 190 spikes, that bore, each at least, 200 flowers. This one plant therefore at one time was covered with about 40,000 flowers, and yet did not produce a single seed. But this seems less surprising when it is considered that there is a cap to be thrown back—solid pollen masses (like tiny grains of wheat) to be removed—that they are very liable to fall back into a hollow in the column (the clinandrum) where they are lost for ever—that they must be inserted into a little cave-like hollow below, and that they can hardly *fall* into it from the position of the flower, while the lip appears to be rather a hindrance to the action of insects than a help.

In the genus *Eriochilus*, the only species (*autumnalis*) if placed out of reach of insects produces no seed, but the discs to which the pollen masses are attached are simply placed above the stigma for removal, without complication in lip or column, and at least in some localities very many flowers bear seed. Thus, throughout the whole Order, as far as my experience extends, fertility is in an inverse ratio to the apparent arrangement for its production by the intervention of insects. Pretty little flowers, perfect of their kind, stand there from day to day, and at last wither on their graceful stems without performing the object of their existence. Do they not in their virginity present a curious picture of over-lauded Nature?

Mr. Darwin seems to me to lay rather too much stress on the action of large insects seeking honey by the aid of a proboscis, as agents in fertilization. Among Australian Orchids, and perhaps generally, two other classes appear to be at least as instrumental. Small insects of various kinds that crawl among fallen branches, and in and out of any flowers growing amongst them, and insects that attack the flowers and partly devour them. The whole form of *Cypripedium*, for instance, seems to be suited to entrap a small insect in the labellum; such an insect, by escaping through either opening on either side of the column would carry the pollen to another flower, or by retreating, after an effort to escape, would fertilize the flower with its own pollen. This view of the action of such small intrusive insects as thrips, beetles, &c., will be more fully referred to in remarks on the genera *Pterostylis*, *Corysanthes*, &c.; but I may add that they appear to me (as being likely to seek the long nectary as a retreat) to afford an easier solution of the fertilization of *Angraecum sesquipedale* than the idea that there is an insect, of which nothing is known, with a proboscis of so extraordinary a length as would be required for the extraction of honey from such a depth; or perhaps the third class of insects are still more likely (attracted by the long nectaries as delicate food) to eat their way into the flower and to become the means of its fertilization. *Sarcochilus Fitzgeraldi*, when first found in a deep gully, had its leaves and petals much eaten in holes by a kind of wood-louse, and I have no doubt that insect was the principal agent in its fertilization. It would be interesting if it could be ascertained whether in its native habitat *Angraecum sesquipedale* is similarly mutilated. On one occasion I found a small caterpillar on a flower of *Dendrobium speciosum*; it had partly devoured an adjoining flower, the remnant of which I marked by tying a small bit of wool round the pedicel. The flower so marked alone on the spike, or indeed on the plant, produced seed. An insect, by devouring the top of the column, would be particularly likely to cause fertilization in *Dendrobium*, as the pollen masses, when the division between the clinandrum and stigmatic chamber is eaten away, would be likely to fall into it. But in considering such developments as the nectary in *Angraecum*, tailed sepals in *Cypripedium*, hinged labellum in *Caleana*, &c., it is not necessary, as I read the case, to look for any benefit directly or indirectly to the flower as a cause of their existence. If minor appendages occur, and are of no use, why should not such accessories or modifications be useless? Of what advantage are the curiously-varied glands on the labellum of the *Caladenias*, of *Lyperanthus*, &c., or, to refer to another Order, the glands on the phyllodium in the *Acacia*? Is not the true answer that they are modifications of parts which *may* have been once of use, and all the more likely to occur in exaggerated forms where there has been much disturbance by hybridization or otherwise? There seems to be no reason why they should not be continued in varying forms, unless they happen to become so detrimental as to cause extinction. This is a point that the naturalist should keep constantly in sight in considering Mr. Darwin's theory of development; for so educated are we to the ideas of design and pattern that it is almost impossible to regard adaptation and similitude from any other stand-point; so much so indeed that even Mr. Darwin speaks of contrivance and the purpose of an organ, whereas the determination not to expect or look for any object or purpose enables us to accept without difficulty such transitions as are to be found in the labellums of *Pterostylis*, to find special utility for which might well puzzle any naturalist. It enables us also to pass over extraordinary, and perhaps monstrous developments, without being compelled to find or invent a use.

It would seem that many species are not only dependent on insects for existence, but on some special insect affecting the localities where they are found. *Sarcochilus parviflorus* produces capsules not unfrequently in the Blue Mountains; removed from thence to Sydney, numbers of plants, though flowering well, have not borne any seed, if left to themselves, though invariably fertile when the pollen masses were removed and placed on the stigma.

Hitherto fertility has been spoken of only in reference to the production of seed, but there is another and very important sense in which it should be considered, as again modifying the chances of existence in Orchids. The amount of seed produced forms no criterion of the rarity of any species. The number of individuals in a species appears to

depend much more on the adaptability of the seed to vegetate, under various circumstances and in various soils, than on quantity. *Thelymitra carnea* produces, as before stated, a full capsule for every flower, yet it is not nearly so common as *Acianthus fornicatus*, the majority of the flowers of which are unproductive. *Phajus grandifolius* and *Calanthe veritriifolia* grow in similar situations. Every flower of *Phajus* produces seed, only occasionally one of *Calanthe*, yet *Phajus* is rare and *Calanthe* common; but in any species the seeds that vegetate bear no conceivable proportion to those that are lost. The chances for and against extinction are thus curiously balanced, and no doubt the balance sometimes turns against a species—then that species ceases to be. This sweeping away of species, together with hybridization (which I believe occurs in this family), appears to me to account for its isolation, or departure from the general types of vegetation, and for so great variability within itself; as of course where there is great *denudation* and *reconstruction* (to use appropriate geological terms) there must be great departures from homologies.

The debtor and creditor account of *Dendrobium speciosum* may be stated thus: Against it—that not one flower, say in a thousand, produces a capsule. For it—that that one capsule contains half a million of seed. Against it—that possibly, if not probably, out of the half million not one seed vegetates. For it—that it is long-lived, and hardy. This statement cannot be considered to place *Dendrobium speciosum* in a very solvent position, and were it not for the last item I believe it would long since have become extinct. In support of this opinion it may be stated, that in any situation, even on the summit of flat moss-covered rocks, where they frequently grow, and where the seed might well be expected to vegetate, the masses consist of a few large plants, and very few young ones are to be seen, notwithstanding the quantity of seed that must fall and rest in such a place when even one capsule bursts over it. Around Sydney, where the old plants have recently been removed, though small plants would not be interfered with, very few such can be found.

When there is an unfavourable season many species do not flower. In 1872, the winter of which was dry, I examined carefully very many patches of *Corysanthes*, and found but very few flowers, and not a single capsule, where in a former year thousands of flowers could have been obtained. For years a vain search has been made for the flowers of *Acianthus caudatus* in a situation where they had been previously found, and where the leaves are plentiful. When, from want or excess of rain, ground Orchids only grow leaves at their usual time of flowering, I believe they sometimes avail themselves of the somewhat similar temperatures of spring and autumn to produce a few stray flowers out of season; but it appears probable that in whole districts for years many Orchids hardly add to their number.

In the various species not palpably self-fertilized I have frequently found the flowers impregnated, their own pollen not having been removed. In such instances the pollen must have been brought from other flowers. The strongest argument against its having been conveyed by insects has appeared to me to be that frequent hybridization might be expected, as a consequence, allied species being often found growing near each other.

It must, however, be remembered that they do not always flower at the same time, and that hybrids may easily be overlooked or considered varieties, and may never reproduce themselves. That crosses between species of the same genus or allied genera do sometimes occur in nature, and possibly establish new species, I am led to believe from the following reasons:—Without fail I have succeeded in obtaining full capsules of seed from such crosses, the plants belonging to species not self-fertilized being placed under bell-glasses and the genuineness of the cross tested by the placing of others also under bell-glasses without interfering with their flowers. From the latter no seed was ever obtained. In both cases the plants were covered from the time they were in bud. When we consider the marvellously low ratio of vegetation in the seed, and the consequently very high ratio of chances against a stray hybrid growing in the first instance and afterwards producing self-fertilized seed that should also be fortunate enough to grow, we can hardly wonder that hybrids are not frequently found. I have, however, discovered at least on three occasions Orchids which I believe to be hybrids—one between *Dendrobium gracilicaule* and *D. Hillii* (?), one between *Pterostylis pedunculata* (?) and *P. curta* (?), and one between *Glossodia major* and *minor*.

That such crosses may originate new species is as yet only based on inference, as I believe no series of experiments have been made as to how far the few hybrids grown in hot-houses can be self-fertilized, and I have not as yet succeeded in flowering plants raised from hybridized seed to experiment upon; but I am strongly of opinion that hybrids will be found to seed freely if impregnated with their own pollen, and that the only obstacle to their continuance will be found to be the difficulty common to all Orchids of inducing the seed to vegetate. This conclusion is founded on the belief that a repugnance to intermixture does not exist in this family as it does in others, and this belief is based on the very great ease with which I have crossed species of the same genus apparently the farthest removed from one another, and even species not belonging to the same genus. In confirmation of which statement, the following list of crosses effected in 1872 is given. The plants were generally crossed both ways, the pollen being alternately taken from each flower. *Pterostylis*, *ophioglossa*, *concinna*, *acuminata*, *nutans*, *pedunculata*, *curta*, *grandiflora*, *reflexa*, *obtusata*, *Daintreana*, *longifolia*, paired in every combination that the season of flowering would permit. *Caladenia*, *filamentosa*, *pulcherrima*, *alba* and *testacea*, *Glossodia major* with *Caladenia*, *alba*, *testacea*, *filamentosa*. *Glossodia major* and *minor*. *Diuris*

punctata, maculata, aurea. Thelymitra ixiooides with *Diuris punctata, aurea. Thelymitra carnea* with *Diuris aurea. Thelymitra longifolia* with *Diuris aurea. Thelymitra longifolia* with *Thelymitra ixiooides. Dendrobium, speciosum, gracilicaule, Fairfaxii, Beckleri, linguiforme.* The great departure from other families, as previously suggested, and the extent of abortion, modification, and consolidation of the parts, also seem to imply transformation arising from hybridization.

In seeking confirmation of Mr. Darwin's theory that "some unknown great good is derived from the union of individuals which have been kept distinct for many generations," and at the same time observing that the Orchids which were self-fertilized produced a much greater quantity of seed than those most dependent upon insects, and therefore most likely to be fertilized by the pollen of other individuals, it seemed to me to be possible that the "good" derived was increased fertility in the seed itself, thereby making the smaller proportion produced by crossed species of more avail than the larger quantity from species always reproduced from themselves. I cannot say that this possibility appears to me to be borne out by facts; on the contrary, the frequency or otherwise of individuals in a species seems to be a characteristic property of the species altogether independent of the *method* of its fertilization. Of self-fertilized species *Thelymitra longifolia* is very common, *T. carnea* not nearly so common. The two species of *Calochilus* are common, and *Phajus* uncommon. The same uncertainty affects the species most likely to have the pollen carried from one flower to another. No Orchid is so common in Eastern Australia as *Acianthus fornicatus*, *A. exsertus* not nearly so common, and *A. caudatus* very rare. Comparisons cannot be made amongst epiphytal Orchids, as insects appear to be instrumental in the fertilization of all the species, and no reference is made to those that increase their numbers by forming bulbs on the roots in addition to the annual bulb, by which the life of the individual, as it were, is carried on. On the whole, it would appear that neither under ordinary circumstances nor when sown and attended to by man, has the seed of Orchids obtained by the union of separate individuals any advantage as to fertility over that procured from plants constantly self-fertilized. It must, however, be admitted, that as regards experiments with Orchid seed all conclusions must be received with caution, owing to the great difficulty in *persuading* them to vegetate, and the immense disparity, under any circumstances, between that scattered and grown.

Sensitiveness exists in several Australian Orchids, especially in *Pterostylis*, and it is apparently of use to some; but there is not, I think, sufficient evidence that it is necessarily so. In some species it appears to be simply mechanical, and at least useless; in others it must at times be a disadvantage, and might, by a slight modification, become permanently so. In fact, with the appendages often connected with it, it seems rather like a remnant of another state of existence than a requirement of extant forms. It is, however, very interesting in its action, and in its apparent linking of the animal with the vegetable kingdoms. So lifelike is it, that the first observation of a spike of *Pterostylis longifolia*, with all its little tongues protruding and rapidly drawn in on the slightest touch, is certainly very startling and impressive.

Orchids are generally divisible into two groups—the epiphytal (*i.e.*, growing on trees or rocks) and terrestrial. There are, however, intermediate forms, such as *Phajus* (which I have seen growing on a tree), *Calanthe*, &c., where the production of pseudo-bulbs shows a tendency towards the form specially adapted for the retention of moisture in store against the vicissitudes the true Epiphytes are exposed to. Among such intermediate forms one species of *Lyperanthus* and the genus *Cryptostylis* may be included, as at least three species of *Cryptostylis* are found adhering to rocks by their rhizomes and thick fibrous roots, though in other respects they approach more closely to the terrestrial types. As a general rule the relationship between Epiphytes is marked by (or retained in) the form of the anther, which is "lid-like," and resembles (more or less) the upper half of a bird's head with the upper mandible attached, and amongst terrestrial or ground Orchids by the double under-ground bulbs. The progress of such bulbs through the ground, from year to year, by the decay of last year's bulb and the production of a new one, is well illustrated by some of the *Prasophyllums*. In this genus the new bulb seems frequently to grow or be produced only on one side of the older, the decayed bulbs and old withered leaves thus forming a line or rank of two or three inches, terminated by the new bulb, with its green leaves or flower-stem. In general Epiphytes affect moist tropical and the terrestrial extra-tropical situations; for though there are of course exceptions, the southern limit of the Epiphytes may be considered to be the Manning River, and the centre of the terrestrial may, I think, be placed in Sydney, where, 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.*

* NOTE.—The names of the species referred to are appended, not only to indicate at a glance the character of the genera to be found around Sydney, but as a record of what now exists, but will probably have passed away in a very few years. Hunter's Hill wharf is the centre of the circle within which they can be procured:—*Liparis reflexa, Dendrobium speciosum, D. linguiforme, D. teretifolium, Dipodium punctatum, Cymbidium suave, Galeola casythyoides, Spiranthes australis*, with two [varieties?] *Calochilus campestris, C. paludosa, Thelymitra ixiooides, T. longifolia, T. media, T. —, T. carnea, Diuris punctata, D. aurea, D. maculata, D. sulphurea, Orthoceras strictum, Cryptostylis longifolia, C. erecta, Prasophyllum elatum, P. patens, P. rufum, P. striatum, Microtis porrifolia, M. parviflora, Corysanthes fimbriata, C. pruinosa, C. bicalcarata, Pterostylis ophioglossa, P. concinna, P. accuminata, P. nutans, P. pedunculata, P. curta, P. grandiflora, P. reflexa, P. obtusa, P. Daintreana, P. rufa, P. longifolia, Caleana major, Acianthus caudatus, A. fornicatus, A. exsertus, Eriochilus autumnalis, Lyperanthus suaveolens, Cyrtostylis reniformis, Caladenia pulcherrima, C. —, C. —, C. —, C. carnea, C. alba, C. testacea, C. carulea, Chiloglottis diphylla, Glossodia major, G. minor.*

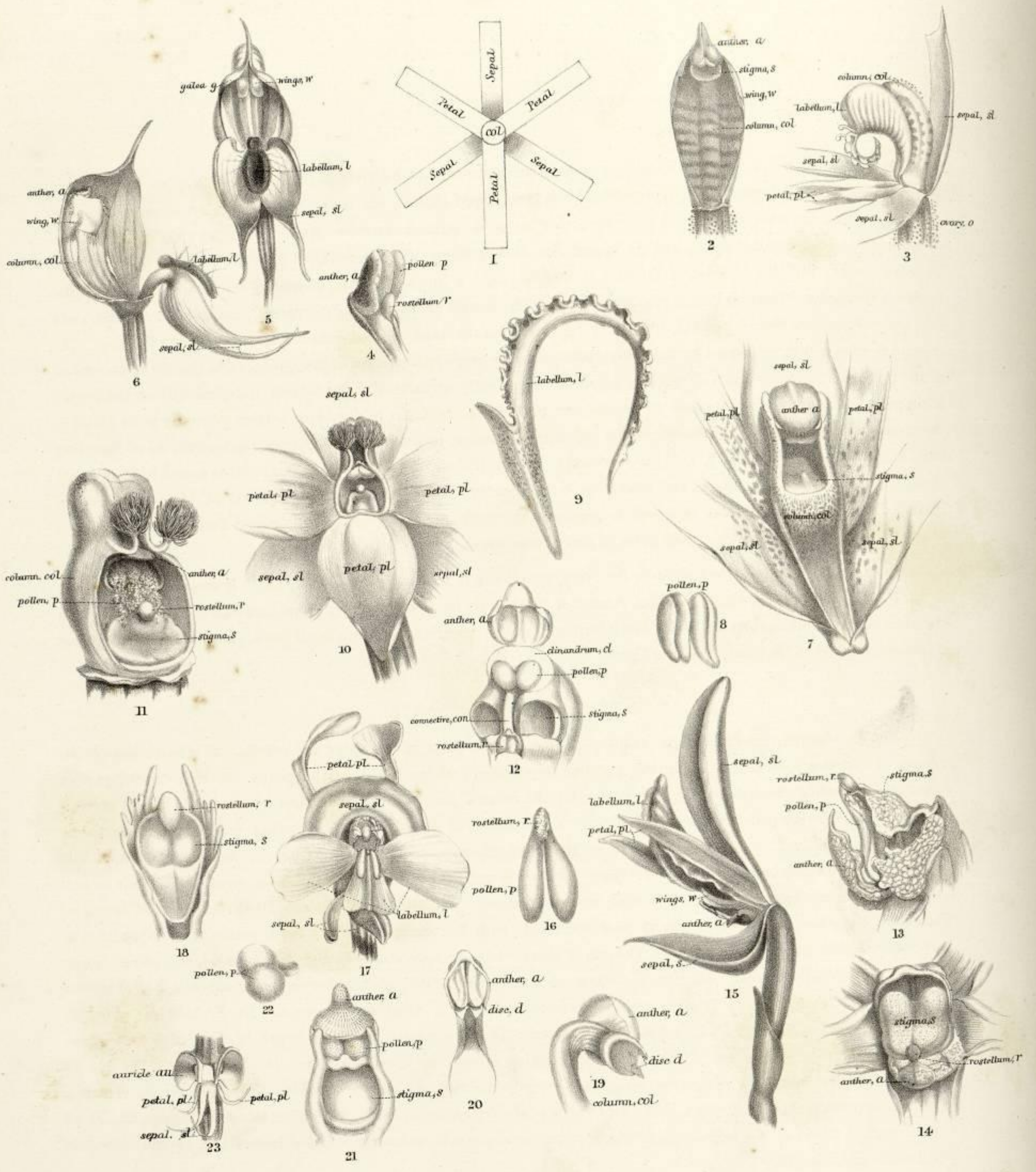
The rich tropical brushes are by no means favourable to the production of terrestrial Orchids, nor are they so frequently to be found growing on trap or other formations as on sandstone, especially where the sand is mixed with vegetable mould. The distribution of species is very capricious. When the botanist penetrates into some "gully" he has not previously explored, it is always with an uncertainty as to what species he may find tenanted it; for no matter how near it may be to any similar spot he has examined, he cannot depend upon obtaining the same species, and he not unfrequently comes upon one he did not believe to belong to the district.

In illustration the following species are given as found in two short precipitous creeks falling into "The Basin" at Pitt Water, within a hundred yards of each other. In the northern gully, *Dendrobium speciosum*, *Liparis reflexa*, *Bulbophyllum exiguum*, *B. Sheperdi*. In southern gully, *Dendrobium speciosum*, *D. tetragonum*, *D. linguiforme*, *D. striolatum*, *D. æmulum*, *Liparis reflexa*, and *Pterostylis nutans*. The presence of *Dendrobium tetragonum* is specially remarkable, as it had not, I believe, been previously found further south than the Hastings River, a distance of 200 miles. The exceptional finding of species thus isolated is, in my opinion, another proof (if any be required) of the low ratio of fertility in the seeds of Orchids. To reach such situations the seed must be widely diffused over suitable localities, yet in all time they have not succeeded in establishing a colony except here and there.

On reviewing the whole subject of fertilization of Orchids, the ideas that seem to me to remain most impressed upon the mind are, the fearful waste of vital power in the production of so many barren flowers and such an infinity of useless seed, and the consequent vastness of time required, through such precarious and intermittent means, to bring about the present state of species (so called) and genera (so called). Supposing that species are but more persistent varieties, and that genera are but species cut asunder by the destruction of intermediate forms or species, how overwhelming the contemplation becomes of the vastness of the time required, with the means before us, to bring about such a divergence, with yet a retention of a trace of common origin, and how vast and relentless must have been the sweeping away of all the strange forms that must have connected them!

How the naturalist longs that he could be more merciful than Nature, and could bring them into existence again, or even obtain a glance at the beautiful forms and curious relationships that have passed away for ever, and how insignificant, for what it has accomplished, all time, short of eternity, appears to be when he looks upon the whole Order itself as but one of its own seeds compared with the whole Creation—a Creation retaining throughout *that trace* of common origin.





From Nature by R.D. Fitzgerald F.L.S.

On Stone by Arthur J. Stoppe.

Sydney, N.S.W., Thomas Richards, Government Printer.



THE reader who is not a botanist may, it is hoped, the more readily understand the general type of an Orchid from consideration of the diagram, fig. 1, representing two three-rayed crosses, the limbs of which are set at equal angles to each other, and the one cross placed over the other so as to form a six-rayed star. The lower cross represents the divisions of the calyx called sepals, and the upper cross the divisions of the corolla, all of which in other flowers would be called petals; but one of them in Orchids is modified into a lip or labellum, often very unlike the others. In the centre is situated a column in lieu of stigmas and styles (the female organs and their supports), and anthers and filaments (the male organs and their supports), usually to be found in the class of Endogens in some multiple of three. The column is supposed to be formed by the consolidation of such parts, and consists in the typical form (fig. 2) of an anther at the top and a stigma beneath it, supported by what is generally specialized as the column, independently of the organs it supports. The anther is supposed to be the one perfect representative of the three anthers generally to be found in the class, and the wings or expansions of the column (sometimes present) to be the barren representatives of the other two (fig. 6). The stigma (figs. 2, 7, 11) is supposed to be two of the three stigmas (that might be expected to be present) consolidated into one, and above the stigma in many genera is to be found a boss (figs. 4, 11, 14, 18) or a projection, (figs. 7, 12), called the rostellum, supposed to represent the third stigma. Such is the general character of the flower of an Orchid, subject to much modification in almost every part.

In some genera, owing to a twist in the ovary, the flower is inverted (figs. 13, 14, 15). Reference in such a case to fig. 1, or a clear recollection of the idea contained in it, will be found to be a great assistance to the student in studying such and other aberrant forms, the labellum from its peculiarities being in all cases, except in *Thelymitra* and *Apostasia*, a guide to the position of the figure.

EXPLANATION OF PLATE.

Fig. 1. Diagram illustrating the relative position of the parts of the calyx and corolla. 2. Front view of the column of *Caladenia carnea*, showing the peculiar development of the wings in the genus. 3. Side view of part of flower of *Caladenia carnea*, showing labellum clasping the column, part of sepals and petals removed. 4. Top of column of *Pterostylis rufa*, the pollen removed. 5. Front view of flower of *Pterostylis rufa*, showing column within the galea, and labellum dependent between lower sepals. 6. Side view of same, half the galea (that is, the combination of side petals and dorsal sepal) being removed. 7. Front view of flower of *Dendrobium teretifolium*, sepals and petals in part cut away, and labellum removed. 8. Pollen masses of same. 9. Labellum of same. 10. Front view of flower of *Thelymitra longifolia*, petals and sepals in part cut away, with the exception of the lower petal (which is modified in most other Orchids into a labellum). 11. Column of same, showing appendages to the column hood, and pollen falling from the anther on the stigma. 12. Top of column of *Sarcochilus Hillii*, anther thrown back, exposing pollen masses resting on the clinandrum. 13. Side view of inverted column of *Cryptostylis erecta*. 14. Front view of same, showing base of the labellum, which has been removed. 15. Side view of inverted flower of *Prasophyllum elatum*. 16. Rostellum, and pollen masses of *Diuris æqualis*, showing winged or lobed labellum. 17. Front view of column of same. 18. Front view of column of same. 19. Top of column of *Acianthus fornicatus*, slightly inverted, to show the stigma. 20. Front view of same, showing rostellum modified into discs. 21. Front view of *Bulbophyllum Ellisæ*. 22. Pollen masses of same. 23. Front view of part of flower of *Corysanthes fimbriata*, showing sepals, petals, and auricles at the base of the column, labellum and dorsal sepal removed.

Genus *Pterostylis*. (R. Brown.)

THIS genus is one of the largest and at the same time most interesting of Australian Orchids. It divides itself naturally into two divisions, the one-flowered and the many-flowered. *Pterostylis nutans* may be taken as typical of the first, *P. longifolia* of the second, and *P. parviflora* of an intermediate form. The first division have the lips enclosed within the flowers, with fimbriated appendages at the hinge. The second have the lips dependent from the flowers, and without appendages, or at least *fimbriated* appendages, at the hinge. All, I believe, grow radical leaves, but at different periods of their growth. In some, bracts or colline-leaves are alone found on the flower-stem, and the radical leaves grow only from the young bulbs after the flowering, or on the plants that have not flowered. In others, the flower-stem rises from the centre of the radical leaves. All are found growing in groups, and this grouping is, in my opinion, corroborative of the belief that they are very seldom produced from seeds, the grouping being accounted for by their forming frequently bulbs on leading roots, in addition to the annual bulb formed near the plant to replace the bulb of the year. In proportion as this habit is frequent in a species, that species will be found common or the reverse. The production of extra bulbs is favoured by the plant being (as is often the case) situated in light leaf-mould on the top of a rock. In that position the waxy filamental roots extend a long distance on the surface of the stone beneath the loose dead leaves and sticks, and protruding here and there into the light, form new bulbs. From such situations the bulbs are frequently swept by heavy rain; they are also, by the up-casting of ants, exposed to removal from the fine sandy soil in which they generally grow, and by the burrowing of bandicoots. Bulbs thus transported vegetate again, though frequently left on the surface uncovered and a species may in consequence often be traced for a long distance through "tea-tree" slopes and down gullies.



From Nature by R.D. Fitzgerald FLS.

On Stone by Arthur J. Stoppes.

PTEROSTYLIS Longifolia.

Pterostylis longifolia. (R. Brown.)

THE lower sepals, united for the greater part, depend in front of the flower like a pair of pointed bands. The upper sepal forms a hood, enclosing the column, the opening to reach which is still further narrowed by the side petals, which partly cohere to the hood. The labellum, formed like the last for a lady's boot, with the toe slightly turned up, and the whole covered with hairs, especially along the "welt," is attached from the heel by a short band in front of the column. This band permits the labellum to hang down on the lower sepals. The column is slightly arched forward, and the united stigmas form a furrow with raised edges along the greater part of its length. The sides of the rostellum are produced on either side into wings (probably abortive anthers), which meet in front with interlacing hairs, leaving but a narrow opening at the top over the anther. The rostellum rises slightly between them into a viscid boss, and supports four long pollinia, which rest loosely in the open cells of the anther. The anther hangs forward lightly over the pollen masses, and is readily moved backwards on a hinge, so as to admit of their easy removal. In this and all other species of *Pterostylis* the wings are placed very much as the sods are in front of a gin set for stone-chats, and would form a barrier against an insect reaching the rostellum other than by passing through and under them. The labellum, as stated, falls down on the lower sepals, but on the slightest touch springs up (into the position shown in figs. 1, 6, 7), and continues to close the flower from half an hour to an hour and a half, according to the state of the plant and the weather. It then drops down again, taking from one minute to five to descend spasmodically, when, after about one minute, it quickly regains its sensitiveness. The form and position of the wings and action of the labellum, closing the flower, led me to the conclusion that fertilization must be performed by very small insects, shut in by the labellum and effecting their escape through the wings, thereby being brought into contact with the viscid matter on the rostellum, transferring it to the pollen masses, and thus removing them from the anther, which would yield on the hinge at the back and permit egress. I therefore procured a few of the small beetles that afflict the Hibiscus, and carefully dropping one of them on the labellum, it was instantly carried into the flower, where its efforts to escape were anxiously watched for a quarter of an hour, when it managed to effect that escape by creeping through the wings and past the rostellum (fig. 6), forcing the anther partly back. It was immediately seized, and two of the pollen masses were found attached to its side (fig. 8). This insect was then dropped on the labellum of a *Pterostylis obtusa*, from which the pollinia had been removed, and a full capsule of hybrid seed was thus obtained. On repeating this experiment the result was not always the same, as in some cases the beetle, after advancing up the column (fig. 6) sufficiently to remove one or more pollen masses, drew back, and retiring over the stigma fertilized the flower, and at length escaped with some of the pollen attached to it; and again, in some cases the beetles were apathetic, and remained inactive till the labellum had fallen, when they escaped without affecting the condition of the plant. This result is however far less likely to occur when an insect visits a flower of its own freewill and is suddenly entrapped, than when it has been handled and kept in confinement before being dropped on the labellum. Notwithstanding this complex arrangement for the fertilization of this species very few flowers comparatively are fertilized, and the visits of insects, unless they occur at night, seem to be few and far between; for though it is not an uncommon Orchid, and is to be found in groups, the labellum is seldom noticed closing the flower, which would often be the case were it frequently touched, as it remains so long a time before recovering the dependent position. Should insects touch the labellum and not be carried into the flower, or should wind shake the plant, the instant exclusion of all insects, by the springing up of the labellum and its continuance for so long a time in debarring entrance, must apparently be at least as great a disadvantage as any advantage its sensitiveness can possibly be.

Under all the circumstances very few pollinia are found in a state of nature to be removed from the anthers, and when the plants are kept under a bell-glass no seed is ever produced. When the pollen of this species itself or that of any other *Pterostylis* is placed on the stigma, full capsules of apparently good seed are almost invariably obtained. The labellum continues to be sensitive till the flower begins to wither, whether it has been fertilized or not, and plants subjected to strong fumes of chloroform lose little or none of their sensitiveness. The time of flowering of this species is from June to September.

EXPLANATION OF PLATE.

No. 1. Side view of flower, half of the galea removed, labellum in position assumed on being touched. 2. Side view of flower, labellum in ordinary position. 3. Side view of top of column, pollen and wings removed. 4. Front view of labellum. 5. Front view of top of column, wings removed. 6. Side of column, showing position of labellum on being touched by an insect, and a beetle crawling over the stigma. 7. Front view of flower closed by labellum. 8. Beetle on having escaped from the flower through the wings and removed two of the pollen masses from the anther.



From Nature by R.D. Fitzgerald F.L.S.

On Stone by Arthur J. Stopps.

PTEROSTYLIS Baptistii

Pterostylis Baptistii. (*Fitzgerald.*)

It is surprising that so fine and remarkable a species, and to be found close to Sydney, should hitherto have escaped notice; but I cannot reconcile any description in the "Flora" or elsewhere with this giant form. The late Mr. John Baptist was the first, so far as I am aware, to bestow any practical attention on it. That gentleman having a few years since noticed this species growing in a "tea-tree" swamp, removed a plant to his nursery gardens, where it has since been grown. Specimens were kindly sent to me from "Baptist Gardens," and my attention thereby directed to the locality (Hen and Chickens Bay) where it was first obtained, and close to which I have since had the satisfaction of observing it *in situ*. For the above reason, and in consideration of the assistance rendered by Mr. Baptist to horticulture when in its infancy in this Colony, I have given to this species of *Pterostylis* (the most likely to attract the attention of florists) the specific name of *Baptistii*. Month of flowering—October.

DESCRIPTION.

Leaves elliptical to lanceolate, from two to four inches long, shining as though varnished, and reticulate above, smooth beneath, on long petioles, radical and rosulate, or in proportion to luxuriance carried upwards and passing gradually into bracts. Scapes one-flowered, from one foot or even less to more than two feet, with three or four sheathing, acuminate bracts. Galea inflated at the base on either side of the central line, erect, but curving from about the centre, acuminate, about three and a half inches (measured from the point to the ovary). Lower lip cuneate, with two broadly cupular lobes extending into lanceolate and then subulate points embracing the galea and longer than it. Labellum linear, compressed for about one-fifth its length into a point (but not twisted as in *P. curta*), curved forward from where the compression commences, with a raised ridge along the centre on the front, and corresponding depression at the back. Basal appendage not very broadly penicillate, in two tiers. Stigma cupular at the base, passing upwards into a long point between the wings of the column. Lower extension of wings long, falcate. Pollen masses hooked.

EXPLANATION OF PLATE.

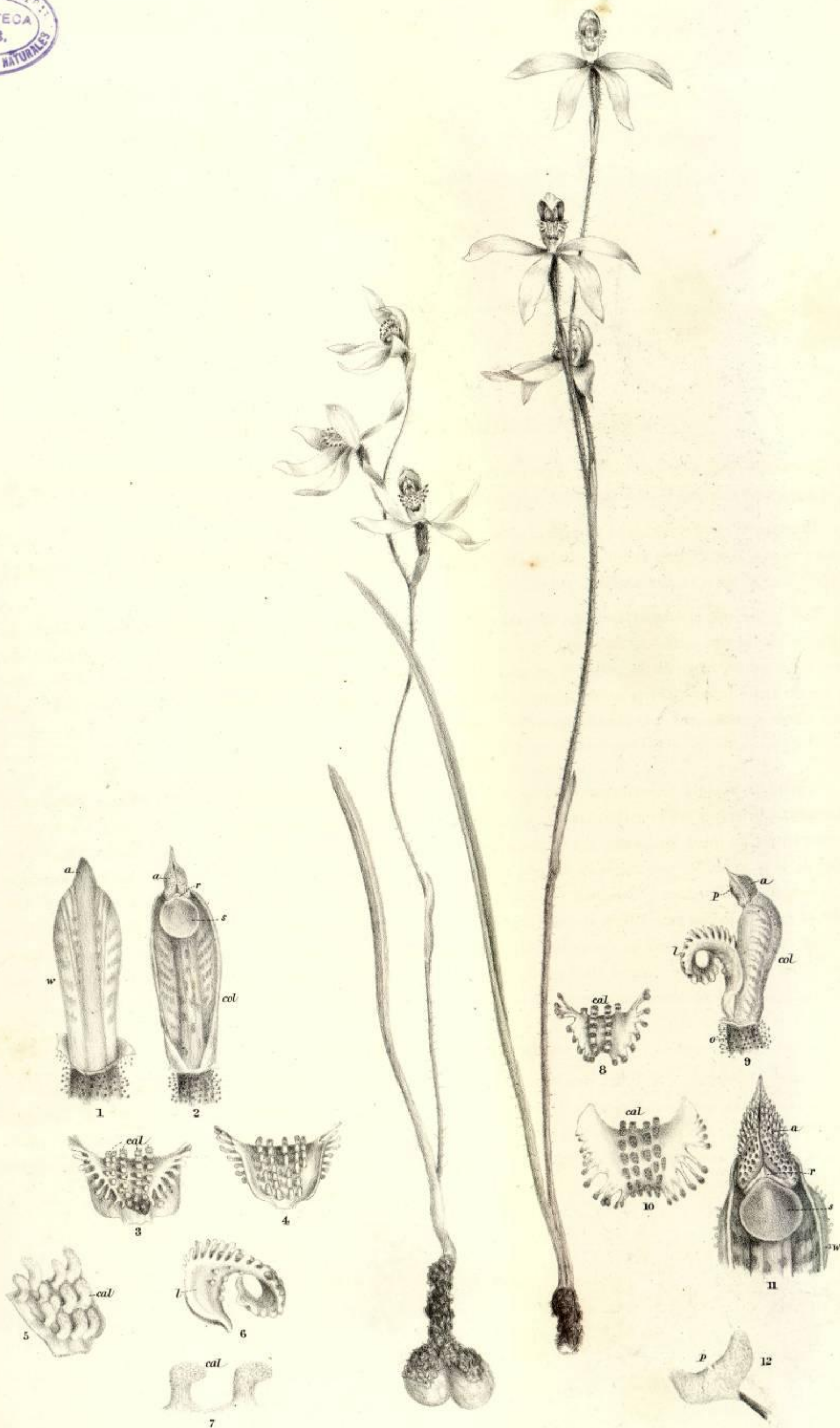
No. 1. Side of flower, half of galea removed (not magnified). 2. Front view of labellum. 3. Back of labellum. 4. Top of column, one wing removed, side view. 5. Column from below stigma, front view. 6. Top of column, wings removed. 7. Pollen masses. 8. Penicillate appendage of labellum. 9. Column and labellum, side view. 10. Plant when not luxuriant, prior to flowering.

The central figures give together the total height of scape.

Genus *Caladenia*. (*R. Brown.*)

THE *Caladenias* are terrestrial Orchids, and are a peculiarly Austral type. They are generally diffused, being found not only in shady moist places, but on the barren summits of hills and among arid rocks and in pure sand. They very seldom produce more than one bulb in the year, and are consequently (being wholly dependent on seed) not found so closely grouped as some other genera. They seldom have more than three or four flowers, and pass very gradually into each other, so much so that the distinction between varieties and species has been very much at the caprice of Botanists.

The leading characteristics of the genus are an upright sepal at the back of the column, the remaining petals and sepals being horizontal, a hairy slender stem, and narrow lanceolate leaf. They generally flower in the beginning of the summer.



From Nature and on Stone by R.D Fitzgerald FLS

CALADENIA *Dimorpha*

Caladenia dimorpha. (*Fitzgerald.*)

THIS very pretty species, which has not, I believe, been hitherto described, I found growing on the swampy flats on the tops of the mountains and on the stony talli of the cliffs known as "walls" round Bowenfels.

It produces two very marked varieties, the one pure white, with the exception of the calli on the labellum (which are straw yellow), the column and the point of the labellum; the other white, with the calli and tips of the fimbriæ of the labellum, and point of the labellum, purple.

This is the only species of Orchid I have known, when placed in a room, to be fertilized by insects. A house-fly lighting on the lip was carried by its spring against the column, and becoming entangled in the gluten of the stigma and struggling to escape, removed the pollen in its masses from the anther and smeared them on the stigma. Such rather large insects are, I believe, the principal agents of fertilization in the genus; the species of which, without some such agency, never produce seed. *Caladenia dimorpha* flowers in October.

DESCRIPTION.

Slender, from eight inches to one foot, not very hairy, from one to three flowered. Flowers white. Dorsal sepal erect, concave, bent forward over the column, about half an inch long, remaining petals and sepals nearly equal, about three-quarters of an inch, lanceolate, acuminate. Labellum concealing two-thirds of the column, hardly three-lobed, contracting to a point for two-thirds its length, recurved and ciliate along the edges for the same length, cilia clavate, ends yellow or purple, sides of labellum incurved. Calli of labellum all similar, short, and rather thick, but bent forward at a right angle, pale yellow in one variety, in the other the upper surface spotted with purple; a few calli on the outside of the labellum and on the outside of the wings, none at the base of the column. Column about three-eighths of an inch, broadly winged throughout its length. A sheathing bract of hardly half an inch beneath each flower, and one of about three-quarters of an inch on the centre of the stem. Leaf linear, from five to nine inches.

EXPLANATION OF PLATE.

1. Back of column. 2. Front view of column, labellum removed. 3. Labellum in yellow-tipped form, from the front. 4. Labellum in yellow-tipped form, from the back. 5. Calli of the labellum. 6. Side view of labellum, yellow-tipped form. 7. Calli of labellum, much magnified. 8. Labellum of purple-tipped form, near the point. 9. Side of labellum and column. 10. Centre of labellum, purple-tipped form. 11. Top of column, showing stigma and anther. 12. A pollen mass.

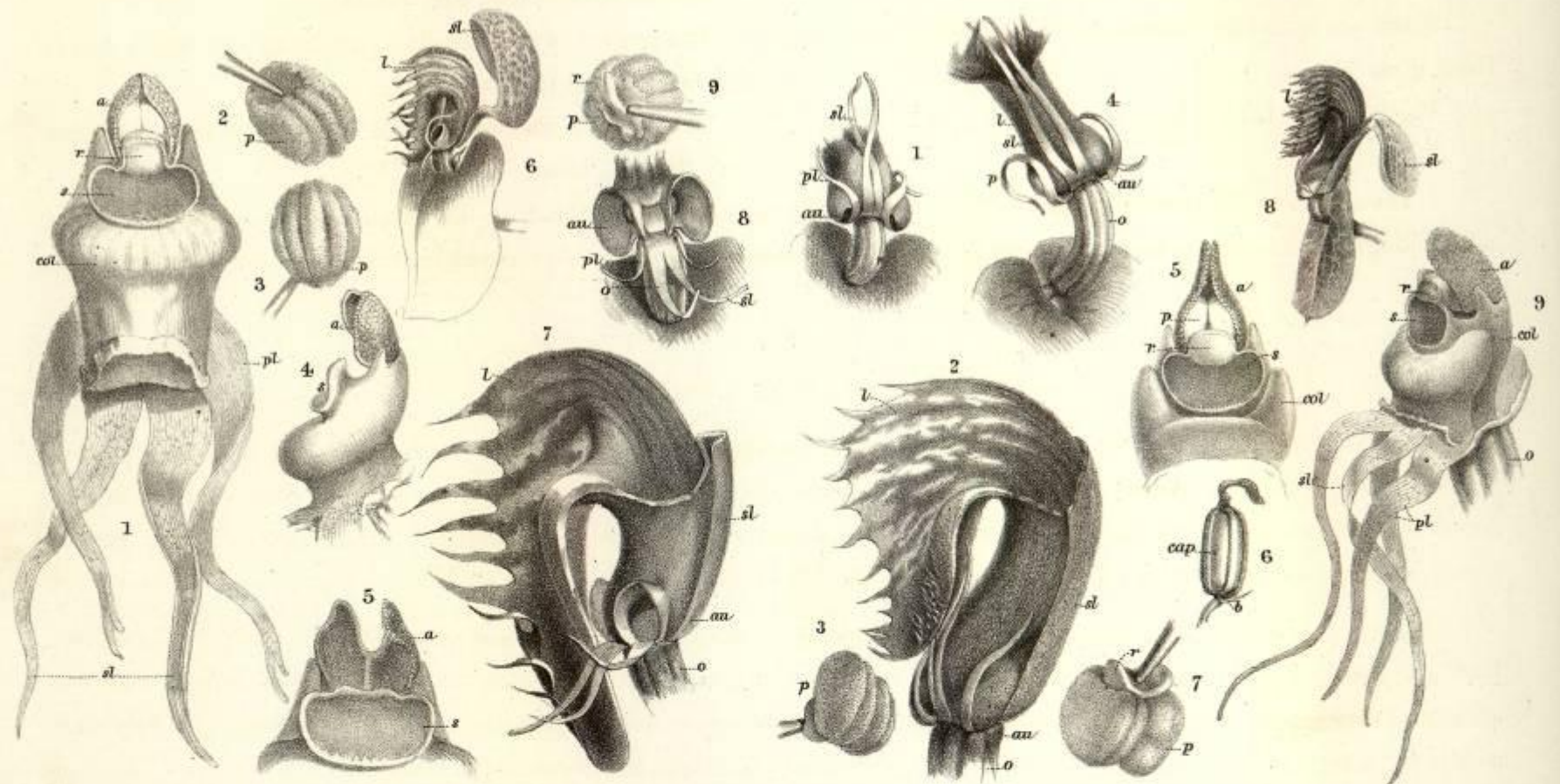
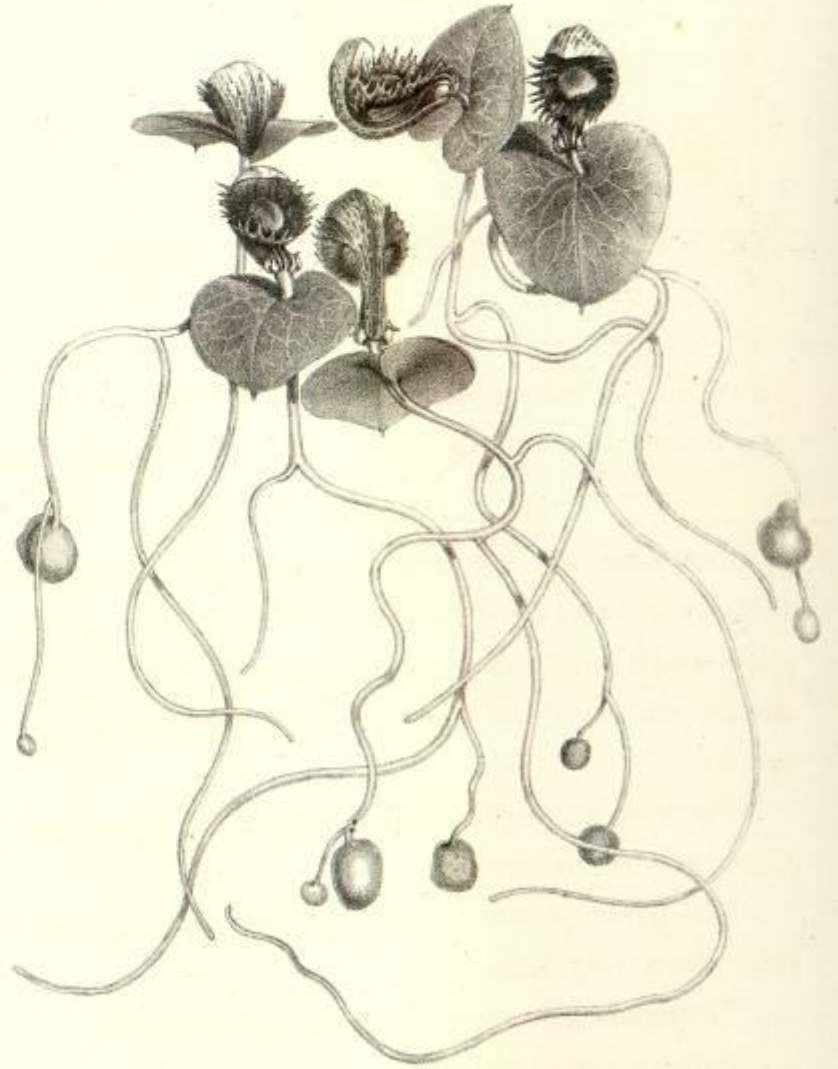
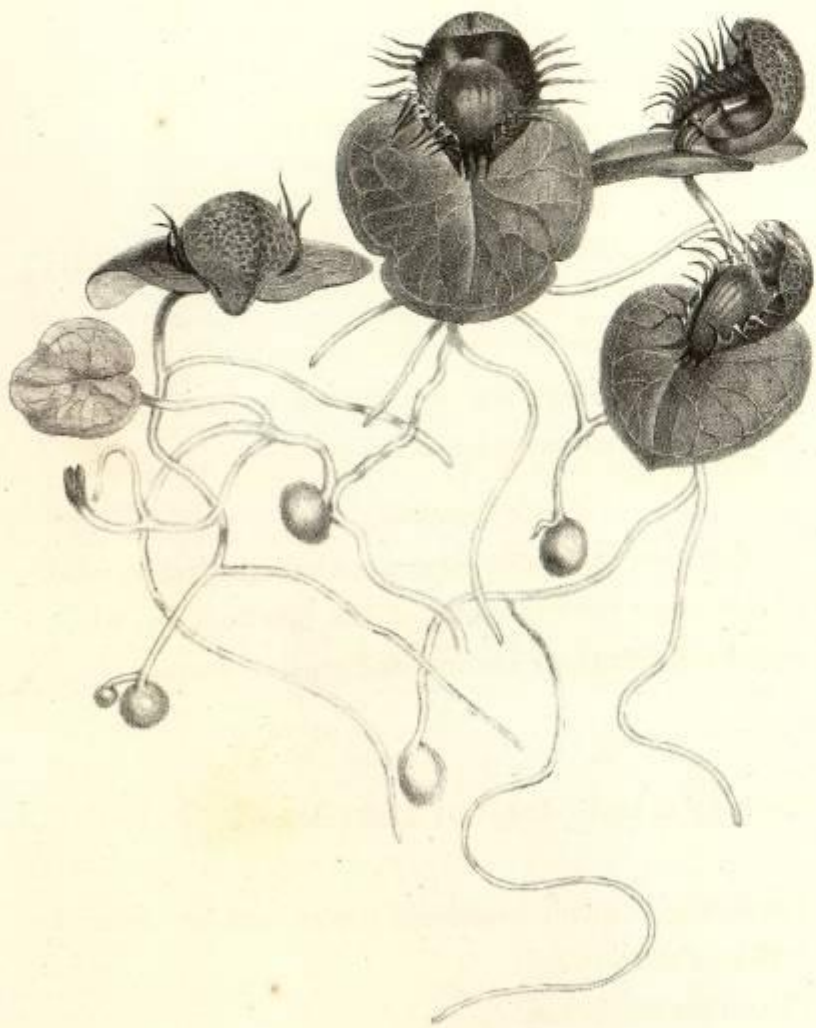
Genus *Corysanthes*. (*R. Brown.*)

THE species in this genus have the flowers large in proportion to the plants, sessile or nearly so on a single large leaf, with a small bract above and below it, the lower sometimes developing into a second leaf. *Corysanthes* are to be found among leaves and sticks. Insects crawling through the mass of rotting vegetation may readily enter the funnel-shaped labellum, which is placed beneath a hood, and in endeavouring to creep through the auricles (where they are open) or to return from the tube—still further narrowed by the short column at the bottom, would in all probability fertilize the plant with its own friable pollen, and take away some to other flowers.

In *Corysanthes*, with the exception of the labellum and upper sepal, the petals and sepals are rudimentary, and auricles and spurs to the labellum are introduced.

The benefit derived from them is not very obvious, unless it be in the one case as an egress or an opening, which would be attempted as such by an entrapped insect, and in the other as a receptacle where an insect might expect to find honey, and under that delusion fertilize the flower. Self-fertilization by the aid of insects must apparently be the rule in this genus, for the rostellum is so connected with the copious viscid matter covering the stigma that it would be almost impossible for an insect to remove the pollinia (which crumble at the slightest touch) without leaving pollen imbedded in the glutinous stigma. In fact the gluten, which is drawn out in strings, drags back the pollen masses to the stigma. Notwithstanding the close connection between the pollen and the stigma, the species seldom produce seed, but the plants increase in numbers by the formation of bulbs on the roots, and two or three individuals are sometimes found thus united though growing some inches apart. I have never found more than one of the plants so united in flower, and I think this connection only lasts for one season.

In *Corysanthes pruinosa* and *C. fimbriata*, if not throughout the genus, the pedicel (if a capsule is formed) continues to grow from one and a half to about six inches, though otherwise the flower perishes and lies like a blot upon the leaf. It may be said that this extraordinary development is of advantage to the plant by increasing the chance of diffusion of the seed by the wind, but this would be a doubtful advantage, as it would also increase the probability of their being taken to unsuitable situations and lost. To the disciple of Darwin it may rather appear to be one of those peculiarities that are not, never have been, have ceased to be, or are not as yet, of any use to the plant.



From Nature by R.D.Fitzgerald F.L.S.

On Stone by Arthur J. Stopps

CORYSANTHES

Fimbriata

Pruinosa

Corysanthes fimbriata. (*R. Brown.*) *Corysanthes pruinosa.* (*A. Cunningham.*)

In the "Flora Australiensis" *Corysanthes fimbriata* and *C. pruinosa* are united under the name of *C. fimbriata*, but there are I think sufficient grounds for their separation and for supposing the species here figured as such to be the *C. pruinosa* of A. Cunningham. The most striking distinctions between the two species are as follows:—

C. pruinosa.

The spurs are comparatively long, point downwards, and open in small auricles almost hidden by the sepals and petals which arise from beneath them, and, if freed, extend into the fimbria of the labellum, which does not cover the auricles.

The hood is comparatively upright and narrow, and of a light grayish green colour.

The flower stands high off the leaf on a long ovary, and is never very large.

The sepals and petals are longer in proportion.

Column almost winged.

Anther flaps long and adpressed.

There are spur-like fimbria on the labellum adjoining the central boss.

The labellum tube is long and narrow.

C. fimbriata.

The spurs are reduced to large auricles, opening forward, and placed under the expansion of the labellum, by which the sepals and petals are covered and crushed down.

The hood is broad, low, and dark coloured.

The flower is much larger and flatter, and lies close to the leaf on a short ovary.

The petals are forked.

Column devoid of any approach to a wing.

Anther flaps shorter and valvate.

The portion of the labellum adjoining the much larger and more raised boss is smooth.

The tube of the labellum is short, and the expansion very flat and broad.

The leaves of *Corysanthes fimbriata* found in a gully near Picton, in the Blue Mountains, were markedly mucronate, though the mucronate leaf appears to belong to *C. pruinosa* in specimens procured near Sydney. Both species flower in June.

EXPLANATION OF PLATE.

C. fimbriata. No. 1. Front view of column, labellum and dorsal sepal removed. 2 and 3. Pollen masses. 4. Side view of column, pollen removed. 5. Front view of top of column, pollen removed. 6. Side view of flower, dorsal sepal drawn back. 7. Labellum, part cut away, dorsal sepal removed in part. 8. Front view of lower part of flower, showing auricles, lower sepals, petals, and ovary. 9. Pollen masses.

C. pruinosa. No. 1. Lower part of flower, showing auricles, lower sepals, and petals, front view. 2. Labellum, part cut away, dorsal sepal removed in part. 3. Pollen masses. 4. Front view of lower part of flower, showing auricles, lower sepals, petals, and ovary. 5. Front view of column. 6. Seed capsule. 7. Pollen masses. 8. Side view of flower, dorsal sepal drawn back. 9. Side view of column, labellum and dorsal sepal removed.

Genus *Acianthus*. (*R. Brown.*)

ACIANTHUS is a small genus near *Caladenia*, but very markedly separated from it by habit, by the discs attached to the pollen masses, and by the pollen masses, which in *Caladenia* are flat, triangular, and separate, but in *Acianthus* ovate, thick, and connected by a solid arch. As yet no representative has been found in Western Australia.

The formation of the column in this genus is not apparently well adapted for the fertilization of the species by flying insects, being bent forward, so that the anther is presented to them and screens the stigma from any direct approach.

Should an insect alight upon the labellum, the slightest touch to the little tongue-like discs, especially from below, would remove them, but any motion forward would not place them on the stigma owing to the arching of the column.

They would be more likely to strike against the column itself, and, in fact, I have frequently found them thus adhering to it and other parts of the flower. I am of opinion that the species in this genus and many others are more indebted to crawling than to flying insects for their fertilization. Such an insect creeping up and down the column could hardly fail to leave more or less pollen on the stigma which would lie directly in its road to or from those little discs, which, as before stated, are most easily caught from below. Another argument in favour of this view is that though the great majority of the spikes of *Acianthus* are unproductive, one is frequently found on which all or nearly all the flowers produce seed capsules. The explanation of this inconsistency seems to be, that some small thrip or spider or the like, has made such a scape its home, and in its frequent peregrinations over it has thoroughly effected its fertilization.

The rostellum is commonly believed by botanists to be a third metamorphosed stigma; the stigma proper being considered to be the remaining two stigmas (that might be expected to be found in the order) consolidated into one. It is with hesitation that I venture to doubt respecting an opinion so generally held, but the apparent anomalies are at least worth consideration and further examination by experiments. In *Pterostylis*, *Calanthe*, &c., the ordinary stigma palpably divides into two, in accordance with the received theory, but in so doing would seem to preclude any similar division of the rostellum; but in many cases the rostellum is divided (as in this genus) into discs, having no semblance to stigmas, and in others appears to be a function (so to speak) of the pollen masses, rather than the remnant of an independent organ. Again, as in the similar theory, where the wings of the column are supposed to be abortive anthers, confirmation might be expected to be found in cases where the original object was not wholly lost; and such confirmation is to be found in anther-bearing wings of *Phajus*, but as yet I have been able to find no similar proof, that the rostellum has ever been a stigma.

I have frequently placed pollen on the rostellum of various genera, but have never found that it had any effect on the ovary, nor have I noticed any tendency to reversion to stigmatic characters. It would be an interesting discovery if any genus could be found capable of being fertilized through the rostellum.



From Nature by R. D. Fitzgerald FLS.

On Stone by Arthur J. Stopps.

ACIANTHUS

Fornicatus

Exsertus

***Acianthus fornicatus.* (R. Brown.) *Acianthus exsertus.* (R. Brown.)**

Acianthus fornicatus is the commonest Orchid on the east coast of Australia. It is to be found under shelving rocks and under the shade of trees. It sometimes produces an extra bulb; but its frequency must apparently depend rather on greater fertility in the seed than on increase from the roots, as no such increase would account for its general distribution.

Acianthus exsertus is not nearly so common. It flowers earlier, coming into bloom in March, *A. fornicatus* in May. It is readily to be distinguished from *A. fornicatus* by the smooth labellum and narrower dorsal sepal.

Neither species produces seed if placed when in bud under a bell-glass; but if the point of a pin be brought ever so gently into contact with one of the little discs four pollen masses are at once removed, and should they then be applied to the over-hanging stigma the flower invariably produces seed.

EXPLANATION OF PLATE.

A. fornicatus.—No. 1. Side view of column. 2. Top of column, slightly inverted to show stigma. 3. Side view of flower. 4. Front view of column, dorsal sepal and labellum removed. 5. Pollen masses. 6. Pollen masses from above, showing connecting arch.

A. exsertus.—No. 1. Side view of flower. 2, 3, and 4. Pollen masses. 5. Front view of flower. 6. Top of column, pollen removed. 7. Side view of top of column.

Genus *Lyperanthus*. (*R. Brown.*)

LYPERANTHUS is one of the unsatisfactory intermediate genera absorbed by one botanist into some other genus, and by another extended or contracted according to the importance he places on one characteristic or another.

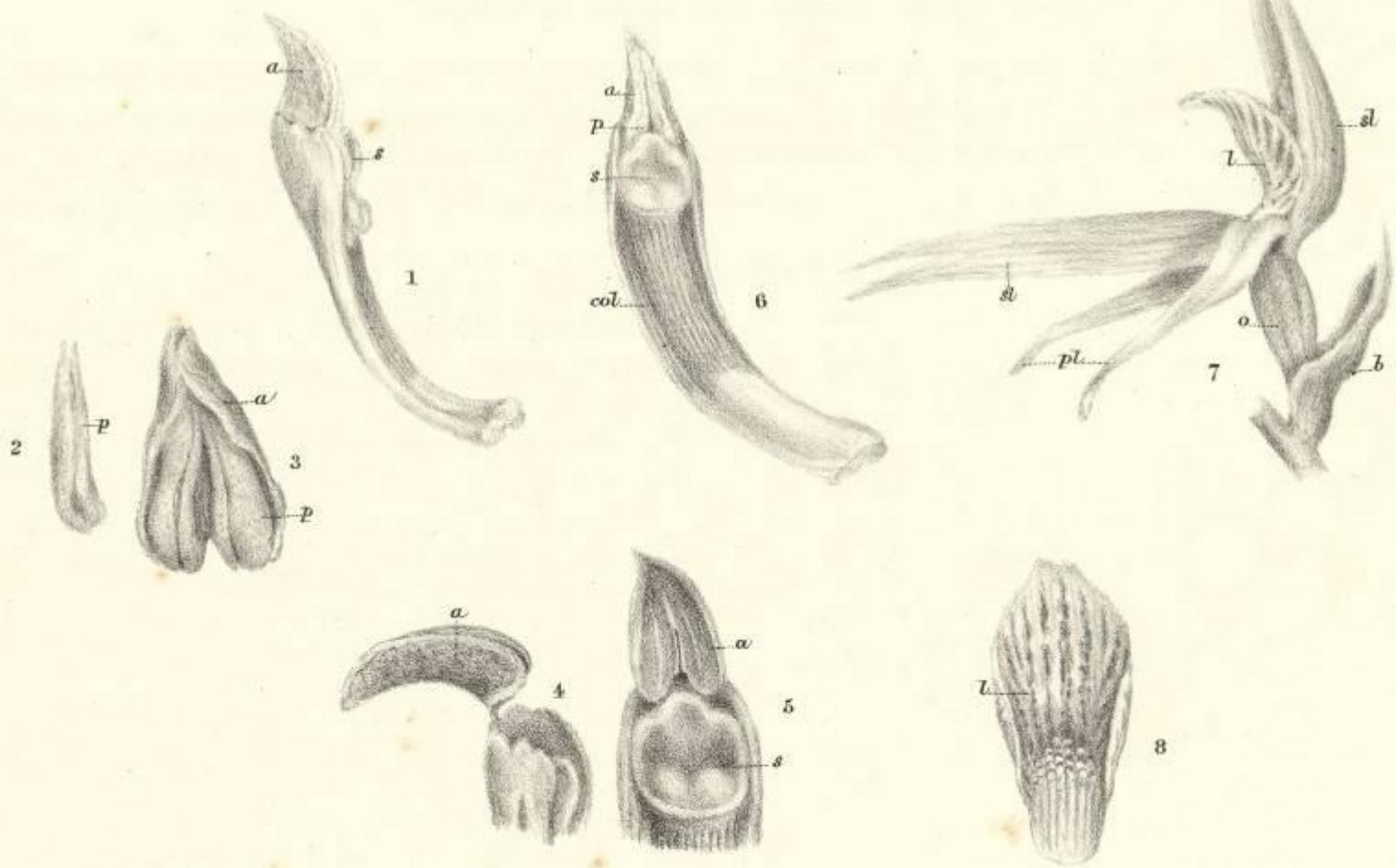
It is one of the genera that throw doubt on the reality of *all* genera, except as an artificial distinction made by systematists where they can step in, as it were, into a gap, and push the species apart by diversity of names.

Not that gaps do not exist more or less definite, but they would be greatly reduced could the true relationships of even existing forms be grasped. Could those of the past be recovered, would there not be the same difficulty about genera that now exists about species?

Lyperanthus as restricted by Mr. Bentham is erroneously described as producing "small underground tubers."

In *L. nigricans* the roots are clustered, thick, and fleshy, and in *L. ellipticus* they are long rhizomes, from which leaves and flowering stems spring. *L. suaveolens* (included by Mr. Bentham in *Caladenia*) has tubers somewhat distinct from those of *Caladenia*. But from the fact that calli of the labellum readily pass into papillæ; from the general aspect of the flower resembling *L. nigricans*, the form, texture, and permanence of the leaf, absence of pubescence, and especially the form of the pollen masses, which are long and terete as in *Lyperanthus*, and not flat and triangular as in *Caladenia*,—it should, in my opinion, be retained in *Lyperanthus*.

The intermediate fragmentary character of the genus is still further borne out by the situation in which the three species referred to are found growing,—one in shady forests, another in sand, and the third in the crevices of rocks; and again by the season of flowering—one being in September and another in December.



From Nature and on Stone by R.D. Fitzgerald H.S.

LYPERANTHUS Ellipticus

Sydney, N.S.W., Thomas Richards, Government Printer.

Lyperanthus ellipticus. (R. Brown.)

THIS is a very rare Orchid, very capriciously distributed.

In one bay on the north side of Sydney Harbour it has been found on a single rock. I know of no other locality where it can be procured nearer than the Blue Mountains, and there only in a few favoured spots. Why it should be confined to the yellow clay in certain crevices, where there are thousands of similar fissures, can only be accounted for by the seeds requiring a very extraordinary concurrence of circumstances to produce vitality—by the plants being very seldom fertilized—by their being in a young state the special prey of insects, or by delicacy of constitution. It is interesting to consider all or any of these causes as affecting plants in their native country. Has Nature produced them to let them hang on the verge of existence? Have similar inherent defects caused the destruction of others, without the interference of man—without his ever having seen them—without any great or violent change of circumstances or climate? If so, from whence has such imperfection come, and why should there be such imperfection? It can hardly be said that it is by design, or that the design was imperfect and inadequate to the end, though it may perhaps be accounted for by variation (in an unfavourable direction) from a more suitable type.

Lyperanthus ellipticus is interesting not only for its rarity, but for its being a link between the terrestrial and epiphytical Orchids, having in its creeping rhizome and growth on rocks the character of the Epiphytes, and in the form of the flower, especially the anther and stigma, that of the terrestrial. It is found following the crevices in damp sandstone rocks, in the yellow clay so frequently to be observed between the stratification. Its season of flowering is December.

EXPLANATION OF PLATE.

No. 1. Side view of column. 2. Pollen masses. 3. Anther, including pollen masses. 4. Top of column, anther thrown back, pollen removed. 5. Front view of same. 6. Front view of column. 7. Side view of flower. 8. Labellum.

PART 2.

MARCH, 1876.

Genus *Spiranthes*. (*Reichenbach*.)

THE genus *Spiranthes*, though generally distributed through the "temperate and tropical regions of the globe," is only represented in Australia by one species said to be found in Europe and Asia. Possibly, on further examination, it may be found that it has not so wide a range.

Spiranthes, as implied by the name, has the flowers arranged in a spiral twist, and is devoid of the usual globular underground tubers, which are replaced by thick fibrous roots.

Spiranthes australis. (*Lindley*.)

No Orchid examined by me has afforded greater pleasure or surprise than *Spiranthes australis*. Having read the very interesting description by Mr. Darwin of the organization of *Spiranthes autumnalis*, so wonderfully specialized for the intervention of insects, I fully expected to find the Australian species almost identical, in the arrangement of a splitting rostellum boat-like disc, easily removable pollinia, and labellum falling lower as the flower expanded. But, as though to set analogy at defiance, *S. australis* is as much self-dependent as *S. autumnalis* is at the mercy of external influences. To obtain the clue to the fertilization of this Orchid it is necessary to examine the bud in an early stage (figs. 6, 2, 3, and 4), when the pollinia will be found slightly overhanging the stigma and enclosed within the anther to a far greater extent than subsequently, when the anther shrinks back by withering (figs. 1 & 5). The pollinia, at first loose and easily removable, touch the upper lip of the stigma and fertilize it at an early stage. After the flower has opened, and for some time previously, they cannot be removed, clearly owing to the connection formed, by the extension of pollen-tubes, between them and the stigma, which is much less defined as to its limits than is generally the case.

I could discover no trace of a rostellum or disc of any kind. In this flower the persistence with which the pollinia remain behind the stigma, though left naked by the shrinking back of the anther, is very peculiar (fig. 1). No transfer of the substance of the stigma on the point of a pin or bristle induces them, after the opening of the flower, to come forth for the chance fertilization of another flower. It even requires some violence to break them up, as the more friable portion is turned towards the anther. In the very many flowers examined I have not noticed the slightest derangement of the pollinia, or trace of pollen upon the stigma; yet every flower produces a full capsule of seed, and the placing it under a bell-glass makes no alteration in its fertility. In my opinion it is never made fruitful by pollen from another flower, nor in any other way than by contact of the extreme edge (and possibly part of the inner side) of the stigma with the pollinia. The modification or absence of parts leading to so great a difference in reproduction in two species so closely related as *S. australis* and *S. autumnalis* is very interesting and instructive: it illustrates the very slight degree in which results can be anticipated in the study of Orchids, and how greatly their very existence may depend on alterations that leave the plants in the same genus, or may be, by oversight, in the same species.

On some spikes of *S. australis* I have counted seventy flowers. A capsule contained by computation (from a small portion) five thousand seven hundred and sixty seeds, and every flower producing a capsule, the astonishing amount of four hundred thousand is obtained as the production of seed by one plant in a season.

This Orchid is most generally found by the margin of standing water and the sources of streams running through clay lands. It does not affect light sandy soils and the shade of "tea-trees" (*Leptospermum* and *Kunzea*) so much as most other genera, and its bright pink flowers may often be noticed amongst tall grasses.

It does not produce side bulbs as do most of the ground Orchids, nor are bulbs ever formed on the roots. It is therefore solely dependent on seed for its reproduction, and though generally distributed is not common.

I have obtained two varieties of this plant. The one (fig. A), remarkable for the large bracts enclosing the flowers, and for the lengthened sepals and petals, closely resembles the variety *Crispata*, as figured by Blume in his "Javanese Orchids." The interior portions of the flowers in the only specimen procured were too much injured or withered to admit of comparison with the ordinary form. This variety was found in flower at Hunter's Hill on the 10th of November, the usual time of flowering of *S. australis* being March.

Variety B was also obtained at Hunter's Hill, and was remarkable for producing its flowers in two spirals.

EXPLANATION OF PLATE.

Fig. 1. Column from matured flower, showing the anther shrunk back from the pollen. 2, 3, and 4. Back, front, and side of column in the bud, showing anther and wings prior to shrinking. 5. Column from matured flower, side view, showing shrunken wings. 6. Front view of column in very early bud. 7. Front view of column in early bud, pollen removed. 8. Side view of column, and labellum, sepals, and petals removed. 9. Labellum, from above. 10, 11, and 12. Pollen removed from flower in bud. 13. Side view of flower.



From Nature and on Stone by R.D. Fitzgerald H.L.S.

ADENOCHILUS Nortoni

Genus *Adenochilus*. (*Hooker*.)

THE discovery of this genus is peculiarly interesting, as still further uniting the Orchids of Australia and New Zealand, the genera of which, though almost identical, hardly include a single species in common: a union and divergence that may be well explained on the supposition that these countries, once united, have been so long separated that the species are no longer identical, though the genera are unaltered.

As no description of this genus is to be found in the *Flora Australiensis* (no representative having been found in Australia at the date of its publication), and as I have been informed by my friend, Baron Müeller, that the species on which it has been established has only once been discovered in New Zealand, I append the following description:—

Dorsal sepal incurved, broad, inclosing the column, sepals broader and somewhat longer than the petals. Labellum on a long claw, three-lobed, lateral lobes erect, middle lobe very long, covered with calli, except the point. Column erect, deeply winged through its whole length, the wings prolonged behind or on either side (as in *Chiloglottis*), and above the anther. Anther erect, the outer valves turning back and leaving the pollen masses naked. Pollen masses eight granular. Leaves ovate cordate, high up on the flower-stems, or rising on long petioles from creeping rhizomes. Flowers solitary. Bracts two, the upper opposed by a spatule of almost equal length, clavate at the end.

This genus resembles *Caladenia*, or still closer, *Lyperanthus*. It approaches *Lyperanthus* in the broad dorsal sepal, and in habit to at least one species in that genus (*ellipticus*), but is peculiar in the remarkable expansion of the wings of the column both laterally and behind and above the anther, in the reversion of the valves or flaps of the anther, in the form of the pollen masses, which are neither terete, as in *Lyperanthus*, nor flat and triangular, as in *Caladenia*, in the solitary leaf on the flower-stem, which is very distinct from the leaf in *Caladenia*, and from the leaf-like bracts of *Lyperanthus ellipticus*, which approach nearest to it, and it differs from all other Orchids, as far as I am aware, in the curious spatule, opposed to the usual bract beneath the flower, though I have occasionally observed somewhat similar appendages to bracts and to the ovaries in *Pterostylis*, which I have supposed to be abortive flowers, and which are not constant.

Adenochilus Nortoni. (*Fitzgerald*.)

THAT a species representing so rare a genus, hitherto not known to belong to Australia, should be found near Mount Victoria, within a mile of the railway, gives hopes that there may be many yet undiscovered species, and even genera, amongst the gorges of our mountains, to reward the search of such enthusiastic botanists as my friend Mr. James Norton, in honor of whom I have given this species its specific name. Its discovery also illustrates the extreme rarity of some species. As yet I know of only one locality in which *Adenochilus Nortoni* can be procured,—that in which it was first found by Mr. Norton, and where, guided by his kind directions, I had the pleasure of examining it. Where a stream pours over a high rock into a basin this little Orchid creeps along the crevices, in the yellow clay and moss, within the spray and on the clumped roots and stems of the ferns (*Todea africana*), actually beneath the waterfall. The leaves are much more numerous than the flowers, and rise, from creeping rhizomes, here and there through the clay or matted fibres.

Could it be actually understood how great a pleasure can be obtained in the finding such a little plant in such a situation, surely Botany would enrol more votaries.

Adenochilus Nortoni flowers in December. I consider it to be distinct from *A. gracilis*, for the following reasons:—The much greater size of the flower, the lesser inequality between the dorsal and other sepals, its being glabrous except a few hairs along the edges of the sepals and petals, and the wings not being divided at the back of the column (as figured by Hooker) but forming a hood over it.

DESCRIPTION.

General characteristics as given under the genus. A delicate glabrous plant. Flowering stems, and leaves devoid of flowers, rising from creeping rhizomes. Flower-stems, including portion below the leaf, about six or eight inches. Leaves, on slender petioles from one to three inches. Flowers about one inch in diameter, solitary, white. Column and wings spotted with red. A band of long clavate calli down the centre of the labellum, and a few smaller calli scattered over the side lobes. Labellum spotted with red, smaller calli white, band of calli along centre of labellum yellow. A few small hairs on the edges of the sepals and petals. Bracts lanceolate, about half an inch. Leaves one inch long or less, lower surface lighter than the upper. Stem below first bract spotted with red.

EXPLANATION OF PLATE.

Fig. 1. Side view of flower, sepals and petals turned down and partly removed. 2. Back of column. 3. Side view of labellum. 4. Labellum, from the back. 5. Labellum, from the front. 6. Calli of central band on the labellum. 7. Pollen masses. 8. Pollen masses—one removed. 9. Front view of column. 10 and 11. Front and side view of column in the bud. 12. Side view of column and labellum. 13. Anther and stigma. 14. Top of column, showing anther and stigma, part of one wing removed. 15. Upper bract, showing spatule.



From Nature and on Stone by R.D. Fitzgerald FLS

Clavigera

CALADENIA

Tessellata

Caladenia clavigera (A. Cunningham). *Caladenia tesselata* (Fitzgerald).

To one of the forms of *Caladenia* figured I have attached the name of *Clavigera*, not only because it sufficiently agrees with the descriptions given of that species, but on account of the locality from which it has been received, though it can hardly be reconciled with the figure of *Clavigera* as given by Hooker in his "Flora Tasmaniae." In endeavouring to fix the identity, not only of Orchids but of the members of other families, the student will find locality (especially with reference to the Coast Range) a very great help in determining the form originally named. Thus, in this instance, the specimens from which the figure has been taken were kindly sent to me by Dr. Woolls, from near Mudgee, and near Bathurst is given as the locality where the plant to which A. Cunningham gave the name was procured.

The second form was found by me in two localities at Hunter's Hill, near Sydney, and as it differs in several respects from the inland form or species, I have given to it the name of *tesselata*, from a portion of the labellum being paved, as it were, by the close packed calli.

Where the species is the same, the flowering is always later on the western side of the Blue Mountains than on the coast, generally by a month or two. So far as I am acquainted with the time of flowering of *C. clavigera* and *C. tesselata*, the order is reversed; specimens of the former having been obtained in the end of August, and of the latter in the beginning of October.

C. tesselata grows in sandy, swampy ground, under the shade of "tea-trees," (*Kunzea*.) It very rarely produces two flowers. On examination of a plant of this species as it grew, the pollen was found to be drawn down out of the anther, and attached to the centre of the stigma by a little group of the chaffy scales of some plant, which helped to form a cocoon. This cocoon belonged, in the opinion of Mr. Patrick McKay, to a dipterous insect, and the flower must have been fertilised by the efforts of the inmate to get rid of its covering. A method of fertilisation that may frequently occur, as the dorsal sepal presents a suitable shelter for an insect about to undergo a change, but a method that would hardly be conjectured if not observed.

The principal distinctions between the species are as follow :—

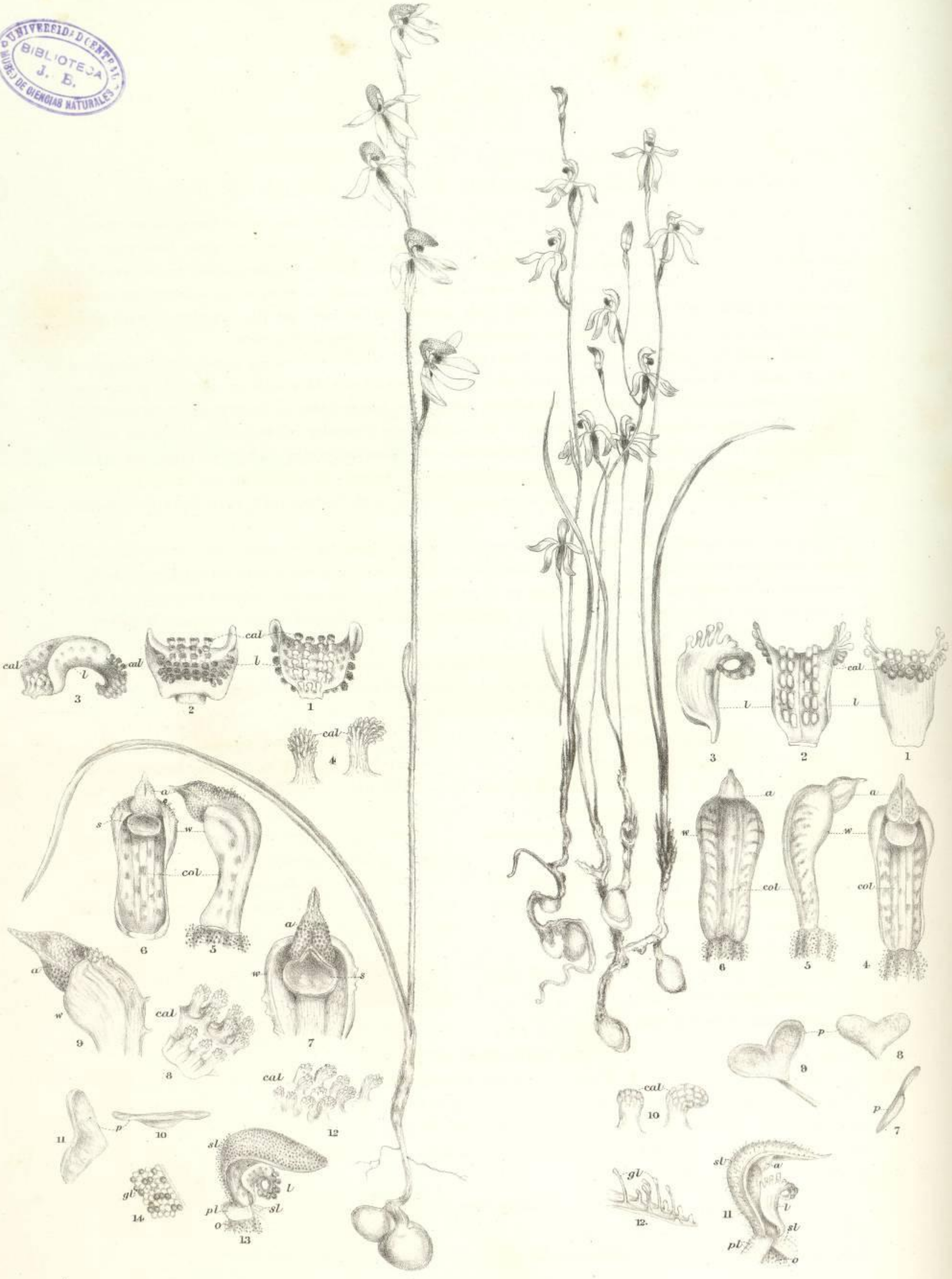
<i>C. clavigera.</i>	<i>C. tesselata.</i>
Flower three inches in diameter.	Flower one and a half to two inches in diameter.
Sepals contracted for a third of their length, and clavate at the ends.	Whole plant generally smaller and slighter.
Column but slightly curved.	Sepals not contracted, and not clavate.
Anther markedly mucronate.	Column very sharply curved.
Wings of column moderately dilated.	Anther very slightly mucronate.
Labellum recurved.	Wings of the column near the anther considerably dilated.
Half the labellum towards the point naked, with the exception of faint raised lines corresponding to the spaces between the rows of calli.	Labellum flatter, not recurved.
Half the labellum to its base traversed by four rows of slender distinct bent calli.	Same portion of labellum covered with close set calli, in four rows.
Glands at the base of column globular.	Same portion of labellum, for half its length, bearing four rows of thick, close-set, bent calli, and at the base a group of upright clavate calli.
Leaf broad.	Glands at the base of column oval.
	Leaf narrow.

EXPLANATION OF PLATE.

Caladenia clavigera. Fig. 1. Labellum, from the back. 2. Labellum, from the front. 3. Column, from the front. 4. Labellum, from the side. 5. Calli of the labellum. 6. Side view of top of column, pollen masses and one wing removed. 7. Column, from the side. 8. Front view of top of column. 9. Column, from the back.

Caladenia tesselata. Figs. 1, 2, and 3. Column, from the front, back, and side. 4. Front view of top of column. 5. Side view of top of column, pollen masses and one wing removed. 6. Calli on centre of labellum. 7. Labellum, from the side. 8. Calli on base of labellum. 9. Labellum, from the front. 10. Labellum, from the back.

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From Nature and on Stone by R.D. Fitzgerald FLS.

Cucullata

CALADENIA

Testacea

Caladenia cucullata (Fitzgerald). *Caladenia testacea* (R. Brown).

As among birds, many species are represented on opposite sides of Australia by closely allied forms, so amongst the Orchids are species approximated on the distant shores of this great island. Not only so, but while some genera and species would seem to be unable to cross the great dividing range, others, though they have passed the barrier, would appear to have been isolated from each other thereby, so as to have passed (possibly in the same way as the species of birds referred to) into other shapes, and such shapes often retain so much in common that the naturalist hesitates about claiming the points of distinction as of sufficient importance to demand a separation of species.

But to avoid the separation, and unite one form (generally selected from its frequency in some one locality) with others, as varieties of it, when there is nothing to show that they reproduce each other, is, in my opinion, a greater error than the occasional separation of forms under the name of species, that may hereafter be found to reproduce each other, and that therefore must be regarded only as varieties. The submergence of possibly constant forms, under the head of varieties, induces a brevity and laxity in their descriptions that embarrasses the student, and prevents that close investigation into their stability become so necessary at present, when science demands the determination of the great question of mutability—a question that can only be solved by the patient study of the buds (as it were) before they become branches.

The two forms figured on the opposite page do not, I believe, reproduce each other, and are, I think, sufficiently separated to require demarcation as species. The inland form I have named *cucullata*, from the dorsal sepal hooding the column to a far greater degree than is the case in *C. testacea*. The first specimens I obtained were from Dr. Ross from Molong, and I subsequently received exactly similar from Mr. G. H. Sheaffe from Boorowa. It flowers in October.

C. testacea is found in the neighbourhood of Sydney, growing in stony places under the shade of the "tea-tree" (*Kunzea*), and is one of the last of the *Caladenias* to blossom, being in flower in the latter end of September.

The principal distinctions between the species are as follow:—

Caladenia cucullata.

- A robust plant, exceeding one foot in height.
- Dorsal sepal extremely concave, and suddenly curved forward over the column, in great part concealing it.
- Dorsal sepal covered with a closely set granulation, grains (or glands) purple or white.
- Labellum flat, the sides entire for two-thirds their length, then suddenly depressed to the purple extremity, which is crenate to the end.
- Sides of labellum spotted.
- Calli of the labellum in four rows, having their upper portions covered with fimbriæ.
- Column suddenly bent, spotted.

Caladenia testacea.

- A slender plant, from three to nine inches in height.
- Dorsal sepal not nearly so concave or abruptly bent, leaving the anther exposed.
- Dorsal sepal covered with clavate hairs of various lengths, separated from each other.
- Labellum less flat, that is, having deeper sides, entire for not half their length, then ciliate to the purple point, which is crenate to the end.
- Sides of labellum plain.
- Calli of labellum in two double rows, having the upper portion granular.
- Column gradually bent, striped.

EXPLANATION OF PLATE.

Caladenia cucullata. Figs. 1, 2, and 3. Labellum, from the back, front, and side. 4. Calli of the labellum. 5. Column, from the side. 6. Column, from the front. 7. Top of column, from the front. 8. Group of calli, from the back. 9. Top of column, from the side. 10. Pollen mass, from the edge. 11. Pollen mass. 12. Group of calli of the labellum, from the side. 13. Dorsal sepal, column and labellum, from the side, petals and lower sepals removed. 14. Group of glands on dorsal sepal.

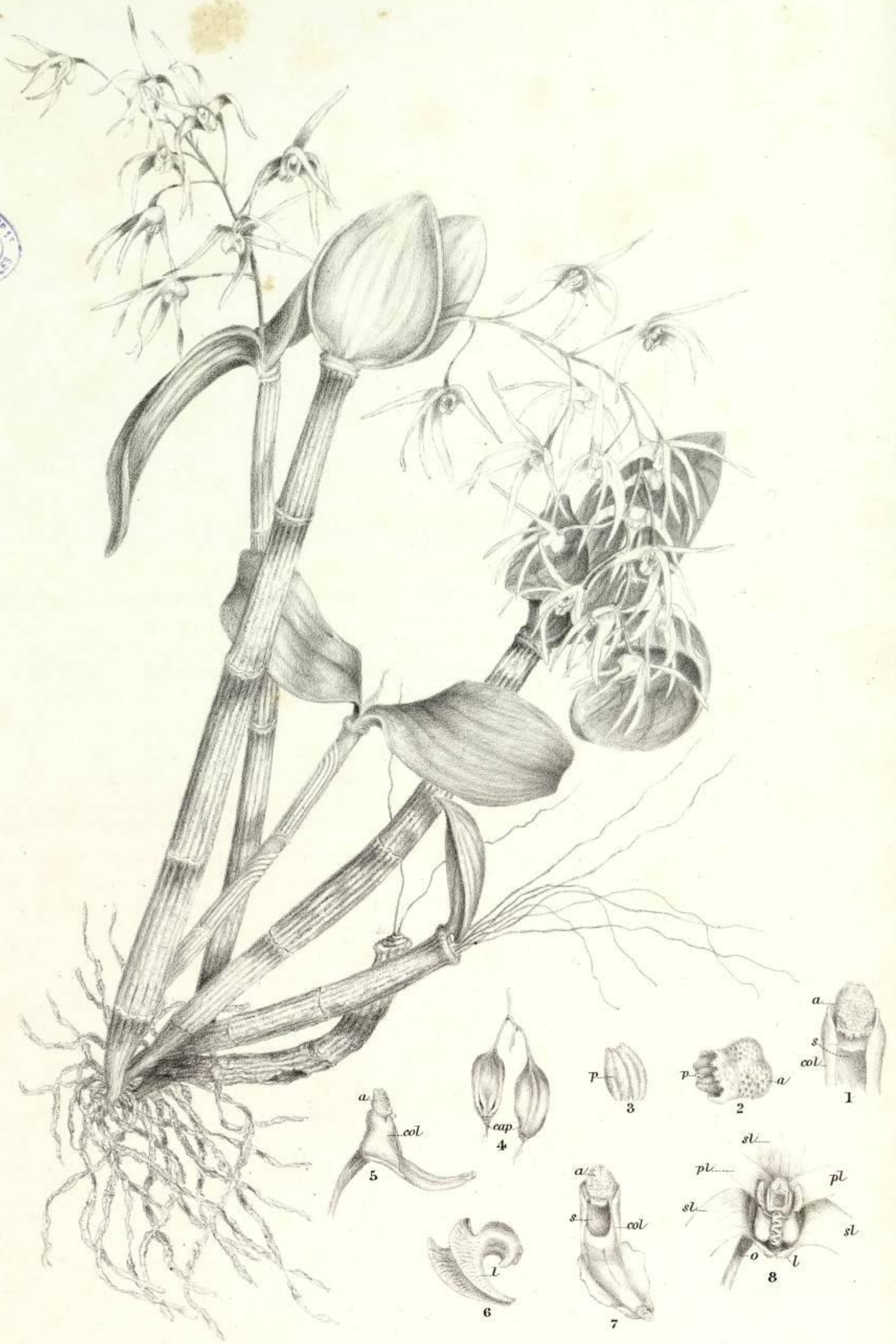
Caladenia testacea. Figs. 1, 2, and 3. Labellum, from the front, back, and side. 4, 5, and 6. Column, from the front, side, and back. 7. Pollen mass, from the edge. 8 and 9. Pollen masses. 10. Calli of the labellum. 11. Dorsal sepal, column and labellum, petals and lower sepals removed. 12. Glands or clavate hairs of dorsal sepal.

Genus *Dendrobium*. (Swartz.)

DENDROBIUM is the largest genus of *Epyphites* in Australia, and grows on rocks and trees. The forms of the pseudo-bulbs and leaves are very various, from the square pendent pseudo-bulbs of *D. tetragonum* to the little cucumbers of *D. cucumerinum*, and the large oblong thick leaves of *D. speciosum* to the long terete leaves of *D. teretifolium*. But various as are their forms, they are all readily fertilized, each by the pollen of any others; though in this respect, also, they show some variation of character or constitutional difference, as, though there may be no difficulty in obtaining a few capsules of hybrid seed on a spike of any species, some produce a capsule for every flower.

When found in the "brushes" or "gullies," *Dendrobiums* are very rarely observed producing more than one or two capsules on a raceme. Totally barren racemes are by far the more numerous. Yet this barrenness is by no means owing to the incapacity of producing seed, but to the fact that the stigmas of thousands of flowers are never touched by pollen. When, however, a little waxy pollen mass of its own, or of another plant or species, is placed in the stigmatic chamber, it soon appears to become incorporated with the stigma, and changing its consistency seems together with the stigma to boil up, as it were, and almost fill the chamber.

The same species, though found constantly growing on rocks in one locality, is as constantly found on trees in another, and I think a general tendency may be observed in each species to affect rocks in the southern limits of their distribution, and trees in the northern, also, to produce slighter and longer pseudo-bulbs, as the habitat is more and more to the north. The range of the genus is almost absolutely confined to the eastern slope of the Coast Range, and the general time of flowering is September and October.



From Nature and on Stone by R.D Fitzgerald FLS

DENDROBIUM *æmulum*

Sydney, N.S.W., Thomas Richards, Government Printer.

Dendrobium æmulum. (R. Brown.)

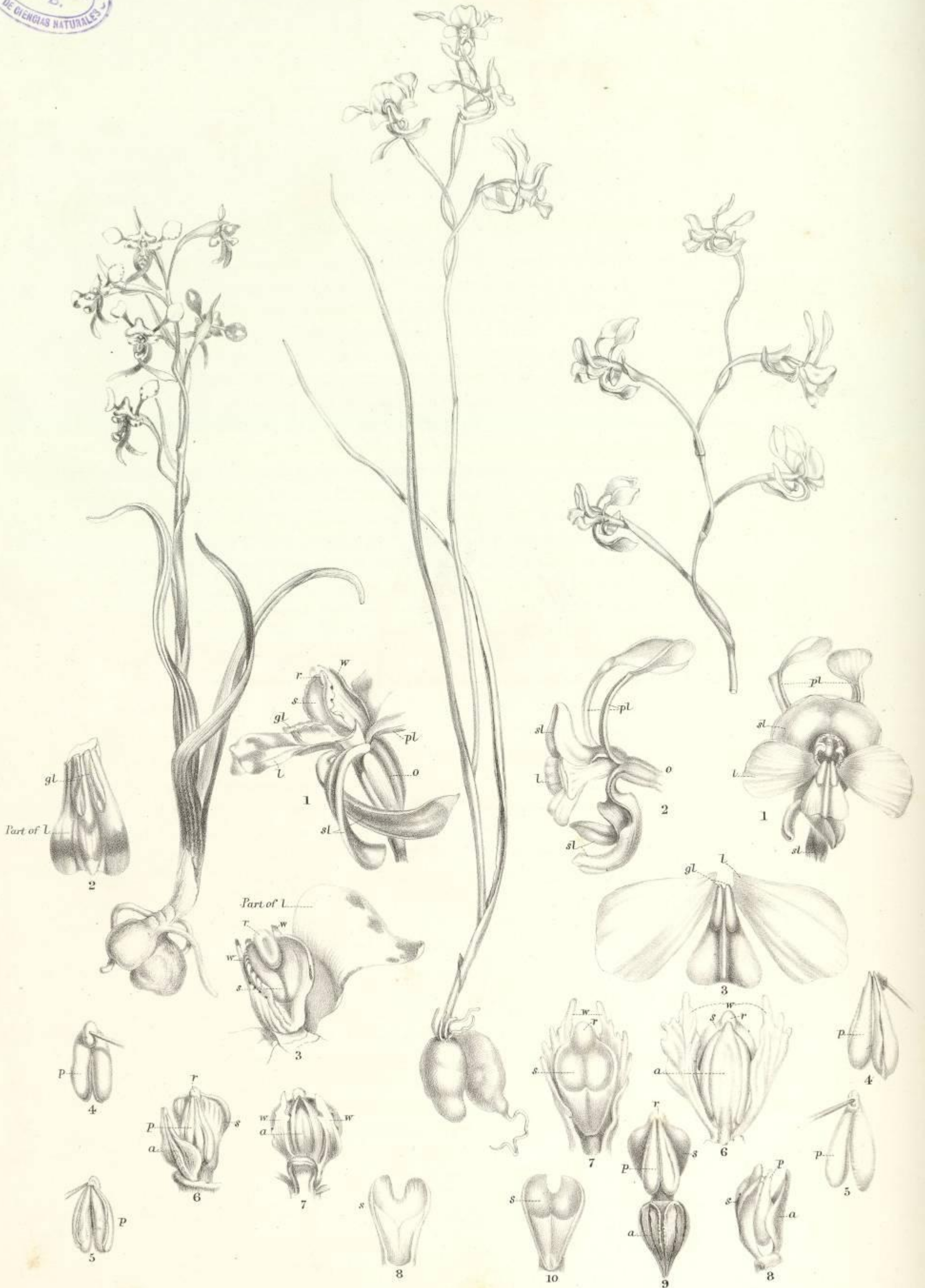
THE illustration has been taken from a fine plant obtained on the Bellingen. South of the Macleay or Hastings Rivers *D. æmulum* assumes a somewhat different form, the pseudo-bulbs being much shorter and generally thicker in proportion, and the flowers by no means so fine or numerous. This Orchid may frequently be found if properly sought for; but it is necessary to scrutinize the trunks of the lofty iron-barks (*Eucalyptus siderophloia*, &c.) amongst their highest branches, or in the mountain gullies in like manner the sassafras (*Doryphora sassafras*), and, to the north of the Hastings, the tall, red stems of the "box" (*Tristania conferta*). It certainly is not by any means well adapted to give pleasure to man, as, to admire the beauty of its flowers it would be necessary to have recourse to a telescope, and the instrument has not yet been invented by which he might enjoy the delicate odour which they occasionally emit.

This is the only Orchid, so far as I am aware, to be found habitually growing on any species of gum, *Cymbidium* not excepted, as that plant grows from the "spouts." This may in part be accounted for by the shedding of the bark in many species of Eucalyptus; but from the frequency with which Epiphytes are to be found on figs and some other trees it would appear to me that the exudations from some trees, or the rain water that rests upon them, is more congenial to Orchid life than the moisture on others. On the mangroves, for example, though so frequently placed in suitable situations, I have never found an Orchid of any kind.

D. æmulum flowers in September. It is impatient of removal to the "bush-house" or green-house, but flowers freely till it dies.

EXPLANATION OF PLATE.

Fig. 1. Front view of upper part of column, showing anther and stigma. 2. Under side of anther, pollen masses dropping out. 3. Pollen masses. 4. Seed capsules, not magnified. 5. Column, from the side, sepals, &c., removed. 6. Labellum, from the side. 7. Column, from the front, portions of sepals only left. 8. Part of flower, showing labellum, column, and portions of petals and sepals.



From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Stoppes

Maculata

DIURIS

Aequalis

Diuris maculata (Smith). *Diuris æqualis* (Mueller).

IN *Diuris maculata* the dorsal sepal leans forward for half its length, then turns upwards and backwards; the lower sepals, forming channelled tails, cross one another below the flowers. Between them the orbicular side petals stand out on footstalks, and above the cross sepals projects the labellum, the sides of which act as wings to the column, and the central portion is formed like the withers of a horse, on which rest two long glands like the sides of a pack saddle. Above the labellum is the stigma, formed like a shovel, into the round edge of which is let in a large boss (the rostellum), to the back of which the pollen masses are attached. Should this boss be touched it immediately adheres, and the pollinia are drawn out from behind the stigma. The central portion of the labellum must act as a resting place for an insect, and the plant be fertilized, either by its own pollen returned into the flower, or by that from some other flower should the insect leave immediately after the removal of the pollinia. I have frequently found unfertilized flowers deprived of the pollinia, and others fertilized though retaining the pollen masses in the anther. This Orchid is barren when placed under a bell-glass out of the reach of insects. It is the earliest *Diuris* to flower, at least in the neighbourhood of Sydney. It flowers in the beginning of July. It is a common species, and is to be found in open forest, as well as in shady places. It is becoming rarer about Sydney, owing to children (who know it under the name of "Yam") digging up the bulbs to eat them. They are sweet, mawkish, with a slight taste of raw potato.

Diuris æqualis was so named by Baron von Mueller from a specimen found by me at Liverpool. I have, since received exactly similar plants from Moruya and Lake George.

It has been included in *D. maculata*, by Bentham in the "Flora Australiensis," but this is, I think, an error arising from his having seen it only in a dried state. It flowers in October and November.

Diuris maculata.

Generally rather a robust plant.
Flowers yellow, more or less spotted with brown.
Lower sepals narrow, brown and yellow.
Dorsal sepal ovate oblong, reduplicate on each side.
Petals ovate on brown claws.
Wings of labellum broad, irregularly cuneate.
Centre of labellum raised, but not rigidly so.

Wings of the column small, not rising above the rostellum, slightly toothed.

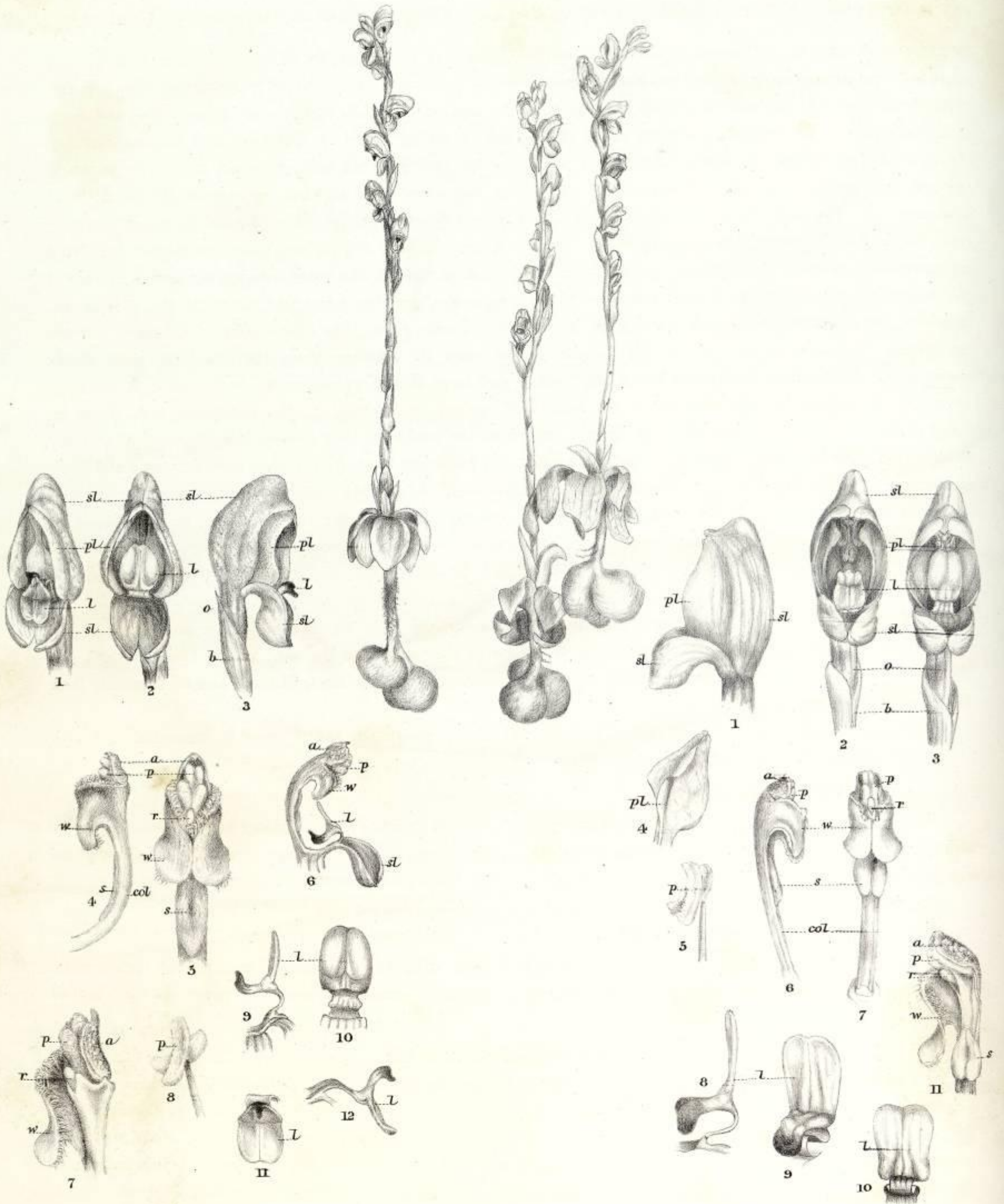
Diuris æqualis.

Very slender and graceful.
Flowers orange, not spotted.
Lower sepals broad, especially towards the ends, green.
Dorsal sepal ovate, not recurved.
Petals cuneate, on green claws.
Wings of labellum narrower, symmetrically rounded.
Centre of labellum raised in a rigid line, giving, with side glands, the appearance of three linear glands.
Wings of the column large, deeply indented, rising above the rostellum.

EXPLANATION OF PLATE.

Diuris maculata. Fig. 1. Side view of part of flower, dorsal sepal, petals, and wings of labellum being removed. 2. Central portion of labellum, showing glands. 3. Column, from the front, and wing of labellum. 4. Pollen masses, from the front. 5. Same, from the back. 6. Back of column, wings removed, and anther drawn slightly down. 7. Back of column, showing wings. 8. Stigma, the rostellum removed.

Diuris æqualis. Fig. 1. Flower, from the side. 2. Flower, from the front. 3. Labellum. 4. Pollen masses, from the back. 5. Same, from the front. 6. Back of column, showing wings. 7. Column, from the front. 8. Stigma and anther showing portion of pollen masses, wings removed. 9. Back of column, wings removed, and anther drawn down. 10. Stigma, the rostellum and pollen removed.



From Nature and on Stone by R.D. Fitzgerald FLS

PTEROSTYLIS

Cycnocephala

Mutica

Sydney, N.S.W., Thomas Richards, Government Printer.

Pterostylis cycnocephala (Fitzgerald). *Pterostylis mutica* (R. Brown).

IN the present state of the science of Botany, while the question of the mutability of species remains undecided, it appears to me to be a matter of the greatest importance to the botanist to endeavour to determine whether approximate forms pass into one another,—keep constant to their present slight divergence,—or depart more and more from each other. The objection, so often raised against the Darwinian theory, in the form of a demand that any absolute (that is, present or recent) alteration in species be pointed out, can only, it seems to me, be answered through such investigation and determination as to whether the form called a variety reproduces the form called a species. At this point must the truth, either one way or the other, be proved or disproved, in part through relics of the past, but more determinately in the future; though the time may be long indeed before sufficient proof can have accumulated. The first step towards such proof must be through the most accurate description or careful delineation, so as to stereotype present forms for future comparison; and the forms best suited for the purpose are those that, generally resembling each other, differ on some one specific point. The salient point of difference between the species (?) figured on the opposite page is, that in one where the labellum closes the flower the point of the appendage to the labellum turns down into a little hollow just large enough to receive it; in the other, it turns up. It would be easy to include both under one name and species, by inserting in the description such words as “appendage variable, either turned up or down”; but does the one form ever produce the other, and if not, why should they be forced together by a union only in name? On the other hand, if they were once the same and there has been a variation that does not relapse into the original form, is not the variety a new species? or in what respect is it not a new species? though, of course, both can be included under the one name, and the departure lost sight of by an extension of the specific description, which is nothing more than a begging of the question; unless it be ascertained that with or without change of soil or climate the one relapses into or reproduces the other.

The form to which I have given the name of *Cycnocephala*, from the likeness of the appendage of the labellum to the head and neck of a swan, seems to belong to the country to the west of the Coast Range; the only places I have yet received it from being, in the first instance, from Dr. Ross, Molong, and subsequently from Mr. Sheaffe, Boorowa.

The form *Mutica* appears to be generally distributed on the East coast, and is found in Tasmania.

The leading points of distinction are as follow:—

Pterostylis cycnocephala.

The point of the appendage to the labellum abruptly acuminate, and turned up when the labellum closes the flower.

The labellum is ovate emarginate.

The stigma cordate, the point turned upwards.

Pterostylis mutica.

The point of the appendage to the labellum is thick and blunt, and turned down (when the labellum closes the flower) into a depression suited to receive it.

The labellum rhomboidal emarginate.

The stigma ovate.

Both figures are of plants rather below the average in size. The finest specimen I have seen of *Cycnocephala* bore twenty-four flowers. In both species the labellum is extremely sensitive, closing the flower on the slightest touch.

EXPLANATION OF PLATE.

Pterostylis cycnocephala. Fig. 1. Front view of flower, showing labellum dependent. 2. Front view of flower, showing labellum erect, closing the entrance. 3. Side view of flower, labellum dependent. 4. Column, from the side. 5. Column, from the front. 6. Side view of column, with lower sepals and labellum, dorsal sepal and petals removed. 7. Upper part of column, from the side, one wing removed. 8. Pollen masses. 9. Labellum, from the side, erect. 10. Labellum, showing under side, erect. 11. Labellum, showing upper side, dependent. 12. Labellum, from the side, dependent.

Pterostylis mutica. Fig. 1. Side view of flower. 2. Front view of flower, showing labellum dependent. 3. Front view of flower, showing labellum erect, closing the flower. 4. Inner side of petal. 5. Pollen masses. 6. Column, from the side. 7. Column, from the front. 8. Labellum, from the side, erect. 9. Labellum, showing upper side, erect. 10. Labellum, showing under side, erect. 11. Upper part of column, from the side, one wing removed.



From Nature by R.D.Fitzgerald.FLS

On Stone by Arthur J. Stopps.

Woollsii

PTEROSTYLIS

Rufa

Pterostylis rufa (R. Brown). *Pterostylis Woollsii* (Fitzgerald).

PTEROSTYLIS RUPA is by no means a common Orchid in the neighbourhood of Sydney, belonging rather to the flats nearer the Blue Mountains.

P. Woollsii cannot be included in any of the varieties of *P. rufa*, as given by Bentham in the "Flora Australiensis," and should, in my opinion, be ranked as a distinct species. I have therefore named it as such, after my friend, Dr. Woolls, who has contributed so largely to the knowledge of the Botany of New South Wales, and who kindly sent me specimens discovered by him growing in the neighbourhood of Richmond, and from which the figures have been taken. The only other locality from which I have since received it has been from Boorowa, from Mr. G. H. Sheaffe.

The varieties of *P. rufa*, as given by Bentham, are *gibbosa*, *squamata*, and *Mitchelli*; *gibbosa* said to be "merely a tall-growing, luxuriant state of the typical, short-pointed form," *squamata* to be "a small-flowered variety, with short points," and *Mitchelli* to have numerous cilia on involved margins of the labellum, the maximum length of the lower sepals being given as from three-quarters to one inch.

A glance at the figure opposite will, I think, be sufficient to convince the reader that *P. Woollsii* cannot be placed under any of such varieties.

The most remarkable distinctions are as follow:—

Pterostylis Woollsii.

Bracts leafy.

Large sheathing bract beneath the flower, enclosing it when in bud.

Tails to the lower sepals two and a half to three inches long.

Labellum lingulate.

Appendage lingulate with a few hairs at the end, a second lingulate appendage on the centre of labellum near the point.

Wings of column short and blunt; small point at the upper angle, well defined.

Stigma forms at the top a bifid hood.

Anther very short and rugose.

Pterostylis rufa.

Bracts scale-like.

Small sheathing bract beneath the flower.

Points to lower sepals from one-eighth to one-quarter of an inch.

Labellum ovate.

Appendage globular, covered with hairs; no second appendage on the labellum.

Wings of column square, point at upper angle not well defined, passing into the cilia.

Stigma at the top simply channelled.

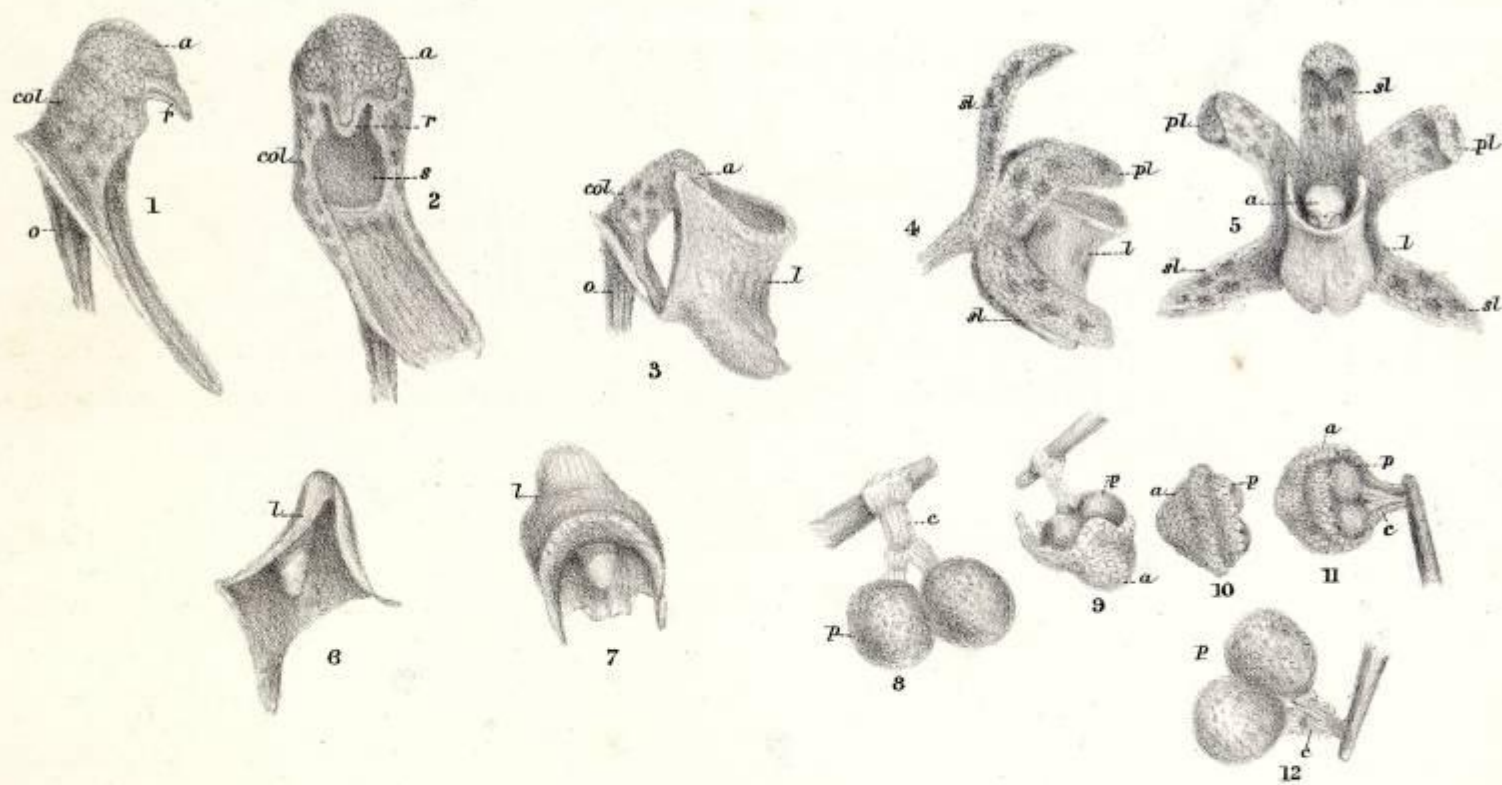
Anther longer and smoother.

In both species the labellum is highly sensitive, closing the flower at the slightest touch. Both flower in October and November; the leaves, which when young are a smooth, bright green, having become yellow and withered.

EXPLANATION OF PLATE.

Pterostylis Woollsii. Fig. 1. Flower from the side, labellum dependent. 2. Lower sepals and labellum, labellum dependent. 3. Lower sepals and labellum, labellum erect. 4. Labellum, from the side. 5. Column and labellum, from the side, labellum erect, sepals and petals removed. 6. Pollen masses. 7. Top of column, showing part of stigma, one wing removed. 8. Column, from the front. 9. Top of column, from the side.

Pterostylis rufa. Fig. 1. Front view of flower, labellum dependent. 2. Front view of flower, labellum erect. 3. Top of column, wings removed. 3. Top of column, anther thrown back, and pollen masses removed. 5. Labellum, from the side, erect. 6. Labellum, from the side, dependent. 7. Column, from the side. 8. Pollen masses. 9. Side view of flower, half of dorsal sepal removed, and one petal turned down.



From Nature and on Stone by R.D. Fitzgerald ELS

SACCOLABIUM Hillii.

Genus *Saccolabium*. (*Lindley*.)

SACCOLABIUM closely approaches *Sarcochilus*, but it may readily be distinguished by the undivided pouch-like labellum. As yet only one species has been obtained in Australia, but, as it is an East Indian form, others may be found to the north.

Saccolabium Hillii. (*Mueller*.)

In *Saccolabium Hillii* the bird-like head of the column (fig. 1) seems to stoop to drink out of the labellum (fig. 3.)

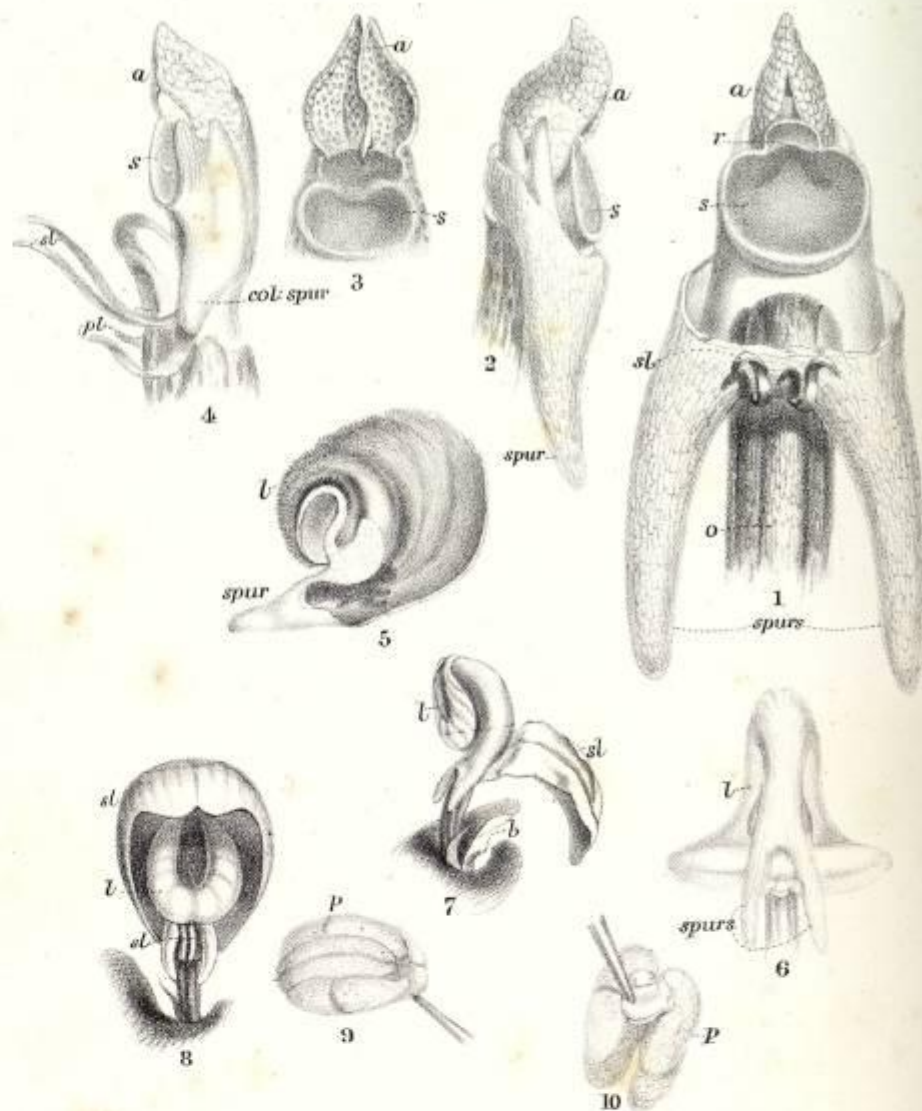
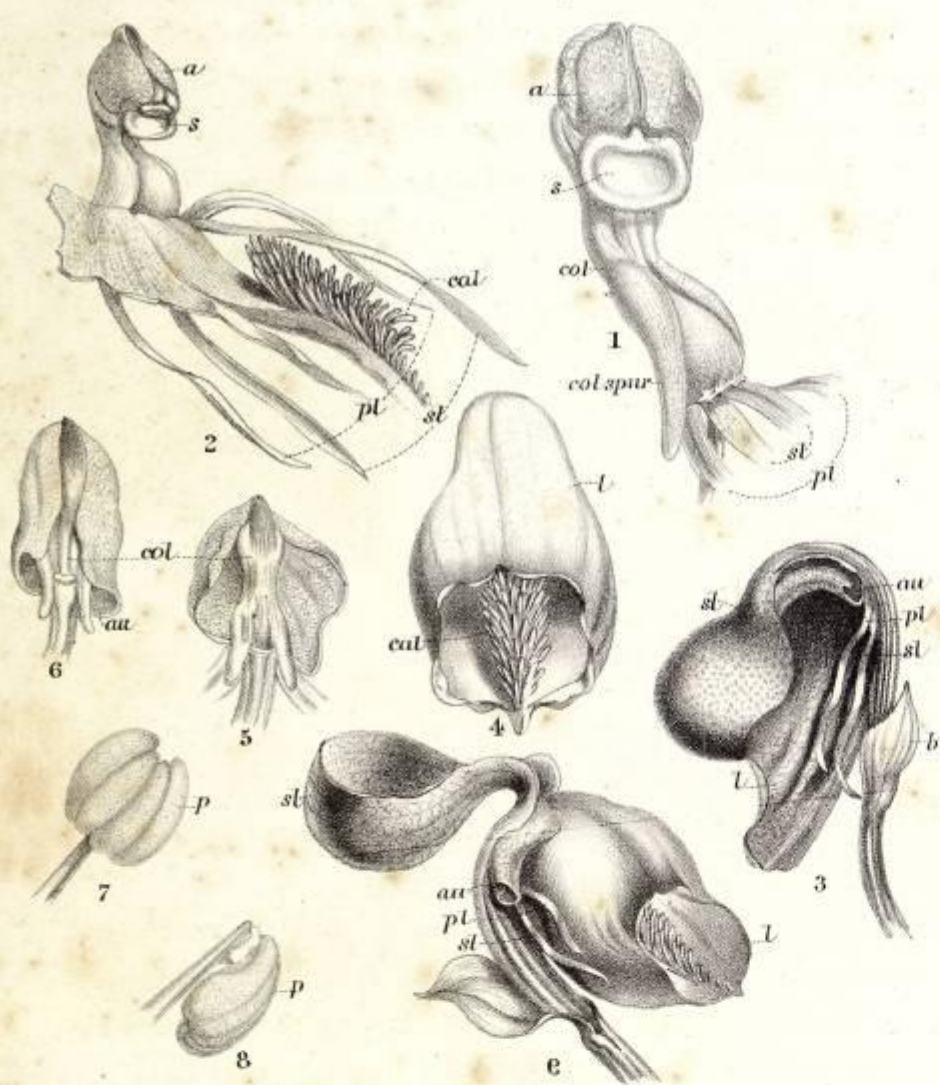
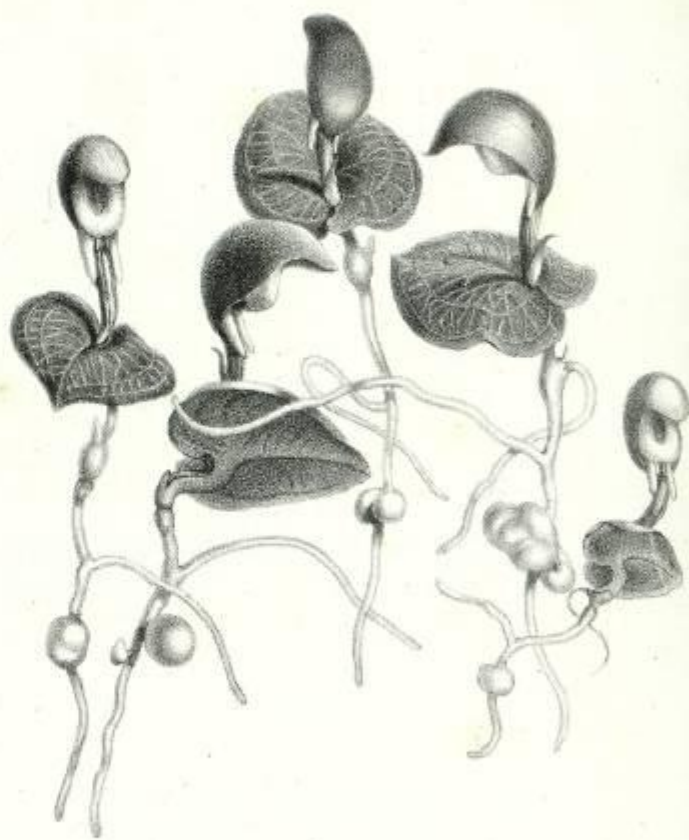
If a small insect should happen to enter or fall into the labellum, which hangs upon an elastic hinge, it would in all probability be pressed or thrown against the under side of the bird's-bill (rostellum), which at once adhering would come away with the skull (anther) and upper mandible (fig. 11) from off the neck (column). On the first motion of the insect the skull (anther) would fall off (fig. 9), leaving the two lobes of the brain (pollinia) (figs. 8 and 12) ready to be inserted in the cavity of the stigmatic chamber (in the throat) (fig. 2), there to adhere and fertilize the flower. By such intrusion the pollinia may reach the stigma, but otherwise they remain in the anther, and the flower withers unfertilized.

Saccolabium Hillii is an epiphyte found in the "cedar brushes" as far south as the Clarence, and flowers in October.

In this species the pollen-masses are not, as given in the characters of the genus, either "four in pairs (or two deeply two-lobed)," but are very similar to the pollinia of some species of *Sarcochilus*, being two in number, waxy, globular, and united by a short flattened caudicle.

EXPLANATION OF PLATE.

Fig. 1. Side view of column. 2. Front view of column. 3. Side view of column, and labellum, petals, and sepals removed. 4. Side view of flower. 5. Front view of flower. 6. Section of labellum cut close to the internal spur. 7. Labellum, from above. 8. Pollen-masses freed from the anther. 9. Pollen-mass and anther falling off. 10. Anther containing the pollen-masses, from the back of the anther. 11. Anther containing the pollen-masses, from underneath. 12. Pollen-masses, from below.



From Nature by R.D. Fitzgerald FLS.

On Stone by Arthur J. Stopps.

CORYSANTHES

Unguiculata

Bicalcarata

Corysanthes unguiculata (R. Brown). *Corysanthes bicalcarata* (R. Brown).

IN these curious little Orchids there is considerable departure from the ordinary type by the great development of some parts, the reduction of others, and the introduction of appendages, the use of which (if any) is by no means obvious. The dorsal sepal and labellum are greatly enlarged, apparently at the expense of the petals and the other sepals, which are all but rudimentary. In *C. unguiculata* the base of the labellum is curled upon itself, so as to make spur-like auricles, and in *C. bicalcarata* it forms actual spurs closed at the ends; such auricles and spurs, in both cases, enclosing spurs of the column, for which I cannot imagine any possible use. Nor can I find a use for the calli on the labellum of *C. unguiculata*, whilst the smooth funnel-shaped labellum of *C. bicalcarata* answers all purposes. Both must apparently be fertilized by similar insects, and those are, I have little doubt, small ones of various kinds that crawl into the labellum, as, should they penetrate to the columns, they could hardly fail in their wriggings to smear the very friable pollens on the extremely viscid stigma, which so passes into the rostellum that it is very difficult to extract the pollen masses perfectly, so as not to leave a portion on the stigma.

Whatever way they be fertilized, whether wholly by their own pollen, or occasionally by that from other flowers, neither of them produce seed at all frequently; in fact, I have never as yet been able to find a capsule on either species, and am therefore unable to say whether it is elevated by the petiole lengthening after fertilization, as in the case of *C. pruinosa* and *C. fimbriata*, or not. In *C. bicalcarata*, the under surface of the leaf is always red, and in *C. unguiculata* red, more or less streaked with a bluish-grey. Thus, by the colour of the bottom of the leaf alone, in the absence of the flowers, *C. bicalcarata* and *C. unguiculata* can be distinguished from *C. fimbriata* and *C. pruinosa*, the bottom of the leaves of which are greyish-green, and of a bright granular substance.

C. unguiculata is very rare. At present I know of only two situations in which it may be procured (both near Sydney), the one at Long Bay, and the other at the head of boat navigation, Lane Cove.

C. bicalcarata would appear to be the northern representative of the genus, and Sydney (where it is not common) perhaps its southern limit.

Both flower in June and the beginning of July.

EXPLANATION OF PLATE.

Corysanthes unguiculata. Fig. 1. Front view of column, showing its spurs and portion of petals and lower sepals, dorsal sepal and labellum removed. 2. Side view of column, with petals and lower sepals; and showing calli on fragment of labellum. 3. Side view of flower. 4. Labellum, showing calli in the interior. 5. Back of column, auricle-flaps opened, and spurs of column thereby exposed. 6. Back of column, showing auricles and spurs of column. 7 and 8. Pollen masses. 9. Side view of flower, dorsal sepal thrown back.

Corysanthes bicalcarata. Fig. 1. Front view of column, showing lower sepals, dorsal sepal, and labellum removed, with the exception of its spurs. 2. Side view of column, showing spurs of labellum. 3. Top of column, anther flaps thrown open by removal of rostellum and pollen masses. 4. Side view of column, showing the spurs of the column, petals, and lower sepals. 5. Section of labellum cut through the spur. 6. Labellum, from the back, showing base of column. 7. Side view of flower, dorsal sepal thrown back. 8. Front view of flower. 9 and 10. Pollen masses.

PART 3.

JUNE, 1877.



From Nature and on Stone by R.D. Fitzgerald FLS

ORTHO CERAS Strictum

Genus *Orthoceras*. (*R. Brown.*)

THE genus contains only one species, and closely resembles *Diuris*, from which it may readily be distinguished by the greater number of leaves. It is to be found in sandy open ground, and sometimes in the crevices of rocks.

Orthoceras strictum. (*R. Brown.*)

THIS genus, though so closely related to *Diuris* as to have been included in it, is separated from it, so far as both genera are known, not only by minor distinctions but by the peculiarity of its fertilization; and not only from *Diuris*, but from the whole order, so far as I am aware.

It has somewhere been remarked that where a genus is confined to very few species (as for example the Turnstone amongst birds), such genus is more generally diffused than others containing many species. Such is the case, at least to a certain extent, in this genus; *Orthoceras strictum* being found in New South Wales, Victoria, South Australia, probably Western Australia, and New Zealand.

It would be well that such propositions relative to distribution were thoroughly examined as to their truth, and should that be established, that the cause be diligently sought, for in such are to be found the clues to the past and possibly the links by which relationship to extinct forms may be elucidated.

Orthoceras strictum is by no means an attractive species—there is nothing either in colour or form to please the eye; but to the botanist, endeavouring to trace slight outward variations leading to important physical distinctions, it is very interesting and important. It possesses the usual labellum, which is furnished with its own peculiar gland. The labellum appears to be as well suited for a resting-place for an insect, as in *Diuris* and other genera; and to all outward appearances, the stigma, rostellum, and anther are very similar to *Diuris*; but unlike *Diuris*, should an insect alight on the lip and touch the rostellum it would have no effect upon the flower, and all the facilities towards fertilization afforded to insects, though present as in allied species, are useless. If a well-formed oyster had the hinge placed at the broad end of the shell, it would afford a good illustration of the column in this species (fig. 1). The flat shell represents the stigma (fig. 1), the hollow shell the anther (figs. 3 and 4), and the fish itself the pollen (fig. 8); the pointed rostellum (occupying the position of the true hinge in the oyster) has no connection with the pollen masses, which are of rather solid consistency. When the flower has but recently opened, if the anther is gently drawn back, the pollinia are easily removed, having as yet no attachment to the back of the stigma or to the anther; but should the flower be permitted to remain longer, the pollen will be found to have become attached to the back of the stigma (much in the same way as the oyster to the flat shell) and a little later to the greater part of the lower portion of the back of the stigma. On a close examination of the stigma it will be found that the material of which it is composed is as it were thinned away just below the boss or rostellum (as though the oyster-shell had been scraped away until the outer surface was reached), and here the pollen coming in contact with the stigmatic material of the front of the stigma, first lays hold upon it and then gradually becomes united with the lower part, but never attaches itself to the back of the rostellum. Whenever and wherever I obtained this species I invariably

EXPLANATION OF PLATE.

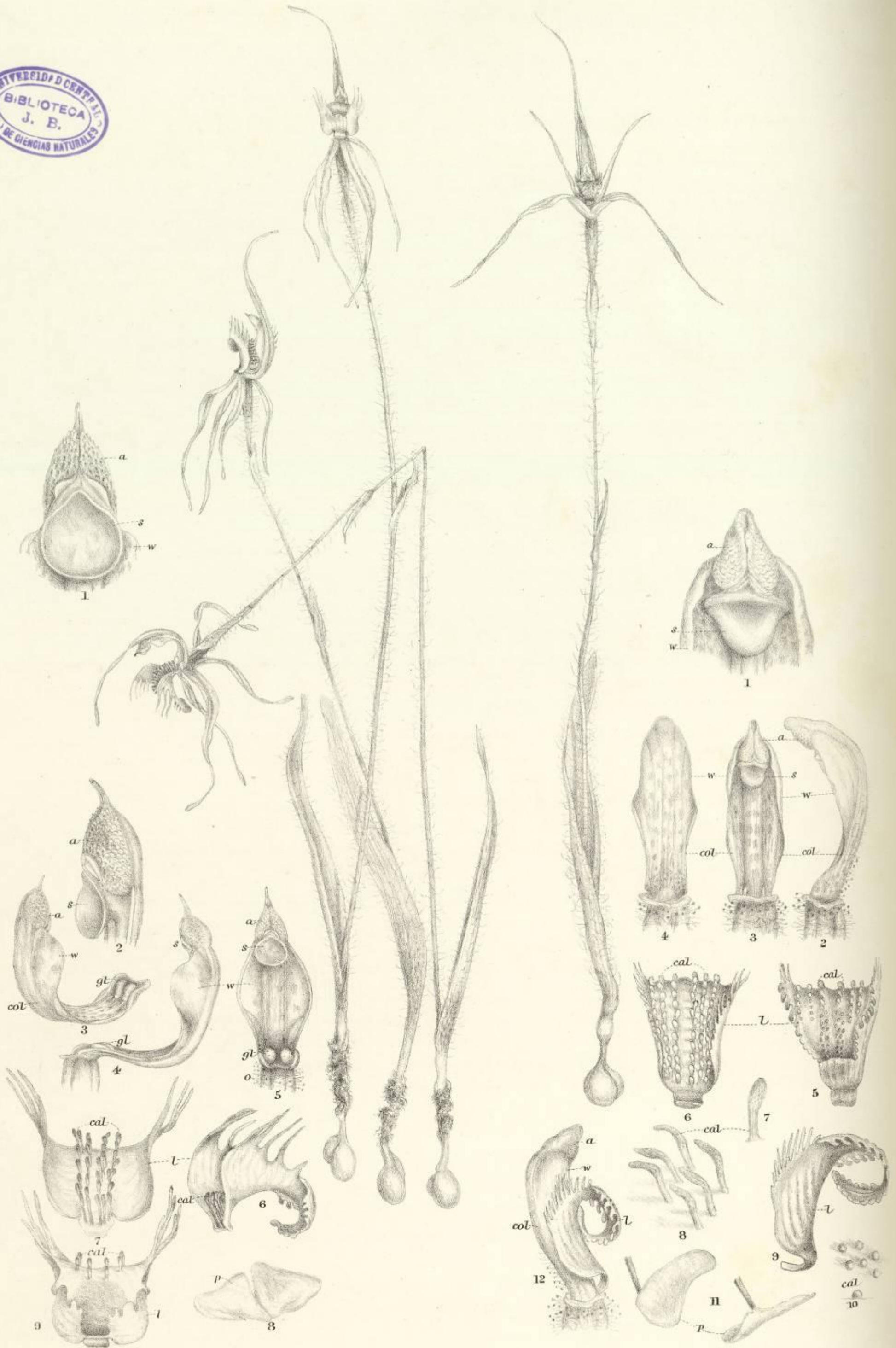
Fig. 1. Front view of column. 2. Side view of column. 3. Side view of stigma, showing adhesion of pollen to the back. 4. Back of column, showing back of anther and column wings. 5. Front of column, stigma removed, showing pollen in the anther. 6. Side of column with petals attached, and parts of sepals, dorsal sepal and labellum removed. 7. Front view of flower, parts of sepals removed. 8. Pollen masses. 9. Labellum, and gland on labellum.

observed that all the flowers produced seed, yet in no instance could I find pollen on the stigma, or that the pollinia had been removed—a fact that upon consideration is readily explained; for the pollinia, being without connection with the rostellum are without the usual means of removal, and being snugly placed away between the stigma and anther, and still further hemmed in by the wings of the column, are not at first in the least likely to be removed in any other way, and cannot after they become attached to the back of the stigma.

It was not, however, until I had examined several specimens that I became convinced that so great a departure, involving absolute self-fertilization, was affected by such a variation as this thinning of the lining, so to speak, of the stigma. All the more wonderful should it be found that this single species of an outlying genus is the only one in which the stigma is fertilized from within, and the ordinary stigmatic surface, though present, thus rendered useless. When the pollinia are removed before the pollen unites with the back of the stigma, the flower produces no seed, but when they are similarly removed and placed on the front of the stigma, the flower is thereby fertilized.

Whether such solitary species be remnants of the past (as would appear to be the case with the Port Jackson shark, *Cestracion Philippii*), that from the specific character, of extraordinary stability, have come down to us from the times of bygone forms is, of course, open to question. The absence, however, of links leading up to them (links that might be expected to be forthcoming if they were recent departures, but not probably to be found if individual obstinacy of species alone accounts for their presence) tends to corroborate the idea that they are of the past, and if so their peculiarities may be a guide to the direction of modification. As in this case, if *Orthoceras strictum* be an outlier from extinct forms, then fertilization from the back of the stigma may have been the rule amongst Orchids at one time and not the exception. And by attention to similar cases, it may be found possible that self-fertilization in all orders was the original process, gradually departed from by the differentiation of organs, intervention of insects (as in *Diuris*), and separation of sexes (as indicated by *Monachanthus*).

Orthoceras strictum, though generally distributed, is not a very common Orchid. It flowers in December.



From Nature and on Stone by R.D. Fitzgerald, F.L.S.

Dilatata

CALADENIA

Patersoni

Caladenia dilatata. (R. Brown.) *Caladenia Patersoni*. (R. Brown.)

THE speculations of Mr. Darwin have had a marked effect upon systematic Botany, not only amongst his disciples, but among systematists who do not accept his theory of mutability of species.

Specimens that, if submitted a few years ago to the highest authorities, would without doubt have been considered as representing new species, are now matters of hesitation, uncertainty, and re-comparison, and are finally pronounced to be varieties, very often to the disgust of the collector, who has seen them in a fresh state, and who cannot accept the ruling that they are identical with others previously named, with which he may be equally familiar, and into which he feels confident that they never lapse.

To include a great number of very distinct varieties under one species cannot, if it be possible to avoid it, be satisfactory. The general reason for thus including them is that intermediate forms have been obtained. This may not have been sufficiently attended to formerly; but is not too much being made of it now? Could it not, and should it not, to be consistent, be carried out to the union of all our species, or nearly so, of *Eucalyptus* into one species, all our *Acacias*, &c.? And if all the forms of the world were brought together, might not many others, such as *Hibiscus*, be similarly united?

I am compelled to refer specially to this subject here, as the two *Caladenias* represented on the opposite page are included with several others by some of our greatest botanists under the one species, and it is therefore necessary that some explanation should be given for my departing from their arrangements. If the line between variety and species be difficult to define, there is all the more reason (whether it be natural and absolute, or only artificial) that it should be made as intelligible as possible. The only rule that appears to me to be satisfactory in separating what should be called varieties from what may be called species is, when varieties reproduce themselves constantly, and the one form is not produced from the seed of the other, that they be then termed species. This rule therefore is adopted, so far as the facts are known to me, in dealing with this and other genera. Where differing individuals are always found growing together, and sometimes lapsing the one into the other, as in the case of the two forms in *Caladenia dimorpha*, they must be considered as mere varieties; but when a series though closely united are found growing apart, and perfectly constant in themselves, the one never producing the other, they must, I think, be treated as species, if species is to have any consistency, though they may have originated from variations.

When a large group, especially of dried specimens, are examined by a botanist, such specimens being forwarded from various localities, and approaching one another more or less closely, it is natural for him to conclude that they belong to one variable species; but were he to find one of the series in the East at Sydney, and at the West at Molong, altogether the same, and again another form found close to it at either place never passing into it, I do not think he would unite them because another somewhat similar to either of them should be found elsewhere. The species may be variable, but unless the varieties are found to lapse into the original form, they must by variation depart further and further from each other, and thus produce new forms.

Whether this has been the case by hybridization or otherwise, in forms placed in the "*Flora Australiensis*," under *C. Patersoni*, I am unable to state, but I have not been able to find anything to show that they relapse into one another and I have never found that the points of distinction were wanting; for instance, the calli were never (except now and then by evident abortion) subject to any variety in the various forms as found growing in patches and in various localities.

C. dilatata is a coast and inland form. *C. Patersoni* is, I think, restricted to the western side of the Dividing Range. Both species are readily fertilized by pollen from any other *Caladenia* or *Glossodia*, and like the other species in the genus are, I believe, indebted to large flies for the removal of the pollinia and their transfer to the stigma, the labellum pressing such insects by the elasticity of the hinge against the column. Both species flower in October.

EXPLANATION OF PLATE.

Caladenia dilatata. Fig. 1. Top of column, front view. 2. Top of column, from the side, wing removed. 3. Column, partially from the back. 4. Column, from the side. 5. Column, from the front. 6. Labellum, from the side. 7. Labellum, from the back. 8. Pollen masses. 9. Labellum, from the front.

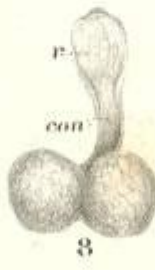
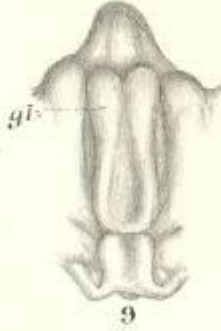
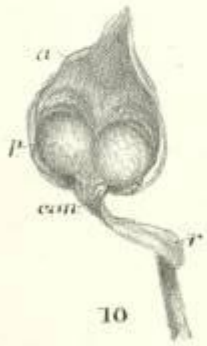
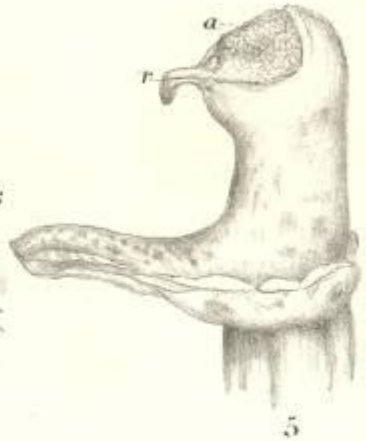
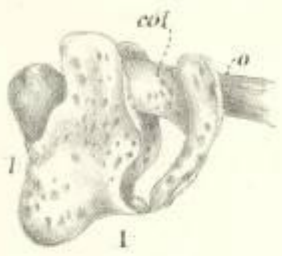
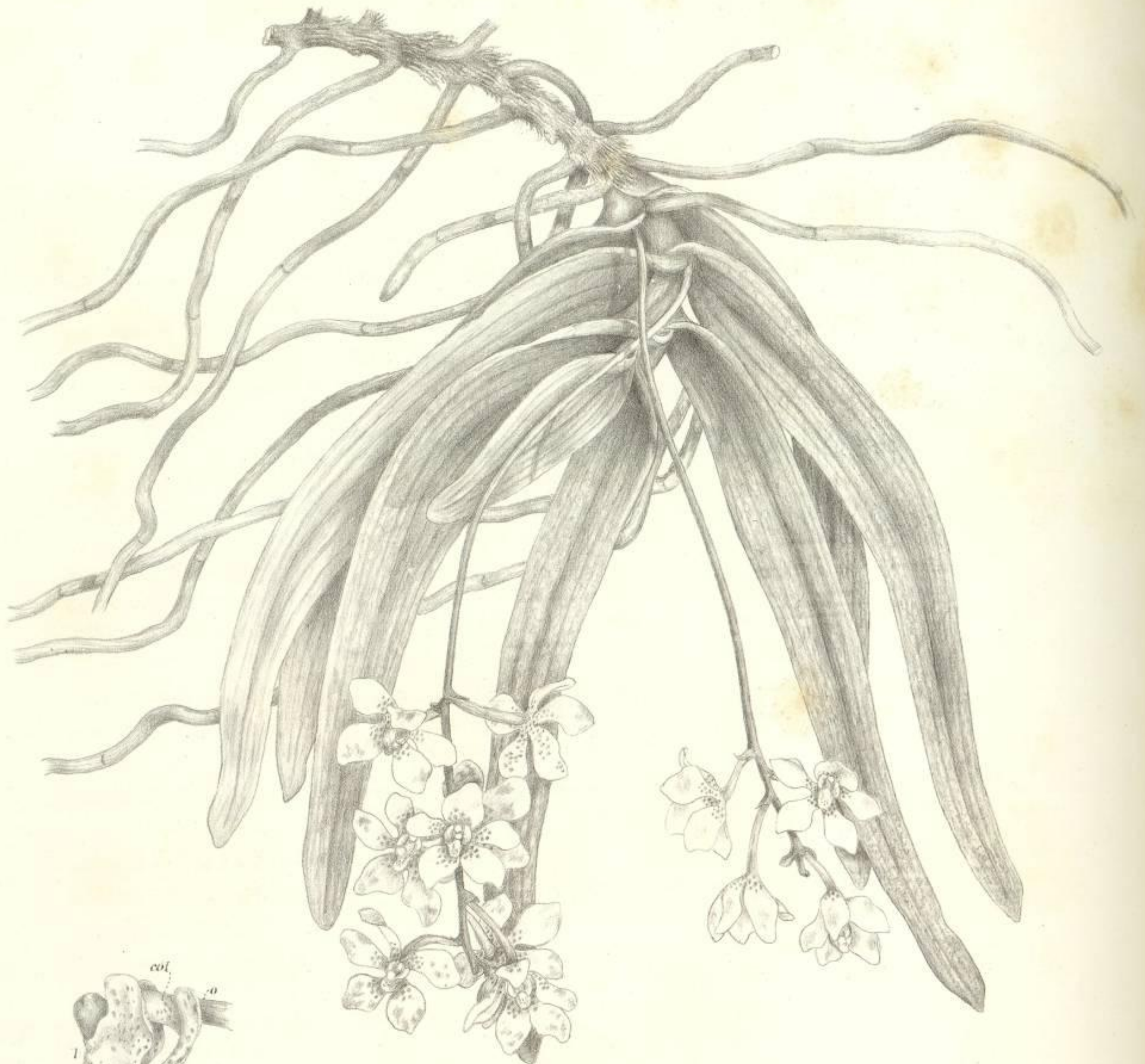
Caladenia Patersoni. Fig. 1. Top of column, from the front. 2, 3, and 4. Column, from the side, front, and back. 5. Labellum, from the front. 6. Labellum, from the back. 7. One of the calli of the base of the labellum, from the back. 8. Calli of the base of the labellum, from the side. 9. Labellum, from the side. 10. Calli of the point of the labellum. 11. Pollen masses. 12. Column and labellum, from the side.

Genus *Sarcochilus*. (*R. Brown.*)

THE greater number of the little Orchids to be seen clinging to the branches of trees in the dense "cedar brushes" and in the mountain "scrubs" belong to this genus. The botanist in search of them can hardly expect to see the little plants themselves perched amongst the branches, but he readily catches sight of the slender roots that traverse trunk and branch to the slightest twig, and following them to their source he perceives the little epiphyte itself, from the centre of which often depend spikes of flowers, the perfume of which spreads far and wide under the dense foliage of fig or sassafras.

Sarcochilus, being one of the genera that extend from the East Indies into Australia, as might be expected, belongs to the north-east coast, and is only represented south of Sydney by two or three species, one of which is found even as far south as Tasmania.

In many respects it resembles *Dendrobium*, but differs much from it in the form of the pollen masses, in their attachment to a caudicle and in the seed-capsule and seed. Attempts to cross the two genera have not been successful, but the species cross freely amongst themselves. The season of flowering is from the beginning of September to December.



From Nature and on Stone by R.D. Fitzgerald F.L.S.

SARCOCHILUS Fitzgeraldi.

Sarcochilus Fitzgeraldi. (Mueller.)

THIS is one of the prettiest and rarest of our epiphytes. It has been named by my friend, Baron Von Mueller, from specimens procured by me in a deep gorge of the mountains at the head of the Bellinger River—one of those numberless ravines that terminate in precipices down which innumerable streams fall from the table-land into the deep darkness of shadowing tree-ferns, palms, and fig-trees.

Within the spray of the Naroo Falls and the surrounding streams, *Sarcochilus Fitzgeraldi* was found in masses clinging to the dripping rocks, and covering the black basalt with its green roots that stretched for yards over the smooth surface, and followed the mossy crevices. With it were associated a strangely proliferous form of *Dendrobium Kingianum* and clumps of *Sturmia reflexa*, while to the small branches of bush and tree clung the little *Oberonia palmicola*, *Dendrobium aurantiacum*, and *Sarcochilus olivaceus*, and upon the fallen trees grew wonderful old plants of *Dendrobium Hillii*. The rich vegetation, black basalt, and white foaming river, with glimpses through the tops of the trees of the ever-falling water, made one of those rare spots in which the world is forgotten and the longings of the naturalist realised.

In the figure of this *Sarcochilus* only one branch or plant is given, but it produces off-sets and thus becomes a thick mass of pendent leaves, through which numerous flower-stems protrude. It is a free flowerer, a small plant grown in a "bush-house" frequently producing from forty to fifty flowers.

It bears culture better than any other in the genus with which I am acquainted, and if placed on a moss-covered rock and kept damp, bears well removal to the "bush-house."

It is dependent on insects for its fertilization. At the Naroo Falls many of its leaves were found to be eaten, probably by a species of wood-louse or sand-hopper (*amphipoda*), which was numerous beneath the clumps; and those insects are, I believe, the principal agents in conveying the little globular pollen masses into the stigmatic chamber.

In the introductory remarks I referred to this supposition, and suggested that in like manner the long tails of *Angraecum sesquipedale* may be attractive as delicate food, and consequently be attacked by insects that in the course of their depredations become the means of its fertilization. This idea has, I think, been strongly supported by a remark I have since noticed in "My Garden," by Smee, page 302, in which he says, referring to *Angraecum sesquipedale*—"It is remarkable for its having a long appendage which the crickets delight to eat, making the flower look ridiculous."

S. Fitzgeraldi flowers in November.

EXPLANATION OF PLATE.

Fig. 1. Side view of labellum and column, petals and sepals removed. 2. Labellum, from the back. 3. Labellum, from the front. 4. Column, from the front. 5. Column, from the side. 6. Top of column, anther removed. 7. Top of column, anther, rostellum, and pollinia removed. 8. Pollen masses, with caudicle and rostellum. 9. Glands on labellum. 10. Anther removed and still attached to pollen masses.



From Nature and on Stone by R.D. Fitzgerald F.L.S.

SARCOCHILUS Parviflorus

Sarcochilus parviflorus. (Lindley.)

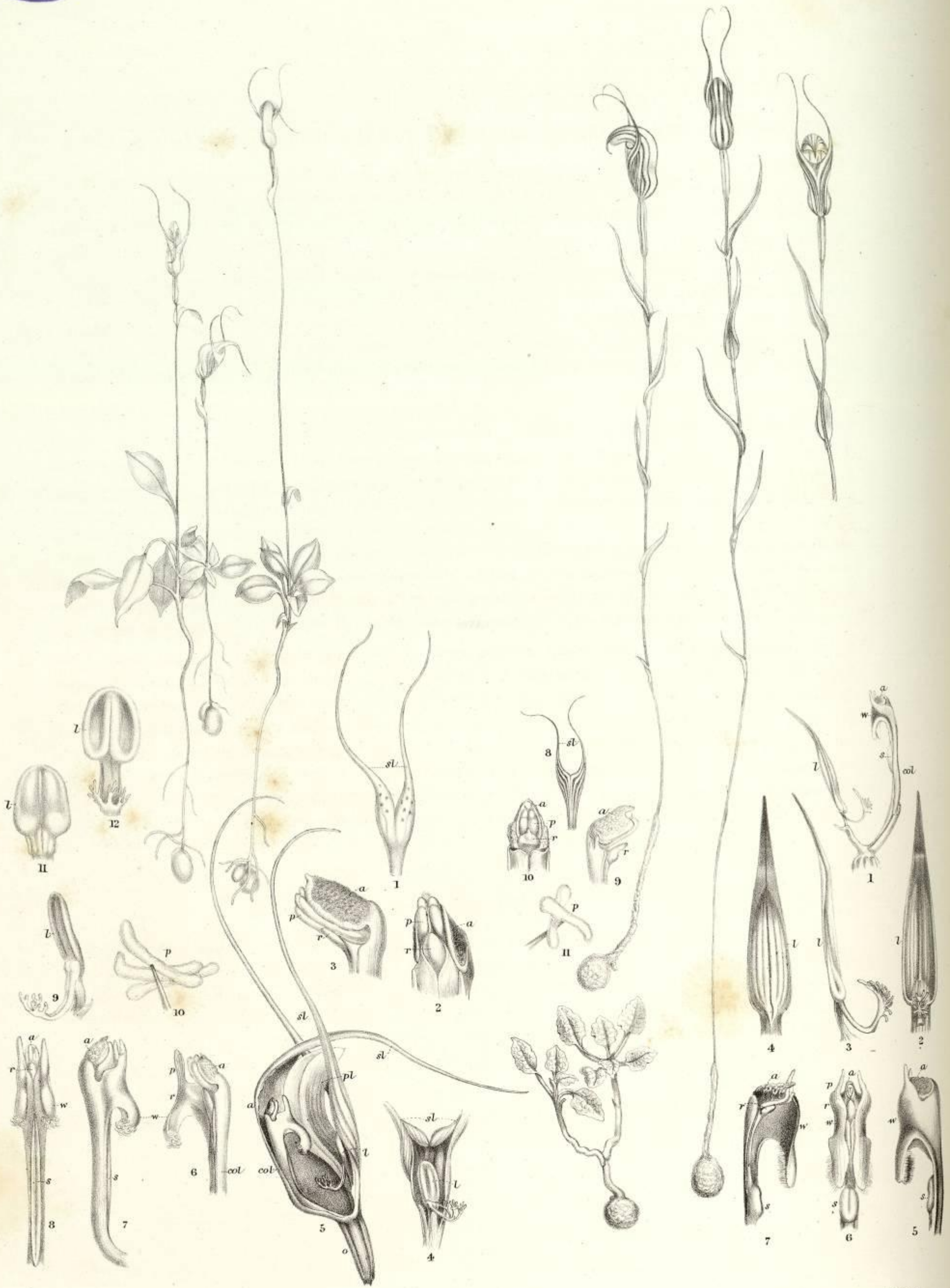
THE name of *parviflorus* hardly seems suitable for this species, the flowers being remarkably large and numerous in proportion to the size of the plant. The myrtle (*Backhousia*) is the tree favoured by the presence of this little plant in the Blue Mountains, but I found it growing on the "Musk" (*Olearia argophylla*) in Fern-tree Gully, near Melbourne.

Whether the sand-hopper (*Amphipoda*) is the agent of fertilization of the species in the gullies of the Blue Mountains, as I believe it to be of *S. Fitzgeraldi* at the Naroo Falls on the Bellinger, I have not been able to make out; but it is certain that though capsules may frequently be seen on the plants in the dark gorges of the mountains, when removed the plants do not produce any seed, unless the naturalist interfere with them, when they may be made fertile by placing their own pollen or that of any other *Sarcochilus* on the stigma.

It is therefore evident that in removing them they have been taken out of the range of some special insect or insects that are in the habit of visiting them, and introduced among others to which they are unattractive, or which have not learned that any advantage is to be obtained by visiting them. Though the range of this Orchid is large, as it is to be found in the comparatively warm climate at Pittwater, north of Sydney, in the cold of the Blue Mountains, and even in Tasmania, yet it cannot long survive introduction to either the green-house or "bush-house"; for though it sends out its roots and for a time seems at home in the latter, it misses the equable temperature of the deep ravines, and gradually perishes. It flowers in October.

EXPLANATION OF PLATE.

Fig. 1. Labellum, from the back, showing gland. 2. A seed. 3. Group of seed. 4. Capsules (not enlarged). 5. Flower, from the side. 6. Flower, from the front. 7. Pollen masses. 8. Labellum, from the front. 9. Top of column, anther thrown back. 10. Column, from the front.



From Nature by R.D. Fitzgerald F.L.S.

On Stone by Arthur J. Stepps

Pedoglossa

PTEROSTYLIS

Striata

Sydney, N.S.W., Thomas Richards, Government Printer.

Pterostylis striata. (Fitzgerald.) *Pterostylis pedoglossa.* (Fitzgerald.)

Pterostylis striata and *pedoglossa* appear to me to have no very close relationship to any other forms or to each other, and are placed together only as new species. *P. striata* has a general resemblance to *P. concinna*, but is with ease distinguished from it by the labellum (not forked), and by the stem-leaves. It was found near Yass by Mr. S. A. Fox, and flowers in May.

P. pedoglossa (so named from the likeness of the labellum to an ancient rudder) perhaps approaches *P. semirubra* most nearly, but is distinguished from it by the round labellum and long subulate points of galea and sepals. Like *P. semirubra*, which, according to Baron Mueller, was found growing on tree-ferns, it was obtained on the stem of a *Macrozamia spiralis* as well as in the sands beside it. The only situation in which I am aware of its existence is where I first procured it, in June, 1873, near Long Bay, Sydney, and where it has not flowered since, that is for a space of four years.

DESCRIPTIONS.

Pterostylis striata is a very slender, glabrous, one-flowered plant, reaching one foot or more in height. Leaves about six in number, gradually increasing in length upwards from a small sheathing bract to over one inch, linear lanceolate, acuminate amplexicaul, the leaf next the flower opposed to a small filiform appendage. Galea about three-quarters of an inch long, one and a half inches from ovary to point, gradually bent from opposite the junction of united sepals. United sepals, where united, narrow cuneate; where divided, gradually passing into long erect subulate points, one inch long. Sepals and petals striate. Labellum linear lanceolate, acute, concave for two-thirds its length, channelled along the centre, remaining pointed portion bent slightly back, not extending above the anther. Basal appendage linear penicillate at the end. Stigma ovate, about one quarter of an inch long. Upper points of column-wings short, erect. When the plant is not in flower the leaves are rosulate, shortly petiolate, ovate, oblong, obtuse.

Pterostylis pedoglossa. A very slender, glabrous plant. Leaves ovate or oblong, in a radical rosette or not strictly rosulate, a quarter or less to three-quarters of an inch or more. Scape one-flowered, from two to five inches in height. Bracts one or two, the lower sometimes transformed into a leaf. Galea half an inch long, one inch one-eighth from ovary to point, suddenly bent from opposite the junction of the united sepals, and produced into a long subulate point as long as those of the united sepals. United sepals, where united, narrow cuneate, inflexed; where divided, gradually passing into long curved subulate points, three-quarters of an inch long. Labellum on a long claw, ovate, oblong, cordate, thick, reaching only to the wings of the column. The basal appendage linear curved, as long as the labellum, exclusive of the penicillate termination, which is tripartate. Stigma linear acuminate at both ends, extending from between the wings down the whole length of the straight part of the column. Upper points of column wings erect, as high as the anther.

EXPLANATION OF PLATE.

Pterostylis pedoglossa. Fig. 1. United sepals. 2. Top of column, from the front. 3. Top of column, from the side. 4. Part of united sepals from within, subulate points removed, showing enclosed labellum. 5. Side view of flower, part of dorsal sepal and one petal removed, showing column and position of labellum. 6. Top of column, from the side, wing removed. 7. Column, from the side. 8. Column, from the front. 9. Labellum, from the side. 10. Pollen masses. 11. Labellum, from the back. 12. Labellum, from the front.

Pterostylis striata. Fig. 1. Column and labellum, from the side, petals and sepals removed. 2. Labellum, from the front. 3. Labellum, from the side. 4. Labellum, from the back. 5. Top of column, from the side. 6. Top of column, from the front. 7. Top of column, from the side, wing removed. 8. United sepals. 9. Top of column, from the side, wing removed. 10. Top of column, from the front, wings removed. 11. Pollen masses.



From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Stopps

DENDROBIUM Canaliculatum.

Printed at the Surveyor General's Office Sydney NSW



Dendrobium canaliculatum. (R. Brown.)

THIS pretty species is much better known under the name of *D. Tattonianum*. It is found in Queensland, but has not yet, so far as I am aware, been procured in New South Wales. It is rather variable in colour, and flowers in November. It is the species referred to by Mr. Carron as having attracted his attention and admiration when the illfated expedition under Kennedy was entangled in the swamps and back waters of Rockingham Bay, and as such may well be associated with the memories of a thorough botanist and of an intrepid explorer. Though rather frequently to be found in collections of Orchids in England it is not readily grown here in Sydney, even in the hot-house, and soon languishes in either green-house or bush-house.

The figure is taken from a plant kindly given to me by Sir William Macarthur.

EXPLANATION OF PLATE.

Fig. 1. Side view of labellum and column, petals and sepals removed. 2. Labellum, from the back. 3. Labellum, from the front. 4. Point of the labellum, showing glands. 5. Front view of flower. 6. Pollen masses. 7. Column, from the front. 8. Side view of part of column. 9. Top of column, showing anther displaced but retaining the pollen masses. 10. Top of column, showing anther empty and displaced, the hinge, clinandrum, rostellum and upper portion of stigma.

Genus *Prasophyllum*. (*R. Brown.*)

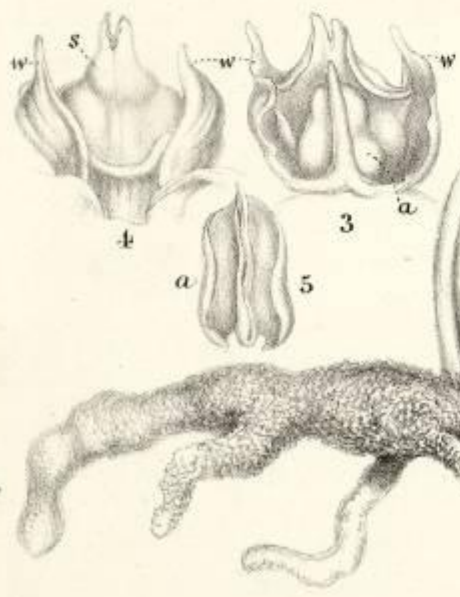
THIS genus, though easily recognized by its grass-like sheathing-leaf and long spike of inverted flowers, presents more difficulties to the botanist when he attempts to deal with the species than any other genus of Australian Orchids.

The difficulty arises from the similarity and minuteness of the flowers, the uniformity of habit, and from the distinctions amongst the species being of such a character as to evade description. The members of the genus are not so partial to shade as most terrestrial Orchids, but are generally to be found either singly or in small groups on the cold damp clayey flats on the hill-tops.

They are wholly dependent on insects for their fertilization, and a marked difference is often to be observed in the number of flowers producing seed, according to the situation in which the plant is found. On solitary plants I have frequently observed that not a single flower had been fertilized or pollen mass removed; and again, in groups, growing generally in the little rushy flats, every flower was fertilized and not a pollen mass could be found in the anthers. The reason I believe to be that such groups were in the haunt of some special insect to which they were indebted for their fertility. All the species I have obtained may be freely crossed amongst themselves.

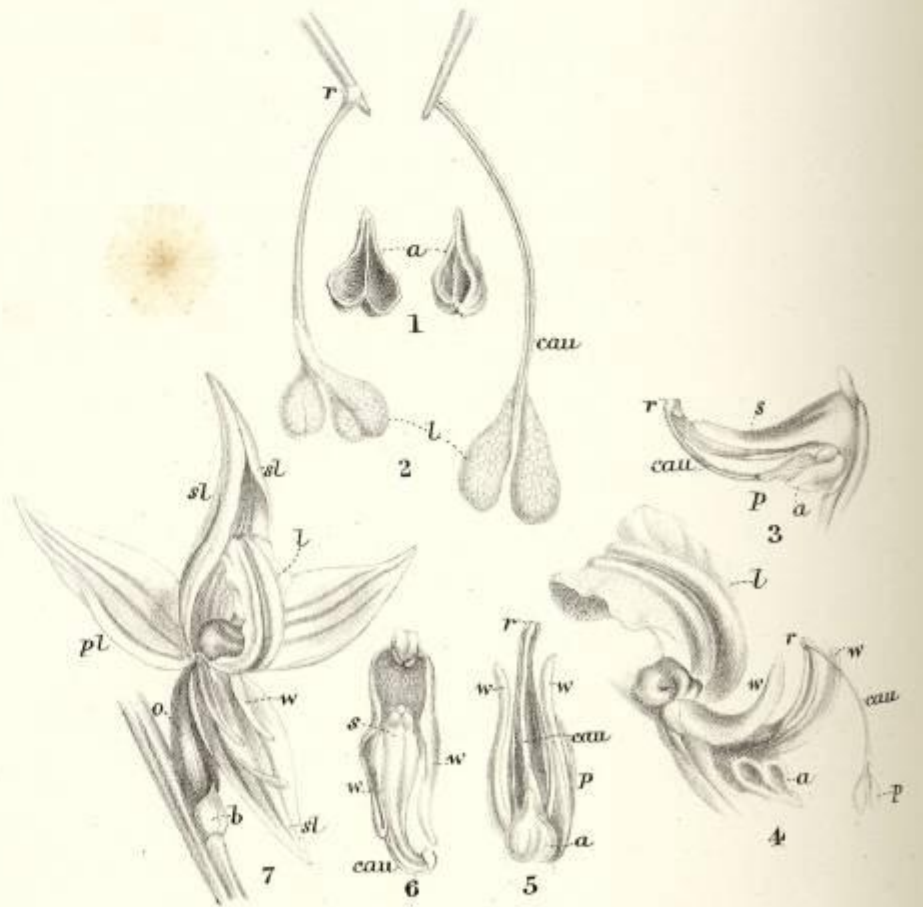
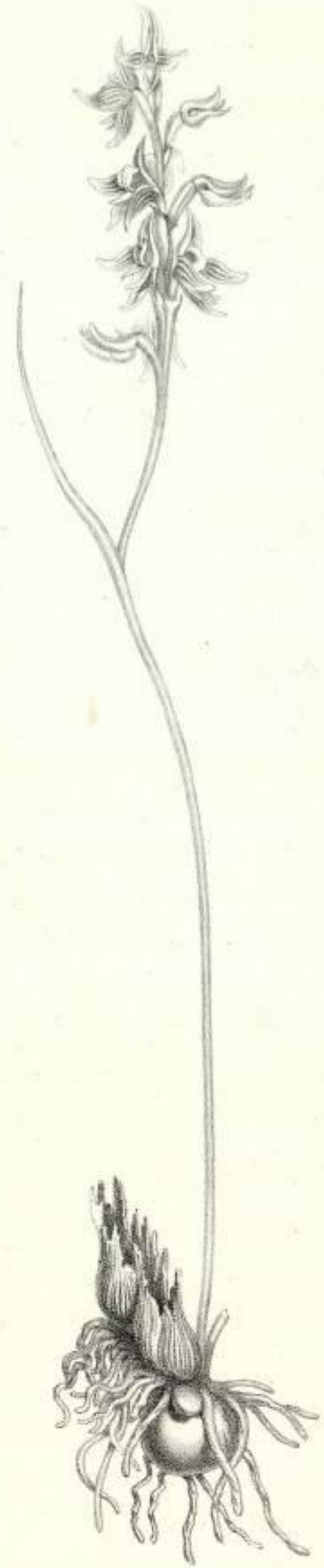
The inflorescence is peculiar, beginning in the centre of the spike and passing upwards and downwards.

The flowering is generally in the winter and spring, though some species flower in autumn and summer.



From Nature by R.D. Fitzgerald FLS.

Flavum



On Stone by Arthur J. Stopps.

Striatum.

PRASOPHYLLUM

Prasophyllum striatum. (R. Brown.) Prasophyllum flavum. (R. Brown.)

Prasophyllum striatum is not uncommon in swamps on the Blue Mountains, but I have only found it in one place near Sydney.

The great length of the caudicle appears to me to be rather a consequence on the length of the rostellum than any advantage as an assistance to fertilization, the short caudicle of *P. flavum* and others in the genus appearing to be equally advantageous. The slightest touch to the boss on the end of the rostellum removes the pollen masses from the anther; but from the position they are then placed in to the insect that had displaced them, it hardly seems probable that they would come in contact with the stigma of the flower from which they had been removed. Insects are the instruments in the fertilization of this Orchid, and so effectually do they perform the office in some situations that in large groups of plants in the Blue Mountains I have not been able to find a single pollen mass in the anthers of the expanded flowers. In this species the remains of the old growths illustrate the method of slow progression through the ground, by the new bulbs constantly replacing the old one on the same side.

P. striatum flowers in April.

Prasophyllum flavum is said to be found in the neighbourhood of Sydney, but I have never seen it nearer than the Blue Mountains, where it is generally to be observed singly or only a few in the same locality. The root is very peculiar, being unlike those of the other members of the genus, so far as known to me. It is deeply embedded in stiff yellow clay, and it is very difficult to remove whole. It is possibly epiphytal on the roots of trees.

P. flavum flowers in December.

EXPLANATION OF PLATE.

Prasophyllum striatum.—Fig. 1. Anther, from above and from the side. 2. Pollen masses. 3. Column, from the side. 4. Column and labellum, the pollen masses having sprung out of the anther. 5. Column, from below. 6. Column, from above. 7. Flower, from the front.

Prasophyllum flavum.—Fig. 1. Pollen masses. 2. Flower, from the side. 3. Column, from below, showing anther and lower surface of stigma, pollen removed. 4. Column, from above, showing upper surface of stigma, rostellum removed. 5. Anther, from above, pollen removed. 6. Column, from the side.

Genus *Cryptostylis*. (R. Brown.)

A small genus resembling *Prasophyllum* in the inversion of the flowers and in their general character, but unlike it in habit and form of the leaves. It is only semi-terrestrial, being frequently found clinging by its fibrous roots to rocks beneath a mossy covering. It forms a link between the truly Australian genera and those of the East Indies, partaking of the characteristics of both. Some of its species are found in Java and the neighbouring islands. It flowers in summer, and is wholly dependent on insects for its fertility.



From Nature by R.D. Fitzgerald, F.L.S.

Erecta



On Stone by Arthur J. Stopps.

Leptochila

CRYPTOSTYLIS

Cryptostylis erecta. (R. Brown.) Cryptostylis leptochila. (Mueller.)

Cryptostylis erecta is to be found in sandy ground and amongst rocks in the neighbourhood of Sydney.

The flower being inverted, the stigma is almost horizontal, and the rostellum presents itself to an insect at the entrance of the little chamber (made by the lower part of the labellum) to which the large shell-like upper part acts as a decoy or guide. The slightest touch to the rostellum removes the pollen masses from below the stigma, and they may then either be pushed against the stigma or borne away with the chance of insertion in some other flower. *C. erecta* flowers in December.

C. leptochila was lost sight of from the time it was first found at Springwood, by R. Cunningham, till rediscovered by Miss Atkinson at Kurrajong. It appears to be a mountain form, as I have procured it at Mount Tomah, and at Mittagong. It much resembles *C. arachnites*, figured by Blume in his "Javanese Orchids." It flowers in December.

EXPLANATION OF PLATE.

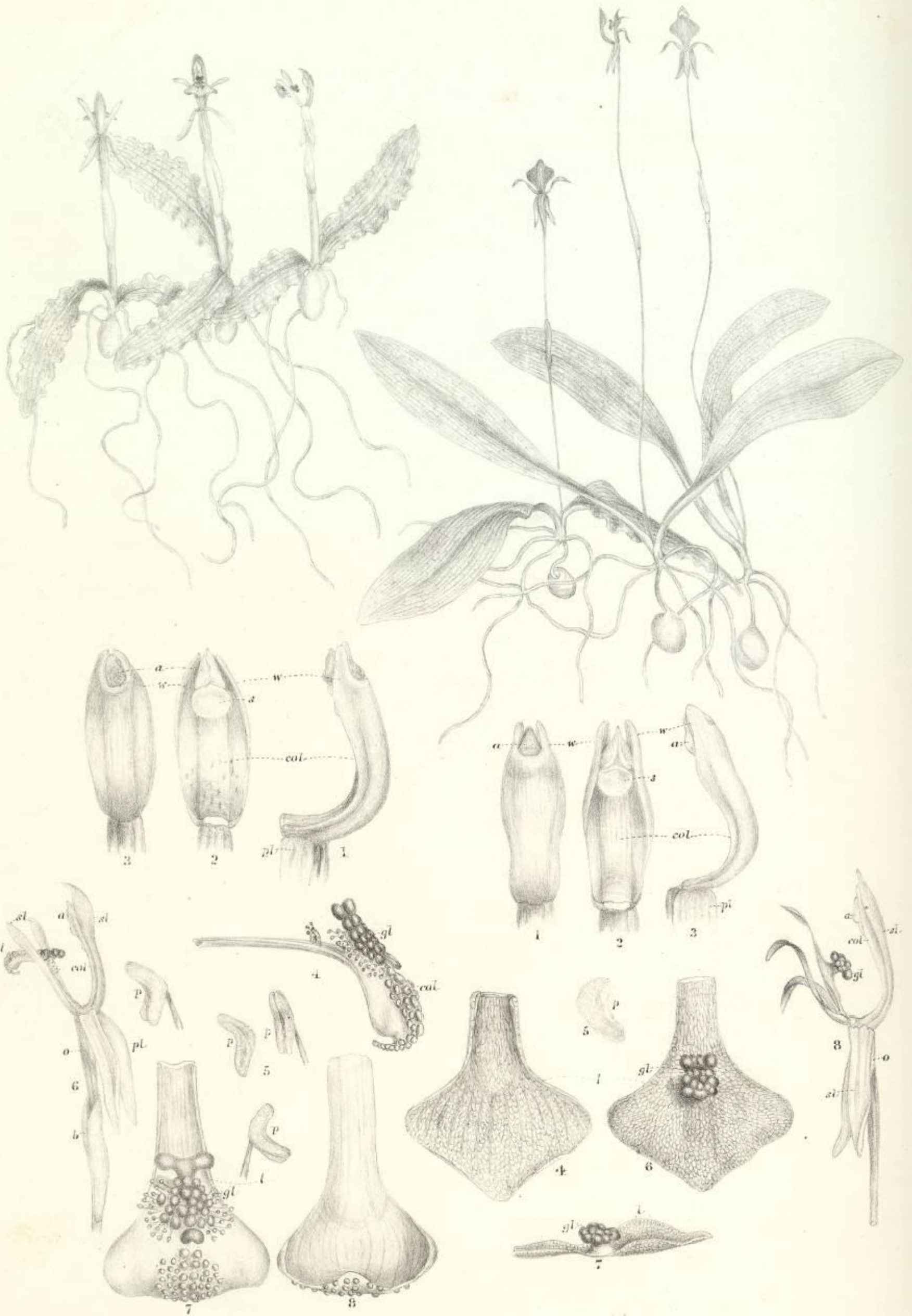
Cryptostylis erecta. Fig. 1. Side view of column. 2. Labellum. 3. Front view of part of flower, labellum and parts of sepals and petals removed. 4. Front view of column. 5. Stigma, rostellum removed. 6 and 7. Pollen masses with rostellum.

Cryptostylis leptochila. Fig. 1. Labellum, from the front. 2. Labellum, from the back. 3. Labellum, from the side. 4 and 5. Pollen masses, with rostellum. 6. Anther, pollen removed. 7. Column, from above. 8. Side view of part of flower, labellum, one petal and part of remaining petal and sepals removed.

Genus *chiloglottis*. (R. Brown.)

Chiloglottis is a small genus approaching *Caladenia* and *Adenochilus*. The species are all two-leaved delicate plants, to be found in deep gullies, on damp banks, under rocks, and in hollows by the sides of rivers. *Chiloglottis*, unlike *Caladenia*, appears to produce only one bulb or tuber, at least, at time of flowering, and in this respect approaches *Caleana* and *Drakæa*. Though not a very common genus, where found the plants are generally numerous in patches.

It is wholly dependent (like all the genera that approach *Caladenia*) on the visits of insects for fertility. The season of flowering is winter and spring.



From Nature and on Stone by R.D. Fitzgerald FLS

Formicifera

CHILOGLOTTIS

Trapeziforme

Chiloglottis formicifera. (Fitzgerald.) *Chiloglottis trapeziforme*. (Fitzgerald.)

Chiloglottis formicifera was first obtained in a gully at the Kurrajong, and I should have probably passed it by as *C. diphylla* (it being only in early bud) were it not for the season at which it was coming into flower; and here, it may be remarked, that this point is apt to be overlooked by botanists who are compelled to refer to dried specimens only, but it should never be neglected by the field botanist, for though an Orchid may flower at times out of season, the habitual diversity of period, in forms that might be considered identical, will, according to my experience, upon close examination, be found to indicate that there are other important distinctions.

This Orchid has since been kindly sent to me from Liverpool by the Rev. Canon King, and I am not as yet aware of any other habitats.

It flowers in September and October. The specific name has been given from the likeness of the glands on the labellum to an ant.

Chiloglottis trapeziforme has been so named from the form of the labellum. For the only specimens I have seen I am indebted to the Rev. Canon King. It was found by him at Liverpool, and has not as yet been obtained elsewhere.

It flowers in October.

DESCRIPTIONS.

Chiloglottis formicifera.

Leaves oblong-lanceolate, amplexicaule undulate crenate, hardly two inches long.

Scape one-flowered, robust, about two inches high, the single bract large near the flower.

Dorsal sepal erect, acuminate spoon-shaped.

Lateral sepals acuminate spatulate.

Petals linear-lanceolate, rather longer than the lateral sepals, and three times their width, reflexed behind the ovary.

Labellum horizontal on erect claw, including the claw about three-eighths of an inch.

Labellum ovate, the point and edges reflexed, claw very long, the same length as the labellum.

A group of glands near the centre of the labellum, one near the claw being double-headed, and one towards the point heart-shaped, the group surrounded with calli on filiform supports, two rows of small glands extending from the group to the point, with others irregularly placed round them.

Column wings broad (not laterally compressed), rising as high as the top of the anther.

Tuber ovoid close to the leaves.

Chiloglottis trapeziforme.

A delicate glabrous plant. Leaves thin, flat, ovate, or oblong-lanceolate, from two to two and a half inches, on long petioles, from half an inch to one inch long.

Scape one-flowered, from three to six inches high, very slender, the single bract one inch or more from the flower.

Dorsal sepal erect, cuneate, gradually contracted downwards.

Lateral sepals linear, longer than the dorsal sepals, recurved.

Petals linear-lanceolate, shorter than the sepals, and four times their width, reflexed close to the ovary.

Labellum erect, about three-eighths of an inch, including the claw, rhomboidal, on a long claw, the claw being about one-eighth of an inch.

One large gland near the centre having a botrychial surface.

Column wings rising above the anther, laterally compressed near the top.

Tuber globular, not close to the leaves.

EXPLANATION OF PLATE.

Chiloglottis formicifera.—Fig. 1. side view of column. 2. Column, from the front. 3. Column, from the back. 4. Pollen masses. 5. Side view of flower, showing ordinary position of labellum. 6. Labellum, from above. 7. Labellum, from below.

Chiloglottis trapeziforme.—Fig. 1. Column, from the back. 2. Column, from the front. 3. Column, from the side. 4. Labellum, from below. 5. Pollen masses. 6. Labellum, from above. 7. Labellum, from the side. 8. Side view of flower, showing ordinary position of labellum.

Genus Galeola. (*Loureiro.*)

A SMALL genus of very peculiar habit, containing as far as known only two Australian species—the one to be found in the poorest sandstone country, the other in the rich brushes of the Northern rivers.

The species, at least in Australia (for the genus extends to East India and the East Indian Archipelago), are probably epiphytal on the roots of the trees on which they cling. The roots are long, thick, and fleshy, and those of *G. foliata* penetrate in every direction, the rotten wood and masses of dead leaves to be found heaped together in the "cedar brushes," where it grows.

The stems adhere to trees, and throw out handlike roots opposite to each spike of flowers.

The stems die down partially or to the ground every year. Summer is the flowering season.



From Nature and on Stone by R.D. Fitzgerald FLS

GALEOLA Cassythoides.

Galeola Cassythoides. (A. Cunningham.)

THIS species is not uncommon at Hunter's Hill and similar situations round Sydney. It is to be found generally adhering to gum-trees, but at times trailing over rocks, possibly owing to the disappearance of the tree to which it had at one time clung. The greatest height to which I have known it to grow is about twelve feet. About one-third of the total stem bears flowering branches, opposite to which and to each spike of flowers roots are produced which cling to the trunk of the tree. It has no leaves, and dies down every year more or less, apparently according to the severity of the winter. I do not think it is a long-lived species, as I have seldom been able to find the same plant for more than three or four years. With me it has been an impossibility to transplant it with success, though the greatest care has been taken. This may possibly be owing to its being parasitical on the roots of trees; but it is sometimes to be found growing without any apparent connection with any other plant. Its fertilization must be effected in a similar manner to that of *Dendrobium*, that is, by an insect, which resting on the labellum and kept close to the column by the spring touches the rostellum, and by means of the gluten thence obtained, removes the pollen masses, and either leaves them in the stigma of the flower thus visited or carries them away to some other. The long peculiar capsules are seldom to be seen, and considering the number of flowers the agency of insects cannot be very efficacious. I have attempted to obtain crossed seed between this Orchid and *Dendrobium*, but without success; a failure that might be expected, notwithstanding the likeness of the flowers and the pollen masses, when the climbing habit and the winged form of the seed is considered. It flowers in October and remains in flower for a considerable time, but fades and drops to pieces quickly when plucked.

EXPLANATION OF PLATE.

Fig. 1. Column, from the side. 2. Top of column, from the front. 3. Capsules (not enlarged). 4. Seed. 5. Seed (not enlarged). 6. Top of column, showing stigma and clinandrum, anther and pollen masses removed. 7. Column, from the front. 8. Pollen masses. 9. Labellum, from the side. 10. Flower and buds. 11. Labellum, from above.

PART 4.

JULY, 1878.



Genus *Thelymitra*. (Forster.)

WITH the exception of *Apostasia*, *Thelymitra* is the only Australian genus in which the perianth is regular, the sepals and petals being similar. The lower petal in *T. venosa*, however, has a tendency to vary from the others and assume the peculiarities of a labellum.

The colours of the flowers are blue, purple, pink, and yellow; many of this species resemble *Ixias* rather than Orchids.

Some species are to be found in sand among rocks, others on plains and in forests, and others in swamps and the shallow black soil that rests in the depressions of sandstone. The forms are most various on the East Coast, but some extend into the "salt-bush country," and some are peculiar to Western Australia. The genus is also represented in New Zealand, New Caledonia, Java, and other East Indian islands.

The flowering season is spring.

The various species when crossed produce seed freely amongst themselves, and with the various forms of *Diuris*.

That a species should be wholly dependent on insects for its fertilization that is dependent upon them for its existence, or that it should be absolutely independent of them and always fertilize itself, would seem to constitute a physiological difference as great almost as can be imagined, yet, in *Thelymitra*, the transition between the two extremes is so gradual that it has not been noticed, and the individuals through which it passes have even been included in the same species.

If species be immutable, it is wonderful that so important a difference should exist between forms that have not even ranked as varieties, and detracts greatly from the value of species as a classification, seeing that it can include so great physical incongruities. If, on the other hand, species are not immutable, and a change however great may be introduced by gradual alteration, then the case in question is exactly what might be expected—that is, a case where the transition still exists and the links have not as yet disappeared, a case in which it is either necessary to gather all the varieties that may not have developed some *technical* distinction (however important and absolute the departure) under one species, or else constitute a species for every variety. This is a difficulty that besets the botanist at every turn, and will, I believe, be admitted by all where the variation does not, so far as known, affect the individual to any vital extent; but when such is the case it becomes of great importance and deserves close examination and record, as marking the line on which the whole theory of development is to be maintained or abandoned.

In *Thelymitra*, as the flower advances from the bud to the perfected flower, the anther which is placed behind the stigma has a tendency to go upwards as the column to which it is attached lengthens, and thus to leave the stigma. In some varieties or species the pollen is extremely friable, and being taken in the arms, as it were, of the ascending anther leaves the rostellum attached to the stigma, and is dropped in dust on the stigma while the flower is yet in the early bud, thus invariably fertilizing it before it opens, if it ever does open, as is often not the case. In another the pollen is rather more flaky and more firmly attached to the rostellum. The anther cannot therefore take it with it or only in part, and the fertilization of the flower by the first method becomes uncertain, but the upper edges of the stigma are very thin and recurved, and the pollen though it remains behind the stigma is very irrepressible when expanded, and thus frequently impinges upon some portion of the stigma and the flower is fertilized. In the next modification the column remaining short the pollen cannot be taken up by the anther, and is rather too consistent to admit of an ebullition of fine dust over the edges of the stigma as in the last case; but here the same end is obtained by these edges turning back upon themselves, and thus presenting their stigmatic surface to the pollen, which quickly adheres to it and self-fertilizes the flower. In another form the pollen is more consolidated still, and none of it is taken up by the anther, but remaining firmly attached to the rostellum, that little vivid boss must be touched for the removal of the whole masses in a globular though easily friable form. This variety or species is, I believe, never self-fertilized, that is without the intervention of some insect.

In yet another form the pollen is at least as consolidated as in the last, and the column remaining very short the anther is not taken away from it. The stigma stands well up in front, and unless the rostellum, which is situated near the centre of the stigma, is by its adhesion to some foreign substance removed and the front of the stigma touched by it, the flower never produces seed. There are in this series other variations in form not very prominent, and in some possibly not sufficient to warrant a separation even as varieties if the method of fertilization is omitted. Are they then to be species or varieties? If species, how many more "varieties" to which we cannot apply the same test are species and not varieties, and if varieties what is the value of the term species that can admit of such varieties?



From Nature and on Stone by R.D. Fitzgerald FLS

Medea

THELYMITRA

Circumsepta

Thelymitra media. (R. Brown.) *Thelymitra circumsepta.* (Fitzgerald.)

Thelymitra canaliculata is a Western Australian species, and *T. media* is given by R. Brown as from Port Jackson, on the shore of which the specimen from which the figure has been taken was obtained. *T. media* is, in the *Flora Australiensis*, made a variety of *T. canaliculata*. Having no access to Brown's specimens it is with hesitation that I have given the name of *media* to this plant, but it is at least not inconsistent with the short description given by him, and is, I think, the species he obtained near Sydney.

In this form the pollen-masses are connected with the rostellum (figs. 8 and 9), and may, in the early bud, be easily drawn from the anther; but the column does not increase much in height, and the pollinia therefore remain behind the stigma; the edges of which, however, curl back and so present the stigmatic front to the pollen-masses, each pair of which immediately become united by pollen-tubes with the recurved edges on their own side (fig. 12), and gradually become with the stigma an almost solid mass (figs. 10 and 11) separated from it only along the centre, the rostellum gradually shrinking or being absorbed.

I am of opinion that this species is invariably self-fertilized, unless the pollen of some other species be brought by insects and left upon the stigma, when should such pollen be more potent than its own, hybrid seed would be produced. I have invariably obtained hybrid seed by removing the pollen-masses from the bud, and afterwards applying the pollen of some other *Thelymitra* to the stigma. When flowered under a bell-glass every flower produced seed.

I have never found *T. media* except at Hunter's Hill, nor as yet obtained it from any other locality. It grows in the stiff, swampy soil so often to be found on the summits of dividing ridges in the sandstone country. When in bud it can readily be distinguished from the other *Thelymitras* by the dark Prussian-blue of the buds, as *T. circumsepta* can by a metallic green.

T. media flowers in October.

Thelymitra circumsepta. This fine species of *Thelymitra* I found growing on the swampy edges round the summit of Mount Tomah. The flowers are uncommonly large for a self-fertilizing species, for in this genus the flowers of such are generally reduced to such an extent as only to enclose the large columns. The appendages of the column would (if adapted for any purpose) appear to be adapted for the exclusion of insects, as they not only enclose the pollen and stigma but spread a network over them by the interlacing of the filaments with which they are terminated, from which incarceration I have named the species. Unlike *T. media* the rostellum is not attached to the pollen-masses, and may, in the early bud, be drawn away from them (fig. 3), but the column remaining short they are not carried up from behind the stigma, and the upper edges of it as it grows become revolute and imbed themselves in the bursting pollen, which cannot at any period (as it can in *T. media*) be removed, as a whole, from the anther. This species is, I believe, wholly self-fertilized, and the third wing in front of the stigma seems to render hybridization by the visits of insects improbable. Such a third wing to a column has not, I believe, been observed in any other Orchid, and were it not that there is proof from other genera that the lateral wings are abortive anthers it would seem to contradict the idea. All the flowers on spikes which were placed under a bell-glass produced full capsules of seed. The time of flowering is December.

DESCRIPTION.

Thelymitra circumsepta. Stem glabrous, from one to nearly three feet. Leaf glabrous, more than one foot, broadly linear, deeply channelled. Empty bracts generally two, linear, lanceolate, amplexicaul. Flowers lilac-blue, twelve or more, large, spreading an inch or more in diameter. Sepals and petals ovate, lanceolate. Column about two lines. Lateral wing lobes pencilled with tufts of white cilia. The wings united into a cup at the base of the column and produced into a third central triangular lobe in front of the stigma. The apex of central lobe ciliate. Lateral lobes of hood irregularly denticulate, the central space deeply emarginate and denticulate. Margin of the hood bright pink, with blue dorsal band beneath. Not more than one-third of the anther at any time carried above the rostellum. Stigma lingulate, broadest at the base, lateral margins revolute, rostellum not connected with the pollen-masses. Two rather large globular glands beneath the stigma.

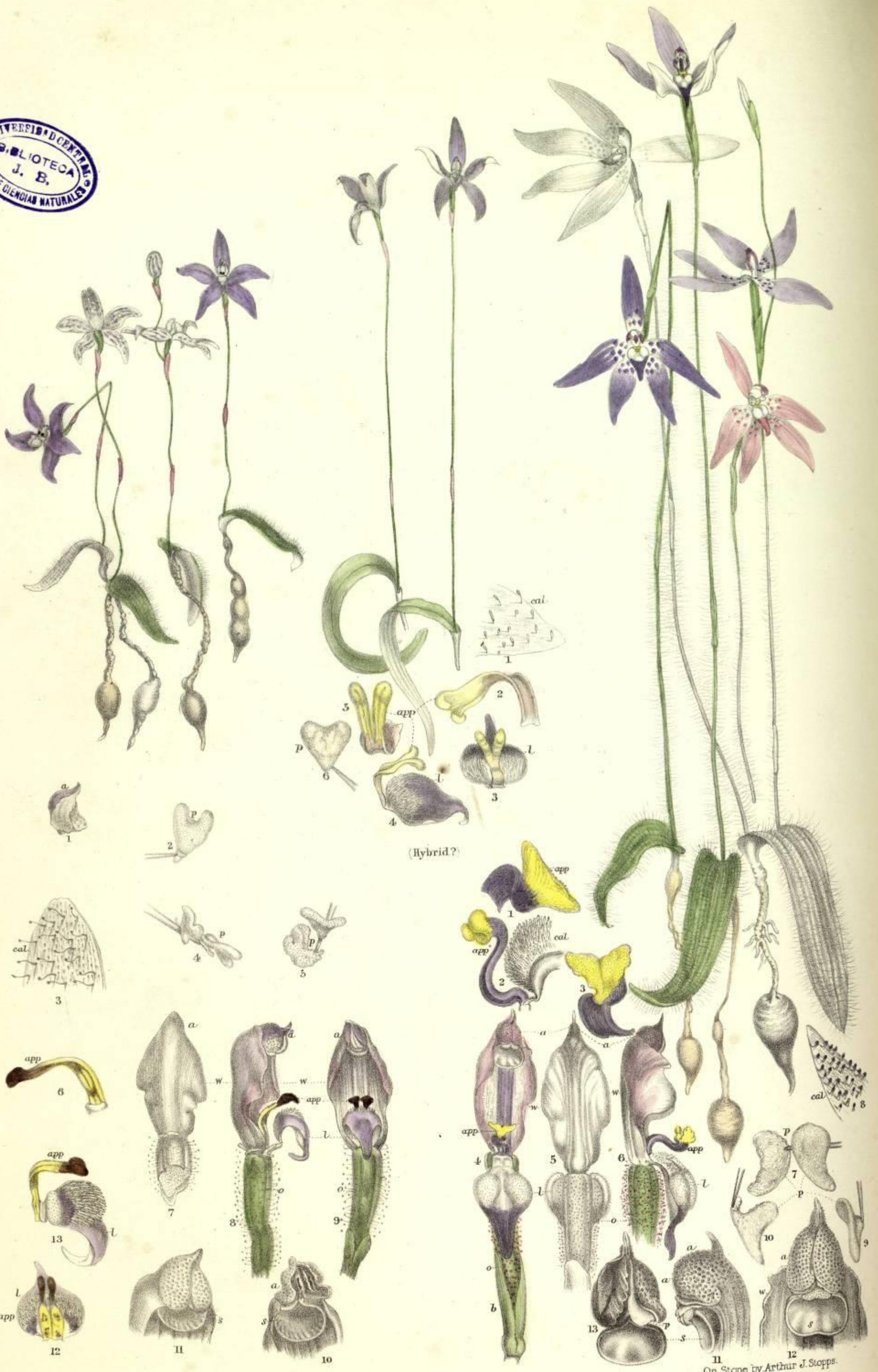
EXPLANATION OF PLATE.

Thelymitra media. Fig. 1. Column, from the side, one side and wing removed. 2, 3, and 4. Stigma and pollen, from the side, front, and back. 5, 6, and 7. Column, from the side, front, and back. 8 and 9. Pollen-masses. 10 and 11. Stigma, pollen, and anther, from the full-blown flower. 12. Back of stigma (in an earlier stage than 10 and 11), showing adhesion of pollen-masses to reflexed edge of stigma; two pollen-masses removed, the others turned outwards. 13. Column, from the top.

Thelymitra circumsepta. Figs. 1 and 2. Stigma and anther, from the side and front. 3. Anther and stigma in the bud, the anther drawn back from the stigma and rostellum. 4. Anther and stigma in the bud. 5 and 6. Column, from the front and side. 7. Appendage in front of the stigma. 8. Occasional abortive form of appendage in front of the stigma. 9. Back of column.

Genus *Glossodia*. (*R. Brown.*)

THIS small genus (said to be confined to Australia) is closely allied to *Caladenia*, but recognizable from it by the absence of calli on the labellum; the calli being replaced or possibly consolidated into, or reduced to, two appendages, or one bifid appendage at the base of the column. They affect similar situations to *Caladenia* and *Prasophyllum*, the bright flowers of *G. major* glinting amongst tall "tea-tree" (*Kunzia*), and *G. minor*, purpling the cold flats on the hill-tops. The flowering season is spring. For fertilization they are dependent on insects.



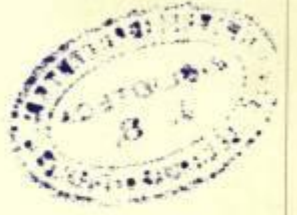
From Nature by R.D. Fitzgerald F.L.S.

On Stone by Arthur J. Stopps.

GLOSSODIA

Minor

Major



Glossodia major. (*R. Brown.*) *Glossodia minor.* (*R. Brown.*)

Glossodia major and *minor* are not uncommon in suitable situation. *G. major* appears to be the more widely diffused, specimens from Molong being undistinguished from those to be obtained at Sydney except in colour, the inland flowers in this, as I believe in other cases, being darker and brighter than those from the coast.

The glands or appendages to the labellum are, as far as I can discover, of no use to either species unless possibly as an attraction to insects. The agents of fertilization appear to be (the same as among the *Caladenias*) large flies that lighting upon the labellum are pressed by its spring against the anther and stigma. Both species flower at about the same time (in July and August) according to the season, *G. minor* being a little in advance of *G. major*. The leaf of *G. major* has a very sweet perfume especially when bruised, and the odour is long retained even by the dried plant. It flowers occasionally pink or white.

G. minor affords an example of how variation may originate from a centre. It is extremely rare to find this plant with two flowers, though among thousands I have on a few occasions seen one. In a "tea-tree" scrub near Buffalo Creek, Lane Cove River, there is a group of this Orchid, about one in ten of which produces two flowers on the same stem.

Amongst a number of plants of *G. major*, but not far from where *G. minor* also grows, the individual figured on the plate, and which I believe to be a hybrid, was obtained. It is thoroughly intermediate in character, being between both species in height and habit. The labellum partakes of the peculiarity of both as to form and pubescence (figs. 1, 3, and 4). The appendage (figs. 2 and 5) is of the same colour as in *G. major* (figs. 1 and 3) but further cleft, and the ends are almost clavate as in *G. minor* (figs. 6, 12 and 13). The calli on the under surface of the perianth in *G. minor* (fig. 3) are filiform, like little leeches in motion; those of *G. major* (fig. 8) short and thick. There are two kinds on the hybrid (fig. 1), but they do not exactly resemble either, some approaching those of each parent. From situation and general appearance this plant was probably grown from seed produced by *G. major*, the pollen having come from *G. minor*. The leaf, contrary to what might be expected, is glabrous.

EXPLANATION OF PLATE.

Glossodia minor. Fig. 1. Anther cell, partly turned back. 2, 4, and 5. Pollen-masses. 3. Glands on under surface of perianth. 6. Appendage at base of labellum. 7. Back of column, part of ovary cut away. 8. Side view of flower, perianth removed, showing labellum and appendage. 9. Front view of flower, perianth removed, showing labellum and part of appendage. 10. Top of column, anther thrown back. 11. Top of column. 12. Appendage and labellum, front view. 13. Labellum and appendage, side view.

Glossodia major. Fig. 1. Appendage of labellum. 2. Appendage and part of labellum. 3. Appendage of labellum. 4. Front view of flower, perianth removed, showing labellum and appendage. 5. Back of flower, perianth removed, showing parts of labellum. 6. Side view of flower, perianth removed, showing labellum and appendage. 7, 9, and 10. Pollen-masses. 8. Glands on under surface of perianth. 11. Top of column, from the side. 12. Top of column, from the front. 13. Stigma and anther, pollen removed from one cell.

Hybrid. Fig. 1. Glands on under surface of perianth. 2. Appendage of labellum. 3. Appendage and labellum, front view. 4. Labellum and appendage, side view. 5. Appendage of labellum. 6. Pollen-mass.



From Nature and on Stone by R.D. Fitzinger HLS

Coccina

PTEROSTYLIS

Truncata

***Pterostylis truncata.* (Fitzgerald.) *Pterostylis coccina.* (Fitzgerald.)**

Pterostylis truncata. Not being able to reconcile the specimens of this Orchid, collected at Mittagong by my friend E. Daintrey, with any description of *Pterostylis* to which I have had access, I must consider it as a distinct species, and have named it from its peculiar truncate dorsal sepal. It flowers in April.

P. coccina. This species, being also irreconcilable with any description of *Pterostylis* known to me, I have named from its colour, so unlike that of its congeners generally. I obtained it on a swampy talus at the base of "Hassan's Walls," Bowenfels, and also from the "Guy Faux" pass, near Grafton. Its beauty is detracted from by the strong resemblance it bears to a boiled prawn. It flowers in February.

DESCRIPTION OF *Pterostylis truncata.*

Stem not very slender, under one foot, glabrous. Leaves along the stem lanceolate, acuminate, amplexicaul, the longest an inch to an inch and a half, suddenly changing downwards into much shorter leaves or bracts. One-flowered. The flower very slightly inclined, striped with red-brown, olive-green, and white; one inch and a half from the ovary to the point of the galea. Dorsal sepal truncate, not longer than the petals. Lower sepals cuneate where united, from where united gradually reducing into filiform points, the united portion about half an inch, the disunited two inches or less. Labellum linear, lanceolate, acuminate, the tapering portion gradually curved and channelled. Appendage curved, linear, penicillate. Upper wing-lobes of column fine-pointed, the points but slightly higher than the anther, lower not very broad, ciliate along the edges, with a few hairs upon the outer surface. A conical gland in the sinus of the column. Stigma lanceolate, projecting at the base, and deeply furrowed along the centre.

DESCRIPTION OF *Pterostylis coccina.*

Stem not very slender, under one foot, glabrous. Leaves along the stem lanceolate, acuminate, amplexicaul, the longest two inches, gradually reducing downwards to bracts. One-flowered. The flower gradually but much curved, red or olive red, three inches from the ovary to the point of the galea. Dorsal sepal produced into a long filiform point about an inch longer than the petals. Petals tapering to a point. Lower sepals cuneate where united. From where united quickly reducing to long filiform points. The united portion about three-quarters of an inch, the disunited two inches or more. Labellum linear, lanceolate, acuminate, suddenly bent at about two-thirds from the base. Point almost clavate. Appendage curved, linear, penicillate. Upper wing-lobes of the column fine-pointed, slightly higher than the anther, lower broad, rhomboidal, glabrous. Stigma lanceolate, almost cordate, deeply channelled.

EXPLANATION OF PLATE.

Pterostylis coccina.—Fig. 1. Top of column, wing removed. 2. Labellum, from the front. 3. Labellum, from the side. 4. Top of column, from the front. 5. Flower, perianth turned down. 6 and 7. Top of column, from front to side.

Pterostylis truncata.—Fig. 1. Top of column, from the front. 2. Top of column, from the side, one wing removed. 3. Labellum and column, from the side, perianth removed, showing gland in sinus of column.



CALANTHE Veratrifolia.

From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Stopps.

Printed at the Surveyor General's Office Sydney NSW
February 1877.

Genus *Calanthe*. (R. Brown.)

Calanthe is an East Indian genus, represented in Australia by a single outlying species, and forms one of the links that unite the Australian with a Northern Flora. It belongs to the rich soil of the trap country rather than to any other formation, but is to be found even in the sandstone where there are deposits of leaf-mould. All the species are, I believe, terrestrial, but they approach the *Epiphytes* in the pseudo-bulb and bird's-head anther, and, like the *Epiphytes* (at least of Australia), are probably all dependent on insects for fertilization.

Calanthe veratrifolia. (R. Brown.)

THE labellum divided into four lobes protrudes like a scaffold in front of the flower; at the base are a mass of orange glands, above them the passage to the nectary, and on either side two stigmas hollowed out of the wing-like sides of the column and divided by a flat rostellum. On the rostellum rests an oval disc, easily removed from below, and to it are attached by fragile caudicles eight pollinia formed like clubs and enclosed in a cap. If the point of a pin be introduced into the passage to the nectary and gently pressed upwards against the lower side of the projecting rostellum, the little disc attaches itself to the pin and is withdrawn off the upper side of the rostellum, and with it the pollinia which expand like the feathers of a shuttlecock; but should the upward push be in the slightest degree excessive the anther is also removed, and it requires some violence to get rid of it. If the pollinia are returned and pushed against the column, one or more are broken off, and remain sticking in the hollow stigmas. When the anther is removed with the pollinia, as must frequently be the case, the flower is not probably fertilized by its own pollen, as the pollinia cannot be inserted while it remains, and it does not seem probable that it would be shaken off for some time.

This Orchid is, I think, from its formation, generally fertilized by some insect furnished with a proboscis, though the tube of the nectary is so very fine it hardly seems possible for any proboscis to fathom it, and I could never find a trace of honey in it. The idea of a "sham nectary" has been objected to; but I cannot see why the semblance of anything beneficial to a plant might not be originated or inherited as well as the reality, or, in an abortive state, be equally efficacious in causing the same result as though it were perfect. The colour in a flower is no direct benefit to an insect, and often attracts it when it must be disappointed; and in the case of *Thelymitra carnea* is possessed by a flower that can hardly be said ever to open.

I have never known *C. veratrifolia* seed in the green-house unless the pollen was artificially placed on the stigma, and in the "cedar brushes," where it is abundant, only a single capsule here and there can be observed. The season of flowering is December and January.

EXPLANATION OF PLATE.

Fig. 1. Top of column, anther and pollen removed. 2. Column, from the front, showing glands at the base of the labellum. 3. Anther, from the top. 4. Anther, from below, showing inclosed pollen-masses and disc. 5 and 6. pollen-masses.



From Nature and on Stone by R.D. Fitzgerald F.L.S.

CLEISOSTOMA Erecta

Printed at the Surveyor General's Office Sydney NSW
October 1877.



Genus *Cleisostoma*. (*Blume*.)

THE distinctions between *Cleisostoma* and *Sarcochilus* are slight, the principal being the pouch to the labellum, of which *Sarcochilus* is destitute. *Cleisostoma* is also generally more aerial in habit, being frequently found suspended by its roots only from twigs, often overhanging water, and its stems are generally longer, and leaves further apart. It belongs to the gully and the river on its southern limit, and to the "cedar brush" and "mountain scrub" to the north.

The flowering season is summer, and, like our other epiphytes, it is wholly dependent on insects for its fertilization.

Cleisostoma erecta. (*Fitzgerald*.)

THIS plant, first found by me on a rock in Howe's Island, in 1869, has since been kept in a bush house at Hunter's Hill, but, though it grows fairly, has never flowered. I again found it in flower on a rock in the same island in 1877. There were about ten plants on the rock and one on an overhanging tree. Though thoroughly searched for it was not observed elsewhere. In its only known habitat it is therefore extremely rare, and from observation of it when transplanted, and from the very few old flower-stalks to be seen on the specimens obtained in its own island, it would appear that it flowers but rarely. This may then be looked upon as one of those peculiarly interesting species that, though still existing, may any day pass away for ever. *Cleisostoma erecta* is closely allied to *C. tridentatum*, but may be easily distinguished from it by the erect habit (from which it has been named), short thick leaves, short racemes, short nectary, short caudicle to the pollen-masses, &c. It stands upright on the surface of a rock or branch of a tree, the roots descending from below the leaves till they reach a support, and thence along it, thus propping the slender stem somewhat after the fashion of a *Pandanus*.

It flowers in December.

DESCRIPTION.

Stem growing to one foot or upwards, not very slender. Leaves distichous, one inch to one inch and a quarter, thick, ovate, oblong, the point thickened and slightly deflexed. Racemes from one-quarter to three-quarters of an inch, bearing from two to four flowers. Flowers ochreous yellow. The pedicels, including the ovaries, about one-eighth of an inch. Petals and sepals oblong, lanceolate, about the same length as the ovary. Labellum the same length, with a short truncate spur, the central lobe obtuse, lateral oblong, lanceolate (all much shorter than in *C. tridentatum*). Gland within the spur ciliate (but not the throat as in *C. tridentatum*). Caudicle to pollen-masses about twice the diameter of a pollen-mass (in *C. tridentatum* about four times). Rostellum and anther point short in proportion. Roots thick, descending from below the leaves.

EXPLANATION OF PLATE.

Fig. 1. Flower, from the side. 2. Labellum and column, from the front. 3. Labellum and column, from the side. 4. Anther, from top and side. 5. Labellum, cut down the centre and half removed. 6. Pollen-masses, anther adhering and fallen off.

Genus *Calochilus*. (*R. Brown.*)

ONLY three species are as yet known in this genus, which is confined to Australia, and has, in my opinion, no close relationship to any other, coming possibly nearest to *Caladenia* or *Lyperanthus*, but having more the habit of *Thelymitra*. They are remarkable for their large labellums, which are covered with ciliæ. They belong to sandy, barren country, and are not locally very numerous. They flower in spring, and are apparently altogether self-fertilized.

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On Stone by Arthur J. Stoppes

CALOCHILUS

Paludosus. Campestris.

Calochilus paludosus. (*R. Brown.*) *Calochilus campestris*. (*R. Brown.*)

THE most salient points of distinction between *Calochilus paludosus* and *campestris* are—in *C. paludosus*, the short anther, the castellated bar across the base of the stigma, the two glands on each side, and the red colour and straightness of the hairs on the labellum; in *C. campestris*, the great length and flatness of the anther, the calli on the base of the labellum numerous and alike, the long hairs of the labellum curled and barred with red, and the bright blue colour of the base and centre of the labellum.

C. paludosus and *C. campestris* are both self-fertilized. The rostellum is not connected with the pollen-masses, and seems only to act as a support to them; they protrude beyond it on each side and beyond the upper part of the stigma, and rest upon the edge of the stigma and slightly on its front (figs. 1 and 2 and figs. 4 and 6), except in the early bud, thus actually embedding themselves in its substance as its surface gradually liquefies into a viscid secretion. By this arrangement every flower must of course be self-fertilized, unless the pollen is early removed or other pollen is placed on the stigma and is more potential than its own.

Either of the above alternatives, in my opinion, seldom or never occurs, as the rostellum is not removable and is not attached to the pollen, and the pollen-masses themselves are not to be removed by moderate force when once connected with the stigma, which is early the case. In the very many flowers I have examined I have never found the pollen removed or any pollen on the stigma. Every flower produces seed, though the plant be placed under a bell-glass in early bud. If, however, the pollinia are removed from the buds no seed is obtained, unless (when the flowers are sufficiently advanced) pollen of either species be placed on the stigma, when they again become fertile.

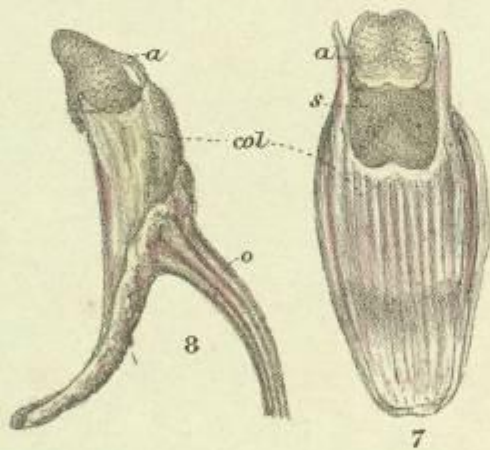
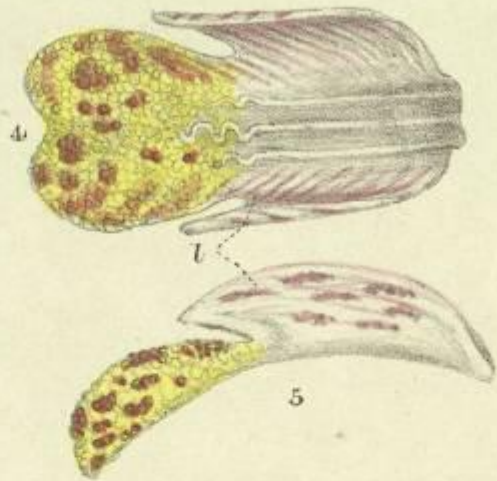
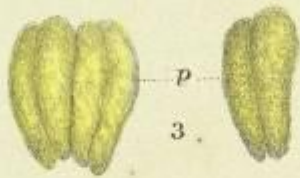
Though the names attached would lead to an opposite conclusion, both species are found in similar situations, in poor sandy soil, on rocky spurs, under shrubs, and even in open forest. The time of flowering is October.

EXPLANATION OF PLATE.

Calochilus paludosus.—Fig. 1. Stigma and anther, from the front. 2. Stigma and anther, from the side. 3. Column, from the front, showing parts of labellum and perianth. 4. Side of column, showing part of labellum. 5. Back of column.

Calochilus campestris.—Figs. 1 and 2. Pollen-masses. 3. Column, from the side, showing part of labellum and perianth. 4. Stigma and anther, from the front, anther drawn back, the pollen-masses being thus raised off the stigma. 5. Flower, from the front. 6. Column, from the side.

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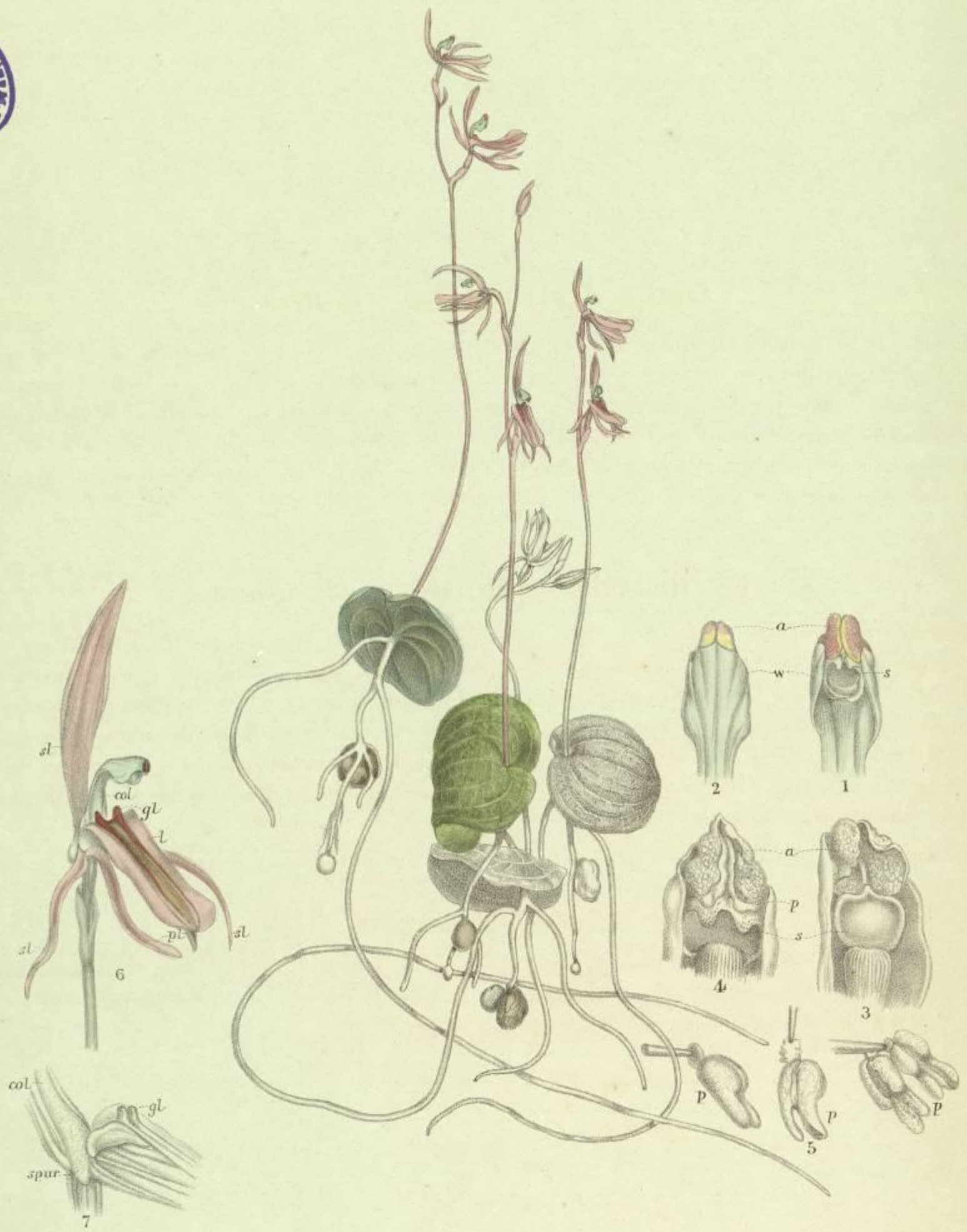
DENDROBIUM Rigidum.

Dendrobium rigidum. (R. Brown.)

To the kindness of Sir William Macarthur I am indebted for the opportunity of figuring this representative of the thick-leaved group of *Dendrobiums*, which seems hardly to have been collected since the days of Solander, owing probably to its flowers being unattractive. It is a Northern Queensland species, but seems to endure the cold or damp of a green-house in Sydney better than most of the northern *Dendrobiums*. Like the other members of the genus, an insect struggling between the column and the labellum, which constantly impels it upon the rostellum, seems to be the ordinary agent of fertilization; without such intervention the flowers produce no seed. The flowering season is January and February.

EXPLANATION OF PLATE.

1. Flower, from the side. 2. Flower, from the front. 3. Pollen-masses. 4 and 5. Labellum, from above and from the side. 6. Top of column, anther (including pollen-masses) thrown up. 7. Column, from the front. 8. Column and ovary, from the side.



From Nature by R. D. Fitzgerald, F.L.S.

On Stone by Arthur J. Steppes

CYRTOSTYLIS Reniformis

Printed at the Surveyor General's Office Sydney N.S.W.
June 1877.



Genus *Cyrtostylis*. (*R. Brown.*)

ACCORDING to Mr. Bentham there are only three species in this small genus, one being Australian and two belonging to New Zealand. It is, therefore, another of the small genera widely spread that unites the Floras of the two countries which were apparently themselves once united. Like *Orthoceras*, the single species being generally distributed throughout Australia without variation tends to the idea that there are some genera and species much less susceptible of variation than others, and thus remain as monuments of former connections, or from the same cause are examples of either total or partial reversion to a former type.

Cyrtostylis reniformis. (*R. Brown.*)

Cyrtostylis reniformis is not uncommon in shady damp places. Its single kidney-shaped leaf is beautifully veined. Two dug-shaped discs depend over the circular concave stigma, and on the insertion of the point of a pin into the flower, either one or both at once lay hold of it and the pollen-masses are easily removed. Below the stigma is a peculiar fluted enlargement of the column. On the strap-shaped labellum are two large glands which, with the centre of the labellum, are coated as it were with varnish, and on either side of the lip are curious spurs from the base of the column; the spurs at least seem to be useless. This Orchid appears to be wholly dependent on insects for its fertilization, and produces few capsules in proportion to the number of flowers.

The flowering season is July.

EXPLANATION OF PLATE.

Fig. 1. Top of column, from the front. 2. Top of column, from the back. 3. Top of column, pollen-masses removed from the anther. 4. Top of column. 5. Pollen-masses. 6. Flower, from the side. 7. Part of ovary, parts of perianth, base of column, showing spur, and base of labellum, showing glands.

Diuris elongata. (*R. Brown.*) *Diuris secundiflora.* (*Fitzgerald.*)

UNLESS where there appears to be good reason for departing from the naming in our great book of reference—the *Flora Australiensis*—it is adhered to by me; but in this instance I think it is best to adopt the name (as given in Brown's "*Prodromus*") of *elongata* rather than that of *punctata*, as adopted by Mr. Bentham from Smith, notwithstanding its priority. The name *punctata* appears to me to be inapplicable, whereas *elongata* is very characteristic, and is the name by which the species is generally known. *Diuris elongata* is widely distributed throughout the south-east portion of Australia, though it varies a good deal in size, colour, and even form, being darker in the interior, and darker and smaller on the mountains than on the coast. It is to be found in pastures and open downs, and rather in clay lands than peat, not seeming to require shade or shelter. It is totally barren when placed under a bell-glass, but crosses freely with any other *Diuris*, the flowers that have been fertilized withering in a wonderfully short time after the pollen has been placed on the stigma, while other flowers on the same spike remain for weeks in bloom. It flowers in September.

Diuris secundiflora I obtained on the Macleay, where it was growing in a small cluster on an open bank. I am not aware of its having been found elsewhere. It approaches *D. alba*, *D. elongata*, and *D. pedunculata*, and possibly may be a hybrid. The name has been given from the habit of bearing the flowers on one side of the spike. It is an elegant addition to the species hitherto known. It flowers in October.

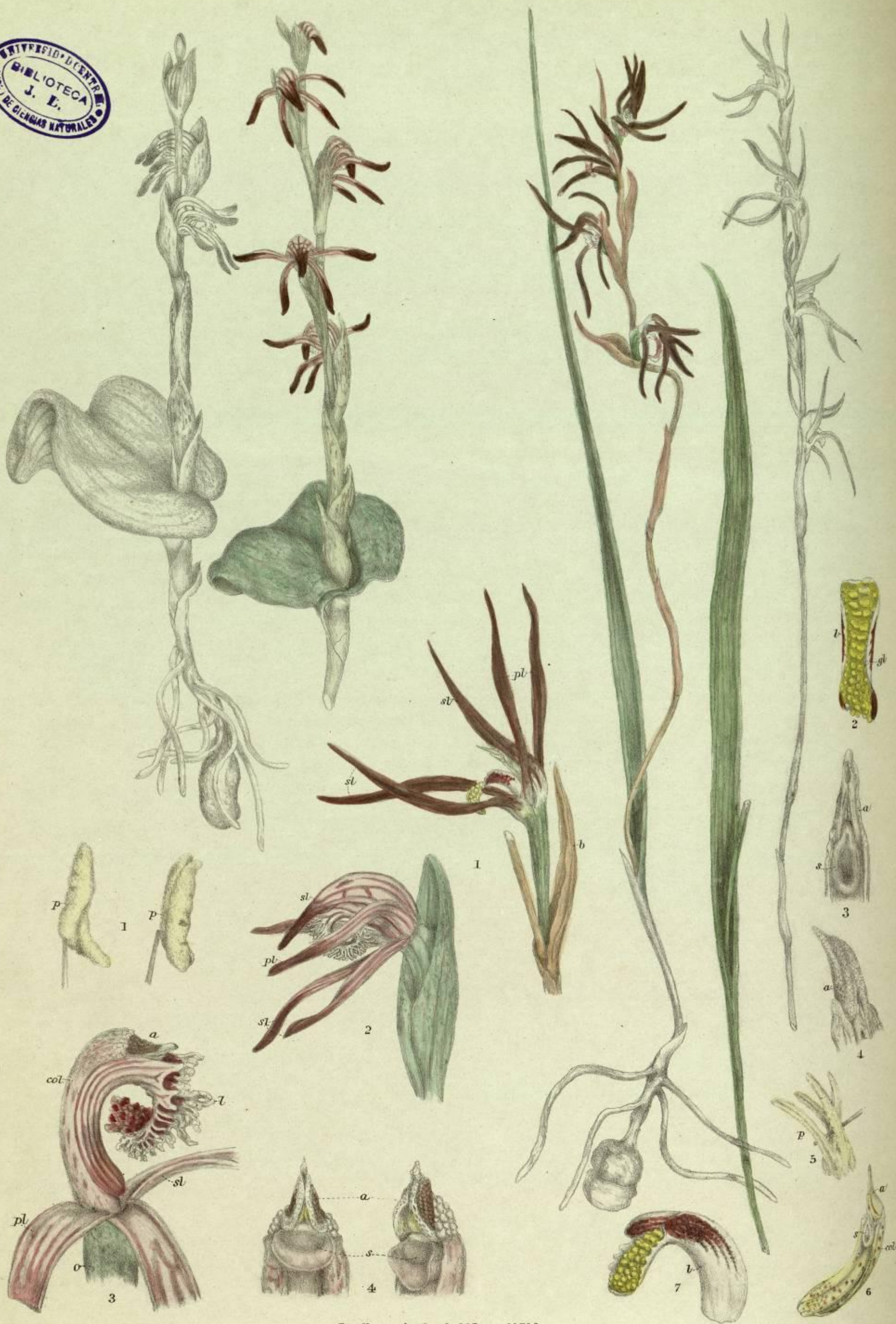
DESCRIPTION OF *Diuris secundiflora.*

Stem about one foot six inches. Leaf narrow, linear. Bracts three. Flowers six or more, all turned in one direction—yellow, with the exception of the lower sepals, which are light olive-green, the contracted portions of the petals, which are red-brown, and a few spots of red-brown on the dorsal sepal. Petals ovate, about an eighth of an inch, on claws of at least twice that length. Dorsal sepal not as long as the labellum, ovate, cuniate, very much bent forward so as to lie close upon the labellum. Sepals narrow, linear, the longest on the spikes reaching to one and a quarter inches or more. Labellum having two small lateral lobes, the central broadly rhomboidal. Two straight glands at the base, and a raised ridge from where they terminate to the end of the labellum. Stigma very broadly cordate, wings of column not denticulate (as in *D. elongata*). [There is a marked distinction between this species and *D. elongata* in the diminutive wings or side lobes of the labellum.] (Figs. 6 and 8.)

EXPLANATION OF PLATE.

Diuris elongata.—Fig. 1. Pollen-masses. 2. Column, inclined to the side. 3. Column, from the front, showing also the wings and upper portion of labellum with its glands. 4. Side of column, its wings removed and the anther drawn back. 5. Stigma, rostellum removed.

Diuris secundiflora.—Figs. 1 and 2. Flower, from the side and front. 3. Back of column. 4. Front of column. 5 and 7. Pollen-masses. 6. Labellum, from the side. 8. Labellum, from above. 9. Dorsal sepal, anther attached.



From Nature and on Stone by R.D. Fitzgerald F.L.S.

Nigricans

LYPERANTHUS

Suaveolens



Lyperanthus nigricans. (*R. Brown.*) *Lyperanthus suaveolens.* (*R. Brown.*)

Lyperanthus nigricans (so named from its leaves turning black in dried specimens) is to be found in pure sand, the thick flat leaves lying close to the surface, and often very numerous within a small space, either in the open ground or amongst the stunted bushes of the sand-hills. Though the leaves may be frequently observed in suitable situations the flowers are by no means so frequently to be found, though they are occasionally in some one locality very numerous. The reason is, I believe, that this species very seldom flowers unless a "bush fire" has passed over it. Where a fire has recently been I have found almost every plant producing a flower-stem, though at a short distance, where the fire had not reached, though the leaves were numerous, not a single flower or bud were observed. This species is generally diffused over the east and south-east portion of Australia, and extends into Tasmania. It flowers in August.

Lyperanthus suaveolens (so called through some mistake, for it has no perfume) is to be obtained in the poor sandstone country, and often requires a close observer to detect it among the branches of stunted "tea-trees" (*Kunzia*), into which its dark spikes frequently penetrate. The moss growing where water is at least for a time kept back by a sandstone ledge is also a favourite spot for this Orchid, but in such situations leaves are more frequently found than flowers.

Mr. Bentham has, in the *Flora Australiensis*, removed *L. suaveolens* to the genus *Caladenia*, owing to its narrow dorsal sepal and to its having calli on the labellum; but I cannot agree with the arrangement. The form of the dorsal sepal is that of *L. ellipticus*. The pollen-masses and the stigma are those of *Lyperanthus*. The plant is glabrous, and the leaf (which is not that of a *Caladenia* in form or texture), like those of *Lyperanthus*, does not wither and disappear with the flower as the leaves do in *Caladenia*. The presence of calli on the labellum is not, I think, of equal importance to the above distinctions, especially as there is an evident tendency to their production in *L. ellipticus*.

Lyperanthus nigricans and *L. suaveolens* cross freely with any *Caladenia* and with *Glossodia*.

L. suaveolens flowers in September.

EXPLANATION OF PLATE.

Lyperanthus nigricans. Fig. 1. Pollen-masses. 2. Flower, from the side, showing bract. 3. Column, from the side, showing labellum and parts of perianth. 4. Top of column, from the front and side.

Lyperanthus suaveolens. Fig. 1. Flower, from the side, showing bract. 2. Labellum, from above. 3. Top of column, from the front. 4. Top of column, from the side. 5. Pollen-masses. 6. Column, from the side. 7. Labellum, from the side.

PART 5.


OCTOBER, 1879.



From Nature and on Stone by R.D. Fitzgerald FLS

Hybrid ?

Fimbriatum PRASOPHYLLUM Nigricans



Prasophyllum fimbriatum. (R. Brown.) Prasophyllum nigricans. (R. Brown.)

Prasophyllum fimbriatum.—This little flower presents another of the anomalies frequent in the family. So constantly does the labellum appear to act as a resting-place for insects that in trying to trace the probable manner in which they fertilize a species, you naturally look upon it as the platform of the operator; but in this case, should a tiny insect alight upon one of the lips which hang trembling from the flowers, it would meet with a projection resembling the column (figs. 1 and 5) and in the same position usually occupied by it, but without anther or stigma, being in fact nothing more than the hinge from which the fringed lip depends. This baffling is caused by the flowers being inverted, and the dropping of the labellum in front of them. Such modifications as this are useful in checking the natural tendency to assume that a certain part of a flower is *designed* to act in a certain way simply because through a long series we find it performing that function, and to show us how a slight change may alter all the results. Here the labellum bars access from the ordinary direction; the lower sepal encloses the column from below; the petals and wings of the column intercept access from the sides, and a prolongation of the anther obstructs it from the end; so that a very small space is left open beneath the labellum in what would appear to be the least likely place for an insect to approach, though from the conformation of the column the intervention of insects seems to be a necessity. After a very careful examination, I came to the conclusion that the most probable method in which this interesting little orchid becomes impregnated is by a very minute insect alighting on the *under* surface of the labellum and following it up into the flower, the lip giving way to its pressure upwards (by being lifted on the hinge) should the visitor be slightly too large. Would not the chances of the reproduction of this species be improved by the removal of the labellum? This, then, is another instance of a part of a flower, generally of importance, becoming of very doubtful advantage, if not actually detrimental. *P. fimbriatum* is by no means common near Sydney, but may be found in a few swampy situations, and more frequently and in drier land on the Blue Mountains. It flowers in March and April.

Prasophyllum nigricans is one of the forms that are ever puzzles to the botanist. So close does it come to some others that no description can separate them without the aid of drawings or specimens, and even with both there is constant hesitation as to whether the distinctions are real or constant. The descriptions do not agree, as given by different authors, and even the specimens can hardly be said to be consistent with themselves. Glands on the ends of the sepals (fig. 1) might be considered as a guide to *P. nigricans*, but I have found them upon what I consider to be *P. rufum* quite as frequently as upon it, and in the flowers of the same spike they are present and absent. The best distinctions between *P. nigricans* and *P. rufum* are, I think, to be found in the glands on the lips, and in the stigmas. In *P. nigricans* the stigma is strap-shaped (fig. 4) and quite free from touching the pollen (figs. 5 and 6). In *P. rufum* it is broad at the base but suddenly narrowed and bent down into the pollen. On this slight difference depends a total distinction in the method of fertilization, to be entered more fully into when describing *P. rufum*.

Prasophyllum nigricans is to be found in shallow peat under the shade of tea-trees (*Kunzia*) near Sydney, and in the sandy flats upon the Blue Mountains. It flowers in March and April.

Among a group of plants of *P. nigricans* found at Bargo I obtained the *Prasophyllum* from which the central figure is taken. I believe it to be a hybrid between *P. fimbriatum* and *P. nigricans*, partaking of the peculiarities of both. It may however be distinct, and possibly be the *P. Woollsii* of Bentham.

EXPLANATION OF PLATE.

Prasophyllum fimbriatum. Fig. 1. Flower, from the front. 2. Flower, from the side. 3. Column, from above. 4. Column, from the side. 5. Column and part of labellum, from the side. 6. Pollen masses.

Prasophyllum nigricans. Fig. 1. Flower, from the side. 2. Column and one petal, one wing of column removed. 3. Stigma and anther, from the side, the pollen masses in the anther. 4. Stigma and anther, pollen and rostellum removed. 5. Stigma, from the side. 6. Stigma and anther, with pollen masses drawn from the anther. 7. Labellum, from above. 9. Pollen masses.

Hybrid (?). Figs. 1 and 2. Pollen masses. 3. Column and anther. 4. Flower, from the side. 5. Flower, from above. 6. Column and anther, from above. 7. Labellum, from the side and from above.



From Nature by R.D. Fitzgerald, F.L.S.

In Stone by Arthur J. Sargent

Megcalyptra

THELYMITRA

Nuda

Thelymitra nuda. (*R. Brown.*) *Thelymitra megalyptra.* (*Fitzgerald.*)

Thelymitra nuda is intermediate between the forms of *Thelymitra* that are independent and those that are dependent on insects for fertilization.

The anther is carried up by the maturing column (fig. 6), but the pollen masses are too consistent to be raised by it above the stigma (figs. 6 and 2), and being firmly attached to the rostellum they are easily removed with it (fig. 7). They are, however, more friable than in *T. megalyptra* and *T. ixioides*, and probably sometimes fertilize the stigma by crumbling over the edge, being pressed upon closely by it.

As might be expected, the flowers always open; flowers that do not, or seldom open, belonging to the self-fertilizing species in the genus. I have only as yet obtained this form about Sydney, but it is the same as that figured by Hooker in the Flora of Tasmania. It flowers in October.

Thelymitra megalyptra is so called from the large hood of the column, by which it is readily distinguished from *T. media*. I have ventured on naming it, as I cannot find that its peculiarities have ever been recognized so that it could be distinguished from *T. media*. The anther is elevated above the stigma in the mature flower (fig. 1), but the solid pollen masses (much more solid than even in *T. media*) remain behind the stigma, are easily removed by a touch to the rostellum (fig. 4), and never, I believe, fertilize without removal. If removed, they may either come in contact with the stigma of the flower from which they have been taken or those of others, and leaving flakes behind are sufficient to fertilize a number of flowers.

This is the form belonging to the interior, being the species to be obtained on the western side of the Coast Range. I have found it at Deniliquin and Lake George, and received it from Molong, Guntawang, and Boorowa. It flowers in October.

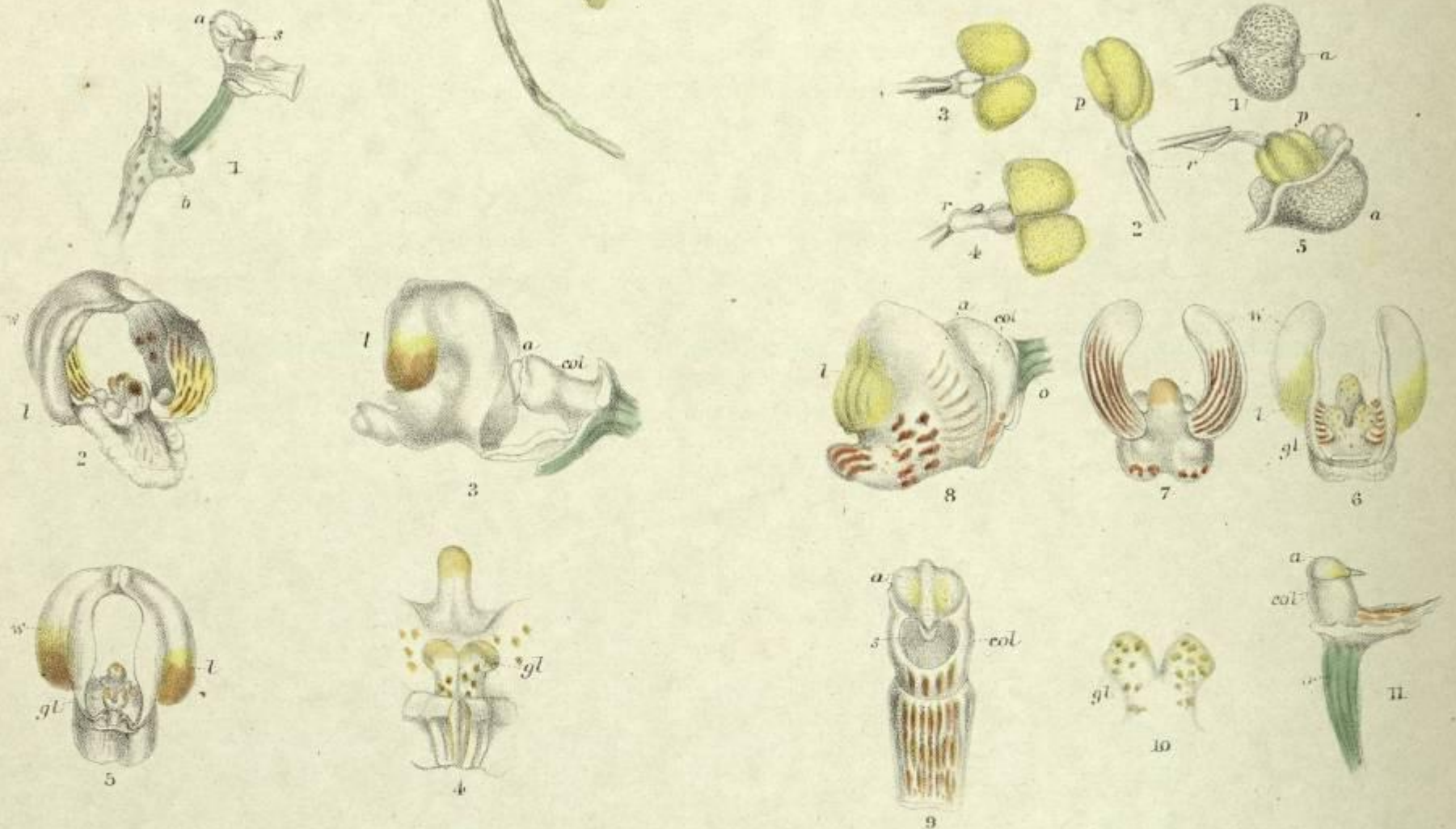
DESCRIPTION OF THELYMITRA MEGCALYPTRA.

Stem glabrous, generally under one foot. Leaf glabrous, linear, channelled, thin, about four inches from where it clasps the stem to the point, which is tapering. Leaf generally withered at time of flowering. Empty bracts usually two, linear, lanceolate. Flowers lilac-blue or lilac, six or less, spreading, about an inch in diameter. Petals and sepals ovate, lanceolate. Column about two lines, broad below the hood, quickly contracting to the ovary. Lateral wing lobes pencilled with tufts of white cilia. Hood without lateral lobes, much inflated even behind the column, and but slightly emarginate (lighter in colour than *T. nuda*). Anther carried wholly above the stigma. Margins of the stigma not revolute. Rostellum connected with the pollen masses, and easily removable with them. Pollen masses globular, less friable than in most species.

EXPLANATION OF PLATE.

Thelymitra megalyptra.—Fig. 1. Part of column, one side and pollen masses removed. 2. Part of column, from the bud, wings and hood removed. 3. Column, from the front. 4. Pollen masses, from the front. 5. Pollen masses, from behind. 6. Top of column, from above. 7. Column, from the side. 8. Column, from the front (inclined backwards).

Thelymitra nuda.—Fig. 1. Column, from the front. 2. Stigma, showing rostellum and pollen masses. 3. Anther. 4. Stigma. 5. Top of column, from above. 6. Column, one side removed. 7. Pollen masses.



From Nature by R.D. Fitzgerald F.L.S.

On Stone by Arthur J. Stapp

Falcatus

SARCOCHILUS

Montanus



Sarcochilus falcatus. (*R. Brown.*) *Sarcochilus montanus.* (*Fitzgerald.*)

To botanists who insist on the immutability of species, I leave to decide for themselves whether I am right in having given the specific name of *montanus* to this mountain form of *Sarcochilus*. To botanists who believe that there is no real distinction between a permanent variety and a species it is of little moment, except as a matter of convenience, whether it be called species *montanus* or variety *montanus*, the fact being that there are two forms, one of which appears to belong to the mountains and the other to the low rich brushes. I found *S. montanus* on Mount Wilson, Mount Tomah, Mount Banda-banda, and the mountains at the head of the Bellinger; *S. falcatus* at the Macleay River, Wollongong, and Port Macquarie.

S. falcatus is generally to be found on myrtles and figs, *S. montanus* on sassafras.

They both flower in November.

DESCRIPTION OF SARCOCHILUS MONTANUS.

Stem seldom more than one inch, retaining the bases of the old leaves. Leaves seldom exceeding three inches, oblong, not so falcate as in *S. falcatus*, and more regular. Flowers—four or five, more regularly formed than in *S. falcatus*. Sepals and petals more ovate, and deeply marked with a purple stripe, conspicuous even in the bud. Labellum having the fleshy protuberance shorter and thicker than in *S. falcatus*; the wings of the labellum broader and shorter, not meeting or overlapping as in it. Middle lobe shorter and broader. Labellum striped and spotted with red, where in *S. falcatus* they are white or only slightly spotted. Capsules from three to four inches, apparently larger than in *S. falcatus*.

EXPLANATION OF PLATE.

Sarcochilus falcatus.—Fig. 1. Portion of spike, showing bract and column. 2. Labellum, from the front. 3. Labellum and column, from the side. 4. Part of labellum, from the back, showing glands. 5. Labellum, from the back.

Sarcochilus montanus.—Figs. 1 to 5. Pollen masses (1 and 5 not disengaged from the anther). 6. Labellum, from the back. 7. Labellum, from the front. 8. Labellum and column, from the side. 9. Column, from the front. 10. Gland, near hinge of labellum. 11. Column and ovary, from the side.



DENDROBIUM Falcorostris

From Nature and on Stone by R.D. Fitzgerald F.L.S.

Dendrobium falcorostrum. (*Fitzgerald.*)

THIS beautiful *Dendrobium* I found growing upon the Brush-trees and Fern-trees in a mountain scrub on Mount Banda-banda, near the Macleay River.

The flowers are very large and numerous for the size of the plant, which is of a compact habit. They vary from ten to twenty, are produced by almost every pseudo-bulb, and exhale a sweet perfume very distinct from that of our other *Dendrobiums*. From the height (about 3,000 feet) at which it was found, it may possibly be suited for cold greenhouses, and is certainly a very fine addition to our Dendrobs. It flowers in October.

There being no scientific Periodical in Sydney, the following description was published in the *Sydney Morning Herald* of the 18th November, 1876, with a notice of the discovery of the plant :—

DESCRIPTION.

Stems or pseudo-bulbs thick, under one foot long, gradually tapering towards each end. Leaves four or five, distichous on the top of the stems, thick, ovate, four or five inches long. Flowers frequently inverted, about twenty, white, slightly striate or veined, large. Pedicels from one to two inches. Sepals broader than the petals, both about one and a quarter inches long. Petals lanceolate. Spur truncate, furrowed round the edge. Labellum three-fourths of an inch long, white spotted with purple. Point (or centre lobe) long, acuminate, turned up. Sides of the labellum festooned, so as to form a lobe near the point, the whole resembling the bill of a falcon (from which resemblance I have given the name); a yellow cruciform gland on the disc, between which and middle lobe or point the labellum is deeply concave, the hollow extending beneath the gland. Longest arm of gland composed for the greater part of its length of three ridges. Column short and thick, yellow from below the stigma and spotted with purple, thickened near the hinge of the labellum. Pollen masses rather elongated.

EXPLANATION OF PLATE.

Dendrobium falcorostrum. Fig. 1. Labellum, in various positions. 2. Column, from the front. 3. Pollen masses. 4. Column, from the side. 5. Gland on labellum. 6. Part of labellum, showing point or centre lobe of labellum and hollow under the gland.



From Nature and on Stone by KDFitzgerald F.L.S.

Hillii

SARCOCHILUS

Olivaceus

Printed at the Surveyor General's Office Sydney N SW

June 1879

Sarcochilus olivaceus. (*Lindley.*) **Sarcochilus Hillii.** (*Mueller.*)

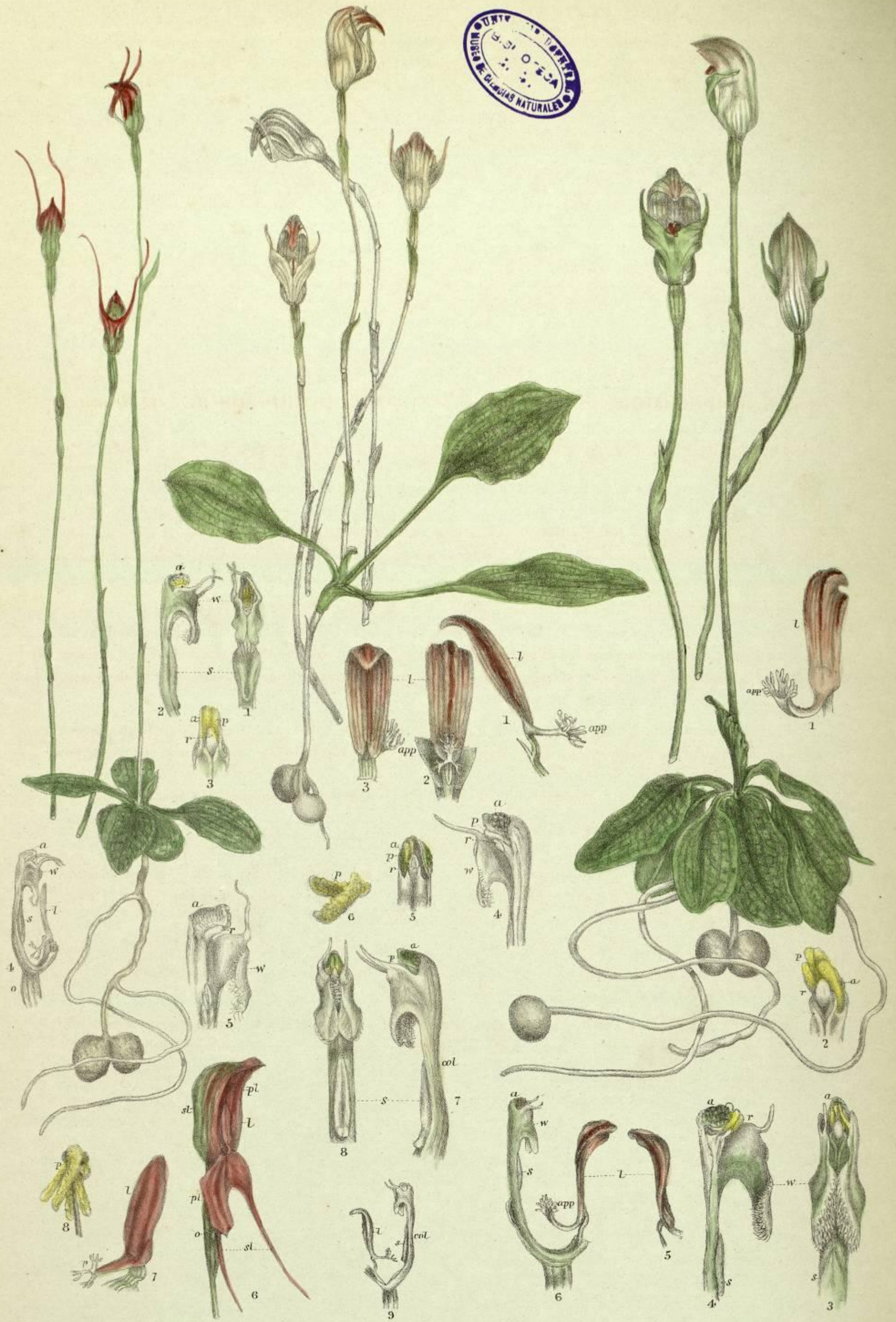
Sarcochilus olivaceus.—In wandering through the dense “brushes” of the Bellenger I frequently remarked the sweet perfume that pervaded certain spots, but for a long time could not discover from whence it came, till it was by accident traced to this little orchid, which has the power at midday of filling the dark recesses with subtle odour, that probably attracts the insects to which it is indebted for fertility. It is generally to be found on the small branches of the myrtles, its long roots reaching to the smallest twigs. I have also found it growing upon rocks above the Bulli pass. It flowers in November.

Sarcochilus Hillii.—The flowers of this little *Sarcochilus* are beautiful objects under the microscope, being of the purest white, and glittering as though composed of snow. Could the whole plant be enlarged to suit human vision, it would be one of our most attractive orchids; but as it is, it hides amongst the leaves and twigs of the myrtles (*Backhousia*), and diffuses its sweet scent only to attract some small insects. It flowers in November.

EXPLANATION OF PLATE.

Sarcochilus Hillii.—Fig. 1. Flower, from the front. 2. Labellum and column, from the side. 3. Labellum, from the side. 4. Top of column, anther thrown back, showing pollen masses on clinandrum. 5. Column, from the front. 6. Pollen masses. 7. Labellum, from the back, showing glands. 8. Labellum, from the side. 9. Pollen masses, not disengaged from anther.

Sarcochilus olivaceus.—Fig. 1. Labellum and column, from the front. 2. Top of column, anther and pollen masses removed. 3. Top of column, from the side. 4. Labellum, from the back, showing glands. 5. Flower, from the side, parts of petals and sepals removed. 6. Column and part of perianth, anther removed, showing pollen masses on clinandrum. 7. Labellum, from the side, cut down the centre and half removed. 8. Pollen masses.

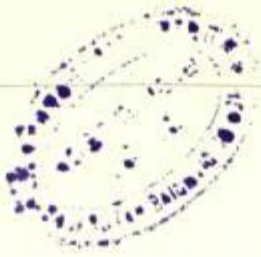


From Nature and on Stone by R.D. Fitzgerald F.L.S.

Pedunculata

PTEROSTYLIS

Curta



Pterostylis curta. (*R. Brown.*) *Pterostylis pedunculata.* (*R. Brown.*)

Pterostylis curta.—In this, and at least the greater number of species in which the tongue is included in the flowers, the lower surface of the tongue is sensitive, and consequently if touched by an insect would to a great extent close the access for about an hour. From the conformation of the flower this appears to me to be as likely to occur as that, by touching the upper surface, the insect should be carried into the flower. The advantage therefore of the sensitiveness of the labellum is not apparent, nor is the object, if any, of the twist in the tongue. By it however *P. curta* is easily distinguished from *P. Baptistii* and all other nearly related species. The best places to look for this orchid are among rotting leaves in the shade of trees or of sandstone boulders, and on the old oyster beds found upraised round the shores of the numerous salt-water inlets along the coast. *P. curta* flowers in July.

Pterostylis pedunculata is one of the latest in flowering of this section of the genus, which is distinguished by an included labellum. It flowers in July and August. It is very generally distributed over the Blue Mountains, and seems to appreciate rich trap soil as well as the leaf mould of the sandstone gullies. There is a marked enlargement of the flowers in specimens obtained in the mountains as compared with those from the coast.

At Pitt-water I found numbers of *P. curta* and *P. pedunculata* both in flower, and in one case a large group of an intermediate form (figure A on plate). This I believe to be a hybrid between the two species, as it partakes of the peculiarities of both and I have never found it elsewhere. There were about one hundred flowers of this peculiar form together; but this does not prove its reproduction from seed, as the plants may have originated from off-shoot bulbs.

EXPLANATION OF PLATE.

Pterostylis pedunculata. Fig. 1. Column, from the front. 2. Column, from the side. 3. Top of column, from the front, wings removed. 4. Column and labellum, perianth removed. 5. Top of column, one wing removed. 6. Flower, the lower sepals and one petal turned down. 7. Labellum. 8. Pollen masses.

Pterostylis curta. Fig. 1. Labellum, from the front. 2. Top of column, wings removed. 3. Top of column, from the front. 4. Top of column, from the side, one wing removed. 5. Part of labellum, showing under surface of twist. 6. Column and labellum, perianth removed.

Hybrid (?). Figs. 1, 2 and 3. Labellum, from side, front and back. 4. Top of column, one wing removed. 5. Top of column, wings removed. 7 and 8. Column, from the side and front. 9. Column and labellum, perianth removed.



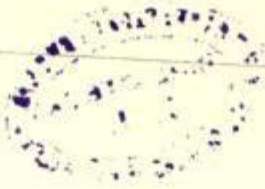
From Nature by R. D. Fitzgerald, F.L.S.

On Stone by Arthur J. Stoppe

Acuminata

PTEROSTYLIS

Reflexa



***Pterostylis acuminata.* (R. Brown.) *Pterostylis reflexa.* (R. Brown.)**

Pterostylis acuminata is to be found near Sydney, generally but sparsely in peaty and sandy soils under the shade of trees. I have placed it with *P. reflexa*, not because it could be confounded with it, but as illustrative of how readily true species (or what may be treated as such) could be considered as identical; for had it the stem leaves of so many of the genus instead of radical leaves, it would in all probability (so much alike are all the parts of the flower) be deemed identical with *P. reflexa*. It flowers in April and May.

Pterostylis reflexa.—The forms considered to be varieties of this orchid may in reality be as distinct from each other as it is from *P. acuminata*; but though Brown separated them, there is not, possibly, anything sufficiently tangible to necessitate such separation.

Form A (on plate) is the common one. B is a mountain variety (?). C is a very similar shape found at Five Dock Bay near Sydney, and figured to show that climate or locality cannot be always made to account for such dissimilarities as exist between it and form A. The figures A and C were taken from two groups (the individuals in which were alike) and the groups themselves were not more than one hundred yards apart, with exactly the same soil and aspect. Mr. A. G. Hamilton, writing from Guntawang, near Mudgee, says, "I can scarcely credit that they" (the two forms referred to) "are not different species. Both grow in groups. On one range of hills I find both varieties growing in clusters side by side. On other hills on the opposite side of the river the larger variety only grows."

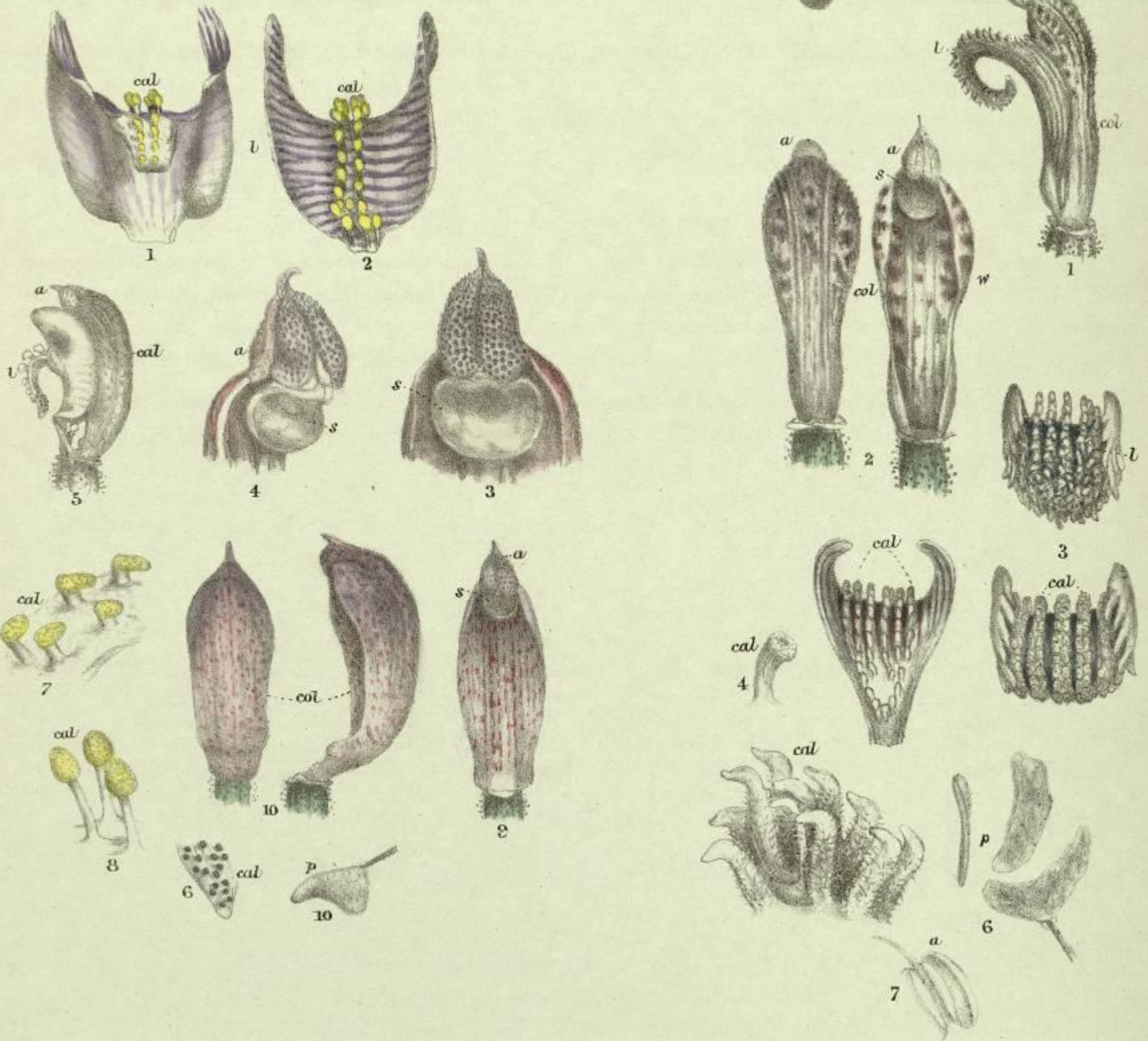
B and C may be Brown's *P. revoluta*.

[The details are all taken from form A, with the exception of No. 8, which is from form B.] *Pterostylis reflexa* is not uncommon in peaty and sandy soils near Sydney, and flowers in March and April.

EXPLANATION OF PLATE.

Pterostylis acuminata.—Fig. 1. Top of column, from the front, wings removed. 2. Top of column, from the side, wings removed. 3. A pollen mass. 4. Appendage to labellum. 5. Labellum. 6. Column, from the side. 7. Column, from the front. 8. Flower, perianth turned down.

Pterostylis reflexa.—Fig. 1. Part of column, one wing removed. 2. Top of column, from the side, wings removed. 3. Pollen masses. 4. Labellum. 5. Column, from the front. 6. Column, from the side. 7. Flower, perianth turned down. 8. Labellum, from form B.

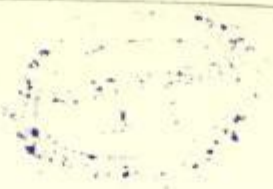


From Nature and on Stone by R.D. Fitzgerald FLS

Cærulea

CALADENIA

Deformis



Caladenia caerulea. (R. Brown.) Caladenia deformis. (R. Brown.)

Caladenia caerulea is to be found in some few situations associated with *C. deformis*, but the latter belongs rather to granite and other formations than to sandstone. *C. deformis* is therefore not seen about Sydney, where *C. caerulea* is sparsely distributed, and where it is generally found on the flat tops of hills in ironstone gravel.

Both species flower in August.

EXPLANATION OF PLATE.

Caladenia caerulea.—Fig. 1. Labellum, from the front. 2. Labellum, from the back. 3. Top of column, from the front. 4. Top of column, from the side, wings removed. 5. Column and labellum, from the side. 6. Portion of the under surface of the point of the labellum covered with calli. 7. Calli on the labellum, from the side. 8. Calli near the base of the labellum, from the back. 9. Column, from the front. 10. Column, from the back and side. 11. Pollen mass.

Caladenia deformis.—Fig. 1. Column and labellum, from the side. 2. Column, from back and front. 3. Labellum, from the front. 4. Gland near base of labellum. 5. Labellum, from the back. 6. Pollen masses. 7. Part of anther. 8. Calli on the labellum.



From Nature by R.D. Fitzgerald F.L.S.

On Stone by Arthur J. Stoppes

CLEISOSTOMA Tridentatum.

Sydney, N.S.W., Thomas Richards, Government Printer. June, 78.



Cleisostoma tridentatum. (*Lindley.*)

Cleisostoma tridentatum depends from the small branches of the "river gum" (*Tristania*) over the rushing river, and from those of the myrtle, the fig, and the sassafras over the cool streams in the mountains. Frequently the old roots have died and became mere fibres, and the twigs to which it clung have decayed and broken; still the plant (supported it may be by a single fibre) hangs over the stream and turns and turns to every breeze, still sending out new roots in search of some new support, still thriving and flowering—a veritable air plant. It is so dependent on constant moisture for its existence, that I believe it is not to be found except in the immediate neighbourhood of water. I have obtained it as far south as Picton. It flowers in December.

EXPLANATION OF PLATE.

Cleisostoma tridentatum. Fig. 1. Part of spike. 2. Flower, from the side, lower sepals and petals removed. 3. Labellum. 4. Top of column, anther, thrown back. 5. Top of column, anther, pollen, and rostellum removed. 6. Pollen masses, anther still attached. 7. Pollen masses.

Genus *Bolbophyllum*. (*Thouars.*)

BOLBOPHYLLUM is hardly more than a section of *Dendrobium*, distinguishable from it by the creeping rhizome and the racemes coming from below the small pseudo-bulbs, and not from the bases of the leaves. It is generally found on rocks, especially (as in *Dendrobium*) towards its southern limits. It is one of the genera that connect the Orchids of New Zealand with those of Australia. It crosses freely, as might be expected, with *Dendrobium*, and, like *Dendrobium*, its general flowering season is spring.



From Nature and on Stone by R.D. Fitzgerald FLS

BOLBOPHYLLUM Shepherdi.

Sydney, N.S.W., Thomas Richards, Government Printer. July, '78



Bolbophyllum Sheperdi. (Mueller.)

Bolbophyllum Sheperdi was at one time known in New South Wales under the name of Wheat-leaved *Bolbophyllum* which indicated the form of the leaves as resembling grains of wheat, and it certainly was most appropriate. It grows in dense clumps upon rocks, and is often half hidden by moss and the pretty little fern *Hymenophyllum Tunbridgense*.

The size of the leaves differs considerably in different situations. Their light green colour alone attracts attention, the little white flowers being hidden beneath them.

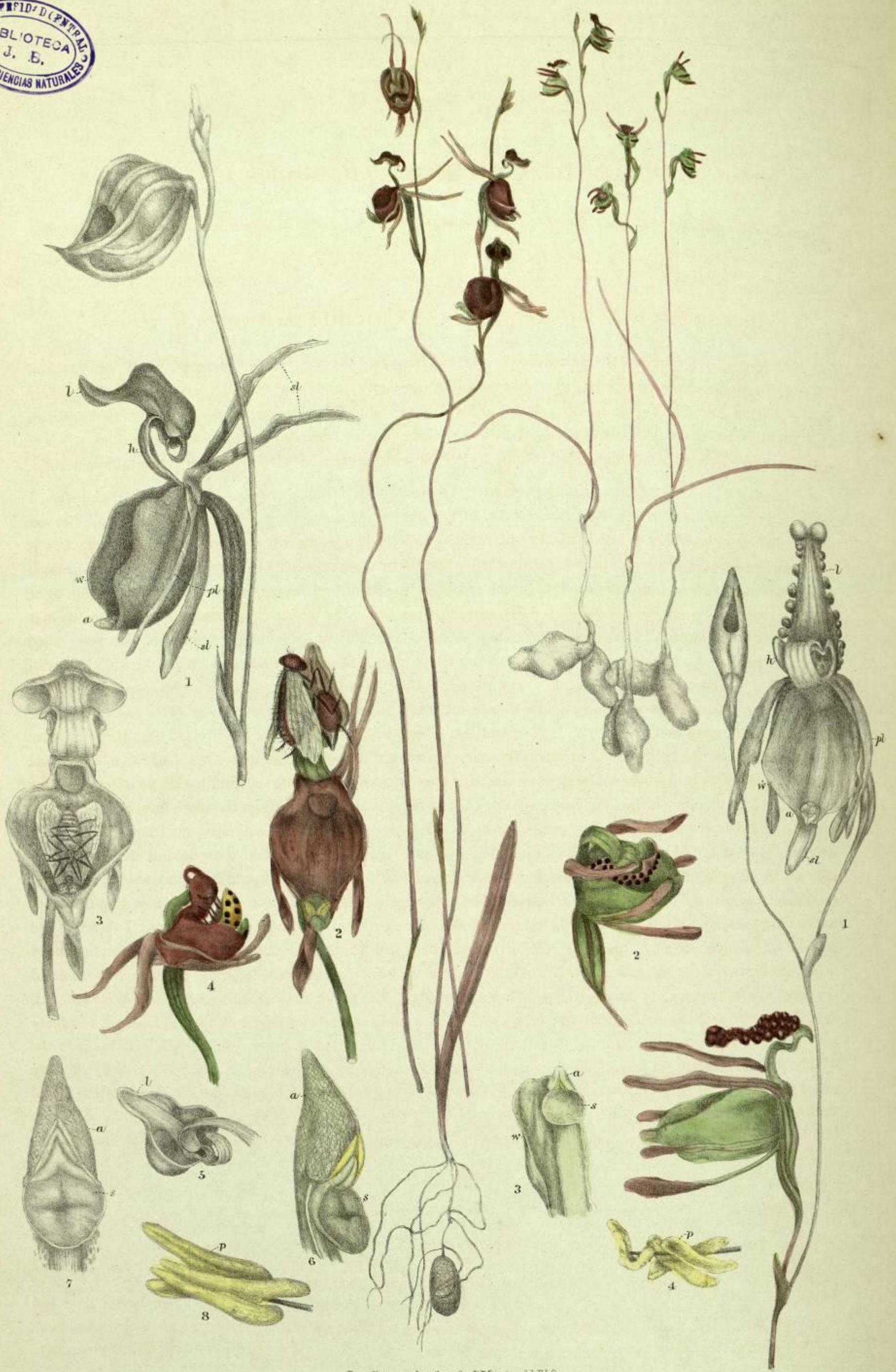
It flowers in October, and is evidently wholly dependent on small insects for its fertilization.

EXPLANATION OF PLATE.

Bolbophyllum Sheperdi. Fig. 1. Labellum and petals, from below. 2. Top of column, anther raised and pollen masses removed. 3. Bud. 4. Flower, from the side. 5. Labellum, from above. 6. Pollen masses. 7. Labellum and petals, from the side. 8. Flower, from the front. 9. Labellum and petals, partly from above. 10. Anther.

PART 6.

JULY, 1880.



From Nature and on Stone by R.D. Fitzgerald FLS

Major

CALEANA

Minor

Genus *Caleana*. (*R. Brown.*)

A SMALL genus confined to Australia and allied to *Caladenia* and *Drakæa*. Found in barren land and flowering in summer.

Caleana Major. (*R. Brown.*)

Caleana Minor. (*R. Brown.*)

CALEANA MAJOR.—This species is not numerous but generally distributed in suitable localities, which are knolls of ironstone gravel and sandstone ridges, where the plants are generally found close to large gum-trees and in the very poorest of hard soil. Unlike most of our orchids it flowers in the heat of summer (December), and with its red-brown leaf, wiry stem, red-brown flowers, peculiarity of form, resembling in body, wings and head, a large ant, and its power of suddenly curling its neck and hiding its head within its body, it seems to depart from the vegetable to join the insect world.

The method of its fertilization was long a mystery to me. Notwithstanding constant watching and examination, I could not satisfy myself as to how the pollinia (which are not very easily removed) were transferred to the stigma. It was evident that the intervention of insects was necessary, but though the flower appeared to be constructed as a trap, how it acted was by no means obvious. The flower is inverted. The column (which would otherwise be that of a *Caladenia*) is expanded so as to form a cup. The labellum (which resembles the lid of a claret-jug) either covers this cup (fig. 4) or stands up, ready to fall and close it (figs. 2 and 3). The other portions of the flower (as is usually the case when there is some extraordinary development) are reduced to insignificance. The labellum (the lid) is not sensitive, but when raised remains in unstable equilibrium, subject to be closed by a slight touch. The mechanism of the hinge by which this end is obtained is curious and simple. Imagine a thin strap of india-rubber having its edges slightly contracted, the result would be that the centre would bulge to one side or the other, and according to the side on which the convexity or concavity lay, the strap would be bent. It is evident that a lid so supported would be ready to fall on a slight pressure from behind, but in this flower (being inverted) the column has taken the position usually occupied by the labellum, and an insect alighting upon it would not bring down the lid, a touch or even a push from the front having no effect, while the falling of the lid, from a touch on the back, would be but to exclude the insect. From the above facts it was apparent that this orchid is not fertilized on the same plan as in allied genera; but it was only upon my friend Mr. Daintrey informing me that he had seen a large fly imprisoned in a *Caleana* that it struck me that the weight of the insect might here act to bring down the labellum, which in other cases springs up, by elasticity, against the weight. My first experiment was with a blow-fly, hung by a thread and let swing against the labellum. But the blow-flies were either too restive or by grasping the cup as well as the lid prevented their weight from being felt by the labellum. I therefore had recourse to lady-birds as more tractable. One of the lady-birds which attack the solanums was induced to climb up a match, till it reached the end, when it readily left the wood for the labellum, and immediately the labellum descended and the insect was fairly caught in the cup (fig. 4). It remained imprisoned for about two minutes, when it forced itself out, but did not fertilize the flower or remove the pollen. Other lady-birds similarly entrapped escaped in from one to twenty minutes, but none of them fertilized the flower; the obvious reason being that they were caught with their backs to the column, and the breadth and smoothness of the back prevented the pollen or stigma being touched. I had frequently placed *Caleanas* where house-flies would be likely to alight upon them, and had occasionally observed that they had closed the flowers, but the flies were never caught, and I believe the labellums were *sprung* by being struck from the back. To help Nature and make the flowers more attractive in the proper part, I now placed a little honey on the front of the

EXPLANATION OF PLATE.

Caleana major.—Fig. 1. Side view of bud and flower. 2. Front view of flower, showing a fly in the act of weighing down the labellum. 3. Front view of flower, showing fly left dead on the column when the labellum had returned to the upright position. 4. Side view of flower, showing lady-bird escaping backwards from under the labellum. 5. Labellum from below and part of hinge. 6. Top of column, from the side (wings removed). 7. Top of column, from the front (wings removed). 8. Pollen masses.

Caleana minor.—Fig. 1. A bud, and front and side view of flowers (open). 2. Side view of flower (closed). 3. Top of column, showing upper part of one wing, the other removed. 4. Pollen masses.

labellums of a dozen flowers, and was soon rewarded by the capture of several flies; only two of which however fertilized plants, and one perished in so doing (fig. 3); it was so firmly united to the stigma that it could not extricate itself. Six hours was the longest time noted as the imprisonment of a fly, but the labellum never rose till the insect escaped or (as in the one instance) died. The usual time for the flowers to remain shut when no insect is inclosed is from a quarter of an hour to an hour.

Though the clue had evidently been obtained, the insects experimented on were not those most suited for the fertilization of the plants, the house-fly, though the best, not being strong enough. I believe stronger flies (possibly those that poise in the air and dart at such objects as the upstanding flower of a *Caleana*) or narrow-bodied beetles are the probable agents of fertilization. But whatever be the insects the flowers are seldom fertilized.

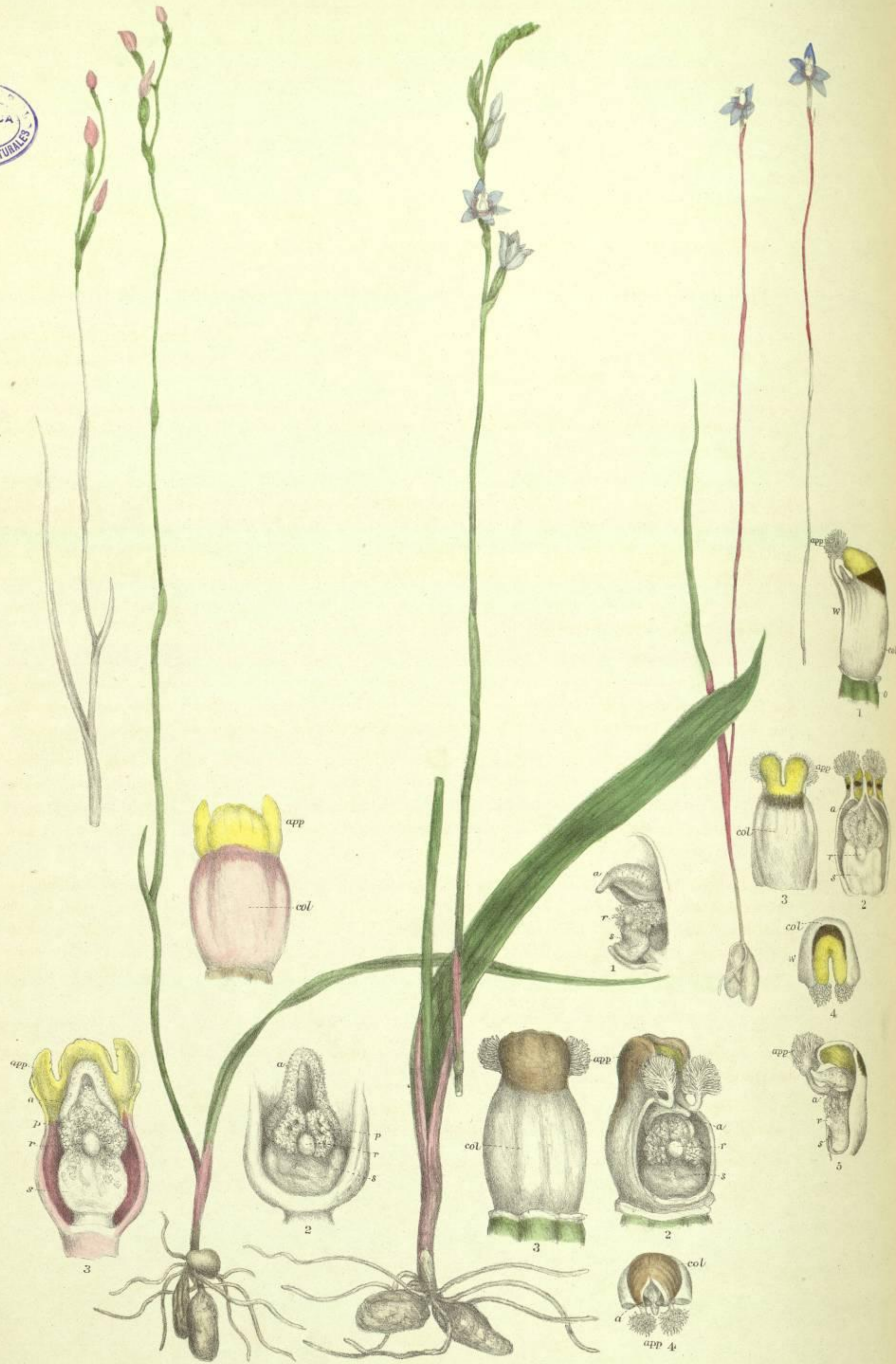
This year (1878) I frequently visited a rocky knoll on which I had found one hundred and five plants and a hundred and twenty-seven flowers open at one time. I never saw insects about them, never found one captured, and on very few occasions found a flower closed. Though the flowers had been in bloom from the 20th October to the 20th December only four capsules of seed were formed, and on the 30th December most of the plants had withered and only a stray flower (not included in those enumerated) remained. *Caleana major* is, therefore, despite of the long period in which it remains in bloom, far from fertile as regards production of capsules, but like other orchids where there is a speciality of adaptation, there is individual barrenness.

Though it may be sometimes fertilized by pollen brought from another flower, it must almost invariably be fertilized by its own. An insect caught and struggling till it could effect its escape, if it were so formed as to touch and extract the pollen, must almost to a certainty leave some on the stigma, and, were it to remove some, the chance (considering the rarity of the captures) that it would be again caught by some other flower seems very remote.

This orchid produced seed in abundance when fertilized by pollen from *Caleana minor*, caladenias of various species, and *Lyperanthus suaveolens*.

CALEANA MINOR is a much rarer and more local species than *C. major*. Personally I have only found it in three places near Sydney. It is evidently fertilized in the same method as *C. major*. It flowers in November.

BIBLIOTECA
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From Nature and on Stone by R.D. Fitzgerald F.L.S.

Carnea

THELYMITRA
Longifolia

Pauciflora

Printed at the Surveyor General's Office Sydney NSW
April 1880.

Thelymitra carnea. (R. Brown.)

Thelymitra longifolia. (Forster.) *Thelymitra pauciflora.* (R. Brown.)

THE flowers of *Thelymitra carnea* cannot be said to *never* open, but of the thousands I have watched at all times of the day I have only seen them expanded on three occasions. Should a flower open for a very short time, it will be in the morning when the sun shines brightly and there is no wind; but long before it is mature enough to expand, should it ever do so, it has been fertilized by its own pollen when in early bud. If the plants are removed and placed under a bell-glass the flowers will never open, no matter how hot the sunlight may be to which they are exposed, but every flower will produce its capsule of seed.

The anther, as in many of the species, gradually rises above the stigma and takes the pollen masses with it (figs. 2 and 3). They are not attached to the rostellum, and on being raised above the stigma burst and the pollen grains fall upon it (fig. 2). I have fertilized others of the genus with its pollen, but I could never satisfy myself that I had fertilized it with that of another species, as removal of the pollen masses, prior to self-fertilization, had to be done at so early a stage of the development of the flower that it could not recover the mutilation.

This orchid is to be found in the very shallow soil or moss that rests upon sandstone ridges, which for a time keep back moisture after the rains of spring, but it may also be seen in damp forest land. It flowers in September.

Thelymitra longifolia is obtained in similar situations, and is fertilized in the same way as *T. carnea*, but in fine calm weather it frequently opens its flowers for an hour or two about noon. They are however fertilized before opening, and unless the pollen from other plants or species is more powerful than its own and supersedes it they can never be other than self-fertilized. Every flower, whether the plant be left undisturbed or be placed under a bell-glass, produces seed.

There has been confusion in respect to *T. longifolia*, and two or three very distinct forms have been included under the one name, probably from the examination being of dried specimens only; but after the exclusion of those in which (in the living state) distinction can be observed, there remain two which are very puzzling. The one (that figured) grows on rocks in moss or shallow soil and has a broad leaf; the other grows in forest land, has a narrow leaf and more numerous flowers. The flowering season of both is September.

Thelymitra pauciflora.—Among the forms referred to as having been included under the name of *T. longifolia* but distinguished from it by R. Brown is *T. pauciflora*. It can readily be distinguished by the column alone, which has the hood deeply divided (fig. 4), whereas in *T. longifolia* the hood is not nearly so produced, and is hardly emarginate (fig. 4). I have only as yet obtained it at Mount Wilson and Hunter's Hill. It is self-fertilized, but the single flower opens in hot weather, if there be bright sunshine. It flowers in October.

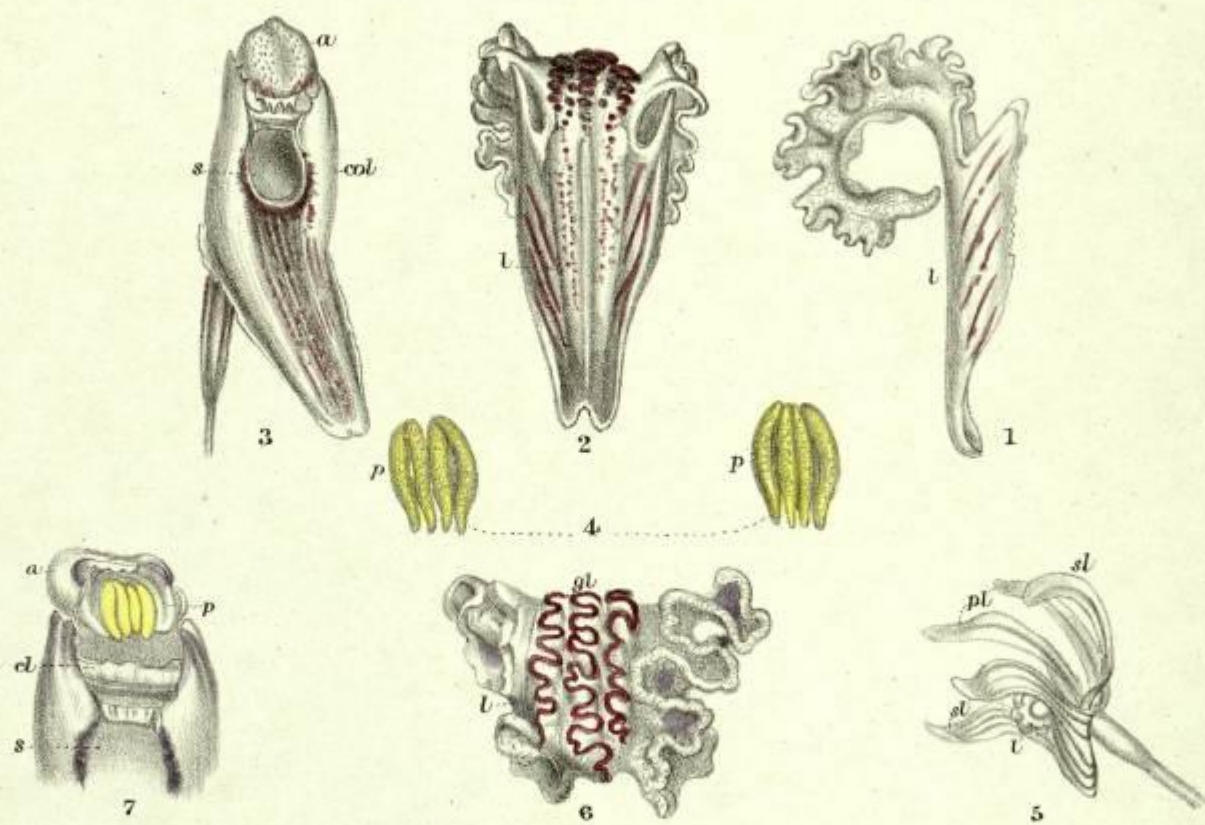
EXPLANATION OF PLATE.

Thelymitra carnea.—Fig. 1. Column, from the back. 2. Lower part of column, from the front, appendages and hood removed. 3. Column, from the front.

Thelymitra longifolia.—Fig. 1. Anther and stigma, remainder of column and hood removed. 2. Front view of column. 3. Back view of column. 4. Top of column, from the top.

Thelymitra pauciflora.—Fig. 1. Side view of column. 2. Column, from the front. 3. Column, from the back. 4. Column, from the top. 5. Column, from the side, one side of hood and part of one wing removed.

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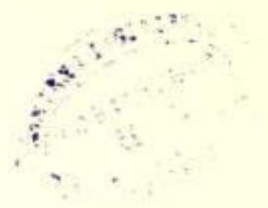


From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Stopps

DENDROBIUM Cucumerinum

Printed at the Surveyor General's Office Sydney NSW
 August 1879.

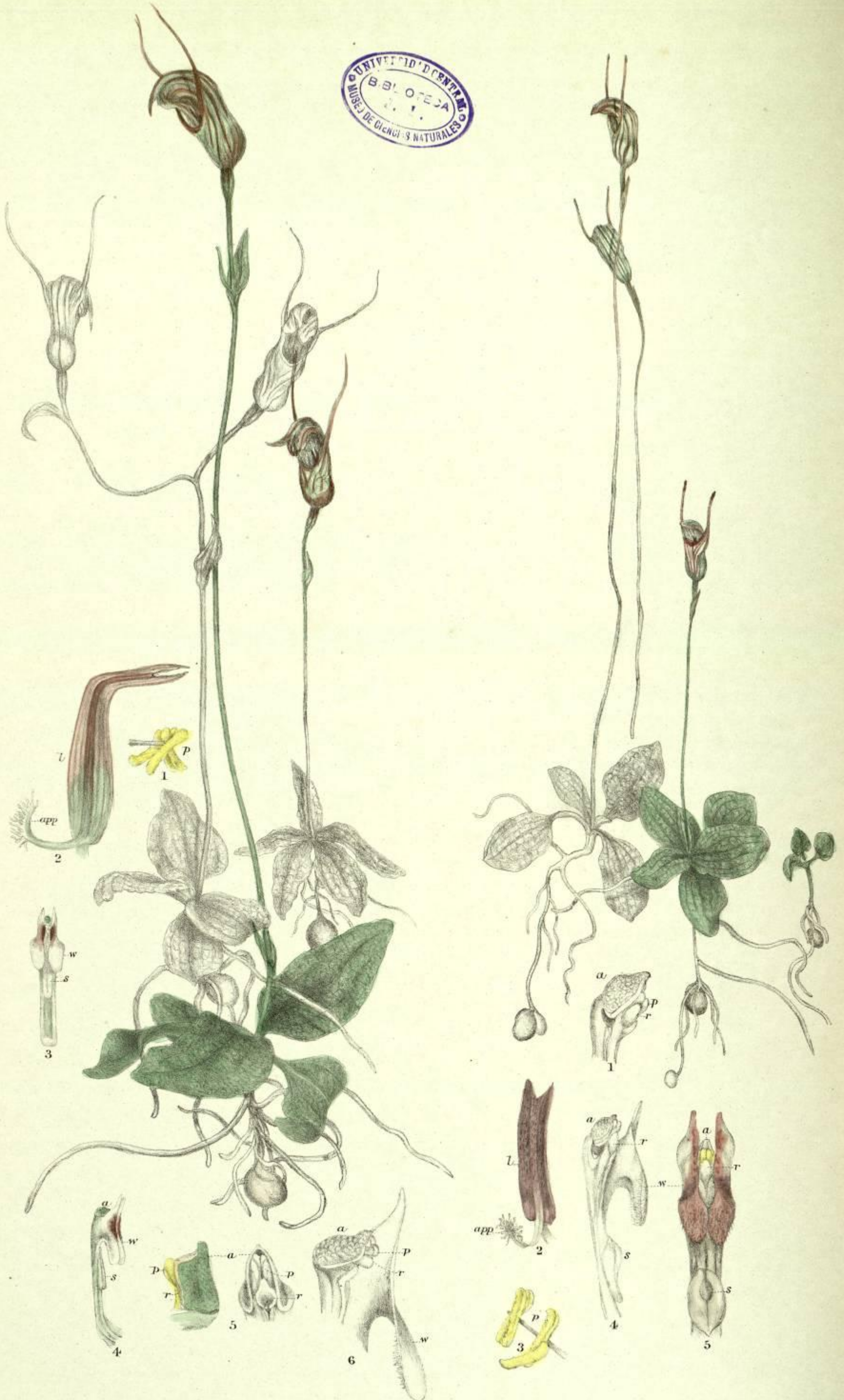


Dendrobium cucumerinum. (*Lindley.*)

DENDROBIUM CUCUMERINUM.—This curious little dendrobe has only been obtained, so far as I am aware, in the Blue Mountains, and the only situations where I have procured it are in “gullies” near Camden and at Picton. It grows on “forest oaks” (*Casuarina torulosa*), and flowers in October.

EXPLANATION OF PLATE.

Dendrobium cucumerinum.—Fig. 1. Labellum, from the side. 2. Labellum, from above. 3. Column, from the front. 4. Pollen masses. 5. Side view of flower. 6. Labellum, from the end. 7. Top of column, anther displaced.



From Nature and on Stone by R. Fitzgerald FLS.

Ophioglossa

PTEROSTYLIS

Concinna

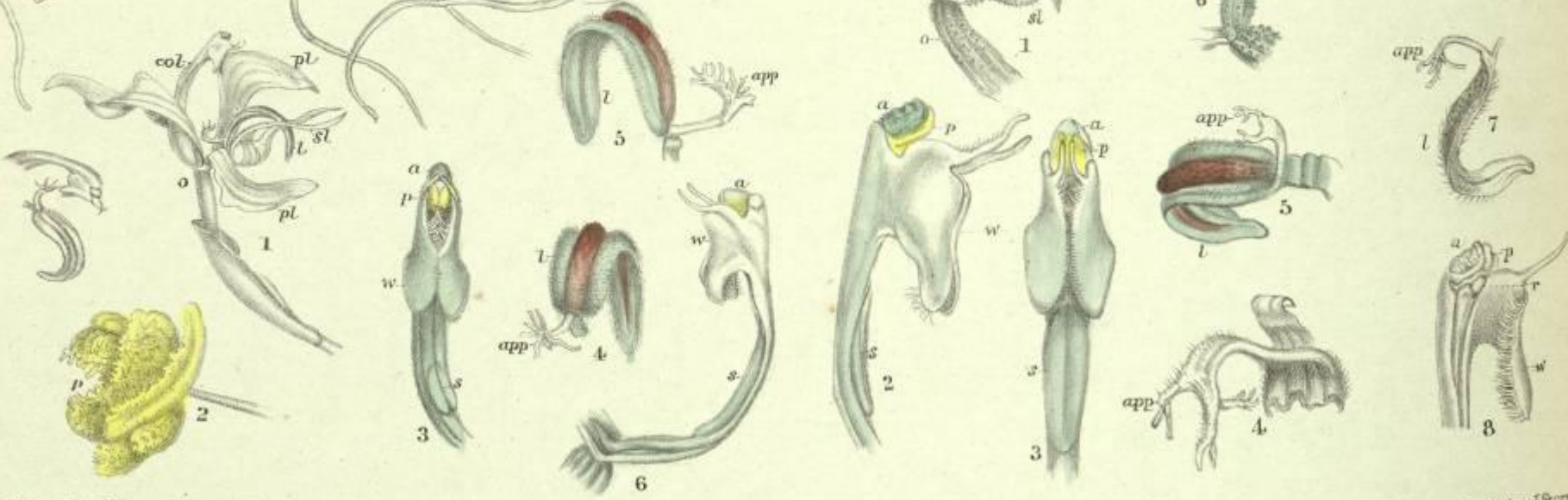
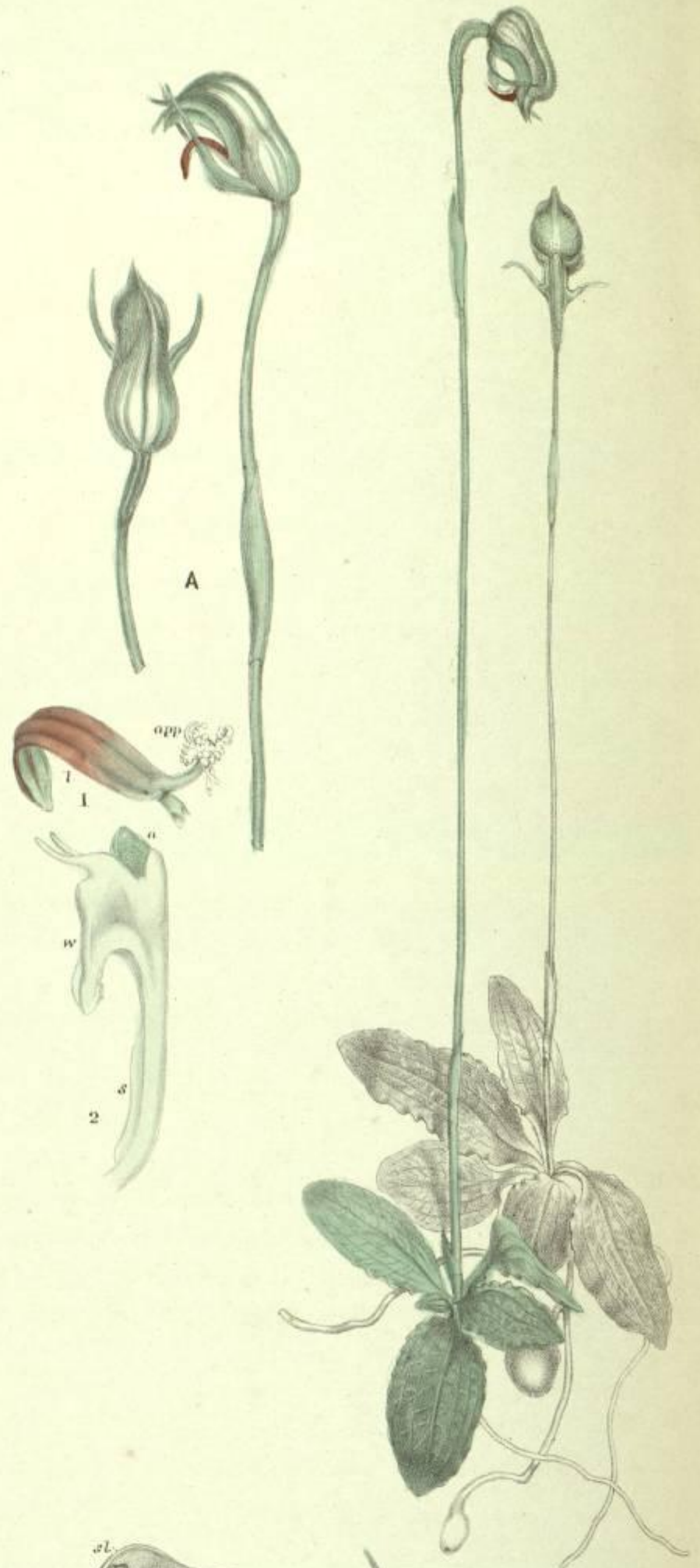
Pterostylis concinna. (*R. Brown.*) *Pterostylis ophioglossa.* (*R. Brown.*)

Two species not very closely related are figured together for the one reason that the tongues in both are cleft or emarginate. In this they differ from other species in the genus so far as known, but I do not believe that the departure from the ordinary form is of any use to them. As in other members of the genus, the labellum, when touched, springs towards the column and no doubt, occasionally at least, impels insects against the stigma or directs them to the opening between the wings and on to the rostellum and anther; but, as stated with respect to other species, the side of the labellum not facing the column is as sensitive as the inner surface, and consequently any touch to it causes the labellum to exclude an insect rather than embrace it. Whether the labellum is in this section of the genus (in which section it is enclosed in the flower) sometimes of use and sometimes disadvantageous, there can I think be no doubt that the insects they may enclose or exclude are small dipterous flies, so frequently are they found in the flowers remaining attached to the rostellum from being unable to release themselves, or to the stigma for the same reason. On one occasion I had the good fortune to find one caught in a spider's web which had been spread over a group of *P. obtusa*, and to the head of this little fly pollen masses of a *Pterostylis* were firmly attached. *P. ophioglossa* is one of the earliest *Pterostylis* to flower after the autumnal rains, for however early or deferred such rains may be, the various species retain the relative intervals between their seasons of flowering, though the same moisture has set them all growing. *P. ophioglossa* is not uncommon in peaty soils, and I have seen it at the Richmond River. It flowers in March. *P. concinna* is also common about Sydney, and is frequently found in mosses on the tops of rocks on which the leaves of "tea-trees" (*Kunzia*) and "oak" (*Casuarina*) have formed shallow soils. It flowers in July.

EXPLANATION OF PLATE.

Pterostylis ophioglossa.—Fig. 1. Pollen masses. 2. Labellum. 3. Column, from the front. 4. Column, from the side. 5. Top of column, from the side and front, wings removed. 6. Top of column, from the side, one wing removed.

Pterostylis concinna.—Fig. 1. Top of column, wings removed. 2. Labellum. 3. Pollen masses. 4. Column, from the side, one wing removed. 5. Column, from the front.



From Nature by R.D. Fitzgerald, PLS

On Stone by Arthur J. Epps

Nutans

PTEROSTYLIS

Hispidula

Pterostylis nutans. (R. Brown.) *Pterostylis hispidula.* (Fitzgerald.)

PTEROSTYLIS NUTANS is, on the east coast, the commonest form in the genus, growing in damp forests, deep gullies, under the shade of fig-trees, and upon sheltered rocks. It is the easiest transplanted with success of all the ground orchids, probably from its being less choice in regard of location than any other except *Acianthus fornicatus*; a great difficulty with most species being to find in gardens exactly similar situations to those from which the plants have been removed, and unless they be placed in such, though they may appear again and even flower for a season or two, they soon perish. This adaptability to various soils and situations is also probably the reason why it is the only orchid from the seed of which I have as yet succeeded in raising and flowering plants. Three hybrids from this species and *C. curta* have grown and flowered in my garden for two years. They have readily produced full capsules of seed as a result of fertilization with their own pollen and that of *P. nutans*, *P. Baptisti*, and *P. longifolia*. When, however, I look back upon the millions of hybridised and non-hybridised seed I have sown without result, I can hardly expect to see any further confusion of species arising from such doubly-crossed seed. From the figure given of one of those hybrids (fig. A) (which closely resembled each other) it will be seen that they partake of the peculiarities of both parents, the form of the flower being intermediate; but its upright carriage that of *P. curta* and the labellum less of that flower than of *P. nutans*; the whole plant, as might be expected, resembling rather the seed-bearing parent than that from which the pollen was procured.

P. nutans flowers in June.

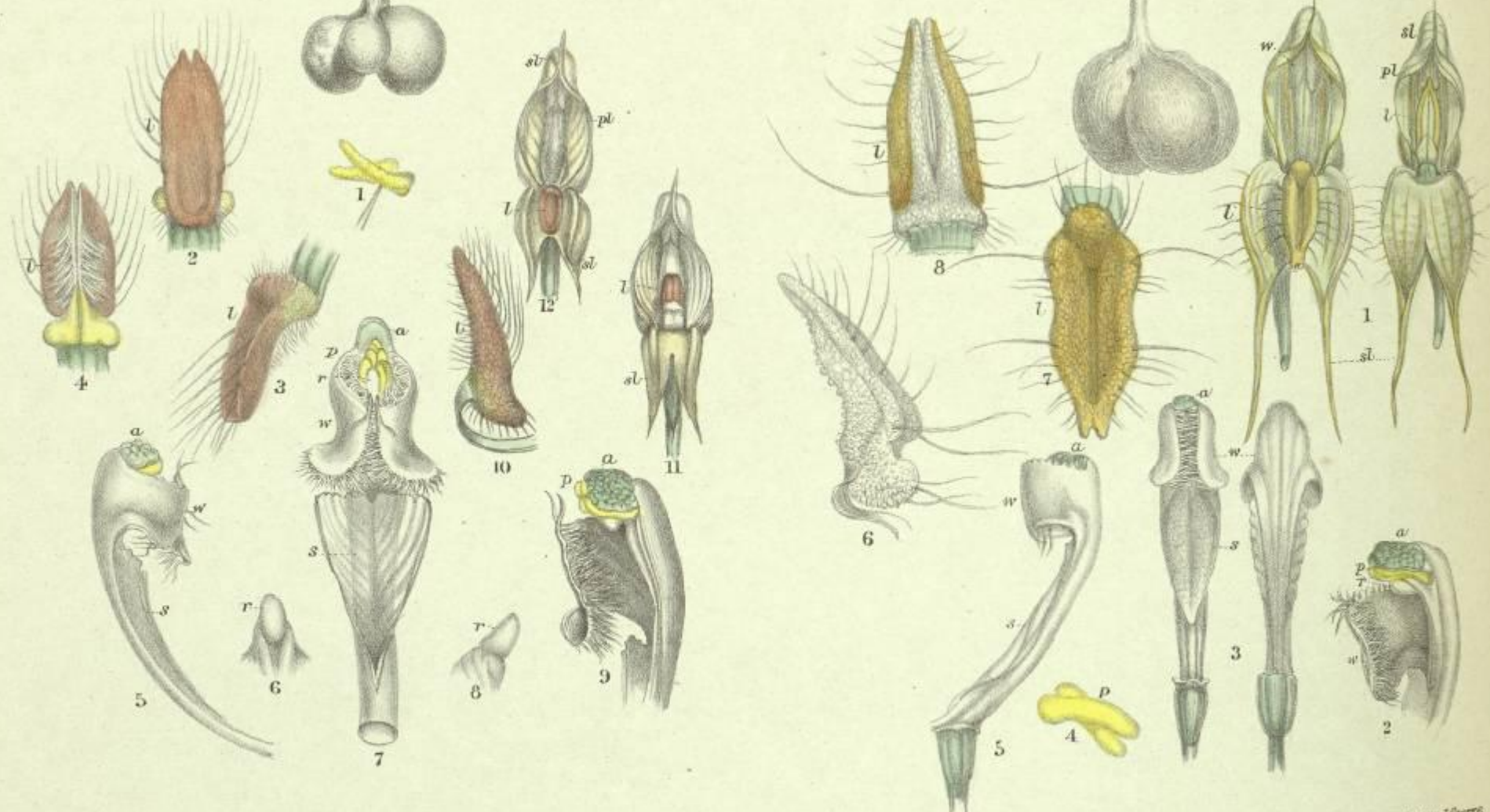
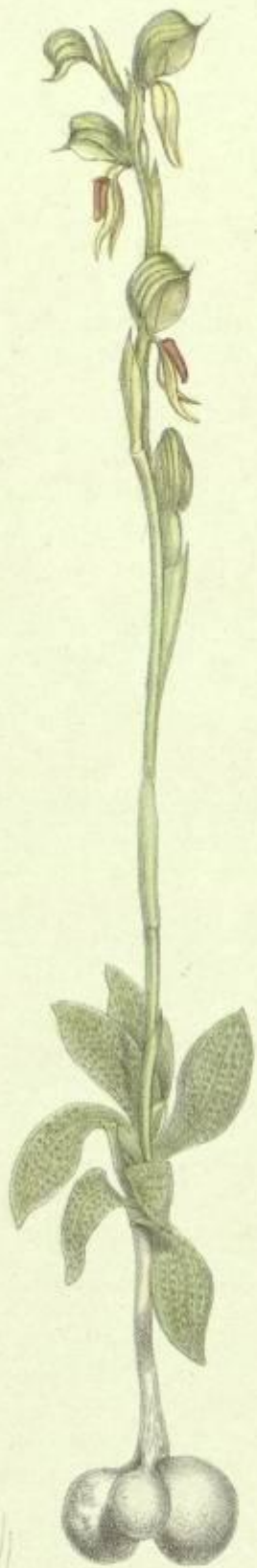
Pterostylis hispidula I have named from the roughness of the flower and stem. By some it may be considered as only a variety of *P. nutans*; but it is a very distinct form, having the flower much smaller, more nodding, and even squarer than in *P. nutans*. It flowers a month earlier (in May), and I have only obtained it in two places, Hunter's Hill, near Sydney, and Springwood on the Blue Mountains.

EXPLANATION OF PLATE.

Pterostylis nutans.—Fig. 1. Flower, from the side, perianth turned down. 2. Pollen masses. 3. Part of column, from the front. 4. Labellum, from the base. 5. Labellum, from the side. 6. Column, from the side.

Pterostylis hispidula.—Fig. 1. Flower, from the side, half dorsal sepal and one petal removed. 2. Part of column, from the side. 3. Part of column, from the front. 4. Appendage of labellum and hinge. 5. Labellum, from the base. 6. Sepals, from below. 7. Labellum, from the side. 8. Top of column, one wing removed.

Fig. A., Hybrid.—Fig. 1. Labellum. 2. Part of column, from the side.



From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Stepp

Mitchelli

PTEROSTYLIS

Squamata



Pterostylis Mitchellii. (Lindley.) *Pterostylis squamata.* (R. Brown.)

PTEROSTYLIS MITCHELLII.—When writing of *P. Woollsii* I expressed a belief that *P. Mitchellii* would again be found, and found to be very distinct from *P. Woollsii*. Since then I have had the pleasure of seeing what I believe to be *P. Mitchellii* on the hill tops near Cootamundra, growing among the trap boulders with which they are covered. It flowered in August.

Pterostylis squamata, distinguished by the scaly bracts on the stem, was also procured at the Round Swamp, Urana. A plant of *pterostylis* found at Cootamundra amongst those of *P. Mitchellii*, though not in flower, appeared to me to be so different from those of that species surrounding it that I brought it away in the hope that it would flower, which it did about a month subsequently, and proved to be *P. squamata*.

P. Mitchellii has since been sent to me by Dr. Woolls from Richmond, obtained in the same situations as *P. Woollsii*.

The fact that the different forms were found in the same localities cannot be considered as in any way showing that they are identical, as I found amongst the numerous plants of *P. Mitchellii* at Cootamundra not only the plant of *P. squamata*, but a plant of *P. barbata*, which certainly cannot be a variety of or identical with the others; and the times of flowering are not generally the same.

EXPLANATION OF PLATE.

Pterostylis Mitchellii.—Fig. 1. Pollen masses. 2. Labellum, from above. 3. Labellum, partly from the side. 4. Labellum, from below. 5. Column, from the side. 6. Rostellum, from the front. 7. Part of column, from the front. 8. Rostellum, from the side. 9. Top of column, one wing removed. 10. Labellum, from the side. 11. Front view of flower, labellum raised. 12. Front view of flower, labellum depressed.

Pterostylis squamata.—Fig. 1. Front view of flowers, labellum raised in one and depressed in the other. 2. Top of column, one wing removed. 3. Column, from back and front. 4. Pollen masses. 5. Column and ovary, from the side. 6. Labellum, from the side. 7. Labellum, from above. 8. Labellum, from below.



From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Scoppa

Daintreyana

PTEROSTYLIS

Obtusa



Pterostylis Daintreyana. (Mueller.) *Pterostylis obtusa.* (R. Brown.)

PTEROSTYLIS DAINTREYANA was first found by E. Daintrey on the North Shore, Sydney, at Sugar Works Bay, and named by Baron Mueller after its discoverer. I am not aware of its being obtained from any other locality. Though included with *P. parviflora* and *P. aphylla* by Bentham in series *Parvifloræ*, I think it much more closely approaches *P. longifolia*. It is intermediate between the section of the genus in which the labellum hangs outside the flowers and that in which the labellum is included. In this species the lower sepals are nearly horizontal, and consequently the labellum (which resembles that of *P. longifolia*) cannot fall lower than to right angles with the flower, but it is not included within it. It flowers in May.

Pterostylis obtusa is generally distributed in suitable situations near the coast and in the mountains. It is to be sought for in peaty soils and under the shade of trees. I have frequently found dipterous insects in the flowers and often adhering to the stigma or rostellum, as shown in figure 3, which was taken from the column and rostellum of a flower in which one fly had perished with its head imbedded in the stigma, and another in its efforts to escape from the wings of the column. Dipterous flies are, I believe, the principal agents of fertilization in the genus. *P. obtusa* flowers in March.

EXPLANATION OF PLATE.

Pterostylis Daintreyana.—Fig. 1. Side view of flower, labellum fallen. 2. Top of column, one wing removed. 3. Side view of flower, half dorsal sepal and one petal removed. 4. Rostellum. 5. Labellum, from below, from the side, and from above. 6. Column and one petal. 7. Column, from the front. 8. Side view of flower, labellum raised.

Pterostylis obtusa.—Fig. 1. Labellum. 2. Flower, perianth turned down. 3. Column and labellum, showing flies adhering to stigma and caught between the wings of the column. 4. Pollen masses. 5. Top of column, pollen masses removed and anther thrown back. 6. Column, from front and side. 7. Top of column. 8. Top of column, one wing removed.



From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Stoppe.

SPATHOGLOTTIS Paulinæ

Printed at the Surveyor General's Office Sydney NSW
February 1879



Genus *Spathoglottis*. (*Blume*.)

THIS genus resembles *Bletia*, and is, according to Bentham, dispersed over tropical Asia, having only one Australian species.

Spathoglottis Paulinæ. (*Mueller*.)

THIS species, and probably the genus, is intermediate between the epiphytes and the terrestrial orchids; the pseudo-bulbs, the habit, the form of the flowers and especially that of the column and anther, are those of the tree or rock orchids; the texture of the leaves and habitat (in peaty swamps) are those of the terrestrial.

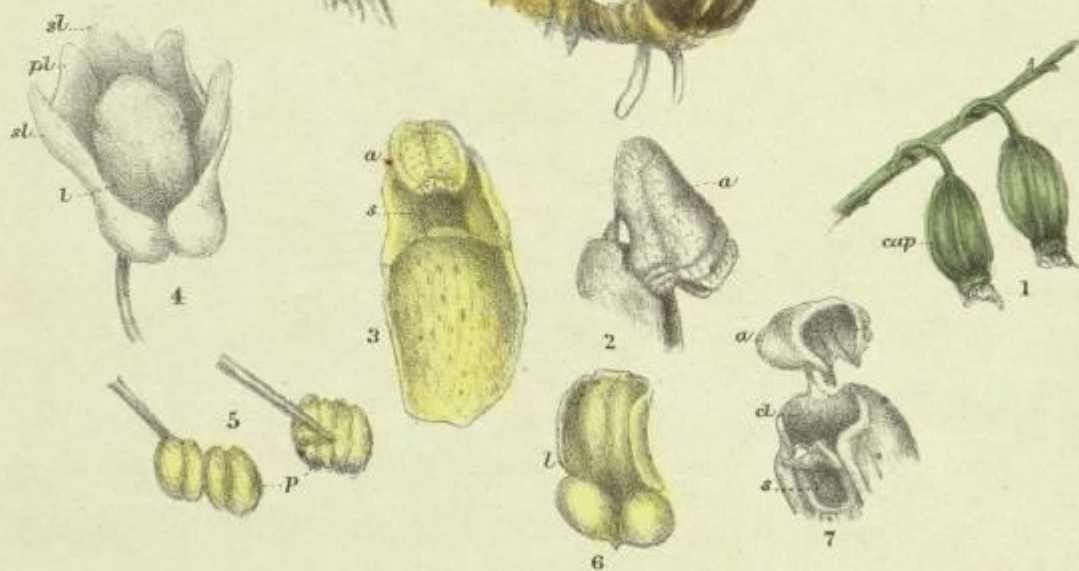
I was surprised to see an orchid with the column and anther of an epiphyte producing a full capsule of seed for every flower, as hitherto I had never found a self-fertilizing species of epiphyte.

I was both surprised and pleased at discovering the very curious and peculiar method by which it becomes self-fertilized. The anther is lid-like, with a rather long point (or beak), between which and a corresponding projection of the clinandrium, lies the caudicle, which (unlike those in other orchids) appears to be composed of or covered with pollen.

If the rostellum at the end of the beak be touched (when the flower first opens) the pollen masses are removed or rather withdrawn from below the anther (as in *sarcohilus* and other tree orchids); but should they not be so removed, after a short time they fall out on each side, where the anther gapes from the clinandrium, and for a while hang from the point of the anther and clinandrium (the rostellum remaining attached, fig. 5). The caudicles then contract, and bending inwards, bring the pollen masses into contact with the very shallow stigma, and the flower is self-fertilized. This method of fertilization is (so far as known to me) unique, and presents a curious connection between that of the epiphytes, in which the intervention of insects is necessary, and those of the terrestrials, in which they are sometimes required and sometimes dispensed with. I am indebted to Sir William Macarthur for the opportunity of figuring this species. It flowered in his orchid house in February, and was obtained from Northern Queensland.

EXPLANATION OF PLATE.

Spathoglottis Paulinæ.—Fig. 1. Column, from the side. 2. Column, from the front. 3. Column and labellum, from the side. 4. Pollen masses. 5. Top of column, from the front, showing pollen masses impinging on the stigma, and section of top of column, from the side, showing pollen masses lying under the anther. 6. Labellum, from above.



From Nature and on Stone by RDEitzgerald FLS

DENDROBIUM Monophyllum

Printed at the Surveyor General's Office Sydney N SW
April 1880.

Dendrobium monophyllum. (*Mueller.*)

DENDROBIUM MONOPHYLLUM is a northern species, not having been obtained, so far as I am aware, farther south than the Clarence. It is generally to be found on "oak trees" (*Casuarina*), high up among the branches and forming dense clumps which resemble patches of lily of the valley. Were it not that the spikes are produced from the bases of the leaves rather than from below the pseudo-bulbs, this species might be classed among the Bolbophyllums quite as well as *B. exiguum*, and it seems to be doubtful whether that genus should not be restricted to such species as *B. Shepherdi*, *B. aurantiacum*, &c., in which the labellum is so differently formed from that of the Dendrobiums and the petals are reduced almost to scales. *Dendrobium monophyllum*, notwithstanding its name, sometimes produces two leaves. The season of flowering is more uncertain than that of any other orchid known to me, depending apparently on the maturity of the new pseudo-bulbs rather than on the season. It will live for a long time and flower near Sydney if placed upon fig-trees, but the pseudo-bulbs gradually diminish in size.

It crosses freely with others of the genus.

EXPLANATION OF PLATE.

Dendrobium monophyllum.—Fig. 1. Capsules. 2. Top of column, anther displaced. 3. Front view of column. 4. Flower, from the front. 5. Pollen masses. 6. Labellum. 7. Top of column, from the front, anther displaced.



From Nature by R.D. Fitzgerald FLS

On Stone by Arthur J. Stepps

SARCOCHILUS Divitiflorus

HERBARIUM
MUSEUM
MELBOURNE

Sarcophilus divitiflorus. (*Mueller.*)

SARCOCHILUS DIVITIFLORUS, though a thorough Sarcophilus, is very distinct from all the other Australian members of the genus. It was named by Baron Mueller from specimens I obtained at Yessaba, on the Macleay River. I subsequently found others at Dongay Creek, a tributary of the same river, and on the Nambucca, and have since seen specimens from Queensland.

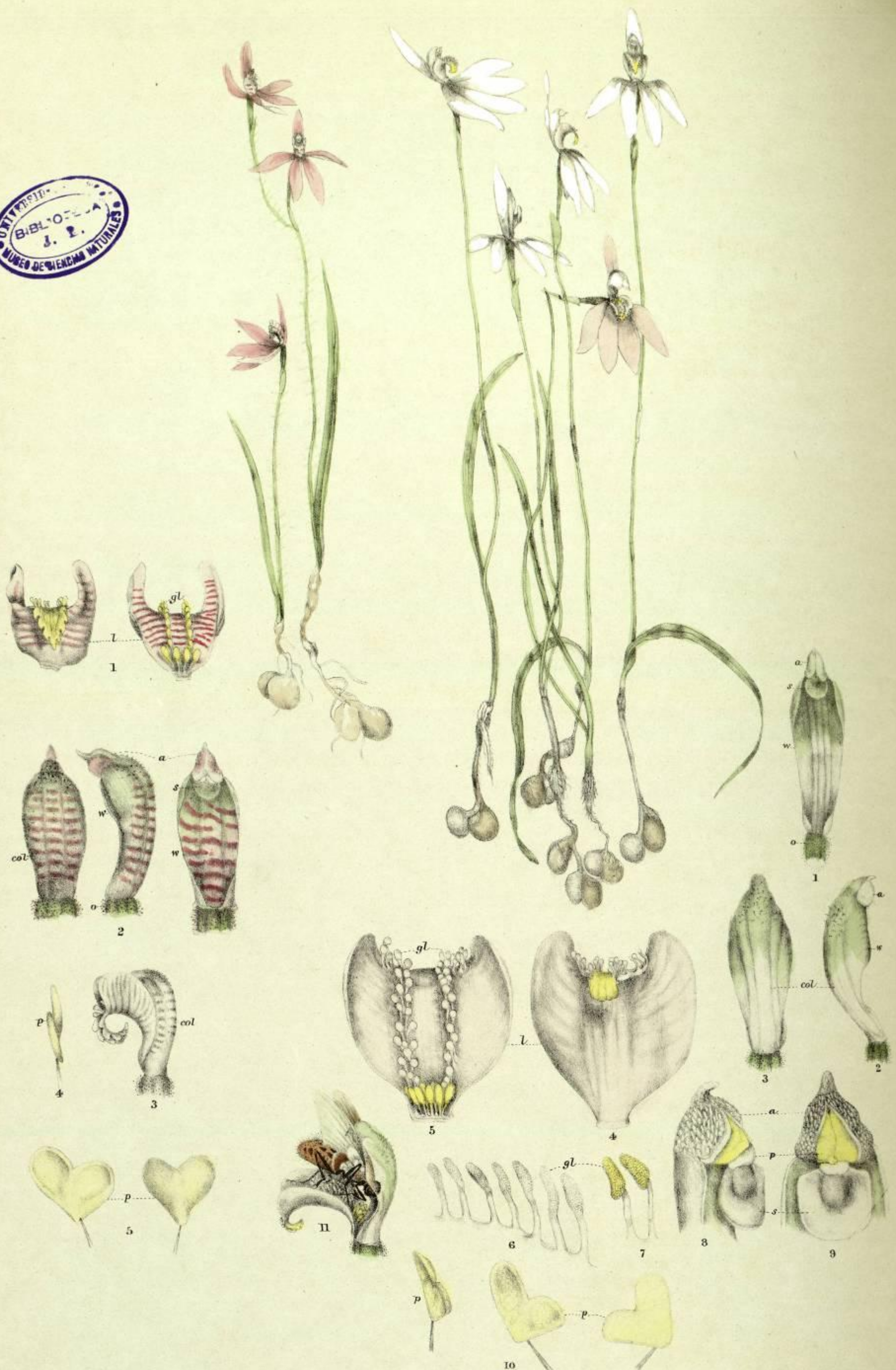
It grows (frequently high up) on myrtles and sassafras. It flowers in October.

EXPLANATION OF PLATE.

Sarcophilus divitiflorus.—Fig. 1. Side view of flower. 2. Labellum, from the back. 3. Top of column, from the side. 4. Top of column, from the front. 5. Column, from the side. 6. Part of labellum, near the hinge. 7. Column and labellum, from the side. 8. Pollen masses, from above. 9. Pollen masses, from below. 10. Top of column, from the side, anther removed. 11 and 12. Pollen masses inclosed in the anther. 13. Labellum, from the front.

PART 7.


OCTOBER, 1882.



From Nature and on Stone by R.D. Fitzgerald F.L.S.

Carnea CALADENIA Alba

Printed at the Surveyor General's Office Sydney NSW
November 1880.



Caladenia alba. (R. Brown.) Caladenia carnea. (R. Brown.)

THESE plants afford a good illustration of a question that has often suggested itself to me in the examination of orchids, and one equally applicable to other orders,—whether there are not varieties or species (hardly recognized even as varieties) that are in reality as distinct from each other as the most unquestioned species; but from their departure from each other being of a constitutional character (not to be marked by a bract or a gland) are overlooked or disregarded. In support of this suggestion of innate distinctness, I may here give the result of a long series of experiments in the hybridization of Hibiscus. No botanist has, I believe, ever thought of including *H. divaricatus*, *H. heterophyllus*, *H. splendens*, and *H. Fitzgeraldi*, in one species, yet they are crossed freely and the offspring are fertile with the original plants and amongst themselves, with no apparent tendency to sterility or relapse to either parent, at least so far as I have been able to test them, that is, to the fifth generation. All attempts, however, to cross any of them with *H. diversifolius*, *H. mutabilis*, or *H. manihot*, or the latter amongst themselves, has been without success. The reason I believe to be that they have a constitutional characteristic (quite as marked in its way as any outward specific distinction) of repugnance to other species, which may possibly lie in the pollen and be consequently inappreciable. A further illustration of innate distinction that cannot be found in dried specimens is afforded by the hybrids between *H. splendens* and *H. Fitzgeraldi*. *H. splendens* flowers early in the morning; *H. Fitzgeraldi*, in the evening; the hybrids in the middle of the day. Thus marking the force of an externally inappreciable distinction. In the case of *Caladenia alba* and *C. carnea*, it would I think be impossible to describe positively the difference between them, yet I believe them to be as distinct as many recognized species, and I do not think that I should ever pick the one in mistake for the other. The only distinction of a specific character however, that appears to be constant, is that the labellum is broader and does not clasp the column to the same extent in *C. alba* as in *C. carnea*. There is, however, a constitutional difference in their time of flowering, *C. alba* being always before *C. carnea*, and the general distinctions are that *C. alba* is white, though sometimes pink; that *C. carnea* is pink, though perhaps sometimes white; that *C. alba* is the larger flower, and that its column is not generally marked or at least barred, though sometimes blotched, and the same may be said of the labellum. Such cases as this deserve more consideration than they generally receive, for who can say whether *C. alba* is a variety or a species? Yet here, if anywhere, and in the thousands of doubtful species (in great part for convenience and to escape the difficulties of determination) called varieties, and to be found in almost every genus, rests the fulcrum of the Darwinian theory, and the proof or otherwise of change so often demanded by its opponents.

On one occasion I had the pleasure of seeing *Caladenia alba* actually fertilized by an insect. A flower was observed to tremble, and on examination it was found that a fly had alighted upon its labellum, was by its spring carried against the stigma and adhering to it struggled violently to escape, and thereby withdrew the pollen-masses from the anther and smeared them over the stigma. This instance, in my opinion, goes far to show that though the pollinia in this and many other species may, without fertilizing the flower, be easily removed by touching the disc or discs with the point of a pin, the operation is not by any means so neatly performed by an entrapped insect, and the consequence is that the flowers are impregnated by their own pollen.

C. alba flowers in August, and is to be found in shady forests generally, on moderately good soil.

C. carnea flowers in September, and is often to be procured on barren hill-tops and in the crevices of rocks, as well as in open forests.

EXPLANATION OF PLATE.

Caladenia carnea. Fig. 1. Labellum, from the front and back. 2. Column, from back, side, and front. 3. Column and labellum, from the side. 4. Pollen-masses, from the edges. 5. Pollen-masses.

Caladenia alba. Fig. 1. Column, from the front. 2. Column, from the side. 3. Column, from the back. 4. Labellum, from below. 5. Labellum, from above. 6. Glands of the disc. 7. Glands at the base of the labellum. 8. Top of column, from the side. 9. Top of column, from the front. 10. Pollen-masses. 11. Column and labellum, showing how a fly is impelled against the stigma by the upward spring of the labellum.

Genus *Cœlandria*. (*Fitzgerald*.)

THE genus *Dendrobium* cannot I think be made to include the plant which I have consequently named *Cœlandria* ("*Smillie*"). The habit is not altogether that of *Dendrobium*, the leaves being more numerous and thin, the short axillary racemes, on a thick peduncle, are not those of a *Dendrobium*, and the labellum and column are altogether distinct. In the true *Dendrobiums* the labellum will be always found to be articulate, indicative of a distinct method of fertilization. In this proposed genus it is united to the column, forming with it a nectary which contains honey (absent in all the species of *Dendrobium* I have examined). The column is not smooth throughout (as in *Dendrobium*) but deeply divided transversely. The stigma is not a chamber, but a shield within a chamber. The labellum is not shaped like that of a *Dendrobium* and is without the longitudinal raised plaits, but on the contrary has a transverse bar which fits into a transverse groove in the column, and the pollen-masses instead of being formed like grains of wheat are united into a thin hollow scale easily resolvable into four narrow hollow scales, and from this peculiarity I have named the genus. Immediately above the stigma and resting upon it, in a depression, is a soft white waxy mass (absent in *Dendrobium*) which may be considered a rostellum, and on this the concave pollinia rest, are removed with at least a portion of it if it be touched, or probably leave it, and remain in the anther, if the anther be drawn back from behind. The pollen-masses, unlike those of *Dendrobium* (which are, I believe, invariably white or yellow), are of a bright red-brown.

I have made a comparison with *Dendrobium* rather than given a description of *Cœlandria*, as I have no opportunity of comparing with *C. Smillie* any of the other species which I think should probably be included with it. Among them are those named *D. agrostophyllum*, *D. viridiroseum*, *D. mohliamum* (Tab. XCI, Flora Vitiensis, page 303), from Mr. Darwin's description, and the representation of the column, &c., given in his "Fertilization of Orchids," page 139, possibly *D. chrysanthum* and probably others now included in *Dendrobium* on the collation of which the characteristics would necessarily require modification.

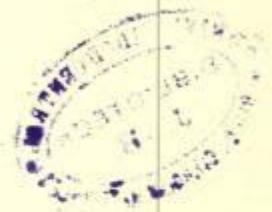


From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Stapp

CŒLANDRIA — Smilliæ

Printed at the Surveyor General's Office Sydney NSW
November 1878.



Coelandria Smilliae. (*Fitzgerald.*)

(*Dendrobium Smilliae*, *Mueller.*)

To Sir William M'Arthur I am indebted for the opportunity of figuring this species, which has flowered in his orchid-house. It appears to me to be fertilized by insects in a totally distinct method from *Dendrobium*, in which as in many other genera the labellum attached by an elastic hinge acts against the weight of an insect and impels it against the stigma. In this species the labellum is included within the lower sepals (fig. 10) and adheres to the column, so as with it to form a nectary (figs. 11 and 12) in which honey is secreted. In the end of the labellum is a groove (figs. 1 and 8), and if a bristle be pushed down through this groove and gently withdrawn, the soft waxy matter (figs. 5 and 12), which rests on the stigma and on which the pollen scales lie, adheres to the bristle and removes the pollen scales, which are driven back upon the stigma by the constant pressure of the labellum or are brought away upon the bristle. In Nature this operation is, I should think, performed by the proboscis of some large moth or butterfly when probing to reach the honey at the base of the column. *Coelandria Smilliae* flowers in November, and is found in North-eastern Australia.

EXPLANATION OF PLATE.

Coelandria Smilliae. Fig. 1. Labellum, from the side, back, and front. 2. Top of column, from the front, anther raised. 3. Pollen-masses. 4. Pollen-masses on rostellum. 5. Stigma, rostellum, and pollen-masses. 6. Column, from the side. 7. Column, from the front. 8. Back of column and top of labellum. 9. Flower, from the back. 10. Flower, from the front. 11. Labellum and column, from the side. 12. Labellum and column, from the side, half of labellum and one wing of column removed.



From Nature and on Stone by R. D. Hagerald F.L.S.

Dendrobioides

DIURIS

Pedunculata

Diuris pedunculata. (R. Brown.) *Diuris dendrobioides.* (Fitzgerald.)

Diuris pedunculata varies much in habit, being sometimes very slender and at others robust—the one belonging apparently to the coast, the other to the interior. The flowers of the larger form are much more open than those of the slender kind, and the labellum much larger in proportion (fig. 3), the central lobe being less rhomboidal; but the pubescence of the labellum easily distinguishes it from all other species. *D. laevis* (which I discovered in Western Australia) is the nearest allied, but differs from it specially in the smoothness of the labellum and the spiral form of the leaves. In one specimen of *D. pedunculata*, found at Deniliquin, the pollen-masses were attached to the back of the stigma close to the rostellum (fig. 4), and this plant would thus no doubt have produced seed without the removal of the pollinia, or pollen being placed upon the front of the stigma. This single instance shows that in some cases *Diuris* may be self-fertilized by contact of the back or edge of the stigma with the pollen of the same flower, and the relationship is established with *Orthoceras*, in which genus fertilization always takes place by contact of the pollen-masses with the back of the stigma, close to the rostellum. *D. pedunculata* is generally but not numerously distributed in New South Wales; it grows in stiff clay, and flowers in September and October.

Diuris dendrobioides may not be considered an established species, as I only found two plants at Cunningham's Plains, near Murrumburrah, and Mr. A. G. Hamilton has obtained what he considered to be the same plant at Guntawang, near Mudgee. The two plants observed by me grew close together in a field, where numbers of *D. elongata* and *D. pedunculata* were in flower, and they may have originated from a cross between the two species. They had, however, some characters very distinct from both, such as the breadth, shortness, and colour of the lower sepals. They are, I think, worthy of a figure and a name, whether others are found elsewhere or not. If not, it is very interesting as an example of a very distinct form, of which two examples at least have existed, and which, if it could establish itself and become numerous, would undoubtedly be considered a species.

The date of flowering was 2nd of October.

DESCRIPTION OF DIURIS DENDROBIOIDES.

Rather stout, about ten inches high. Leaves, three or four at the base of the stem, linear-oblong, obtuse, three or four inches. Flowers (resembling those of a *Dendrobium* rather than a *Diuris*), four or five, dark red-brown, with light edges. Petals about eight lines, oblong, undulate, broadly stipitate. Dorsal sepal broad, undulate, embracing the column, about five lines long. Lateral sepals petal-like, dark red-brown, broadly lanceolate, acute, about one inch. Labellum three-lobed from the base, the lateral lobes broadly cuneate, denticulate at the ends. Central lobe linear at the base, but suddenly expanded at half its length; lower part broadly triangular, with revolute edges and a raised line along the centre. Two raised plates on the linear part of the labellum bent towards the central raised line, which extends to half their length. Wings of the column denticulate, shorter than the anther.

EXPLANATION OF PLATE.

Diuris pedunculata. Fig. 1. Labellum, from the front. 2. Labellum, from the side. 3. Labellum (natural size), from robust form. 4. Stigma, showing pollen-mass adhering to the left lobe. 5. Column, from the front. 6. Column, from the back. 7. Column, from the side, anther drawn back.

Diuris dendrobioides. Fig. 1. Labellum, from the side. 2. Labellum, from the front. 3. Column, from the back. 4. Column, from the front. 5. Pollen-masses.



From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur Stapp

DIPODIUM Punctatum.

Genus *Dipodium*. (R. Brown.)

THIS genus is intermediate between the epiphytes and terrestrial orchids; the form of the column, the anther, pollen-masses, and labellum, being those of the former—the habit that of the latter.

It is in Australia a small genus, two only being known, but, as might be expected from its approach to the epiphytes, it is also found (according to Bentham) in New Caledonia, Eastern Archipelago, and East Indies, and like the epiphytes is dependent on insects for its fertilization.

Dipodium punctatum. (R. Brown.)

THIS orchid is known by many local names, such as "native hyacinth," "spotted lily," &c., and is frequently to be seen in the hands of Christmas holiday-makers, who cannot fail to notice its spike of spotted flowers growing leafless from the baked ground, at the foot of some gnarled gum-tree—almost the only flower in that dry season, and all the more remarkable for the specially barren situation it elects to grow in. *Dipodium punctatum* is probably a parasite on the roots of trees; but it is very difficult to determine absolutely whether tubers such as those of this orchid really derive nourishment from or have been nourished by the roots of other plants or trees, or have merely grown in juxtaposition and adapted themselves to them as they do to stones in gravelly situations. Among the orchids, respecting which it would be interesting to ascertain whether they are always or have been at an early stage parasitical, are *Gastrodia*, *Galeola*, and *Prasophyllum flavum*, and among other Australian families the Western Australian *Nuytsia*, and *Atkinsonia* of New South Wales.

The light greenish form (fig. B) is from specimens kindly sent to me from Guntawang, near Mudgee, by my friend A. G. Hamilton. It may possibly be *D. squamatum*, referred to (in a note) by Bentham in the *Flora Australiensis*, as from New Caledonia, and differing from *D. punctatum* "chiefly in the more closely imbricate, appressed, and acute scales, at the base of the stem," but I have never seen a specimen of the New Caledonian plant. *D. punctatum* is distributed over the whole coast country of Australia, with the exception probably of Western Australia, and flowers, as previously stated, in December.

EXPLANATION OF PLATE.

A. *Dipodium punctatum*. Fig. 1. Seed capsules, part of one removed. 2. Column and part of perianth. 3. Labellum, from the front. 4. Top of column. 5. Top of column, anther and pollen-masses removed. 6. Pollen-masses.

B (possibly *Dipodium squamatum*). Fig. 1. Column, from the side and front. 2. Labellum, from the front, and column, from the back. 3. Labellum and column, from the side.



From Nature by R.D. Fitzgerald, F.L.S. On Stone by Arthur J. Stopps

DENDROBIUM Phalaenopsis

Dendrobium phalænopsis. (Fitzgerald.)

THIS beautiful Dendrobium has been imported by Captain Broomfield, and flowered in his green-house. It is a splendid addition to the charming lilac Dendrobs procured within the last few years from Northern Australia and New Guinea. It is closely allied to *D. bigibbum*, *D. superbiens*, and *D. Goldii*. It is easily distinguished from *D. bigibbum* by the absence of the convex form in the flowers—of the cluster of white glands on the disk of the labellum—of the emarginate termination of the labellum—and the drooping carriage of the flowers; from *D. superbiens* by the broadness of the parts of the perianth, and the sepals not being obtuse or undulate, and the absence of ridges or plates on the labellum, which in *D. superbiens* are similar to those in *D. undulatum*, which *D. superbiens* resembles in all but colour. It is also by no means so robust a plant as *D. superbiens*. *D. Goldii*, of New Guinea, appears from the figure in the "Garden" (Sep. 14, 1878, No. 356)—for I have seen no description—to be unlike it in the form of the labellum, the narrowness of the parts of the perianth, the drooping habit of the flowers, length of spikes, form of the leaves, and banded stems. I have given this finest of the Australian Dendrobs the name of *phalænopsis* from the likeness of its flowers to moths and also its likeness to the genus *Phalænopsis*, the flowers having a strong resemblance to those of that genus. It was obtained in Northern Queensland, and flowers in April. (The plant from which the description was taken has again flowered, producing three hundred flowers.)

DESCRIPTION (*published in the Gardener's Chronicle of 10 July, 1880, Vol. XIV, No. 341.*)

Stems about twenty inches, slightly contracted towards the base. Leaves, about eight or ten on the upper eight inches of the stem, lanceolate, reaching five inches. Racemes at least half the length of the stems, terminal on peduncles of about ten inches. Flowers, about fifteen, on pedicles of about one inch, lilac, two inches to two and a half across. Sepals, lanceolate, acute, one inch long and about five lines broad. Petals obovate, acute, one inch broad. Labellum one inch long, acute, with broad wings meeting over the column-base, forming at the hinge a second spur which reaches half an inch and is curved and compressed at the sides. No calli or plates on the labellum, which is only slightly ridged at the base. Pollen-masses more concave than is general in the genus.

EXPLANATION OF PLATE.

Fig. 1. Flower and buds. 2. Pollen-masses. 3. Labellum and column, from the side. 4. Labellum, from above and from the point. 5. Column, from the side. 6. Labellum, from the front.



From Nature and on Stone by R.D. Fitzgerald FLS

DENDROBIUM Beckleri

Printed at the Surveyor General's Office Sydney N.S.W.
June 1881

Dendrobium Beckleri. (Mueller.)

THERE is some confusion with respect to *Dendrobium Beckleri* (Mueller), *D. Mortii* (Mueller), and *D. Bowmanii* (Bentham), but as specimens I obtained at the Macleay River, and which are referred to in the Flora Australiensis as *D. Mortii*, were considered by Baron Mueller to be *D. Beckleri* as named by him, and as they agree with the description of that species, I am compelled to differ from the "Flora" in attaching the name of *Beckleri* to the figure, which is taken from the plant collected on the Macleay, and from which the flowers were originally sent to Baron Mueller. A leading distinction between this species and *D. Mortii* (of which I believe *D. Bowmanii* is but a synonym) is that *D. Mortii* produces its smaller flowers in pairs, the peduncles being two-flowered. *D. Beckleri* grows occasionally on rocks, but more frequently on the topmost branches of "oaks" (*Casuarina glauca*) which stand in the beds of creeks, or of the densely crowded white-stemmed brush timbers of the "cedar scrubs" on alluvial flats and river banks. Its long straggling branches are often four feet long. Like most of our Dendrobs its flowers are sweet-scented, and are produced in November.

EXPLANATION OF PLATE.

Dendrobium Beckleri. Fig. 1. Labellum, from the back. 2. Labellum, from the front. 3. Column, from the front, with part of perianth, (labellum removed).



From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Stepp.

PTEROSTYLIS

Parviflora Barbata

MUSEUM
1850

Pterostylis parviflora. (*R. Brown.*) Pterostylis barbata. (*Lindley.*)

Pterostylis parviflora has numerous flowers, as in the section in which the labellums are excluded, but in it the labellum is included, and is much smaller in proportion to the size of the flowers than is generally the case—as is also the column. I believe that there is no real distinction between *P. parviflora* and *P. aphylla*. The principal difference between them would, according to the descriptions, appear to be that in the latter the flowers turn towards each other, but I think the distinction is not constant. The specimen from which the figure was taken grew at Bowenfels, but a smaller and greener form (which is I believe *P. aphylla*) is common on the Blue Mountains. Both are sometimes without radical leaves, and at others an offshoot from the base of the flower-stem produces leaves, and in both the flowers are generally turned towards each other, especially in the small green variety. *P. parviflora* flowers in March, and grows in swampy or wet flats on the mountains. I have found it at one place only near Sydney, at Long Bay, near Coogee.

Pterostylis barbata. This species should have been figured with *P. turfosa* of Western Australia rather than with *P. parviflora*, but when the drawing was made I had little expectation of obtaining that species. *P. barbata* has lost, or never developed, sensitiveness in the labellum, and in what way (if any) it assists in the fertilization of the plant I have not been able to discover. It may be that its likeness to an insect is in some way attractive. This is the only Australian species of *Pterostylis* extending into New Zealand, where it is very rare. A solitary plant, which I found on the summit of a hill at Cootamundra, is, I believe, the first procured in New South Wales, though it has been obtained in Victoria, South Australia, Western Australia, and commonly in Tasmania. It flowers in October.

EXPLANATION OF PLATE.

Pterostylis parviflora. Fig. 1. Column, from the front. 2. Top of column, wings removed. 3. Top of column, from the side, one wing removed. 4. Column, from the side. 5. Flower, from the back. 6. Flower, from the front. 7. Labellum, from the side. 8. Flower, torn open, showing proportion of column to perianth. 9. Column and labellum, from the side. 10. Pollen-masses. 11. Flower, from the side.

Pterostylis barbata. Fig. 1. Labellum, from the front. 2. Top of labellum, from the side. 3. Labellum and lower sepals, from the side. 4. Stigma and part of column. 5. Column, from the side. 6. Column, from the front. 7. Column, from the side, one wing removed. 8. Pollen-masses.



From Nature by R.D. Fitzgerald, FLS

On Stone by Arthur J. Stoppel

Arenaria

CALADENIA

Concolor

Caladenia arenaria. (Fitzgerald.) *Caladenia concolor.* (Fitzgerald.)

Caladenia arenaria is the "spider orchid" of the Edwards, Murrumbidgee, Yanko, and Columbo Rivers, where it is to be found growing on the sand-hills among the pines (*Frenela robusta*). It is conspicuous from the large size of the flowers and their grey colour. It flowers in September.

Caladenia concolor I have only obtained from the granite hills near Albury, and it is very remarkable for the darkness and uniformity of colour of the flower and stem. The edges of the labellum are much more acutely divided than in *C. arenaria*, and the column much narrower and simpler in form. It flowers in October.

DESCRIPTION.

Caladenia arenaria. A rather robust species, about one foot high. Leaf, oblong-linear, hairy, about six inches. Flowers, one or two, of a light grey colour. Sepals about three inches long, dilated at the base and tapering into a fine point. Dorsal sepal erect. Petals similar to sepals but shorter, about two inches. Labellum, without lobes, about nine lines long and five broad (on a rather long claw), lanceolate, recurved, the edges for about four-fifths of their length from the point crenate, the points being almost clavate. Calli of the labellum linear, bent forward, in four rows or six rows, near the base. Column about seven lines, curved, winged from above the base of the anther to the ovary. The upper part of the wings broad and undulate. Two small globular glands at the base of the column. Point of the anther short.

Caladenia concolor. A rather robust species, hardly one foot high. The flower and stems of a uniform dark prune colour. At least generally one-flowered, sepals and petals about two inches, dilated at the base and tapering to a fine point. Labellum without lobes, about seven lines long and four broad, lanceolate, recurved, the edges for about four-fifths from the point acutely serrate. Calli of the labellum linear, bent forward in four rows, or near the base six rows. Column slightly curved, winged from below the anther to the base, narrower and of more uniform breadth than in *C. arenaria*. Two large globular glands at the base of the column.

EXPLANATION OF PLATE.

Caladenia arenaria. Fig. 1. Labellum, from the back. 2. Labellum, from the side. 3. Labellum, from the front. 4. Calli of the labellum. 5. Column, from the side. 6. Column, from the back and front. 7 and 8. Pollen-masses. 9. Top of column, from the front.

Caladenia concolor. Fig. 1. Column, from the back. 2. Column, from the front. 3. Labellum, from the back. 4. Labellum, from the side. 5. Labellum, from the front. 6. Calli of the labellum. 7. Column, from the side.



From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Sipple

CALADENIA filamentosa

ACIANTHUS caudatus



Caladenia filamentosa. (R. Brown.) *Acianthus caudatus.* (R. Brown.)

THIS *Caladenia* is easily distinguished from the other "spider orchids" by its having only two rows of flat-topped calli on the labellum, which resemble the soles of stockinged feet. Dr. Woolls sent me specimens from Mudgee, but I have never seen it in New South Wales. In Western Australia it is very common, and has there a peculiarity of growing in clumps which does not belong to members of the genus except those of Western Australia, where many of the orchids spring from roots chained or strung together. This union of many individuals by a connection of their tubers, or rather this production of many united tubers or bulbs from which numerous flower-stems spring, may have originated in the benefit such union would afford in preventing desiccation in a country subject to drought. In the case of this species I have counted forty-two flower-stems which had their bulbs all united together and entangled in one mass. The habit adds much to the beauty of the species which possess it, as the flowers are brought together in pretty bunches. *Caladenia filamentosa* flowers in August.

Acianthus caudatus is figured with *Caladenia filamentosa*, in order to show the distinctions between the two closely allied genera by contrasting the most similar species. *Acianthus caudatus* is a rare orchid in the neighbourhood of Sydney, and appears to be rarer than it is, from the infrequency of its flowering. It is rather a mountain than a coast species, being very common on the Kurrajong and other parts of the Blue Mountains, probably on account of the lower temperature, as it is common in Tasmania. It flowers in August, though its congeners flower in the beginning of the winter (March and April), and it is to be found when near the coast in damp fissures in rocks, but in the mountains in shady forest.

EXPLANATION OF PLATE.

Caladenia filamentosa. Fig. 1. Top of column, from the front. 2. Top of column, from the side, two pollen-masses removed. 3. Labellum, from the front. 4. Labellum, from the back. 5. Pollen-masses. 6. Column, from the side. 7. Column, from the front. 8. Calli of the labellum. 9. Column and labellum, from the side.

Acianthus caudatus. Fig. 1. Flower, from the side. 2. Top of column, valves of the anther turned back, showing pollen-masses. 3. Top of column, from the front and side. 4. Column and labellum, from the front, with part of perianth.



From Nature by R.D. Fitzgerald, F.L.S.

On Stone by Arthur J. Stoppes

DENDROBIUM Moorei

Printed at the Surveyor General's Office Sydney NSW
October 1880.

Dendrobium Moorei. (Mueller.)

THIS pretty Dendrobium, though very like *D. Kingianum* in habit, differs from all other Australian forms in its long nectary or spur and very peculiar petal-like labellum, which, unlike that of other species, is devoid of plates or glands and possessed of pointed lobes on the edges. It was named by Baron Mueller, in honor of C. Moore, Director of the Botanical Gardens, Sydney, from specimens I procured on the mountains at Howe's Island, in 1869, where I again obtained it in 1877. It does not belong to the low grounds of the island (to which it is peculiar), but clings to the precipices in the mountains and the mossy branches of trees which hang over the cliffs. When seen adhering to the black basalt of the chasms, the white waxy flowers, more like white hyacinths than orchids, make a beautiful contrast to the wildness of the scene. In the low grounds it is replaced by *D. gracilicaule*. It flowers in June and July.

EXPLANATION OF PLATE.

Dendrobium Moorei. Fig. 1. Top of column, from the front. 2. Top of column, from the side. 3. Labellum, from the side and front. 4. Flower, from the front (natural size). 5. Flower, from the front. 6. Column, from side and front. 7. Pollen-masses in anther, and pollen-masses.