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ORCHIDACEAE NEOTROPICALES IV

NOTES ON THE GENUS *Caularthron* RAF.

BY

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CAULARTHON was recognized by Rafinesque as a generic concept distinct from *Epidendrum* as early as 1836. It was treated as a special section of *Epidendrum* by Lindley in 1841 under the name *Diacrium*. Section *Diacrium* was raised to generic status by Bentham in 1881. This is the name which has been applied to the genus by most subsequent orchidologists.

Were the genus large or had it become important in horticulture, the resumption of an earlier and unfamiliar name might be unfortunate; and the best procedure might be an attempt to include *Diacrium* amongst the officially conserved generic names. I believe that this procedure should be reserved for names of large genera of great economic or horticultural importance, where the abandonment of a long and well established epithet would lead to extreme confusion. Therefore, I recommend the substitution of *Caularthron* for *Diacrium*.

Our herbaria have not had abundant material of *Caularthron*, nor does the genus appear to have become a wide favorite in horticulture. In great part owing to these circumstances, it has not been so thoroughly understood as we might wish. Recent collections of *Caularthron* in Middle America, northern South America and Trinidad

and Tobago have added somewhat to our knowledge of the range and variability of the genus, but there still remains much to clarify.

In preparing the orchid section for the *Flora of Trinidad and Tobago*, I have had to consider critically the concepts which have been known as *Diacrium bicornutum* and *Diacrium indivisum*. A study of the available herbarium specimens and of the very superior material preserved in alcohol and sent in recently by Dr. Wilbur G. Downs and Dr. T. H. G. Aitken of Port-of-Spain, Trinidad, made it early apparent that the fundamental problems involved could not satisfactorily be handled without an examination of the generic concept as a whole. The present paper embodies the results of that examination.

I wish to thank the officials of the following herbaria for making available material entrusted to their care: Reichenbach Herbarium (in the Naturhistorisches Museum in Vienna); Gray Herbarium; Royal Botanic Gardens at Kew; New York Botanical Garden; United States National Herbarium; Chicago Natural History Museum and Missouri Botanical Garden. Material from these herbaria has supplemented the large collection of *Caularthron* preserved in the Orchid Herbarium of Oakes Ames of the Botanical Museum of Harvard University. It is, furthermore, a pleasure for me to thank Mr. G. C. K. Dunsterville for kind permission to reproduce two carefully executed drawings prepared for his forthcoming book of illustrations of Venezuelan orchids.

When Bentham described *Epidendrum bicornutum* in 1834 on the basis of material from Trinidad, he stated that he had consulted Lindley concerning its generic status, and had received the opinion that it "is certainly a new species; but I think it cannot be separated from *Epidendrum*. The only distinction between it and that Genus consists in the labellum being distinct from the

column: but you will find various degrees of separation between those parts . . ." in several species ". . . which nobody can doubt are genuine *Epidendra* . . . Should you, however, be of opinion that it nevertheless must form a new Genus, its character will have to depend upon the large size of the *petals* and the slight adhesion of the sepals at their base." Seven years later, Lindley erected his subgeneric concept *Diacrium* on the basis of *Epidendrum bicornutum*. Then, in 1881, when he raised *Diacrium* to generic status, Bentham wrote that "the peculiar bicornute labellum, neither adnate to nor parallel with the column, gives the flower a very different aspect from that of true species of *Epidendrum* and can not be included in them without doing violence to the generic character."

Having now at hand material from a wide geographic range—all with certain diagnostic characters which show no variation—I believe that the best interests of orchid classification may be served by keeping the concept distinct on a generic level. It is obviously very closely allied to *Epidendrum*, and some of the differences used to separate it may appear to be superficial. Nevertheless, it would seem that they represent perhaps a definite tangential evolutionary trend which ought to be recognized.

There can be no doubt that *Caularthron* should be used as the name for this generic concept in preference to *Diacrium*. There is a widespread aversion to the acceptance of many names proposed by Rafinesque. But I am sure that most botanists will agree with Merrill (Merrill, E.D. : "Index Rafinesquianus" (1949) 26, 29) that ". . . where a new Rafinesque name was based wholly on a previously described or illustrated species of some other author, all we have to do to understand the application of the Rafinesque name is to determine the status of the originally described form . . . Thus it seems to be a logi-

cal course to follow to continue to select the few sound grains from the overwhelming amount of chaff in the Rafinesque technical botanical papers, even if, occasionally, some more or less universally used generic or specific name might fall before those proposed by Rafinesque at earlier dates."

No greater precision could be desired than that which we find in Rafinesque's description of *Caularthron* as a new genus. He not only published a very adequate description which makes definite references to key morphological characters separating the concept from *Epidendrum*, but, in a day when few botanists even mentioned what we now call types, he named the concept on which he was basing *Caularthron* by citing Hooker's *Epidendrum bicornutum* and referring to its place of publication. The later name for this same generic concept, *Diacrium*, was likewise based on *Epidendrum bicornutum*. The fact that, in second place under his generic description, Rafinesque made the new name *Caularthron umbellatum*, citing as basis for it *Epidendrum stenopetalum* Hook., does not militate against the wisdom or the necessity of accepting as valid his generic name, especially so since his generic description is obviously based on *Epidendrum bicornutum* and not on the very distinct *E. stenopetalum*.

Caularthron Rafinesque Fl. Tellur. 2 (1836 [1837]) 40, *pro parte*.

Epidendrum Linnaeus sect. *Diacrium* Lindley in Hooker Journ. Bot. 3 (1841) 81; Bot. Reg. 31 (1845) Misc. 23; Fol. Orch. (1853) Epidendrum 3; Reichenbach fil. in Walpers Ann. Bot. 6 (1862) 345.

Diacrium (Lindl.) Bentham in Journ. Linn. Soc. 18 (1881) 312; Bentham & Hooker fil. Gen. Plant. 3 (1883) 526; Hemsley Biol. Centr.-Am. Bot. 3 (1883) 221; Warner & Williams, Orch. Alb. 4 (1885) t. 157;

Rolfe in Gard. Chron. 2, ser. 3 (1887) 44; Pfitzer in Engler & Prantl Nat. Pflanzenfam. II, 6 (1888) 146; Veitch, Man. Orch. Plant. 6 (1890) 78; L'Orchidoph. (1891) 378; Rolfe in Lindenia 7 (1891) 19; Cogniaux in Martius Fl. Bras. 3, pt. 5 (1901) 186; Stein, Orchideenb. (1892) 214; Bois, Les Orch. (1893) 74; Kerchove, Livre des Orch. (1894) 264; Linden, Orch. Exot. (1894) 751; Cogniaux in Urban Symb. Antill. 6 (1910) 538; Schlechter, Die Orchideen (1915) 214; Ames ex Standley in Field Mus. Nat. Hist. Publ. 391 (1937) 210; L. O. Williams in Ann. Mo. Bot. Gard. 33 (1946) 378; Hoehne, Icon. Orch. Bras. (1949) 208; P. H. Allen in Orch. Journ. 2 (1953) 185; Ames & Correll in Fieldiana: Bot. 26 (1953) 405; Foldats in An. Univ. Centr. Venez. 34 (1953) 276.

Caularthron may be distinguished from *Epidendrum* on the basis of the characters set forth in the following key.

- A. Labellum vulgo ad columnam variabiliter adnatum et cum ea parallelum, supra numquam protuberantibus elevatis subtus excavatis ornatum. — *Epidendrum*
- Aa. Labellum a columna liberum, a columnae basi angulatim patens, supra protuberantibus duabus elevatis subtus excavatis ornatum — *Caularthron*

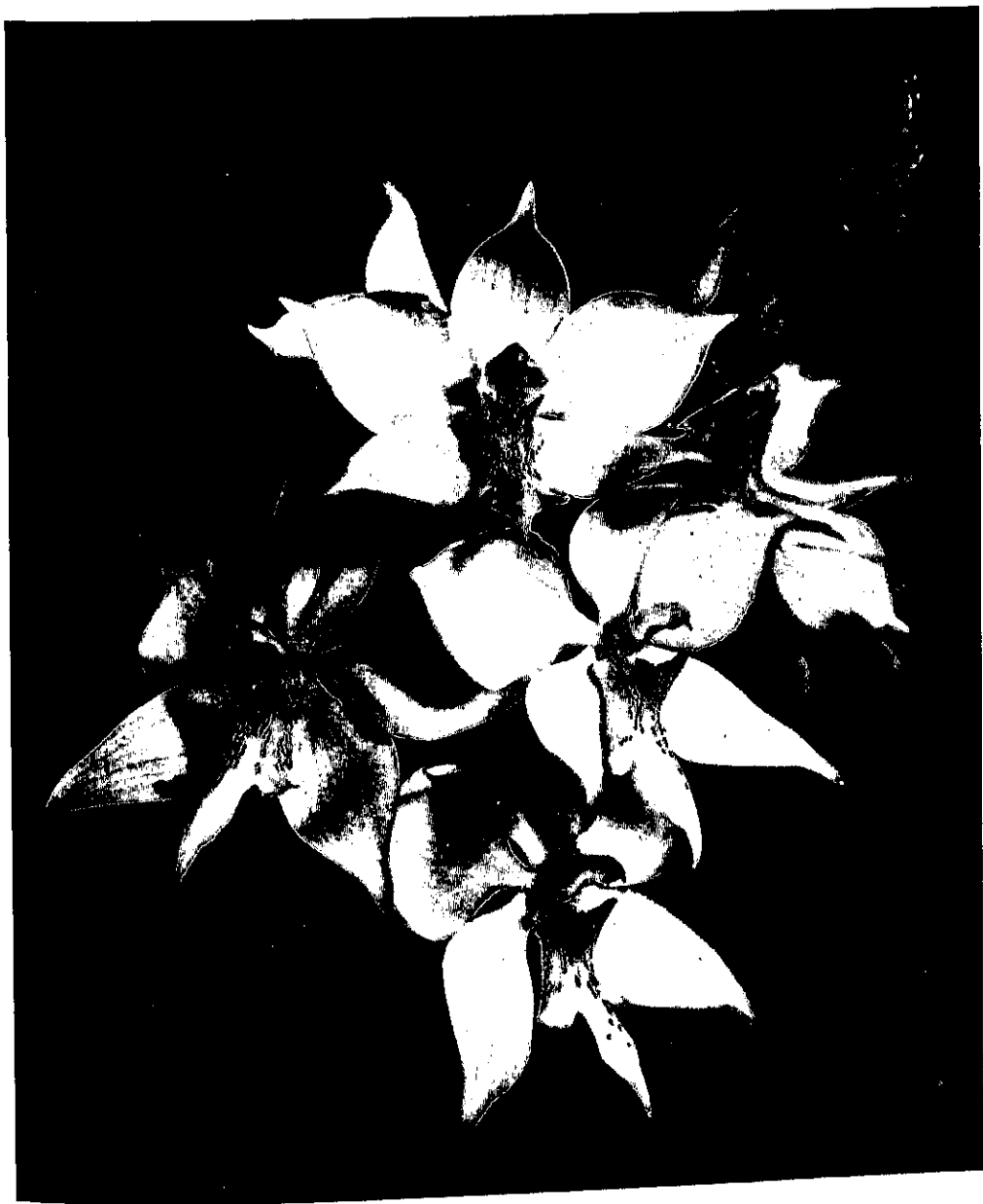
Epiphytic or semi-epiphytic herbs with fleshy pseudobulbose, solid or frequently insect-hollowed stems. Leaves few, borne at apex of pseudobulbs, rigidly sub-carnose-coriaceous. Inflorescence terminal, simple, racemose. Flowers few to numerous, showy, short-pedicellate. Sepals free, spreading, subequal. Petals rather similar to sepals. Lip free and spreading from base of column, 3-lobed; lateral lobes conspicuously tooth-like; mid-lobe triangular or triangular-lanceolate; disk raised between lateral lobes into 2 hollow, often horn-like calluses opening from below to form 2 conspicuous inden-

EXPLANATION OF THE ILLUSTRATION

PLATE XII. CAULARTHON BICORNUTUM (*Hook.*)
Rafinesque. Grown in the greenhouse of F. W.
Hunnewell, Wellesley, Massachusetts.

Photograph by ROSS W. BAKER
Courtesy of American Orchid Society, Inc.

PLATE XII

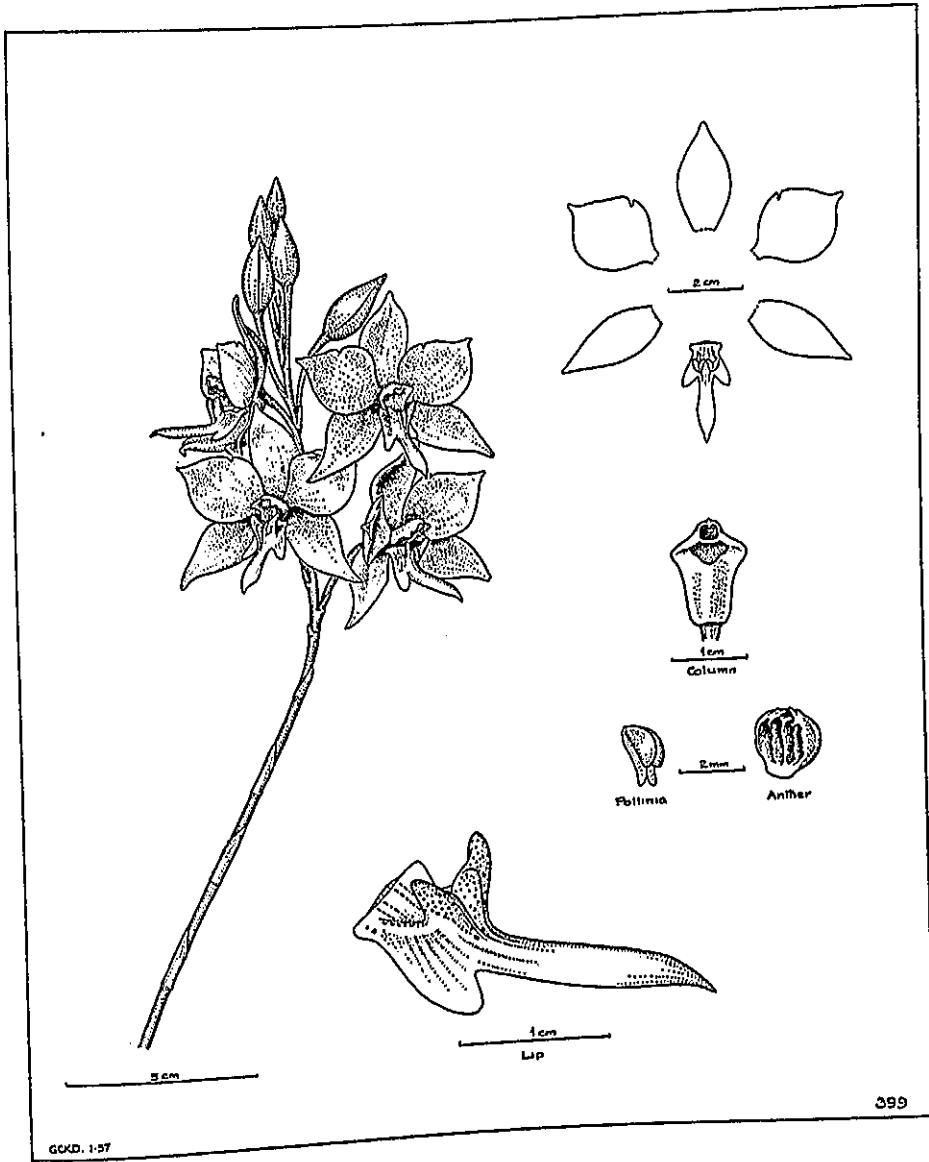


EXPLANATION OF THE ILLUSTRATION

PLATE XIII. CAULARTHON BICORNUTUM (*Hook.*)
Rafinesque. Drawing of *Dunsterville 399* from Ven-
ezuela.

Drawn by G. C. K. DUNSTERVILLE

PLATE XIII



tations or pits on lower surface of lip. Column short, with conspicuous fleshy wings; clinandrium oblique, obtuse. Anther terminal, operculate, incumbent, more or less globose, 2-celled; cells divided longitudinally. Pollinia 4, waxy, each with a granular-viscid appendage. Capsule ellipsoidal.

Caularthron: from the Greek, meaning "jointed stem," undoubtedly in reference to the persistent leaf-bases which lend to the elongated pseudobulbs the appearance of being jointed.

A genus occurring from Guatemala through Middle America, northern South America and Trinidad and Tobago. Two rather variable species are known.

Key to the species of Caularthron

A. Labellum 24-28 mm. longum, profunde trilobatum, lobis usualiter sinu conspicuo separatis; lobo mediano propie lanceolato vel elongato-lanceolato; lobis lateralibus ovato-oblongis. Folia oblonga vel oblongo ligulata, 7-25 (plerumque 12-20) cm. longa \times 1.5-4.2 (plerumque 3-4) cm. lata.

1. *Caularthron bicornutum*

Aa. Labellum 11-14 mm. longum, saepissime inconspicue trilobulatum vel auriculatum vel aliquando subintegrum, lobis usualiter non sinu separatis; lobo mediano propie triangulari-ovato; lobis lateralibus parvis, vulgo auriformibus. Folia ligulato-lanceolata, 7-19 (plerumque 14-15) cm. longa \times 0.8-2.8 (plerumque 1-1.8) cm. lata.

2. *Caularthron bilamellatum*

ORIGINAL DESCRIPTION:

138. *Caularthron* R. (Stem jointed) Diff. *Epidendron*. Label. libero, ad basi alato glanduloso. Col. libera bialata dentata, anthera terminalis 4 pollen. *Caul. articulato, vaginato, bifolio, paucifloro*—Habit very irregular. Types 2 Sp. 1. *Caul. bicornutum*. Epid. do Hook. b. m. 3332. Bulbo cauliformis, fol. rad. ligul. retusis, scapo paucifl. label. trilobo, medio lanc. ac basi bicornae, petalis ellipt. acutis albis. Trinidad . . .

***Caularthron bicornutum* (Hook.) Rafinesque** Fl. Tellur. 2 (1836 [1837]) 41.

Epidendrum bicornutum Hooker in Bot. Mag. (1834) t. 3332.

Diacrium bicornutum (Hook.) Bentham in Journ. Linn. Soc. 18 (1881) 312.

Diacrium amazonicum Schlechter in Beih. Bot. Centralbl. 42, Abt. 2 (1925) 108; Pabst in Arqu. Bot. Est. São Paulo 3 (1955) 125, t. 316.

COMMON NAME: *Virgin Mary*; *Virgin Orchid* (Trinidad and Tobago).

Pseudobulbs long-cylindric, terete, 10–30 cm. long, 2–6 cm. in diameter. Leaves 3–4, thick, oblong, usually quite obtuse to rounded, 6–20 (mostly 15–17) cm. long, 20–50 mm. wide. Flowers few to 20, 5.5–6 cm. wide; pedicel (with ovary) 3–5 cm. long. Sepals broadly ovate-lanceolate, bluntly short-acuminate, 25–32 mm. long, 15–18 mm. wide. Petals ovate, usually clawed, acutish, 22–28 mm. long, 20–23 mm. wide, upper margin usually with a conspicuous notch. Lip fleshy, as long as petals but narrower, deeply 3-lobate, basally with triangular tooth on each side; lateral lobes elliptic-ovate, rounded; mid-lobe oblong, obtuse-acuminate; disk above with 2 erect, triangular, plate-like, obtuse, hollow projections near middle. Column 14–15 mm. long.

The type of *Caularthron bicornutum* was collected in Trinidad by Bradford, who wrote on the label: "This most beautiful species is found in the greatest abundance on the coast and on the adjacent islands at the Boca de Moros, Trinidad.—The rocks and trunks of decaying trees are in some places covered with it. This specimen was gathered on Gaspare Island March 12, 1846 on my return from an expedition to the coast of Venezuela. It flowers especially in the early part of the year from January to April."

The culture of *Caularthron bicornutum* requires a rather warm greenhouse with high humidity (Warner, R. & B. S. Williams: Orch. Alb. 4 (1885) t. 157; Rolfe,

R. A. : Gard. Chron. 2 (1887) 44; *Lindenia* 7 (1891) 19; Linden, L. ; Orch. Exot. (1894) 752). Much difficulty has sometimes been experienced in establishing the plant, as the pseudobulbs, although large and apparently rather tough, seem to damage easily. Once established, it seems to thrive well under cultivation, especially if not disturbed. The most recent article dealing with its culture (Schairer, J. F. : Bull. Am. Orch. Soc. 24 (1955) 106, t. p. 107) states: "Plants are grown potted firmly in brown osmunda. During autumn and winter, when the plants are in active growth, they require a warm spot (night minimum 63° F if possible), high humidity and good light (as much or more than most *Cattleyas*) with plenty of water at the roots, and they appreciate supplemental feeding. At blooming time, they prefer a cooler spot and less light and moisture. They never require a severe rest period after blooming but are kept somewhat dry for a few months before new growth begins. They are native of the West Indies and the Guianas, where they often grow on bare rocks and tree trunks near the sea where they get plenty of moisture and cooling breezes during hot weather. Propagation is by division and they never propagate fast enough to supply the insistent demands of your friends."

Caularthron bicornutum and *C. bilamellatum* occupy rather clearly defined geographic areas: the former is native to South America north of the Amazon River and to Trinidad and Tobago, whereas the latter occurs in Middle America, along the northernmost rim of South America and in Trinidad. It is in Trinidad chiefly that the two species are contingent, but here there appears to be an ecological delimitation of the two species—*Caularthron bicornutum* forms a conspicuous element along and near the sea coast, while *C. bilamellatum* is known only from inland districts.

There are a number of minor morphological characters which serve to distinguish *Caularthron bicornutum* from *C. bilamellatum*. The former is, in general, a much larger and more robust plant than the latter and has flowers approximately twice as large. This difference is variable, and the specimens of *Caularthron bicornutum* from British Guiana are notably smaller in habit and flowers than those from other parts of the range of the species.

Caularthron bicornutum may be recognized at once through its deeply trilobate lip. The mid-lobe is characteristically lanceolate or elongate-lanceolate with the apical portion either long- or short-acuminate. The lateral lobes, which are ovate-oblong and either obtuse or sub-acute, are usually separated from the mid-lobe by a deep sinus. *Caularthron bilamellatum*, on the contrary, usually has an inconspicuously trilobulate or auriculate lip, the mid-lobe of which, characteristically triangular-ovate and acute, is not separated from the small, auriform lateral lobes by a recognizable sinus. To be sure, several collections are known from Trinidad which show a somewhat intermediate lobation of the lip, and here there may be evidence of hybridization. When the available material of these two species from their entire geographic ranges is taken into consideration, however, the significance of the shape of the lip as indicative of a possible evolutionary trend may be appreciated.

A convenient character for separating *Caularthron bicornutum* from *C. bilamellatum*—and a character which seems to have been overlooked—is found in the peculiar notching of the upper margin of the petals of *C. bicornutum*. This margin, which faces the dorsal sepal, usually has one conspicuous notch situated one-third or one-half of the distance from the base of the petal. In some of the specimens, the notch is sharp and triangular; in others, it is less clearly defined. In all cases, however,

the presence of this notch causes the marginal area of the petal to be somewhat ruffled or crumpled. I have very rarely observed anything similar to this condition in *Caularthron bilamellatum*.

In the general shape of the hollow processes or "horn-like calluses" which arise from the disk of the lip and which have been used as the outstanding generic character, there is evident little variability from specimen to specimen, albeit some variation in relative size may be seen. Similarly, there is no significant morphological difference between these processes in *Caularthron bicornutum* and *C. bilamellatum*.

Unlike the concept *Caularthron bilamellatum*, *C. bicornutum* does not have a large synonymy. This is due partly, perhaps, to the greater variability in the former than in the latter species.

In 1925, Schlechter described *Diacrium amazonicum* from material collected in Brazil. The type material of *Diacrium amazonicum* is no longer extant, but a study of the type description convinces me that Schlechter specified no differences which, with the material at hand today, we could not easily accommodate in *Caularthron bicornutum*. Pabst (loc. cit.) determined a specimen (*Frócs 21541*) from the Rio Negro in Amazonian Brazil as representing *Diacrium amazonicum* and published a diagnostic drawing of the floral parts. This drawing likewise shows no character which could serve to distinguish the plant from *Caularthron bicornutum*.

TYPE COLLECTION: Cult. Hort. Wentw[orth], from Trinidad (Herb. Kew).

CULTIVATED: (Herb. Rehb. 898); Hort. Rucker, May 27, 1840 (Herb. Rehb. 899; Herb. Ames 69096a); "from the type plant of Gard. Chron. 1887, pt. 2, p. 45, fig. 11," Hort. Kew, May 1887, *R. A. Rolfe s.n.* (Herb. Kew); Botanic Station, Grenada, W.I. "Originally from Trinidad," April 14, 1906, *W. E. Broadway s.n.* (Herb. Ames 7906, 7907).

BRAZIL: Estado do Amazonas, Manáos, *Spengler s.n.* (Herb. Rehb. 896); Estado do Amazonas, Rio Negro, December 21, 1945, *R. L. Fröes 21541* (Record in Herb. Ames of specimen in Herb. Inst. Agron. Norte).

BRITISH GUIANA: "Flowers white, pink towards the apex, labellum pink with a yellow disk." 1837, *R. Schomburgk 429* (Herb. Kew; Herb. Field Mus. 1025289); Banks of Corentyne River near Crealla, September 1879, *E. F. in Thurn s.n.* (Herb. Kew); Essequibo River, December 1886, *Jenman 3590* (Herb. Kew); *Jenman 7761* (Herb. Kew); Hort. Kew, May 1889 (Herb. Kew); Mount Roraima, Autumn 1894, *J. J. Quelch & F. McConnell 280* (Herb. Kew); *C. F. Appun 657* (Herb. Kew); Cuyuni River, islet at the Akaio Falls. "Epiphyte at about 15 feet; roots in dense clusters. Fl. shallow, cup-shaped, like an *Anthericum*, pedicels mauve. Fl. resupinate. Pts. and sep. pure white, with striations. Stele at base and all labellum spotted with purple. Humps of label. and depression between them and stele yellow, spotted with purple. Label. otherwise white." November 25, 1929, *N. Y. Sandwith 685* (Herb. Kew).

COLOMBIA: Comisaría del Vaupés, Rio Negro, El Castillo (San Felipe). "Flowers white, sepals delicately pink-tinged. Lip yellow, spotted brown. Very fragrant." December 12, 1947, *R. E. Schultes & F. López 9335a* (Herb. Ames 67526, 67527).

TOBAGO: *G. W. Meyer* (?) *s.n.*, December 1879 (Herb. Kew); Roxborough Bay, Military Road, "growing on the stems of logwood tree," February 2, 1879, *G. W. Meyer s.n.* (Herb. Kew); Bacolet, "on rocks and trees near the sea, flowers white with a few purplish spots, very fragrant," January 20, 1910, *W. E. Broadway s.n.* (Herb. Gray 4278); Rockley Vale, "on trees, *Virgin Mary*," February 20, 1913, *W. E. Broadway s.n.* (Herb. Gray 4277; U.S. Nat. Herb. 759445); February 19, 1932, *D. Fairchild 2930* (U.S. Nat. Herb. 1625959; Herb. Ames 69057).

TRINIDAD: *Borroughs s.n.* (?) (Herb. Rehb. 896); *Bradford 1845* (Herb. [Hance 5332] Herb. Kew); Gasparee Island, "on rocks and trees overhanging the sea," December 30, 1906, *W. E. Broadway s.n.* (Herb. Ames 10085, 10086, 10087, 10088, 10089, 68642; Herb. Field Mus. 464601); Maraval, "on rocks and trees," February 3, 1911, *W. E. Broadway s.n.* (Herb. Kew; Herb. Ames 69058); Moruga sea shore, Lance Mettan. "On shrubs, trees and rocks." February 9, 1916, *W. E. Broadway s.n.* (Herb. Trin. 7595; Ames 69924); "On a tree," May 26, 1918, *W. E. Broadway s.n.* (Herb. Ames 22062; Herb. N. Y. Bot. Gard.); Manzanilla, "Flowers white. On a fallen tree," March 9, 1921, *N. L. Britton & E. G. Britton 2173* (Herb. N. Y. Bot. Gard.; U.S. Nat. Herb. 1198102); Little Gasparee, April 4, 1921, *N. L. Britton 2659* (Herb. N. Y. Bot. Gard.); Chacachacare,

January 5, 1922, *W. E. Broadway s.n.* (Herb. Trin. 10566, 2 sheets); Herb. Ames 69925); St. Ann's (Cult.) "wild on rocks and trees along sea shores," March 8, 1923, *W. E. Broadway s.n.* (Herb. Field Mus. 549522); Between Balandra and Toco, "rocks by shore," February 2, 1926, *W. G. Freeman s.n.* (Herb. Trin. 11519); Balandra Bay, "on rocks and low trees near the sea shore. *Virgin Orchid*," February 22, 1931, *W. E. Broadway s.n.* (U.S. Nat. Herb. 1519971; Herb. Mo. Bot. Gard. 1005390); "On trees and rocks, sea shore districts: *Virgin Orchid*," February 23, 1934, *W. E. Broadway s.n.* (Herb. Ames 40385; Herb. Kew); Quinam Bay, St. Patrick, "On trunk of tree, fls. white with faintly speckled throat," January 30, 1946, *L. H. Bailey 121* (Herb. Ames 62541); Chacachacare Island, January 20, 1956 [*Capt. Mendez*] *W. G. Downs & T. H. G. Aitken 15f* (Herb. Ames Alc. Coll. 3187); Sangre Grande, Rio Grande Forest Tree Station, $1\frac{1}{4}$ mile from coast, March 7, 1956, *W. G. Downs & T. H. G. Aitken 15g* (Herb. Ames Alc. Coll. 3188); Chacachacare Island, seacoast, January 14, 1957 [*A. S. Fenwick*] *W. G. Downs & T. H. G. Aitken 15c* (Herb. Ames Alc. Coll. 3204a); Vega de Oropouche, 1 mile from sea, *W. G. Downs & T. H. G. Aitken 15a* (Herb. Ames Alc. Coll. 3206a).

VENEZUELA: [Drawing of a flowering specimen] Carabobo, alt. 2500 ft., 1851 (Herb. Rchb. 890; Herb. Ames 69098); Paria Peninsula, Cariacuita, January 16-21, 1911, *F. E. Bond, T. S. Gillin & S. Brown 40* (Herb. N.Y. Bot. Gard., U.S. Nat. Herb. 1189830); vicinity of Cristóbal Colon, January 5-February 22, 1923, *W. E. Broadway 337* (Herb. Gray 4275; Herb. N.Y. Bot. Gard.; U.S. Nat. Herb. 1187925, 1197666); vicinity of Cristóbal Colon, Avicana, January 5-February 22, 1923, *W. E. Broadway 616* (Herb. Gray 4276; U.S. Nat. Herb. 1197675); April 29, 1941, *H. Pittier s.n.* (Herb. Ames 68209); [Drawing of a flowering specimen] *G. C. K. Dunsterville 399* [*Arrigo R. s.n.*], Puerto Ayacucho (Herb. Garay 6358).

***Caularthron bilamellatum* (Rchb.f.) R. E. Schultes
comb. nov.**

Epidendrum bilamellatum Reichenbach fil. in Walpers
Ann. Bot. 6 (1862) 345.

Epidendrum bigibberosum Reichenbach fil. loc. cit. 8
(1862) 346.

Epidendrum indivisum Bradford ex Grisebach Fl. Brit.
W. Ind. Isl. (1864) 614.

Diacrium bigibberosum (Rchb.f.) Hemsley in Godman
& Salvin Biol. Centr.-Am., Bot. 3 (1883) 222.

Diacrium bilamellatum (Rchb.f.) Hemsley in Godman & Salvin loc. cit. 222.

Diacrium indivisum (Bradf. ex Griseb.) Broadway in Bull. Misc. Inform. Trinidad 2 (1895) 79.

Diacrium bicornutum (Hook.) Benth var. *indivisum* (Bradf. ex Griseb.) Cogniaux in Martius Fl. Bras. 3, pt. 5 (1898) 188.

Diacrium venezuelanum Schlechter in Fedde Repert. Sp. Nov. Beih. 6 (1919) 41.

Diacrium bilamellatum (Rchb.f.) Hemsley var. *Reichenbachianum* Schlechter loc. cit. 17 (1922) 47, *in textu*.

Diacrium bivalvatum Schlechter loc. cit. 19 (1923) 123.

Pseudobulbs subcylindric to long-fusiform, terete, 5-23 cm. long, up to 4 cm. in diameter. Leaves 2-3, ligulate-lanceolate to linear-oblong, obtuse, 5-22 cm. (mostly more or less 15) cm. long, 6-25 mm. wide. Inflorescence erect, up to 15 cm. long. Flowers white or white tinged with pink or lavender, few to numerous, up to about 3 cm. wide; pedicel stout, (with ovary) 1.5-2.5 cm. long. Bracts triangular, cucullate, acute, up to 5.5 mm. long. Sepals concave, elliptic-ovate, acute or sometimes subobtuse and apiculate; dorsal sepal 12-17.5 mm. long, 6 mm. wide; lateral sepals 10-16 mm. long, 6-8 mm. wide. Petals short-clawed, elliptic-obovate to broadly obovate, acute or subobtuse, 10-16 mm. long, 6-9 mm. wide. Lip fleshy, as long as petals, subentire to more or less 3-lobulate; lateral lobes small and auriculate, sometimes only tooth-like, usually without a sinus; mid-lobe triangular-ovate, apically short- or long-acute; disk above with 2 large, erect, triangular, plate-like, obtuse, hollow projections. Column 8-11 mm. long. Capsule up to 2.8 cm. long.

The type of *Epidendrum bilamellatum* was collected in "Caracas" (referring probably to a very extensive area

EXPLANATION OF THE ILLUSTRATION

PLATE XIV. CAULARTHRON BILAMELLATUM (*Rehb. f.*)
R. E. Schultes. 1, flowering and fruiting plant, one
third natural size. 2, flower, approximately natural
size. 3, column and lip, side view, almost twice
natural size.

Drawn by GORDON W. DILLON

PLATE XIV



in Venezuela and not specifically to the city), Venezuela, by Wager and is preserved in the Reichenbach Herbarium on sheet No. 891. This sheet, which is labelled "*Epid. bicornutum*" has, pasted on a card attached to the sheet, three flowers from *Fendler 2436*, collected near Colonia Tovar in Venezuela in 1856-1857. This Fendler material, representing *Caularthron bilamellatum*, has been given the number of Herb. Reichenbach 891a in order to distinguish it from the type or Wager collection. There are also, pasted on the sheet with the type, two labels indicating that the collection was made by Linden in "Nouvelle Granade," but since the original handwritten label is obviously the correct one, we must assume that, as so often happened, the printed Linden labels were glued to the sheet at a subsequent date and undoubtedly in error.

An examination of the type material of *Epidendrum bigibberosum* (Herb. Reichenbach 893, 894) and of Reichenbach's diagnostic sketches of the floral parts fails to uncover a single character which might serve to distinguish this collection from the type of *E. bilamellatum*. In his original description of the concept *Epidendrum bigibberosum*, Reichenbach likewise failed to point out any differences. We, therefore, must reduce *Epidendrum bigibberosum* to synonymy under *Caularthron bilamellatum*.

For some time, I have been undecided as to what the concept which has been known as *Diacrium indivisum* (*Epidendrum indivisum*) really represented. Bradford drew up a description based on one of his Trinidad collections, and this was published as *Epidendrum indivisum* by Grisebach. It was transferred to *Diacrium* by Broadway in 1895. Cogniaux maintained that the concept represented a variety of *Diacrium bicornutum* and made the necessary nomenclatural adjustment. In 1956, I pub-

lished a note indicating my belief that there seemed to be sufficient morphological evidence to maintain it [*Diacrium indivisum*] as specifically distinct from the only other Trinidad representative of the genus. Subsequently, when Dr. Wilbur G. Downs sent me from Trinidad photographs and additional material of the two concepts of *Caularthron* known to grow on the island, I began to realize that a revision of the genus *Diacrium* was necessary before a clear understanding of the Trinidad material could be expected.

The type specimen of *Epidendrum indivisum* is preserved at Kew, together with Bradford's handwritten description of the concept. The type bears the annotation "Herb. Hance 5334." On the same sheet with the type there are pasted two inflorescences from plants collected in Trinidad and flowered at Kew in May 1889. Rolfe has annotated this collection as "*Epidendrum bicornutum* var. cleistogamic flowers = *D. indivisum*."

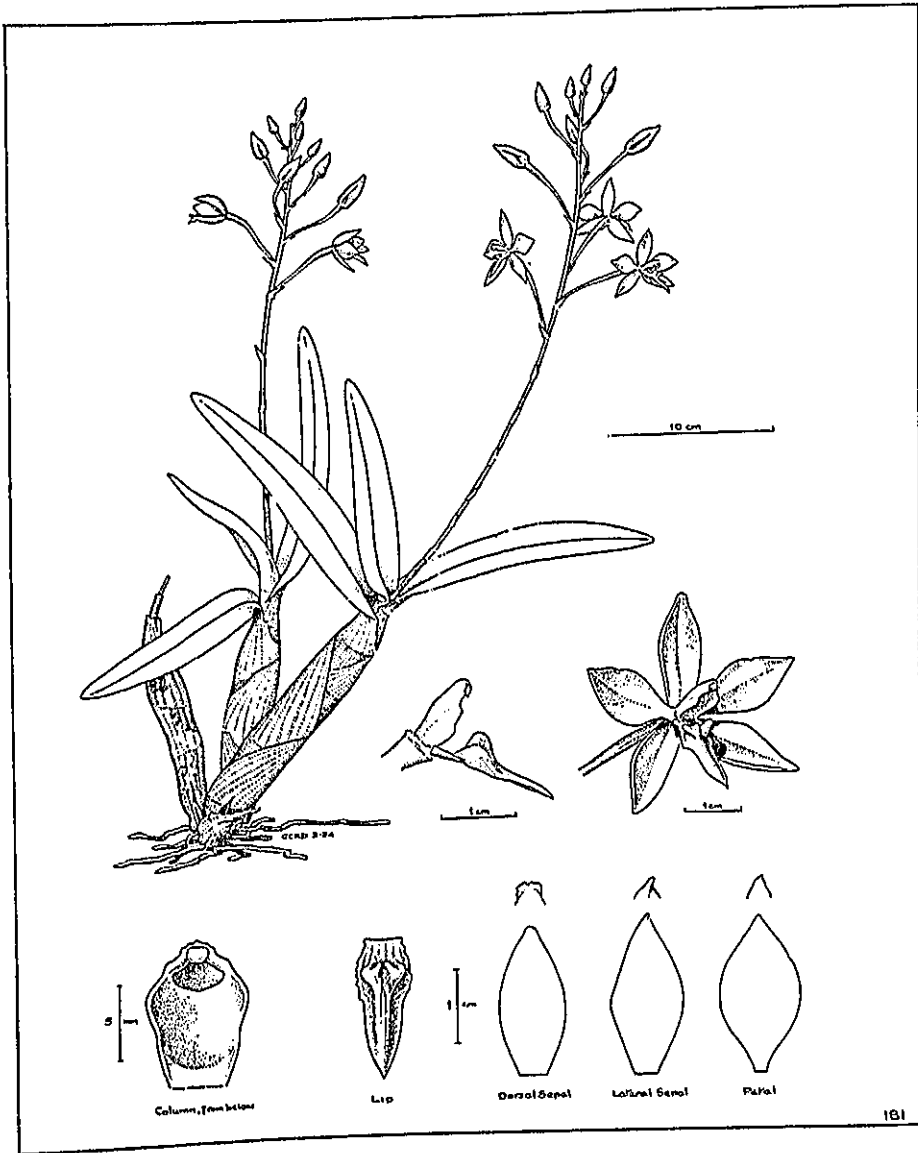
According to Bradford's manuscript description, the type has an undivided lip. In the published description, the lip of the type was stated to be "undivided or minutely auricled above the base." The apical part of the lip was described as "acuminatum" in the manuscript and "subulate-lanceolate" in Grisebach's *Flora*. Unfortunately, the type has, at the present time, only two buds and one imperfect flower. We know from later material, however, that, in Trinidad, this concept is often cleistogamous. It is possible that the type flowers may have been peloric. At least, we do know from the material now available from Trinidad that the lip is very rarely entire but is most often laterally auriculate at the base or inconspicuously bilobulate. In this, as in other respects, the concept does not depart from *Caularthron bilamellatum*, of which it is, consequently, here designated as a synonym.

EXPLANATION OF THE ILLUSTRATION

PLATE XV. CAULARTHRON BILAMELLATUM (*Rehb. f.*)
R. E. Schultes. Drawing of *Dunsterville 181* from
Venezuela.

Drawn by G. C. K. DUNSTERVILLE

PLATE XV



Schlechter's *Diacrium venezuelanum*, a record of the type of which is preserved in the Ames Herbarium, shows no character which cannot fall easily within the variability of *Caularthron bilamellatum*. *Diacrium bivalvatulum*, likewise, presents, according to Schlechter's original description, no differences of sufficient importance for the maintenance of it as a distinct species. *Diacrium venezuelanum* and *D. bivalvatulum* are, therefore, placed in synonymy under *Caularthron bilamellatum*.

TYPE COLLECTION: Venezuela, "Caracas," *Wagner s.n.* (Herb. Rchb. 891; Herb. Ames 69055).

COLOMBIA: 1842, *Sinclair s.n.* (Herb. Kew).

BRITISH HONDURAS: *W. A. Schipp S-482* (Herb. Ames 40443).

COSTA RICA: [Drawing of a flowering specimen and diagnosis of flower] Punta Arenas, February 1909, *A. & C. Brade 1265* (TYPE of *D. bivalvatulum*); Provincia de Alajuela, El Coyolar, alt. about 240 m. "On tree; bulbs elongate, full of ants." April 1-3, 1924, *P. C. Standley 39932* (Herb. Ames 29865); Golfo Dulce, Playa Blanca, sea level, February 25, 1933, *M. Valerio 553* (Herb. Field Mus. 893155).

GUATEMALA: Cult. Hort. Shiller, from Guatemala, *Skinner 1458* (TYPE of *E. bigibberosum*, Herb. Rchb. 893, 894; Herb. Ames 24081, 69091); Montufor Flats, February 27, 1939, *M. W. Lewis 217* (Herb. Ames 69926); Departamento de Izabál, between Milla 49.5 and Cristina, alt. 65-70 m. "On limbs of tree along wooded margins of prairie. Pseudobulb terete, pale green. Leaves thick, coriaceous, rich olive-green. Stem olive-green with purple suffused above and at nodes. Pedicels purplish. Buds orchid-colored. 3 outer sepals delicate orchid without, white within. 2 petals white. Lip white on upper petal and stigma and white on beak with pale orchid color along edge or the column with more lavender." *J. A. Steyermark 38389* (Herb. Field Mus. 1043049); Departamento de Izabál, Bay of Santo Tomás, between Escobas and Santo Tomás, alt. sea level to 2 m. April 13, 1940, *J. A. Steyermark 39341* (Herb. Field Mus. 1041145; Herb. Ames 63752); Departamento de Izabál, shores of Lago Izabál, opposite San Felipe; between San Felipe and mouth of Río Juan Vicente, alt. 50 m. April 19, 1940, *J. A. Steyermark 39692* (Herb. Field Mus. 1085306).

PANAMA: Santa Rita Trail, February 27, 1905, *J. F. Cowell 160* (Herb. N.Y. Bot. Gard.); Cultivated from Canal Zone, Culebra, alt. 50-100 m., April 8, 1911, *H. Pittier 3406* (Herb. Ames 21797); Paitiño, southern Darien, "on cliffs along the beach," February 13, 1912, *H. Pittier 5706* (Herb. N.Y. Bot. Gard.; U.S. Nat. Herb.

715996); Canal Zone, Balboa. "Never flowers a full spray. It is necessary to pick a flower at a time as they show." [rec'd] May 4, 1923, *C. W. Powell* 67 (Herb. Ames 23965, 23966, 69927; Herb. Ames Alc. Coll. 438; Herb. Mo. Bot. Gard. 955922); Canal Zone, Fort Sherman, January 15, 1924, *P. C. Standley* 31231 (U.S. Nat. Herb. 1225409); Provincia de Panamá, between Matías Hernández and Juan Díaz, January 21, 1924, *P. C. Standley* 31944 (U.S. Nat. Herb. 1225418); Provincia de Panamá, swamp between El Jagua Hunting Club on Río Jagua and El Congor Hill, alt. 2 m., February 10, 1935, *A. A. Hunter & P. H. Allen* 473 (Herb. Ames 42248); Pearl Islands, Trapiche Island, March 15, 1937, *G. S. Miller* 1908 (U.S. Nat. Herb. 1688731); Pearl Islands, San José Island, March 16, 1937, *G. S. Miller* 1909 (U.S. Nat. Herb. 1688746) Isla Colon, April 1, 1940, *H. von Wedel* s.n. (Herb. Mo. Bot. Gard. 1227010); Provincia de Bocas del Toro, vicinity of Chiriqui Lagoon, Old Bank Island, "flowers purplish," February 15, 1941, *H. von Wedel* 2100 (Herb. Ames 61580; U.S. Nat. Herb. 1868094); Perlas Archipelago, Gulf of Panamá, San José Island (mouth of Mata Puerco), about 55 miles southeast of Balboa, April 12, 1945, *I. M. Johnston* 703 (Herb. Ames 64953).

TRINIDAD: Cult. Hort. Trin. from "Inland Districts" *J. H. H[art]* s.n. (Herb. Trin. 5512); Inland Woods, 1896, *J. H. H[art]* s.n. (Herb. Trin. 5983; Herb. Kew; Herb. Ames 66910, 68215); *Bradford* s.n. [Herb. Hance 5334] (TYPE of *E. indivisum*, Herb. Kew); Cult. Hort. Kew from Trinidad, May 1889 (Herb. Kew); Government House Grounds, June 3, 1907, *W. E. Broadway* s.n. (Herb. Ames 10736); Government House Grounds. "Flowers white," June 22, 1907, *W. E. Broadway* s.n. (Herb. Ames 10727); Erin, March 27, 1908, *W. E. Broadway* s.n. (Herb. Ames 10640); Santa Cruz, February 23, 1912, *W. E. Broadway* s.n. (Herb. Kew; Herb. Mo. Bot. Gard. 918485); St. Augustine, Imperial College of Tropical Agriculture, April 15, 1949, *N. W. Simmonds* 351 (Herb. Trin. 14488; Herb. Ames 66981); St. Augustine, 6 miles from sea, *W. G. Downs & T. H. G. Aitken* 15b (Herb. Ames Alc. Coll. 3205a); Caigual, about 4 miles from coast, January 24, 1955, *W. G. Downs & T. H. G. Aitken* 15e (Herb. Ames 67831, 67788); Plain Road, 3-4 miles from sea, January 14, 1957, *W. G. Downs & T. H. G. Aitken* 15d (Herb. Ames Alc. Coll. 3208a).

VENEZUELA: Near Colonia Tovar, 1856-1857, *A. Fendler* 2436 (Herb. Rchb. 391a; Herb. Kew; Herb. Gray 4077); [Drawing of flowering specimen and floral diagnosis] Cult. Hort. K. W. John, flowered June 1904, from Venezuela (TYPE of *D. venezuelanum*, Herb. Ames 69928); Between Valencia and Maracay, January 31, 1918, *H. Pittier* 7748 (U.S. Nat. Herb. 987846); Rastrojos, near Cabudare, Lara, Decem-

ber 1923, *J. Saer* 116 (U.S. Nat. Herb. 1193211); June 1939, *V. Barnes* 5923 (Herb. Ames 58216).

EXCLUDED OR UNCERTAIN CONCEPTS

Diacrium bidentatum (Lindl.) Hemsley in Godman & Salvin Biol. Centr.-Am., Bot. 3 (1883) 221.

Epidendrum bidentatum Lindley Gen. and Sp. Orch. Pl. (1831) 98.

The type of *Epidendrum bidentatum* is preserved in the British Museum. Study of a photograph of the type and diagnostic sketches in the Ames Herbarium indicates that this concept cannot be referred to *Caularthron*, but that, without a doubt, it represents, as has previously been suggested (Williams, L. O. in *Ceiba* 2 (1951) 174), *Epidendrum Boothianum* Ldl.

Diacrium Ulmckei Kränzlin Mitteil. Inst. Allg. Bot. Hamb. 6 (1927) 419.

This concept was described on the basis of material which flowered in the Hamburg Botanical Garden. The plant had presumably been collected in Guatemala. Since the Hamburg Herbarium has apparently disappeared, we are unable to trace a type, if indeed an herbarium specimen were ever preserved there when the concept was described. After an examination of the description, I rather doubt that the concept can be accommodated in the genus *Caularthron*.