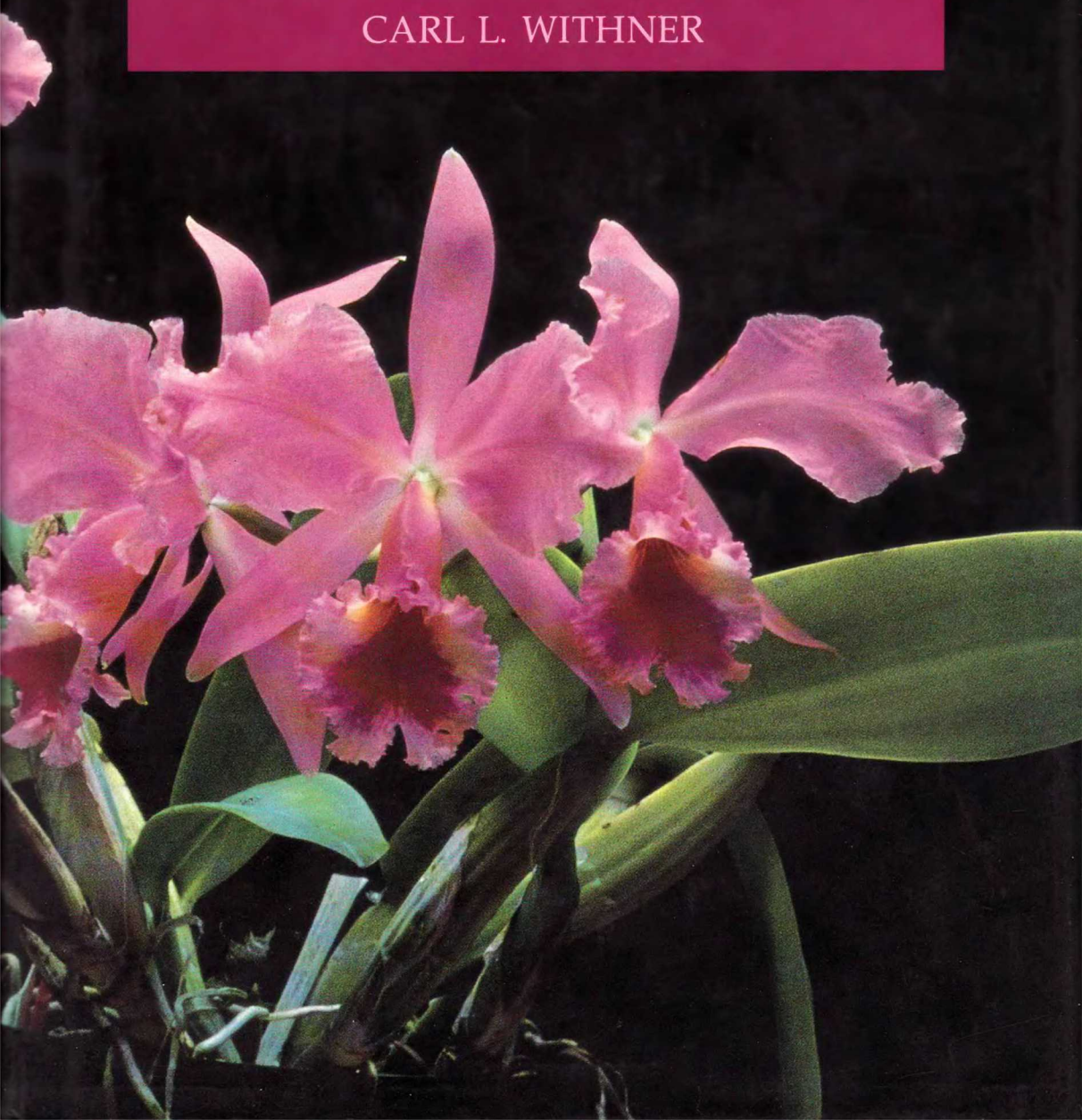
A book in six parts

THE CATTLEYAS AND THEIR RELATIVES

Volume I. The Cattleyas

CARL L. WITHNER



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A book in six parts
by
CARL L. WITHNER

TIMBER PRESS
Portland, Oregon

Reprinted 1995, 2002

ISBN 0-88192-099-1

Printed in Hong Kong through Colocraft Ltd.

TIMBER PRESS, INC.
The Haseltine Building
133 S.W. Second Avenue, Suite 450
Portland, Oregon 97204, U.S.A.

Library of Congress Cataloging-in-Publication Data

Withner, Carl L. (Carl Leslie)
The Cattleyas and their relatives / Carl L. Withner.
p. cm.
Bibliography: p.
Includes index.
Contents: v. 1. The Cattleyas.
ISBN 0-88192-099-1 (v. 1)
1. Orchids. 2. Cattleyas. 3. Orchid culture. 4. Orchids—Latin America. 5. Botany—Latin America. I. Title.
SB409.W793 1988 88-8560
635 9'3415—dc19 CIP

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Preface

For many years I had thought about writing a book on the cattleyas and including information about their close relatives. I first had the idea years ago when Gordon Dillon asked me to write a series of articles on various genera for the *American Orchid Society Bulletin.* I started, but the demands of graduate school constantly interfered. My advisors did not want me to work on orchids: they would take too much time, and anyway, what was there to do! I completed four articles, including one on cattleyas, however, and did continue a number of experiments with cattleya seedlings *in vitro,* and green-podding, that I had started before the war and my service in the Army. My interest in the Cattleya Alliance has always been intense and I continue with it today.

After I began teaching at Brooklyn College in 1948 and, in addition, was associated with the Orchid Collection of the Brooklyn Botanic Garden, my interest in species of all kinds increased. But I always came back to the cattleyas and their relatives as special favorites.

Through the early days of the American Orchid Society judgings and shows in New York I came to know an unusual and highly talented orchidophile, Helen Adams. She had a fine collection of all the early color plate books, had removed the *Cattleya* and *Laelia* plates, mostly from broken bindings, and filed them alphabetically by species, preserving the associated texts so that eventually the books could be rebound. Since she was much interested in hybridizing and in orchid history, Helen also sought out accounts about all the old natural hybrids in the literature, as well as stories about various color varieties of the species reproduced in the plates, so that they could be properly identified with more modern terminology. One aspect of her work culminated in the first judging handbook of the American Orchid Society; it also developed into a series of lessons to teach judges more about judging of cattleyas. The research also led to an association with Prof. Edgar Anderson of the Missouri Botanical Garden, and the article, *Conspectus of Hybridization,* which they published together in 1958 in *Evolution.*

I was much interested in introgressive hybridization, a concept originally developed by Anderson, and as a result of Helen's interest we studied intensively all of the *Cattleya* species and their variants, depending heavily upon her wonderful file of pictures. Using this material, we gave a paper in London at the Third World Orchid Conference emphasizing introgression and how it could help account for interrelationships among the cattleyas and their relatives. Most of that data on the individual species is still not published, but the work certainly reinforced my long interest and knowledge of the group.

I also made periodic visits, in those days and over the years to Lager and Hurrell in Summit, N.J. and eagerly anticipated every one. John Lager was an early A.O.S. judge, grew many species; had a fascinating range with the first large hillside greenhouse I'd ever seen; and knew all the early hybrid growers and their histories. His father had originally been a collector for Sander until he opened his own business in New Jersey. Each visit meant an exciting review of the greenhouses; intense discussions and ideas about hybridizing; hashing over problems with shows and judging various hybrids; and fascinating introduction to newly imported species. John often had interesting stories to tell, and we all were so pleased when Valentino Sarra photographed him for the Calvert "Man of Distinction" series of advertisements. He was truly such a person, and he certainly increased my orchid "know-how" by leaps and bounds as he enthusiastically shared his knowledge.

In 1962 I was awarded a Guggenheim Fellowship to travel and study cattleyas in South America which was, theoretically, to result in a book. Much material and information was acquired during my travels, but no book was then forthcoming, only some notes in *Orchidata* and two travel articles in the *Florida Orchidist.* Eventually I was called upon to write a series on the cattleyas for the new Italian Orchid Society journal, *L'Orchidea,* which were translated from English by my good friend Mario Dalla Rosa. They were ultimately collated and published as a book, *Le Cattleye,* for the members of that Society.

After speaking with Richard Abel, the spark at Timber Press in Portland, Oregon, who is prejudiced toward authoritative and encyclopedic treatments of various plant groups, the present book was conceived. Not only would the cattleyas be treated to combine botanical and horticultural examination, but their relatives should likewise be included, and I was to be the lucky author. This seemed a monumental task, and it is; but when broken down into five or six component parts, the individual sections do not seem such an awesome undertaking. By starting with the cattleyas, about which I had already written for other purposes, and about which I know the most, the work has gone reasonably well. My real problems lie ahead as I try to arrange species still debated by taxonomists, and with which I have not always had as much direct experience, into a meaningful whole. To wait until the work is completed would put off the publishing many years, and produce a book of great expense that most people could not afford or would not buy. We hope by publishing it in sections as completed, that the parts will all be individually affordable, and the reader may acquire the parts which interest him or her if the complete series is not wanted.

As the book is envisioned at present the parts will be as follows:

Volume I	*Cattleya*
Volume II	*Laelia*
Volume III	*Schomburgkia,* monotypic and small genera and Caribbean *Encyclia* and *Psychilis*
Volume IV	Central American and Mexican *Encyclia*
Volume V	*Encyclia* of Brazil and the Guianas
Volume VI	Andean *Encyclia* and index.

Encyclia remains a problem for me, and for this book I intend to use that genus only in the original narrow sense of Hooker (1828) based on *Encyclia patens.* More familiar species today would be *Encyclia tampensis, E. alata, E. cordigera,* etc. To cover *all* the species of *Encyclia* as that concept is currently used in a broader sense (*sensu latu*) would be impossible for the scope of this book.

In addition to the descriptions of the species, it is planned that occasional introductory chapters in each part will cast further light on the complex of species being described. I intend to deal, when material is available, with evolutionary relationships, comparative anatomy, flower color and pigmentation, geography and distributions affected by geologic history, vegetative structures or fragrances and pollinators in addition to cultural information that will help us grow better orchids and at the same time put correct labels on our plants. I think, at this point, of Holtum's remark that you can't understand a genus until you understand all the species in it—and there is still so much to know about the cattleyas and their relatives! Much of orchid history and not a little of the personalities of some of the individuals is implicit in all of the species and varieties involved. I have tried to include vignettes whenever possible to make for more interesting reading and to embellish the bare bones of plant sizes and flower colors.

There is the perennial problem of how to write or print the various plant names, and in this connection I have made certain decisions. For species and natural hybrids from the wild I have used italics, and lower case letter for the species or hybrid epithet even when a proper name is involved. I know that not capitalizing proper names will win me no accolades from some sources, but it is an acceptable option under the International Rules of Nomenclature. It does prevent confusion with older Latinized grex names that *must* be written with a capital letter whether they are proper nouns or not. Further, I have not used an "X" designating hybrids as, I believe, the text will make clear the nature of the plants involved. The Latinizing of proper names also causes some difficulties, and under such species as *Cattleya schroderae, trianaei* and *walkeriana* some of the difficulties are discussed.

The greatest problems arise with varietal epithets. These designations are almost without exception really cultivar or clonal epithets, as they were and are individual plants selected in cultivation from various introductions. They are not varieties in the botanical sense of being some sort of subspecies population. Today we would capitalize such varietal names and place them in single quotes to indicate clearly that they apply strictly to a single clone. But last century these plants were described as though they were botanical varieties. And therein lies the problem! To confuse the issue

even further, more than one clone of a given "variety" has in some cases been discovered, but such plants often have not been given separate cultivar names or fourth epithets to distinguish them. However, some did receive such epithets, for instance, *Cattleya mossiae* var. *reineckiana* 'Exquisita', to distinguish *this reineckiana* from others. In such instances *reineckiana* is used more as a varietal epithet, even though it is not a botanical variety but a particular color pattern. Accordingly, it is no longer a clonal designation as such. By the same token the "alba" term presents a whole spectrum of problems, many albas of certain species having been found, though the name was originally applied as a clonal designation.

Well, I have accepted some varietal names as actual cultivar names, while others have been used as varietal names when more than one such form has received the name. Actually, since few of the older "varieties" have remained in cultivation down to the present, this discussion becomes a bit academic, but names do provide specific information when they are written certain ways. I have attempted to use names as accurately as possible and still stay within the modern rules of nomenclature. There will always be those who do not agree with what I have done, but I will say now that the text has been my full responsibility.

My great thanks and appreciation for very patient and detailed word processing of the various drafts of the manuscript go to Annette Guenard; and to Prof. Thomas Horn of Western Washington University goes my appreciation for his expertise with the details of Latin grammar. Dr. Jack Fowlie and Red and Trudi Marsh have been generous in lending me slides of species "hard-to-find" in illustrations or in flower in the greenhouse. I also have slides from Chris Ellis, Hugh Henry, Ken Girard, Irene Kothuber and Paul Gripp. Dr. Lesie Garay and Dr. Ruben Sauleda have helped me answer many technical questions; and I have had the facilities at Harvard University, Kew, the Reichenbach and other herbaria generously made available to me. And finally, I would like to thank a host of orchid growers who have talked into the "small " hours time and again, encouraging me to go ahead with this project.

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June 30, 1987

CHAPTER 1

General Characteristics of the Genus

In 1824 Dr. John Lindley, the famous orchidologist, dedicated the genus *Cattleya* to William Cattley of Barnet, England. Cattley was a liberal patron of horticulture; an enthusiastic collector of rare plants; and had assembled one of the first collections of orchids in England. His collection formed the nucleus of the Royal Exotic Nursery which, in turn, became James Veitch and Sons, a company that contributed immeasurably to orchid history and modern orchid cultivation. *Cattleya labiata* had been found in the Organ Mountains, about 60 miles (100 km.) north of Rio de Janeiro, in 1818, and was brought in to cultivation by William Swainson. As other species were discovered, the cattleyas became the mainstay of orchid cultivation. Their flamboyant appearance and exotic beauty contributed to the popularity of the orchid family as plants of no other genus have done. Now, more than 150 years later, the cattleya is still Queen of the orchid world.

The cattleyas are plants with strong, woody, somewhat creeping rhizomes that send out each growing season a flush or two of roots and a new stem (now to be called a ramicaul) which forms the pseudobulb. The pseudobulb may be spindle-shaped, club-like, or long and narrow and scarcely thickened, and is surmounted by one, two or more leaves. The inflorescence is terminal, though in one or two species the flowers are produced on a separate growth lacking leaves. The flower buds may be enclosed in one or two large sheaths that protect and support the flowers as they develop. Lower leaves are modified into green sheaths which eventually dry, become white and membranous and subsequently peel away.

Cattleya as a genus was distinguished by Lindley because of the large sized flowers that separate it from *Epidendrum* and the lip of the flower which has not fused to the column, a marked characteristic of true epidendrums. *Cattleya* shares four pollinia with *Epidendrum,* a characteristic which was later used to distinguish between these two genera and *Laelia,* and other related genera, with eight pollinia.

Cattleya sepals and lateral petals are generally of the same color while the lip petal is much elaborated. The lip varies from having no lateral lobes, taking a circular or oval form, to having distinct lateral lobes producing a tripartite shape. Veining patterns, superimposed upon distinct color patterns, which help distinguish one species from another, usually extend from the base of the lip to spread over the lateral lobes or the expanded midlobe. The flowers are not callused as in the flowers of many other orchid genera. The veinings and "eye" patterns on the midlobes are apparently sufficient for guiding insect pollinators in nature, though most of the flowers also produce a sweet fragrance, especially in warm sunlight. The lip lies parallel to the column, with its lateral lobes or enfolding edges enclosing the column to produce a tube leading past the anther and stigma to a nectary where lip and column join. A stylar canal which can be observed if the column is hemisected, carries the pollen tubes from the stigma to the ovules in the ovary. A small flap of tissue, the rostellum, is found between the sticky stigma surface and the anther, obstructing contact between pollen and the stigma, and thereby preventing self pollination under ordinary conditions. In *Cattleya aurantiaca,* particularly in certain cleistogamous clones, the rostellum may dry up, leading to premature pollination, even though the flower bud has never opened. The four pollinia, each of which is possessed of a short tail, the caudicle, are located under the cells of the anther cap.

When a bee forces and penetrates the tubular space beneath the column to reach and sample the nectar, some of the stigmatic fluid rubs onto the insect's back. Then, as the insect retreats from the nectary, the pollinia are lifted off, attached to its back by the caudicles which stick in the fluid. The pollinia are thus in an appropriate position to pollinate the next flower visited. A cattleya seed pod may require 9–10 months, or even longer, to ripen and can produce three million seeds if fully fertile. As we know from green-podding of seeds, the embryos are already present three or four months after pollination. Even after five months there is little further change in seed development. They await the ripening process itself and the subsequent splitting of the pod.

There are at least three classes of pigments present in cattleya flowers, either collectively or separately. The typical blue-mauve-pink-lavender-purple-magenta-red colors are water soluble vacuolar pigments called anthocyanins (flavonoids). They are usually present in the sepals and petals in combinations of two or three types together; though, in lips, with greater intensity of color, there are usually one or two additional anthocyanins. These substances may be co-pigmented with light yellow flavonoids which influence the final color, as can the pH of the vacuolar contents. The second category of pigments includes the yellows and oranges which are carotenoid derivatives. They are fat soluble substances and may form either in the chromoplastids or in the chloroplasts. Lastly, the greens of chorophyll are also present in the chloroplasts. Bronze and brown colorations result from anthocyanins and carotenoids combined with the green from chlorophyll. Clear, pale greens result from carotenoids plus chlorophyll while darker jade-like greens derive from chlorophyll alone. Muddy colors are produced when some anthocyanins are present in surface layers over the greens or yellows in internal cells of sepals and petals.

Pigmentation patterns are very complex, and little is truly understood about their inheritance in hybrids. The investigator must first account for the presence or absence of each type of pigment and then their possible combinations. Then he must determine whether they are located only in the flower parts or also in the vegetative parts of the plants. In addition, the complications of intensifier or inhibitor genes and whether or not the pigment is present only in the epidermis or distributed throughout the tissues must be determined.

Individual plants of most cattleya species have been discovered which naturally lack one or more of the normally dominant color genes. These genetic variations are the grower's good fortune for they give us the alba or semialba forms which lack pigments, or the albescent or xanthotic types with alternate colorations. More unusual color variations from chance gene changes can produce the blue or mauve coerulea types. Currently, the splash petaled and picoteed peloric varieties with the lip pigmentation pattern duplicated on the lateral petals are popular. Such peloric variations are more common in some species than in others, and some have been found more than once in the same species. All these different combinations are appreciated and cherished for their genetic qualities that have enabled us to produce hybrids of the most desired colors. About the only unsuccessful patterns were the "double flowered" cattleya crosses produced by Reychler in the 1920s. Such flowers may have had as many as 10–12 petals and no lip at all!

Red colorations are highly prized today. They usually result from the yellow and orange carotenoids combined with the redder anthocyanins. But breeding true red colors without magenta tints is still difficult and fundamentally seems a matter of luck in any given cross. The presence of red pigments in leaves and roots may parallel the floral pigments or be completely different compounds with no relation to flower color. Leaf pigments, therefore, *may* signal darker colored flowers, or they may not; but certainly such pigments will not usually be present in alba flowered clones.

CHAPTER 2

The Problems of Classification

Cattleya is one genus of orchids, among others of horticultural interest, with which this book is concerned, in the so called *Cattleya* Alliance of the subtribe Epidendrinae. The closest relatives are in the genera *Laelia* and *Schomburgkia.* Other closely related genera are *Rhyncholaelia, Brassavola, Encyclia, Sophronitis* and *Caularthron.* There are a number of smaller, sometimes monotypic genera, such as *Constantia, Neocogniauxia, Sophronitella, Alamania, Pseudolaelia, Broughtonia, Quisqueya, Laeliopsis* or *Cattleyopsis,* etc., all of which will be discussed in turn. A listing of the genera according to their geographic distributions is to be found in Table I.

The common diploid chromosome number of the alliance, for those species already determined, is generally 40. This common chromosome number makes many intergeneric hybrid combinations possible. The wealth of hybrids already produced, both in nature and in cultivation, further attests to the genetic intercompatibility of the plants from these genera.

The natural barriers which generally separate species in the wild are accordingly geographic, temporal or mechanical, not genetic. We now have, in cultivation, grex populations in the *Cattleya* alliance derived from species of as many as five genera. Natural polyploidy is not uncommon in the alliance nor is variation in color patterns, and these qualities have, of course, all additionally been used to produce many of the superior clones of species or hybrids we know today. Table II lists the various intergeneric combinations currently registered (April, 1988) with the Royal Horticultural Society.

Classification of the cattleyas has been a matter of much debate over the years, with certain species having been either moved into or out of the genus according to the orchidologist doing the classifying. By the same token some varieties have been given species status by some authors and not by others. The genus *Cattleya* has conventionally been subdivided into monofoliate and bifoliate subgroups which have in turn been subdivided

again into smaller subtaxa. Some authors (Pabst and Dungs) prefer "alliance" as a way of designating these subgeneric groupings of close relatives, while others follow a more formal and conventional system employing sections or series. Rolfe's system (1895), really the first, classified the species into "groups".

As in many orchid or other subgenera, some groups of species are obviously more closely related than others, while other species may stand alone without any closely related forms. Botanical classification systems theoretically endeavor to indicate these group relationships within the genus as well as the gaps between those species which stand at a distance from others. To varying degrees, they are successful. Since most writings on *Cattleya* have been concerned with Brazilian cattleyas, to the exclusion of other South American or the Central American species, the classification schemes developed are usually incomplete for the genus as a whole. Such classifications can be found in the more recent books by Fowlie or Pabst and Dungs, and the older account by Cogniaux in Martius. Their classification systems are summarized in Table III.

The third edition of Schlecter's *Die Orchideen* by Brieger, Maatsch and Senghas provides a complete system of *Cattleya* classification and is presented here in Table IV together with the earlier system of Rolfe.

All these classification systems are artificial though practical, and should be approached accordingly. The various subgroupings do show the close morphological relationships based on floral anatomy and vegetative habits (both useful distinctions in *Cattleya* classification schemes) shared by the grouped species. But, none of the systems are arranged specifically to account for the evolutionary development nor phylogeny of the species involved—natural systems. In fact, this may never be possible to more than a hypothetical degree, such as Mrs. Adams and I discussed in our paper on introgression in 1960. Rather, the taxa are conveniently subdivided into groups, species, and then into varieties or forms, as each author sees fit.

Botanical problems immediately arise in deciding between species and varietal status for any given plant or group of plants. As a consequence, the subjective judgments by the author of any classification scheme become apparent.

The concept of a species is, by definition in modern biology, an interbreeding population of organisms in the wild which can reproduce its kind in perpetuity. Usually, also, members of a species occupy a distinct geographic area, and live and reproduce in a specific habitat with well-defined ecological parameters. The species concept is thus a fairly theoretical or abstract idea about a group of plants we can more or less recognize. In classification systems we give that group a name and place it most logically in a genus with other related species. At the same time, we realize that a species consists of living, dynamic, changing entities which mutate, interbreed, segregate, sometimes become polyploid, overlap with one another in qualities and characteristics and survive or die in adapting to various environmental changes. Biologists also agree that present species have developed from those that existed in the past. If we could only figure out how all these lineages were related, a near perfect classification scheme for any genus or family could be proposed. Based on the comparative anatomy of the flowers and plants, as well as their physiological and

genetic characteristics, we can observe or deduce some of the necessary information. To that degree, then, our present classification schemes can reflect what went on in nature.

In the Orchidaceae the conventional species concept is often difficult to understand and apply. A given species population ordinarily is kept separate from other species populations by genetic incompatibilities, different flowering seasons, geographical isolation, or the mechanics and specifics of insect pollinations and flower configuration. We know that the barriers which separate most orchid species populations in nature are not the usual genetic ones evolved in most other kinds of plants. Thus, for example, where *Cattleya* species and their relatives overlap in their geographic distributions, the plants may eventually produce fertile natural hybrids.

Adams and Anderson in 1958 list 26 natural hybrids for *Cattleya* with an additional 238 primary hybrids produced in cultivation. More must be added to such lists today. We can see that although the species isolating mechanisms work most of the time in nature, they are not perfect, particularly when genetic incompatibility is not a factor. Therefore the question of varietal versus species status of certain cattleyas becomes mainly concerned with geographical distribution and how heavily one may wish to use it as a major criterion in establishing taxonomic rank. Since orchids are presumed by botanists to have recently entered an explosive phase of rapid evolution (at least before modern man came upon the scene destroying forests and other ecological niches) location has a strong role to play in distinguishing one species from another. Also, if most orchid species are still "young", so to say, they will not have had an opportunity to spread, particularly in areas of mountains or valleys, or continental formations that easily provide distribution barriers. That idea of endemism will be much followed in this book, and Table V represents my viewpoint on *Cattleya* classification as nearly as I can put it down on paper.

Systematists will find differences with previous systems in the subgeneric taxa. Besides geography and vegetative habit, I used both pigmentation and details of the flower anatomy, particularly of the lip, in arriving at the subgeneric divisions. Flower pigmentation systems have evolutionary significance, even though we may not understand their role, and should be considered in any overall scheme for the cattleyas. And the lip of the flower, with its uniquely close association with the column, is critical for pollinator and successful pollination, and is thus essential for the perpetuation of the species. The lip outlines are presented in the drawings on page 22, and a key to the subgeneric taxa is to be found in Table VI. Table VII provides the necessary Latin to make the publication of this scheme "official" so far as botanical nomenclature is concerned.

In presenting this material the author hopes to provide not only a better view of the internal relationships within the genus *Cattleya,* always considering these species from an evolutionary or a developmental point of view. The characters are where you find them, and they add up for me to a reticulate evolutionary scheme such as Mrs. Adams and I presented in our paper to the World Orchid Conference in London. Such reticulation, we thought, could most likely have come about through ancient hybridization, followed then by segregations and inbreeding of localized clones to

produce eventually new species.

Most are agreed that *C. dormaniana* in the *Laelioidea* is somehow a primitive member of the genus, the only species with remains of a more primitive orchid number of eight pollinia (see Dressler), the balance of the species of *Cattleya* having four. The lip structure of *dormaniana* shows an affinity through *C. forbesii* with the *Intermedia* alliance of the species. It also shows a relationship with that group by another characteristic: having petals narrower than the sepals, seldom wider unless there has been some gene flow from wider petaled labiate species. This narrow petaled feature of the *Intermedia* flowers is also shared by other multifoliate species in the genus besides *dormaniana.* The plants characteristically have two or three leaves per stem, and the stems are unthickened, tough and stringy. As is stated above, the characters are where you find them! The lips of both *Laelioidea* and *Intermedia* show bold elongated lateral lobes with rounded tips; lateral lobes that are each larger in area than the midlobe; and the sinuses between the lateral lobes and the midlobes are distinct and narrow so that the midlobes have little or no isthmus connecting them with the base of the lip and they can even overlap the midlobe. The midlobes are either rounded or slightly indented at their tips, and the heavy central vein of the lip, with its two heavy lateral veins, may usually be traced easily to the apex.

Having a small sinus to separate off the midlobe clearly, even though it may not have an isthmus, is already a step beyond the "labiate" type of *Cattleya* (subgenus) flowers with their large rolled lips that enclose the column without more than a notch or indentation in the lip outline to indicate the lateral lobes. The lack of indentation in the lip outline is an "Andean" characteristic mostly continued into the species of Central America. But, in the *Stellata* it is also found in *C. araguaiensis* of Brazil together with monofoliate growth. The *Stellata* all have a distinct winged column.

The presence of the sinus, together with spots, unthickened stems and multiple leaves is more of a "Brazilian" coastal syndrome, and so provides interesting grounds for speculation. How did it arise? From what ancestral stock is it derived? Why are the Andean cattleyas characterized by one leaf instead of two or more? Why are they without lip lobing? Most botanists agree that loss of or specialization of plant parts indicates a more "advanced" status, while retention of "original" condition indicates a more primitive quality.

Two further degrees of specialization in lip notching may be observed. In the *Falcata* complex the sinus becomes progressively deeper, making the isthmus definitely narrower and elongated to at least a third of the lip in length. In these forms the lateral lobes are accordingly reduced in size but remain relatively large in area, though most are no more than equal to the midlobe in size. The midlobes, and often the tips of the lateral lobes, may be covered with small granules or papillae, and the lateral lobes have distinctly pointed apices, in contrast to the rounded tips mentioned above. The other line of specialization increases the sinus to such a point that the lateral lobes are much reduced in size and cannot begin to cover the column completely. This is a quality of the *Aclandia* subgroup with their pencil-thin ramicauls on the one hand, and the stubby bulbous-stemmed

Rhizantha on the other.

The *Schomburgkoidea,* with the exception of *C. bicolor,* have flowers with moderately developed sinuses, pointed lateral lobes, broad though short isthmi and a fanning out of the central veins to match the crenations of the lip edges. The lateral lobes of *bicolor* flowers are so reduced in size as to be mere points, but their broad isthmus and midlobe configuration clearly point to their affinities. Why this species and the two of the *Rhizantha* should have exposed columns is probably significant if we could figure it out. The petals of *Schomburgkoidea* tend to point up (are not horizontally oriented), have coarsely waved margins, and the flowers mostly appear on elongated inflorescences. The plants show a general affinity for sunny bright environments, and three of them, at least, can be propagated from stem sections. Three leaves per growth are usual. For what it may be worth evolutionarily, *Cattleya violacea* in this group has the widest distribution of all the cattleyas in the genus. Does that mean it is also one of the oldest? Or, has it just been more successful?

Within the *Cattleya* (subgenus), the *Stellata* and the *Circumvolva,* spotting of the flowers does not exist as in the above groups, nor is green pigmentation in the flowers a common quality. The petals are usually broader than the sepals and of a lighter substance. The pigmentation systems, carotenoid *vs.* anthocyanin, yellow or purple, are noted by the sectional epithets. The lip midlobes are larger and more elaborately developed and pigmented than in the other subgenera. The plants of *Cattleya* well deserve their labiate (lip) designation as the midlobe elaboration is indeed an outstanding feature of the flowers.

Research on pollinators and their evolution may occasionally provide an explanation of the development of these different systems. Certainly we know that flowering plant families and insects evolved together, each dependent on the other. Coupling pollinator adaptations with the other comparative points described gives us a basis then for an overall classification scheme that is related, we hope, to evolutionary events.

Natural hybrids within the genus *Cattleya* are described under the various parental species involved. When the natural hybrid is of intergeneric origin, it will be discussed, as appropriate, under the non-cattleya species, when its turn comes. In this book 50 species of *Cattleya* are described, two of distinctly hybrid origins; and there is the possibility of the count being 51 if *C. tigrina* (see under *C. guttata*) is considered a separate entity.

TABLE I

Genera of the *Cattleya* Alliance according to their location

South American Genera

Constantia	*Pseudolaelia*
Lanium	*Sophronitella*
Leptotes	*Sophronitis*
Pinelia	*Renata*

Central American and Mexican Genera

Alamania	*Homolopetalum*
Artorima	*Hormidium*
Barkeria	*Microepidendrum*
Caularthron	*Nageliella*
Dressleriella	*Rhyncholaelia*
Hagsatera	

Caribbean Genera

Basiphyllaea	*Laeliopsis*
Broughtonia	*Neocogniauxia*
Cattleyopsis	*Psychilis*
Caularthron	*Quisqueya*
Domingoa	*Tetramicra*

Generalized Distribution

Brassavola
Cattleya
Encyclia
Laelia
Schomburgkia

TABLE II

Intergeneric Combinations with *Cattleya*
Registered through April, 1988
With Approved Abbreviations

CATTLEYA

× *Barkeria*	= *Cattkeria (Cka.)*
× *Barkeria* × *Laelia*	= *Laeliocattkeria (Lcka.)*
× *Brassavola*	= *Brassocattleya (Bc.)*
× *Brassavola* × *Broughtonia*	= *Stellamizutaara (Stlma.)*
× *Brassavola* × *Broughtonia* × *Epidendrum* × *Laelia*	= *Hattoriara (Hatt.)*
× *Brassavola* × *Broughtonia* × *Laelia*	= *Otaara (Otr.)*
× *Brassavola* × *Broughtonia* × *Laelia* × *Sophronitis*	= *Hasegawaara (Hasgw.)*
× *Brassavola* × *Diacrium*	= *Hookerara (Hook.)*
× *Brassavola* × *Diacrium* × *Laelia*	= *Iwanagara (Iwan.)*

× *Brassavola* × *Dominga* × *Epidendrum* = *Kawamotoara (Kwmta.)*

× *Brassavola* × *Epidendrum* = *Vaughnara (Vnra.)*

× *Brassavola* × *Epidendrum* × *Laelia* = *Yamadara (Yam.)*

× *Brassavola* × *Epidendrum* × *Laelia* × *Schomburgkia* = *Yahiroara (Yhra.)*

× *Brassavola* × *Epidendrum* × *Laelia* × *Sophronitis* = *Rothara (Roth.)*

× *Brassavola* × *Laelia* = *Brassolaeliocattleya (Blc.)*

× *Brassavola* × *Laelia* × *Schomburgkia* = *Recchara (Recc.)*

× *Brassavola* × *Laelia* × *Schomburgkia* × *Sophronitis* = *Fergusonara (Ferg.)*

× *Brassavola* × *Laelia* × *Sophronitis* = *Potinara (Pot.)*

× *Brassavola* × *Laeliopsis* = *Fujiwarara (Fjw.)*

× *Brassavola* × *Schomburgkia* = *Dekensara (Dek.)*

× *Brassavola* × *Sophronitis* = *Rolfeara (Rolf.)*

× *Broughtonia* = *Cattleytonia (Ctna.)*

× *Broughtonia* × *Cattleyopsis* = *Vejvarutara (Vja.)*

× *Broughtonia* × *Diacrium* = *Brownara (Bwna.)*

× *Broughtonia* × *Epidendrum* = *Epicatonia (Epctna.)*

× *Broughtonia* × *Epidendrum* × *Laelia* = *Jewellara (Jwa.)*

× *Broughtonia* × *Epidendrum* × *Laelia* × *Sophronitis* = *Buiara (Bui.)*

× *Broughtonia* × *Epidendrum* × *Schomburgkia* = *Wilburchangara (Wbchg.)*

× *Broughtonia* × *Laelia* = *Laeliocatonia (Lctna.)*

× *Broughtonia* × *Laelia* × *Sophronitis* = *Hawkinsara (Hknsa.)*

× *Broughtonia* × *Laeliopsis* = *Osmentara (Osmnt.)*

× *Broughtonia* × *Schomburgkia* = *Schombocatonia (Smbcna.)*

× *Broughtonia* × *Sophronitis* = *Bishopara (Bish.)*

× *Cattleyopsis* = *Opsiscattleya (Opsct.)*

× *Cattleyopsis* × *Epidendrum* = *Hawkesara (Hwkra.)*

× *Diacrium* = *Diacattleya (Diaca.)*

× *Diacrium* × *Epidendrum* = *Tuckerara (Tuck.)*

× *Diacrium* × *Epidendrum* × *Laelia* = *Allenara (Alna.)*

× *Diacrium* × *Laelia* = *Dialaeliocattleya (Dialc.)*

× *Diacrium* × *Laelia* × *Sophronitis*	= *Higashiara (Hgsh.)*
× *Diacrium* × *Schomburgkia*	= *Mizutara (Miz.)*
× *Domingoa* × *Epidendrum*	= *Arizara (Ariz.)*
× *Epidendrum*	= *Epicattleya (Epc.)*
× *Epidendrum* × *Laelia*	= *Epilaeliocattleya (Eplc.)*
× *Epidendrum* × *Laelia* × *Schomburgkia*	= *Northenara (Nrna.)*
× *Epidendrum* × *Laelia* × *Schomburgkia* × *Sophronitis*	= *Izumiara (Izma.)*
× *Epidendrum* × *Laelia* × *Sophronitis*	= *Kirchara (Kir.)*
× *Epidendrum* × *Laeliopsis*	= *Maymoirara (Mymra.)*
× *Epidendrum* × *Schomburgkia*	= *Scullyara (Scu.)*
× *Epidendrum* × *Sophronitis*	= *Stacyara (Stac.)*
× *Laelia*	= *Laeliocattleya (Lc.)*
× *Laelia* × *Schomburgkia*	= *Lyonara (Lyon.)*
× *Laelia* × *Schomburgkia* × *Sophronitis*	= *Herbertara (Hbtr.)*
× *Laelia* × *Sophronitis*	= *Sophrolaeliocattleya (Slc.)*
× *Laeliopsis*	= *Laeliopleya (Lpya.)*
× *Leptotes*	= *Cattotes (Ctts.)*
× *Schomburgkia*	= *Schombocattleya (Smbc.)*
× *Sobralia*	= *Sobraleya*
× *Sophronitis*	= *Sophrocattleya (Sc.)*

Note that certain horticulturally important names, such as *Diacrium* and *Brassavola*, for *Caularthron* and *Rhyncholaelia* respectively, are conserved by the RHS in registering grex names. In other words, there are other species of true *Brassavola* in addition to *Rhyncholaelia*. *Epidendrum*, in like fashion, may refer to true epidendrums or to those we now call *Encyclia*, or by some other generic epithet, names not used in hybrid combinations.

TABLE III

Outlines of *Cattleya* Classification Schemes Based Only On The Species Found in Brazil

From Cogniaux in Martius' *Flora Brasiliensis* (1898)

Genus *Cattleya*
- Section *Gymnochila*
  - Subsection *Rhizanthemum—walkeriana, nobilior*
  - Subsection *Acranthemum—aclandiae, dolosa, schroederiana, bicolor, velutina*
- Section *Cryptochila*
  - Subsection *Diphyllae*
    - Series *Guttatae—guttata, granulosa, porphyroglossa, elatior, soraria, tigrina, patrocinii, brasiliensis, leopoldii, amethystoglossa, victoria-regina, whitei, elongata, schilleriana*
    - Series *Intermediae—violacea, loddigesii, harrisoniana, intermedia, brymeriana, brownii, isabella, forbesii, dormaniana*
  - Subsection *Monophyllae—labiata, eldorado, lawrenceana, luteola*

From Pabst and Dungs in *Orchidaceae Brasilienses* (1975)

Genus *Cattleya*
- *C. walkeriana* alliance—*nobilior, walkeriana*
- *C. aclandiae* alliance—*aclandiae, bicolor, grossi, measuresiana, velutina*
- *C. granulosa* alliance—*elongata, granulosa, porphyroglossa*
- *C. guttata* alliance—*amethystoglossa, dormaniana, guttata, leopoldii, schilleriana*
- *C. intermedia* alliance—*brownii, elatior, forbesii, harrisoniana, intermedia, loddigesii, violacea*
- *C. labiata* alliance—*araguaiensis, eldorado, labiata, lawrenceana, luteola*

From Fowlie in *The Brazilian Bifoliate Cattleyas and Their Color Varieties* (1977)

Genus *Cattleya*
- Section *Laelioidea—dormaniana*
- Section *Gymnochila—velutina, bicolor, aclandiae, schilleriana, violacea, walkeriana, nobilior*
- Section *Cryptochila*
  - Subsection *Granulosae—granulosa, schofeldiana, porphyroglossa*
  - Subsection *Guttatae—elongata, amethystoglossa, leopoldii, guttata*
  - Subsection *Intermediae—intermedia, forbesii, loddigesii, harrisoniana*

TABLE IV

Outlines of *Cattleya* classification schemes for all cattleya species

Outline from R. A. Rolfe in the *Orchid Review* (1895)

Group of *C. guttata*—*guttata, elatior, porphyroglossa, granulosa, leopoldii, amethystoglossa, elongata, schilleriana*

Group of *C. intermedia*—*superba, intermedia, dormaniana, forbesii, loddigesii, harrisoniana, brownii*

Group of *C. walkeriana*—*dolosa, walkeriana, nobilior, schroederiana, aclandiae, velutina, bicolor*

Group of *C. skinneri*—*skinneri, hennisiana, bowringiana, aurantiaca*

Group of *C. labiata*—*labiata, warneri, gaskelliana, trianae, schroederae, mendelii, mossiae, percivaliana, lueddemanniana, warscewiczii, maxima, dowiana, eldorado, rex, iricolor, luteola*

Group of *C. citrina*—*citrina*

Outline from Brieger, Maatsch and Senghas in Schlechter's *Die Orchideen* (Third Edition, 1981)

Subgenus *Skinneri*

- Section *Skinneri*—*bowringiana, skinneri, deckeri, patini*
- Section *Aurantiaca*—*aurantiaca,* × *pachecoi*

Subgenus *Diphyllae*

- Section *Intermedia*—*loddigesii* (subspecies *loddigesii, harrisoniana, purpurea), kerrii, intermedia, forbesii, dormaniana, araguaiensis*
- Section *Guttatae*—*amethystoglossa, violacea, granulosa, schofeldiana, schilleriana, guttata, leopoldii* (subspecies *leopoldii pernambucensis*), *elongata*
- Section *Arcranthemum*—*aclandiae, velutina, bicolor, tetraploidea*

Subgenus *Rhizanthemum*—*walkeriana, nobilior*

Subgenus *Cattleya*—*rex, maxima, iricolor, chocoensis, trianae, warscewiczii, dowiana* (subspecies *aurea*), *mendelii, schroederae, eldorado, percivaliana, mossiae, lueddemanniana, gaskelliana, jenmanii, labiata, warneri, lawrenceana, luteola*

TABLE V

List of *Cattleya* Species Arranged into Subgenus and Section by the Author

Cattleya
- *Laelioidea—dormaniana*
- *Rhizantha—walkeriana, nobilior*
- *Cattleya*
  - *Cattleya—eldorado, gaskelliana, jemanii, labiata, lawrenceana, lueddemanniana, mendelii, mossiae, percivaliana, quadricolor, schroderae, trianaei, warneri, warscewiczii*
  - *Xantheae—aurea, dowiana, rex*
  - *Maximae—maxima*
- *Stellata—araguaiensis, iricolor, luteola, mooreana*
- *Circumvola*
  - *Aurantiacae—aurantica*
  - *Moradae—bowringiana, deckeri, skinneri*
- *Aclandia—aclandiae, velutina*
- *Intermedia—dolosa, forbesii, harrisoniana, intermedia, kerrii, loddigesii*
- *Schomburgkoidea—bicolor, elongata, tenuis, violacea*
- *Falcata*
  - *Guttatae—amethystoglossa, guttata, leopoldii, schilleriana*
  - *Granulosae—granulosa, porphyroglossa, schofeldiana*

TABLE VI

Key to Subgenera and Sections of *Cattleya* by the Author

1. Pollinia 6–8 though some are smaller ..... *Laelioidea*
1. Pollinia 4 ..... go to 2
2. Plants stubby, rhizomatous ..... *Rhizantha*
2. Plants upright, clustered stems ..... go to 3
3. Plants unifoliate ..... go to 4
3. Plants usually with more than one leaf, at least on mature growths ..... go to 7
4. Flowers "labiate"—large and broad petaled ..... *Cattleya,* go to 5
4. Flowers more starry, smaller, non-"labiate" ..... *Stellata*
5. Flowers purple or lavender ..... go to 6
5. Flowers yellow with red lips ..... *Xantheae*
6. Lip with central yellow stripe ..... *Maximae*
6. Lip without central yellow stripe ..... *Cattleya*
7. Lip without lateral lobes ..... *C. bicolor (Schomburgkoidea)*
7. Lip with lateral lobes even though they may be set off by only a shallow notch or no indentation at all ..... go to 8
8. Lips with the notch small or no indentation, flowers not spotted ..... *Circumvolva,* go to 9
8. Lips with lateral lobes marked by sinuses so that a definate isthmus to the midlobe is formed, flowers usually spotted to some degree ..... go to 10
9. Flowers purple ..... *Moradae*
9. Flowers yellow or orange ..... *Aurantiacae*
10. Lateral lobes rounded, each smaller than the midlobe ..... *Aclandia*
10. Lateral lobes broad and shouldered, each not smaller than the midlobe ..... go to 11
11. Lateral lobes rounded at tip ..... *Intermedia*
11. Lateral lobes pointed at tips (or lacking in *C. bicolor*) ..... go to 12
12. Isthmus wide, about half the width of the midlobe ..... *Schomburgkoidea*
12. Isthmus narrow, one third or less the width of the midlobe ..... *Falcata,* go to 13
13. Isthmus one third or less of the lip length ..... *Guttatae*
13. Isthmus more than one third of the lip length .... *Granulosae*

TABLE VII

Latin diagnoses for the *Cattleya* classification system presented in this book.

Laelioidea (Fowlie). Withner. Subgen. based on *C. dormaniana* (Rchb.f.) Rchb.f. *Pollinia quatro superiora perfecta, quatro inferiora parva et imperfecta.*

Rhizantha (Cogniaux) Withner. Subgen. based on *C. walkeriana* Gardner. *Rhizoma repens, elongata; psuedobulbis crassis, ovatis vel fusiformibus; inflorescentia basilaris.*

Cattleya Lindley. Subgen. based on *C. labiata* Lindley. *Flores grandi; labello late ovato-oblongo, margine undulato-crispo, indiviso; psuedobulbis apice monophyllis.*

Cattleya Lindley. Sect. based on *C. labiata* Lindley. *Flores roseo-violacei vel purpureo-lilacini.*

Xantheae Withner. Sect. based on *C. dowiana* Bateman. *Flores luteoli vel aurei.*

Maximae Withner. Sect. based on *C. maxima* Lindley. *Labelli florum cum linea centrali lutea.*

Stellata Withner. Subgen. based on *C. luteola* Lindley. *Flores plus minusve stellati, parvi usque ad medium; labello vix indiviso; plantae monophyllae.*

Circumvolva Withner. Subgen. based on *C. skinneri* Bateman. *Plantae diphyllae; pseudobulbis robustis, incrassatis; labellum column involvens.*

Aurantiacae Withner. Sect. based on *C. aurantiaca* (Bateman) Don. *Flores crocei usque ad flavos; labellum acutum.*

Moradae Withner. Subgen. based on *C. skinnerii* Bateman. *Flores purpurei; labellum rotundatum.*

Aclandia Withner. Subgen. based on *C. aclandiae* Lindley. *Plantae diphyllae; pseudobulbis cylindraceis, induratis; labellum lobis lateralibus parvis, subobsoletis usque ad rotundatos; columna nuda.*

Intermedia (Cogniaux). Withner. Subgen. based on *C. forbesii* Lindley. *Petala sepalo dorsali satis latiora; pseudobulbis longisculis, cylindreis, apice diphyllis; folia obtusa.*

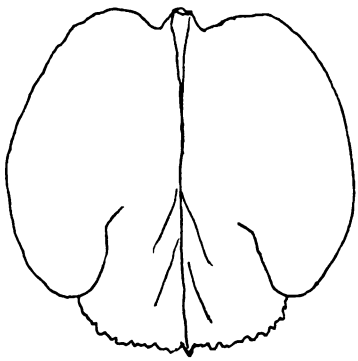
Schomburgkoidea Withner. Subgen. based on *C. violacea* (Kunth) Rolfe. *Flores aliquantus carnosuli; petalis margine satis undulatis; labelli lobus terminalibus breviter latesque unguiculatus, multinervis, nervis supra satis prominans.*

Falcata Withner. Subgen. based on *C. guttata* Lindley. *Pseudobulbis cylindraceis, interdum elongatis, apice di-triphyllis; sepalis coriaceis, lateralibus manifeste falcatis; labelli limbi apices intus tecti papillis.*

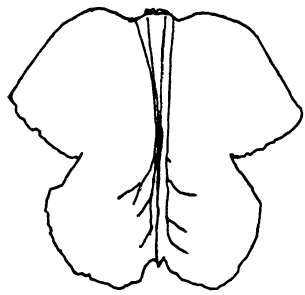
Guttatae (Cogniaux). Withner. Sect. based on *C. guttata* Lindley. *Labelli lobus terminal late breviterque unguiculatus, minus quam pars tertia totae longitudinis labelli.*

Granulosae (Fowlie). Withner. Sect. based on *C. granulosa* Lindley. *Labelli lobus terminal latiscule longeque unguiculatus, maior quam pars tertia totae longitudinis labelli.*

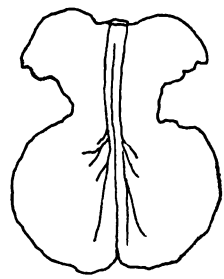
Lip outlines of representative *Cattleya* species from each of the subgeneric categories. Lips not drawn to scale. In each case, note the similarities among the members of each group and the comparison with the shapes of the other groups. See text, p. 12–13, for other details.



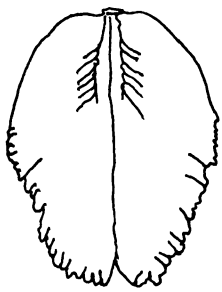
Laelioidea
C. dormaniana



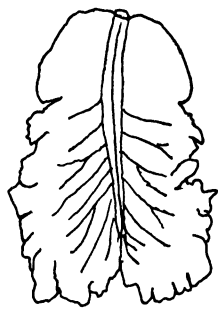
Rhizantha
C. nobilior



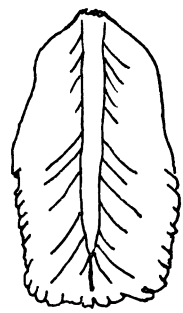
Rhizantha
C. walkeriana



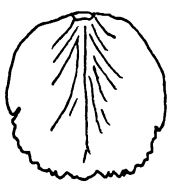
Cattleya, Cattleya
C. gaskelliana



Cattleya, Xantheae
C. aurea



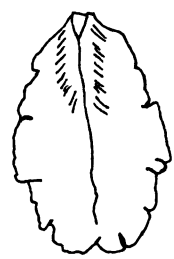
Cattleya, Maximae
C. maxima



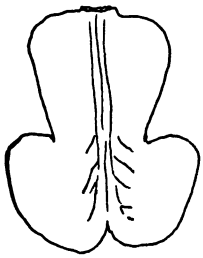
Cattleya, Stellata
C. luteola

Cattleya, Stellata
C. iricolor

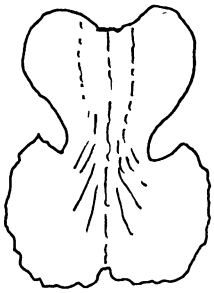
Circumvolva, Aurantiacae
C. aurantiaca



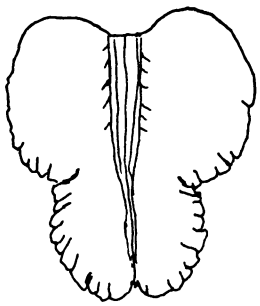
Circumvolva, Moradae
C. skinneri



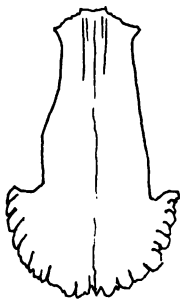
Aclandia
C. aclandiae



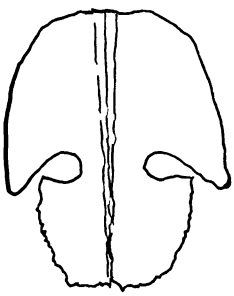
Aclandia
C. velutina



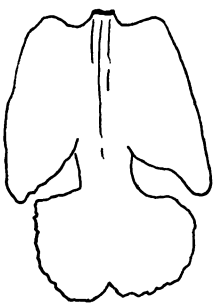
Intermedia
C. harrisoniana



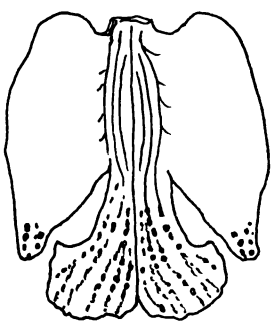
Schomburgkoidea
C. bicolor



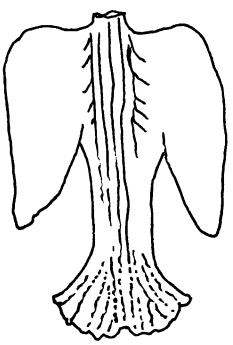
Schomburgkoidea
C. violacea



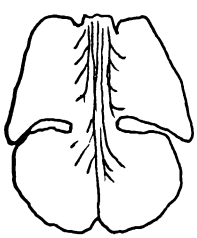
Schomburgkoidea
C. tenuis



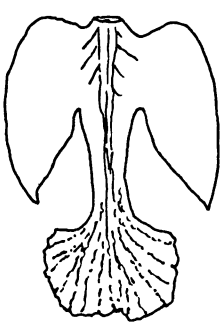
Falcata, Guttatae
C. amethystoglossa



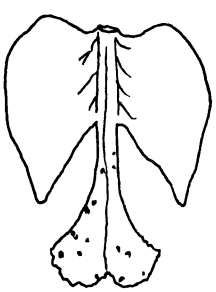
Falcata, Guttatae
C. guttata



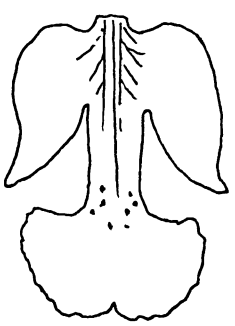
Falcata, Guttatae
C. schilleriana



Falcata, Granulosae
C. granulosa



Falcata, Granulosae
C. porphyroglossa



Falcata, Granulosae
C. schofeldiana

CHAPTER 3

Introgression in Cattleyas

When populations of related species overlap in nature, natural hybridization can occur. The concept of introgressive hybridization was first formulated by Anderson and Hubricht in 1938 "to denote the gradual infiltration of the germ plasm of one species into another as a consequence of hybridization and repeated back crossing." In the plant world introgressive hybridization has given rise to new species as introgressively formed clones have been isolated and subsequently given rise to new populations. Sometimes the new hybrid populations not only combine morphological characteristics derived from their parents but, more importantly, combine physiological qualities as well. Though these physiological abilities may not show externally, as do flower color or leaf shape, the offspring can often thrive and reproduce in new environments not well suited to either parent species. Thus introgression is often a strong source of variation within a species, and, as we know, some orchid species show much variation, others little. This variation provides a plasticity of species response. In my opinion introgressive exchanges have played a particularly significant role in orchid evolution, and the cattleyas are one group that clearly demonstrates that role.

Variant forms and populations of certain orchid species have long been recognized—in some species hardly any two plants are alike. For example, it is difficult to find two *Cattleya mossiae* flowers which are truly similar. At the extreme they can have such distinctively different lip veining patterns that they would seem to be separate taxa. If you have traveled to Brazil you may know that there are more than 100 named clones of *Cattleya intermedia,* all presumably different and recognizable. There are so many named clones of *Laelia purpurata,* in fact more than 200, that entire shows in southern Brazil may be devoted to the clones of this single species. Geneticists tell us that mutation of genes is the major source of variation in species, but in the plant kingdom, at least, introgression offers a possibly better alternate explanation.

The hybridization and repeated crossings of the hybrid individuals back with the parental types, or with each other, may take place many times over many generations. It is not a single event such as is executed by the hybridizer in the greenhouse. The gene flow may be primarily in one direction, toward one of the parental types, so such forms may become the most common. Or, there may be a continuous spectrum of forms ranging between those of the parental species so that it is difficult to determine where one parent population stops, the hybrids begin, and then where the other parental population begins. Using Anderson's techniques, or now, using computer analysis, it is possible to unravel some of these hybrid complexes to gain a better insight into how they are formed. Lotsy's term, *syngameon,* is well applied to these populations of hybrid origin that may involve two, or even more, species.

This hybridization process, if combined with geographical isolation of the resulting clones of such populations from earlier eons, can account nicely for the clusters of related species within the confines of a genus. The labiate cattleyas, or certain of the bifoliate types, demonstrate this well. Further accounts of the details of such studies of cattleyas may be found in the writings of Withner, and Withner and Adams.

Fortunately, we have a pictorial record of the orchid family in the old color plate books that cannot be matched for any other plant family, and the cattleyas figure strongly in this old literature. Both careful textual descriptions and meticulously drawn illustrations give us a rather complete record of cattleya variation as it has been observed over the last 175 years. The field work has already been done for us, fortunately so, as with destruction of the forests in the tropics, many of the natural populations of these species are now greatly diminished or even verging on complete obliteration.

Within the genus *Cattleya* several examples of introgression may be cited. One of the most obvious is the natural hybrid population called *Cattleya guatemalensis,* a complex between *Cattleya skinneri* and *Cattleya aurantiaca.* It is particularly easy to analyze, thanks to the distinct colors and flower shapes of the parents. The *skinneri* has purple flowers, and the *aurantiaca* orange, so the intermediate *guatemalensis* hybrids are a salmon or peach-toned lavender. If such hybrids backcross to *skinneri,* they become more lavender; if they backcross to the *aurantiaca* side, they become more orange, and eventually may produce red, yellow or even white forms as interbreeding continues. These crosses have all been artificially reproduced in cultivation, largely to obtain greater quantities of the rarer colors than may be found in nature. Since the petals of the flowers of *Cattleya aurantiaca* project forward to a marked degree, while the flowers of *Cattleya skinneri* are more or less "flat", this characteristic gives us another quality in addition to color as a hallmark of the degree of hybridization. Lip shape and veining patterns are also significant. As will be discussed later, some of the color variants from the hybrid swarm or syngameon have been described as separate species, but this analysis clearly demonstrates that they now do not deserve such distinct status. A clonal name is sufficient.

Another fine example of introgression is provided by the Colombian natural hybrids called *Cattleya hardyana* from *Cattleya warscewiczii (gigas)* × *Cattleya aurea.* Again, we have distinctive color forms with a purple flower

on one side *(warscewiczii)* and yellow with a red lip flower *(aurea)* on the other. The inheritance of the veining pattern and color of the red lip, all characteristics of the *aurea,* as well as the presence of large yellow "eyes", are characters easily followed in the *hardyana* combinations. The lateral petals and sepals may be of a variety of colors from white through lavender. This natural hybrid population has also been duplicated in cultivation, and should be made again, with selected superior parents, for its colorful beauty.

Clement Moore, quoted in White, remarked that in hybridizing with *C. aurea* "(it) puts color into the throat of the labellum, but does not intensify the color of the sepals and petals as does Cattleya Dowiana". Using it with pure white flowers did not "put" color into the petals, but using *C. dowiana* could. Moore thought the *dowiana* or *aurea* should be the female parent in such hybrids as it would then have a predominant effect in the hybrid.

The other clear example of introgression involves three species, two cattleyas and a laelia, on Santa Catarina island off the coast of southern Brazil. Although Anderson's ideas about introgression originally derived from situations involving pairs of species, the Santa Catarina story readily extends it to complexes among three. *Lc. elegans* was discovered in 1847. Boyle described the plant as "very plentiful in its native habitat beyond all other species . . . home was a small island where it clung to the rocks. Every plant within reach has long been cleared away; those remaining dwell in perilous places on the cliffs." Tatum, a later collector, wrote in 1930 that "*Lc.* Elegans is still very plentiful . . . of course all the plants are not elegans but there are also *Laelia purpurata* and *Cattleya intermedia . . . Laelia purpurata, Cattleya Leopoldii* and *Cattleya intermedia* are three distinct species. As they grow associated with one another, three distinct natural hybrids are produced, viz., *Cattleya intricata (intermedia × Leopoldii), Laelio-Cattleya elegans (L. purpurata × C. Leopoldii)* and *Lc. Schilleriana (L. purpurata × C. intermedia)*." Lenz and Wimber discussed these observations in their chapter on hybridization and inheritance in *The Orchids, A Scientific Survey,* edited by the present author.

Plants contained in this complex show, in the so-called *purpurata* population, *intermedia* characteristics in petal form, lip lobing or color patterning. There is, in fact, evidence of hybridity in each of the parental populations. The lavender hybrids were identified as *elegans* types when they had *intermedia* petal and sepal patterns, but when they had a "labiate" type of petal form, they were classified as a variety of *L. purpurata* instead of *elegans.* The white forms, especially those with labiate cattleya form, were called *schilleriana.* Few *schilleriana* were found, but indeed the least common of all were the combinations between the bifoliate cattleyas which produced *C. intricata. Intricata* was the least desirable, horticulturally speaking, and the form least distinct and therefore most difficult to distinguish from its parents. It is not surprising, therefore, that fewer of them were mentioned or described.

Other introgressive swarms have complicated the naming and descriptions of *Cattleya* species, particularly since there are no special names for the hybrids in the syngameon intergrades and the parents have certain definite similarities. Examples include *C. loddigesii × C. harrisoniana,*

C. guttata × *C. leopoldii*, *C. walkeriana* × *C. nobilior*, *C. bicolor* × *C. harrisoniana* and *C. granulosa* × *C. schofeldiana*. More detailed observations and measurements on the clones and cultivars of these species and their hybrids in cultivation could produce analytical data that would help resolve the difficulties. Does anyone volunteer with data? Please write the author.

CHAPTER 4

Cattleya Culture

The culture of cattleyas is such that one can only set forth a few rules, while the rest must be learned by refining one's own experience. The following horticultural information is derived from a variety of sources, including the author's experience, and must be interpreted in terms of one's own cultural conditions and how they may best be used to grow these orchids. Of course, supplying proper conditions for a commercial greenhouse filled with the same sorts of plants is one thing, but most of us have mixed and crowded collections where conditions are simply not tailored for one species or genus. In such questionable conditions it is quite amazing how tolerant orchids are to growing in cultivation! So, the recommendations which follow represent the ideal or pure state, as though there were no other orchid genera but cattleyas with which we need to be concerned. And seemingly to compound the problem, different cattleyas require somewhat different growing conditions as we shall see. This point requires emphasis! All cattleyas are not culturally identical! Some require more heat, others less; some have distinct dormancy, others not; some like more humidity or air; and so it goes, species to species. Such details will be discussed as we know them in the descriptions of individual species.

Cattleyas require ample light, needing shade only during the summer months and the brightest days of spring and fall. Most are sun-loving plants so like all the light they can get, aside from direct sun. If their foliage appears too yellow, increase shading. Continued exposure to excessive light will result in further chlorophyll destruction as well as dehydration leading to shriveling of the pseudobulbs and leaf tissues. Plants exposed to excessive light are flabby to the touch and are readily flexed without tissues breaking or leaves splitting. On the other hand, lush, dark foliage is not desirable. It is weak and susceptible to fungi and rot, and though the plants may appear fine if they haven't flopped over from their own weight, they do not flower at their best. A medium, yellow-green leaf color is best, with a firm, solid growth, and each growth spurt larger and more vigorous than

the last. In short, proper control of light in most cases is the most important single factor in successful orchid growing.

As to temperature and ventilation, Orpet and Lager have said it well in their classic statement in Bailey's *Cyclopedia of Horticulture* that cattleyas "delight in a genial atmosphere, with all the air possible when the outside temperature will permit." Cold drafts should be mitigated by passing the air over the greenhouse floor or heating elements before it reaches the plants. "In summer, from May on to the end of October, air should be admitted day and night; thus there are no temperatures to be prescribed for these months. A night temperature of 65 (18 C) to 70 F (21 C) is then suitable, rising by day according to the sunshine. Later, when artificial heat is necessary, 55 to 60 F (16 C) at night and 60 to 65 F (18 C) during the day is about right, bearing in mind that the earliest species to flower may be kept at the warmer end, and the later, summer-blooming species may be wintered at the cooler end of the structure. . . .One cannot change the time of blooming of a cattleya, that is to say, force it as other plants may be forced, without injury to the plant and a poor quality of bloom, but they are often retarded by systematic cooler treatment."

With the exception of a few species that have a distinct dormancy or dry period, most cattleyas should be watered moderately the year around. The plants are either getting ready to flower, are in crop, or are recuperating from flowering. Some plants grow and then flower immediately; others grow and form a sheath and buds, only flowering some weeks later after a period of dormancy has passed. Observation of one's plants will show which patterns they follow, and in hybrids, of course, their pattern reflects the parental genes. Seedlings will grow continuously so need not be provided rest periods until they are of good size. The plants need more water in periods of growth and flower formation, less during quiescent periods. Growth may consist of new root or leaf formation, separately or together, after which flower formation follows. If you are able to grow the plants well, but cannot flower them, look first to the amount of light as the limiting factor, then to the temperature relationships for an explanation. Fertilizer always comes last!

In general, water cattleyas in the mornings on sunny days so that they can dry off before nightfall. An actual soaking of the bark, fiber or pumice is necessary only about once a week for mature plants. Far more important, and to be distinguished from this soaking process, is that of the daily dampening-down, which may have to be done two or three times a day in hottest weather. This is simply a matter of turning on the humidifiers or misters or wetting the walks, stagings and the undersides of the benches, lightly misting the foliage, etc., which provides a humid atmosphere during warm weather. In winter the practice is helpful in counteracting the drying effect of artificial heat. Humidity ideally should be maintained between 50 and 75%, but at no time should the house be allowed to become close or damp and cold, as fungi or bacteria will surely attack the plants. To prevent bacterial-fungal invasions, most growers today use fans to circulate the air continuously. When it is rainy and humid outside, watering indoors must be proportionately decreased. As has been said often before, many more orchids (including cattleyas) are killed by excess watering than by too little. The "genial atmosphere" is the thing to achieve. If there is a question about

watering, then don't!

Cattleyas like most orchids are usually grown nowadays in bark mixtures which lack nutrients and require a weekly or continuous fertilizing routine to provide the necessary elements for optimal growth. Fern fiber (tree, polypodium, or osmunda) is another commonly used medium and does have a certain nutrient content, but still orchids benefit from occasional feedings to maintain good growth. Plants growing in fiber media do not require the high nitrogen fertilizer nor the weekly fertilizing that is necessary for plants grown in bark. They may benefit from it, though, especially at times of high nutrient demand, periods of high light and active leaf, root or flower formation. In any case, orchids require relatively low total levels of nutrients. Despite fertilizer company advertisements, fertilizer is seldom a limiting factor in growing save when used too often or in excessive amounts. Fern fiber is expensive compared to bark, and calls for greater potting skill in the case of polypodium or osmunda fiber, but it does have the advantage of not needing a careful, routine fertilization.

In the northwest U.S., at least, many people have begun growing cattleyas in a type of yellow-white pumice with fine results. Some prefer to mix it half and half with bark, after sifting and grading by particle size. The more or less spherical pumice particles absorb water well and yet, because of the good air spaces between granules, roots can penetrate and grow deeply into the pots with no difficulty. Only this one type of pumice has seemed to work uniformly well, other types not producing the same results or being definitely toxic. It is almost impossible to overwater under these conditions, and fungal problems are less common. In combination with the pumice, a small amount of Osmocote 14-14-14 fertilizer is top-dressed on the pots. The coated fertilizer pellets meter out a certain amount of nutrient with each watering and need renewing only once or twice a year. If there is any problem with salt buildup that some growers talk about, the grower is just wasting fertilizer and putting on more than the plants can use, supporting the fertilizer companies unnecessarily.

The perfect balance among light, temperature, humidity, air, watering, nutrients and the potting material is the sign of the good orchid cultivator, the one with the green thumb. Fertilizing and the growing medium are probably the least important of these elements. Light, water, air and humidity are the most critical. One must learn to "read" the plants to monitor their progress, "talk" with them. Also, one must be patient in growing cattleyas or other orchids new to any collection, for no two people (or the rain forests) grow orchids in exactly the same way. It takes from two to three growth cycles in a new location for most plants to adapt completely to their new surroundings, especially since most should be repotted when received from the nursery, a process that in itself can set a plant back a year or two. Remember also that the growth a plant achieves in a given year will influence its development the *following* year. By the time a new lead growth is 2 in. high, the leaves and number of flowers it will produce are already determined in primordial form in the shoot meristem. Giving the plant the best combination of conditions for the development of the new lead will, in turn, influence the succeeding one favorably.

A good healthy root system is to be desired above all, so good growers are more concerned with watching roots than leaves, though, of

course, everyone looks at flowers. Repotting is always done during dormant periods, ideally just as or before new vegetative growth starts, and especially just as a flush of new roots begins. The latter may mean repotting some plants, particularly bifoliate cattleyas, after the growth is well along or even beginning to flower, but it is best, even so, for root formation to be the guide. With the formation of new roots, the plants then reestablish themselves immediately with the least setback. Repotting at other times may cause the tissues to dehydrate before new root action begins, which may make the plants unusually inactive so that they even skip their normal growing period and deteriorate completely. To keep roots alive and vigorous, don't overwater the compost but instead maintain the humidity. Don't expect roots to all stay neatly in the pot in the potting material and repot with least disturbance every two or three years as necessary.

Under ideal conditions in cultivation, leaves and roots may last for at least three years on healthy cattleyas. Unless the roots on the older portions of the plants are still alive, those parts must receive their water and nutrients from the younger parts. This subjects the plants to certain stresses as orchid roots can only absorb water and nutrients at a limited rate, especially if roots are already poor and in a soggy, overfertilized potting medium with a poor air supply. This limited rate of uptake is also the reason that dehydration is better cured by increased humidity rather than increased watering. The extra water only rots the compost, fills air spaces and inhibits proper root function, making the problems worse. Continued growth of good green root tips out into the air, incidentally, is a good sign that the proper humidity is being maintained.

All things considered, the ideal cattleya plant should consist of three well-leafed pseudobulbs and a new lead growth. If larger, more specimen-like plants are desired, clones should be chosen that produce multiple leads each year, two per growth instead of the usual one. It also helps if plants with short rhizome distances between growths are selected. Don't consider plants with strong apical dominance that each time produce only single growths which march deliberately across the flower pot. Ideal specimens are then a compounding of the ideal three-leafed plant mentioned above.

Propagation by seed is the usual method for cattleyas, though divisions and back-bulbs are often used for fine forms of established adult plants. The latter method, until mericloning was developed, was the only way particularly desirable varieties, such as some reds or albas, could be propagated true to form. Not much wonder prices were often very high, and the purchaser sometimes waited for years to acquire a rare form. One means of making a division, yet save the back-bulbs, is to cut halfway through the rhizome and leave the parts in the medium until the dormant back-buds start to grow. Then, the plant may be separated and each part repotted. At least two or three pseudobulbs should be left in front of the cut to form the new stock plant, so before undertaking the procedure, check to see if there is a good viable bud at the base of at least one of the back-bulbs. Without a plump bud, the back-bulbs may never "break" to produce a new plant even if the rhizome is cut. Functional roots on that back section of rhizome are additional insurance for a new growth.

Propagating from seeds, even though the seedlings will require

several years for flowering, is the only means of obtaining new colors or other desired traits. How seedlings turn out is always a gamble, but no one would want to grow orchids without occasionally taking the risk of finding an ideal plant among the chosen few that one felt compelled to purchase. With some crosses, perhaps one in 50 or more plants turns out well; in others nearly every plant may be good. One never knows in advance, even with the best of parents. That is the reason the mericloning technique has been so valuable, especially for commercial growers. By isolating meristems and producing mericorms at will, even by the thousands, it is possible to grow plants of known characteristics to fill any number of greenhouses. There is little gamble here—the plants are made to order—and if mutations do occur, they *may* be a desirable change. For the amateur, the mericloning technique is also a boon. It is possible for everyone to have what amounts to divisions of the best-awarded plants—plants with superior quality, rare color, or desired season of blooming.

The flowering of some cattleyas is controllable by day length and temperature manipulation. These techniques have proven quite useful for *Cattleya labiata* and its hybrids which are ordinarily fall-flowering. If days are lengthened in the fall to 14–16 hours (actually, it's the decrease in length of continuous darkness that is critical), the plants will remain vegetative and so will not flower until winter or later. This effect is enhanced by employing higher temperatures than normal. In commercial production it is thus possible to delay flowering to a later desired date, such as Christmas or the New Year. The plants will flower about 9–10 weeks after the increased light is reduced and temperatures lowered, so the crop can be produced at will. Such plants are "controllable" and produce their flowers when demand and prices are high. No one has worked out the reverse, the shortening of long day (short night) conditions for spring flowering plants, and there is comparatively little commercial interest as many cattleyas are naturally spring flowering.

Two major growth patterns in cattleyas may be recognized, as has been mentioned. Group I produces a new lead in the late winter or early spring, and develops flowers immediately thereafter. These species and their hybrids begin to root only as flowering ends and while the leaf sheaths remain entirely green. Each growth of such plants will flower separately as the leads mature. When rooting is complete, there is no further development until the next cycle begins the following year. This group includes *Cattleya aclandiae, bowringiana, dowiana, gaskelliana, harrisoniana, intermedia, leopoldii, lueddemànniana, violacea, warneri and warscewiczii.*

Group II plants also grow a new lead and roots during the summer, but then enter a resting state for months until the flowers are produced the following winter or spring. When these species and their hybrids flower, all the accumulated leads of the past year flower at the same time, after bud and leaf sheaths have dried to become white and papery. This group includes *Cattleya aurantiaca, guttata, labiata, mendelii, mossiae, percivaliana, schroderae, skinneri and trianaei.*

Hybrids within either of these groups grow and flower in the same pattern, but hybrids between the groups can be intermediate, pulled toward spring flowering by Group II dominance, or toward summer

flowering by Group I dominance. Hybrids, therefore, often flower irregularly, and often more than once a year, as a result of their mixed parentage, an advantage over species for the grower, especially the amateur.

Additional cultural information is readily available in books and articles in the various orchid journals.

CHAPTER 5

Description of Species

List of Species

Lady Ackland's Cattleya

Brazil

Cattleya aclandiae Lindley. 1840 *Bot. Reg.* 26, t. 48.
Subgenus: *Aclandia*

Synonym
Epidendrum acklandiae Rchb.f. 1861. *Walp. Ann. Bot.* 6:312.

warmth, a humid atmosphere and ample moisture during growing periods but dry conditions during resting periods. According to older literature, new growths and flowers are not unusual twice a year, once in spring and again in the fall. However, Hamilton's data show most plants typically bloom once a year peaking in May.

It is native in the State of Bahia, Brazil, where it grows near the ocean. Plants grow on small trees scattered over arid lands with much heat and light but over which moisture laden air blows.

The species was dedicated by Dr. Lindley to Lady Ackland of Killerton, England, in whose husband's greenhouses it was introduced in 1839. Plants flowered the following year.

Various cultivars (varieties) have been described and named for their particular spotting patterns, and for "alba" base colors rather than the usual olive-green. "Blue" forms are also known with mauve instead of the usual magenta-purple lips. Most of the early named forms are no longer in cultivation, but old illustrations and descriptions give us a good idea of the range of variation in the flowers of this species. At present, large flowered intensely pigmented clones are particularly desired even though they may produce no more than a single flower in their seedlings. They are desirable as parents to produce miniature hybrids of a vigorous, tolerant growth habit and with flowers of heavy substance, dark colors and interesting spotting patterns. After mastering the cultivation of this small but fascinating species, one could specialize in only its hybrids and still have space in a small greenhouse.

Amethyst-lipped Cattleya

Brazil

Cattleya amethystoglossa Linden and Rchb.f. *ex* Warner. 1862. *Select Orchidaceous Plants* 1. t. 2.
Subgenus: *Falcata*
Section: *Guttatae*

Synonyms

Cattleya guttata prinzii Rchb. f. 1856. *Bonpl.* 4:327.
Epidendrum amethystoglossum Rchb. f. 1861. *Walp. Ann. Bot.* 6:319.
Epidendrum elatius prinzii Rchb.f. 1862. *Xen. Orch.* 2:173, t. 172.
Cattleya guttata keteleerii Houllet. 1875. *Rev. Hort.* p. 350, t.
Cattleya guttata lilacina Rchb.f. 1881. *Gard. Chron.* 16:38.
Cattleya purpurina Barb. Rod. 1882. *Gen. et Sp. Nov.* 2:158.

This species has a complicated nomenclatural history that is well explained in Fowlie (1977), so that we will be happy to call it by its common name, the Amethyst-lipped Cattleya. Plants produce stems up to 40 in. (100 cm.) high, making it one of the tallest of the cattleyas. Full grown specimens may produce as many as 30 flowers, though 6–8 are common. The 4 in. (10 cm.) flowers are basically an ivory-white, or occasionally a creamy color, while the sepals and petals are suffused with light rose and spotted with rich magenta, especially on their upper halves. The lip is a deep amethyst-purple and has a granular texture on the tips of the lateral

Araguaia Cattleya

Brazil

Cattleya araguaiensis Pabst. 1967. *Orquidea* 29:62–66.
Subgenus: *Stellata*

This species, described only in recent years by Pabst, is poorly known but distinctive in appearance. One wonders why it took so long to be dis-

somewhat distinctive combination of characteristics possessed by the species. We wait with considerable interest a selfing or sib crossing of plants in cultivation (this has been done already, but not yet flowered) so that the variation of an entire population may be studied. The advantages of using this species as a parent remains to be explored.

In coloration and with a lip pattern nearly without sinuses to delimit the lateral lobes, it is reminiscent of and closest to *C. iricolor* from the Andean areas of Peru and Ecuador as they face Brazil. Also, its monofoliate character is similarly an "Andean quality".

We have as yet no definite cultural information for this species, but it appears to grow well under damp intermediate to warm conditions. Braem says it needs moist warm conditions to match its habitat on the Araguaia River in eastern Brazil. Since the plants are delicate in habit compared to other more massive cattleyas, they need time and care to reestablish and recover from transplanting.

Orange Cattleya

Mexico, Guatemala, El Salvador, Honduras

Cattleya aurantiaca (Bateman) Don. 1840. *Flor. Jour.*, p. 185.
Subgenus: *Circumvolva*
Section: *Aurantiacae*

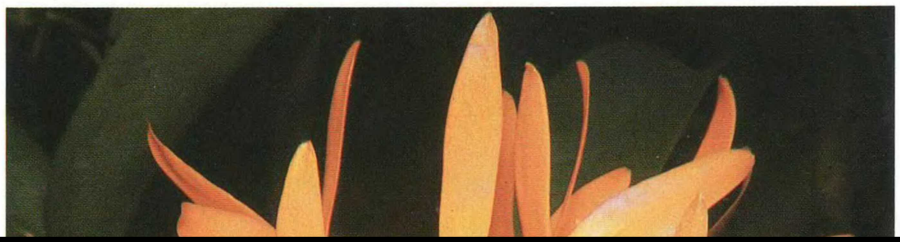
Synonyms

Epidendrum aurantiacum Bateman ex Lindley. 1838. *Bot. Reg.* 24:8, misc.11.
Epidendrum aureum Lindley. 1853. *Folia Orch.* Epid. 4.

This species has the smallest flowers in the genus, 1½–2 in. (4–5 cm.), but they are among the brightest in color of all the cattleyas. Since *Cattleya* was separated from *Epidendrum* by Lindley in 1826 because of "large" flower size, this species has been shifted back and forth between the two genera several times. *Cattleya* is the currently preferred disposition for these plants and is officially accepted as the proper name in hybrid registrations.

A tolerant species, the plants are easy to grow, having 6–15 in. (15–38 cm.) stems with two leaves producing as many as 8–12 flowers in a head or cluster. The color varies from yellow through a deep red-orange with red or purple veins running from the throat out onto the pointed lip. The stems (ramicauls) are enlarged from a narrow base, making the species readily distinguishable from those of *Cattleya skinneri.*

The petals and sometimes the sepals have a tendency to project forward so the flowers do not fully open, and some clones regularly self-pollinate without opening at all. This quality sometimes seems enhanced by high temperatures that promote rapid dehydration of flower parts, and in particular the rostellum, so that pollen and stigma make contact. These are, needless to say, undesirable horticultural traits, and as might be expected, are strongly inherited if great care is not taken in using a good form of this species as a parent for hybrids.



picoteeing of *dowiana,* and the veining of the lip is more extensive and anastomosing. Usually there are prominent yellow "eyes" on the lip, lacking in its *dowiana* cousin. The same "eyes" are also present in some of the lavender labiate cattleyas, particularly *C. warscewiczii,* but are more noticeable here. The plants of this species bloom in the late summer or autumn.

Gustav Wallis discovered it in 1868 near Frontino in the State of Antioquia, Colombia, while he was collecting plants for Linden. It was

Bicolored Cattleya

Brazil

Cattleya bicolor Lindley. 1836. *Bot. Reg.* 22: sub. t. 1919.
Subgenus: *Schomburgkoidea*

Synonyms

Epidendrum iridee Descourtilz. 1821. *Flore medicale des Antilles,* p. 629.
Epidendrum bicolor Rchb. f. 1861. *Walp. Ann. Bot.* 6:311.
Cattleya grossii Kränzlin. 1897. *Gartenfl.* 46:113, t. 1436.

The stems of this species run 18–30 in. (49–76 cm.) high, jointed in the usual fashion and clothed in membranous sheaths. There are two leaves about 6 in. (15 cm.) long. The 3–10 fragrant flowers are 3–4 in. (7.6–10 cm.) in diameter and are variable in color. The fleshy sepals and petals range from pale green or olive to a coppery brown tone, and the flowers may be spotted. The lip is crimson-purple to pale rose, sometimes margined at the edge with white, and uniquely has no side lobes to cover the column. The latter is a dominant characteristic of this species, and is strongly passed on to its progeny, making at least that part of the parentage fairly readily detectable. The exposed column is pink.

Descourtilz named it after Iris, the rainbow goddess. He must really have been swept away by the flowers. The plants bloom in September, like warmth, light, water when growing and then require a good rest.

Repotting should be attended to only when new roots appear at the base of the lead growth. As in dealing with other bifoliate types of cattleya that may have thin stems without much water storage tissue, repotting is only done at that time. If repotting is done on other occasions, it may so shock the plants that they are set back so they may remain dormant for more than the next growing season; or, they may dehydrate to a point that recovery is difficult or impossible. Irrespective of what else the plant may be doing, growing or forming buds, the rooting process is critical and must be respected.

The species was originally introduced by Messrs. Loddiges of Hackney, England, in 1838, who received it from the area around Bananal in the State of Minas Gerais, Brazil. It was found growing in large clumps high on tall trees along rivers. It was also found in the mountains of Rio de Janeiro at 200 ft. (60 m.) elevation, growing on rocks as well as trees. Both Fowlie, and then Braem, describe two distinct populations of this species, although Fowlie also distinguishes a third.

Coastal plants, comparable to the originally described species, are diploid. There are also the tetraploid interior forms which are technically described as *C. bicolor* subspecies *minasgeraisensis* by Fowlie. The latter plants are larger in all dimensions than the diploid coastal clones, and the population includes the variation that has been named *C. grossii* or *C. bicolor* var. *grossii.* These forms are characterized by a more expanded kidney-shaped midlobe on the lip and usually a white margin on the front edge. The third population is the subspecies *brasiliensis,* described and pictured by Fowlie. It has deep brown flowers with a larger, wider lip than ordinary and virtually no white, though the margin of the lip is paler than more central areas. The sepals and petals are somewhat undulate in the fashion of *C.*

Bowring's Cattleya

Belize, Guatemala

Cattleya bowringiana Veitch. 1885. *Gard. Chron.* 2:683.
Subgenus: *Circumvolva*
Section: *Moradae*

Synonyms

Cattleya autumnalis Hort. 1885. O'Brien in *Gard. Chron.* 24:683.

deeply colored veins and reticulations. There is often a glistening satiny texture when the flowers are viewed in a good light. The lip is a deeper purple with a brighter more maroon band toward the throat which, in turn, is white. Plants of this species regularly flower in the fall or early winter, hence one of its names, *autumnalis.*

This is a good species for the beginner, one of the best, as it is tolerant of heat, sun, and poor humidity. In fact, the plants must have bright conditions for best growth. Furthermore, even small plants will bloom with one or two flowers, the number increasing as the plants become larger.

In nature, the plants are found on rocky cliffs by rapid streams where the atmosphere is usually charged with moisture. It was introduced by Veitch and Sons in 1884 and dedicated to J. C. Bowring, an amateur grower, living near Windsor, England.

A general similarity among clones has precluded many varietal descriptions, but there are a few. The clone 'Triumphans' is a deeper purple color than usual and *coerulea* forms are blue mauve, the successful parents of many blue orchids, including selfings. The variety 'Splendens' is presumably a tetraploid form with larger and more richly colored flowers than the type, and 'Kay Francis' was a rosy pink type. The species is famous as a parent of a variety of modern vigorous bifoliate cluster-flowered hybrids, and C. Portia by Veitch in 1897, one of the very first, is still grown both in its blue as well as its usual color phases. I have not yet heard of an *alba* form of this species, but it would be very much in demand were it ever to be discovered and could trigger a whole new line of white cattleya breeding. A variety *albescens* 'Tower Grove' CBM, AM/AOS has faint color on the lip.

Decker's Cattleya

Guatemala to Panama, Colombia, Venezuela and Trinidad

Cattleya deckeri Klotsch. 1885. *Allgem. Gartenz.* 23:81.
Subgenus: *Circumvolva*
Section: *Moradae*

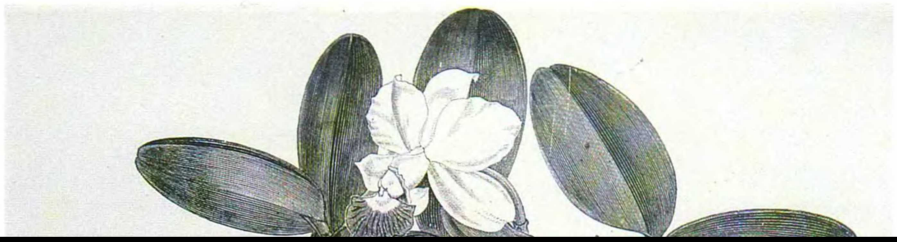
Synonyms

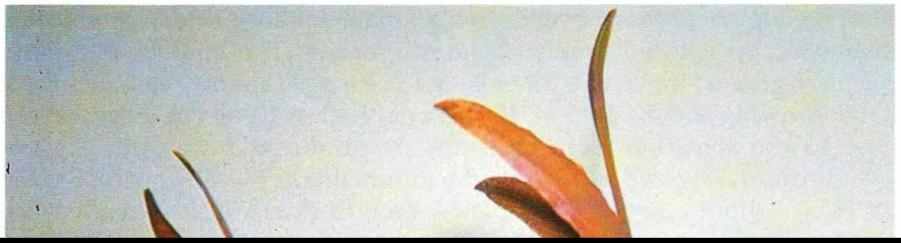
Cattleya skinneri var. *parviflora* Hooker. 1856. *Bot. Mag.* 82, t. 4916.
Cattleya patinii Cogn. 1900. *Dist. Icon. des Orch.* t. 25.
Cattleya skinneri var. *patinii* (Cogn.) Schltr. 1914. *Die Orchideen,* p. 227.
Cattleya skinneri var. *autumnalis* Allen. 1942. *Ann. Mo. Bot. Gard.* 29:345.

This fall flowering species, generally similar to and often confused with *C. skinneri,* as all of the synonyms indicate, is easily distinguished when in flower. It is not spring-flowering at all; and clearly displays notable color differences in the lip. The plants grow to 10–12 in. (26–31 cm.) and produce up to eight 3 in. (8 cm.) lavender flowers. The lips are a deep orchid-purple, with no yellow or white markings in the throat as in *C. skinneri*—a clear-cut distinction supported by autumn flowering. In addition, the flowers seem to be slightly smaller than the typical Skinner's Cattleya. The plants tend toward multiple lead production, so they can easily be grown as specimen plants.

The distribution of this species is concentrated in Panama, growing from sea level to about 3000 ft. (900 m.). It apparently spread from an Andean origin north into Panama and adjacent regions and east through the Andean extensions of Venezuela into what is now the island of Trinidad. This widespread distribution makes it the only *Cattleya* species found in both South and Central America, the others being more confined in their distribution patterns.

In Panama it is typically found growing in a tree called Espave





They are long in proportion to the length of the midlobe, which produces a distinctive lip with an unmistakable proportion. The midlobe is a dark purple with a white throat. The plants have a thin, almost reed-stemmed habit, growing about 12–15 in. (30–39 cm.) high with two or three leaves. One, two or sometimes four blossoms are produced in the fall.

It was discovered in 1879 on the mountains in Rio de Janeiro, Brazil, by Henry Blunt who sent the plants back to England. It is named for Charles Dorman of Sydenham, England, in whose collection it first flowered in 1880. Reichenbach first thought it to be a natural hybrid of *Cattleya bicolor* and *Laelia pumila,* but this idea has long since been discarded. It was formerly rare in collections but is now found fairly often. Coming from the humid cloud-topped Organ Mountains, it likes good air and some warmth while growing, but it needs a definite period of dormancy. However, the thin stems do not tolerate much dehydration, so keeping good roots on the plants is of prime importance in successful culture. Many feel it is best grown on slabs of cork or tree fern. Few varieties or hybrids are known.

Dow's Cattleya

Costa Rica

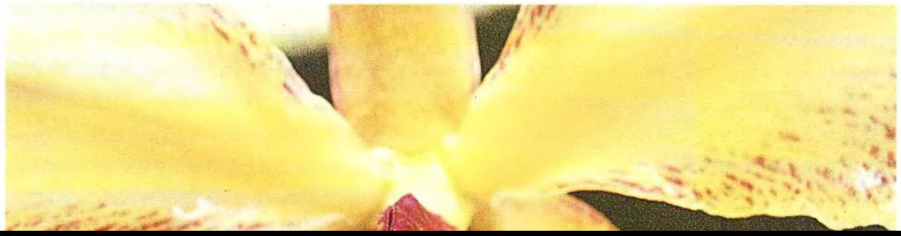
Cattleya dowiana Batem. 1866. *Gard. Chron.*, p. 922.
Subgenus: *Cattleya*
Section: *Xantheae*

Synonyms

Cattleya labiata var. *dowiana* Veitch. 1887. *Man. Orch. Plants, Cattleya,* p. 16.
Cattleya lawrenceana Warsc. *fide* Rchb. f. 1883. *Gard. Chron.* 19:243.

Plants of this species, the *Guaria de Turrialba* or *Guaria Reina,* produce usually 2–3 flowers, though as many as seven may be formed, which are 5–7 in. (13–18 cm.) across. The sepals, and the petals which are twice as broad, are of a nankeen-yellow. Today that term may not mean much, but in earlier days it possessed an immediate connotation deriving from a Chinese raw silk fabric of a particular yellow color. The petals are often flecked at the base and along the margins and suffused on the undersides with crimson. The large, broad lip is a deep velvety crimson-purple veined with gold. The plants bloom toward the end of summer or in early autumn. *C. dowiana* needs more warmth than most of the cattleyas and likes a great deal of moisture in the spring and summer, with considerably less in winter. It also requires ample light and consequently will do well suspended near the glass.

This species was first discovered by Warscewicz in Costa Rica about 1850. Plants sent Messrs, Low and Co. in England died, and dried specimens sent to Reichenbach in Germany never arrived. As a result, there was considerable doubt that these handsome flowers as described in the collector's letters, ever existed. Warscewicz requested at the time that the plant be named in honor of Mrs. Lawrence of Ealing, England, a liberal



who was collecting in Costa Rica for George Ure-Skinner. Ure-Skinner requested that the plant be named after Capt. J. M. Dow of the American Packet Service, who had taken the plants to England. Veitch and Sons then acquired some of the plants and first flowered them in the autumn of 1865.

The habitat is said to be restricted to an area on the western slopes of the central mountain range where the plants today have become scarce. Horich describes the area and its high rain forests in detail. Standley noted

between *C. dowiana* and *C. aurea,* so that we cannot be certain of the exact numbers, even though plants of *C. dowiana* were generally available in cultivation before plants of *aurea.* Nevertheless, it is safe to say that yellow will win over purple any day!

Growing more seedlings in cultivation might also lead to clones of easier culture than the usual run of rare wild plants still in cultivation. In any case, collected plants today are unavailable, so that selfings or sibling crosses remain our best bet, and we should all learn to grow this demanding species that requires warmth, humidity and good light. Under *C. aurea* some remarks on its breeding behavior compared to that species may be found.

Cattleya of the Golden Land

Brazil

Cattleya eldorado Linden ex Van Hout. 1869. *Van Houte's Fl. des Serres* 18, t. 1826.

Subgenus: *Cattleya*
Section: *Cattleya*

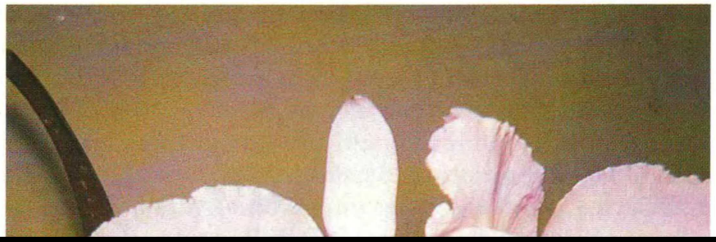
Synonyms

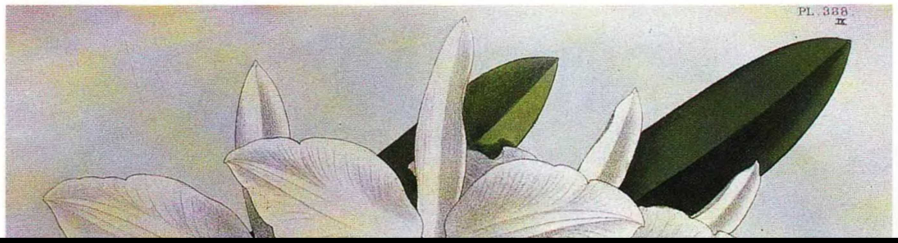
Cattleya virginalis Linden and Andrè. 1876. *Illus. Hort.* 23:161, t. 257.
Cattleya trichopiliochila Barb. Rodr. 1877. *Gen. et Sp. Orch. Nov.* 1:70.
Cattleya wallinsii Linden and Rchb. f. 1882. *Gard. Chron.* n.s. 17:557.
Cattleya macmorlandii Nichols. 1885. *Dist. Gard.* 1:282.
Cattleya crocata Rchb. f. 1886. *Gard. Chron.* n.s. 26:360.
Cattleya labiata var. *eldorado* Veitch. 1887. *Man. Orch. Plants, Cattleya,* p. 17.
Cattleya guadricolor var. *eldorado* Morren and Devos. 1887. *Index Bibl. Hort. Belg.,* p. 183.

The 5–6 in. (13–15 cm.) flowers of this species are a delicate white tinted with pale rose. The lip is white at the base, where it closely encloses the column, and a rich orange-yellow or golden disc is distinctly noticeable in the throat. The rest of the lip is white-edged and sometimes has a spot of purple magenta in the front. There is a greater occurrence of white clones in this species than in any other *Cattleya* species. They are so distinctly numerous as to be common, likely accounting for one of its early names, *C. virginalis.* The plants tend to be smaller than the other labiate forms of cattleyas with their single leaves. Flowers appear in July, August and September in the Hamilton survey of blooming times.

The habitat of this species is the interior Amazon region where it is hotter and more humid, and the alternation of wet and dry seasons is more pronounced, than are the regions in which the other large flowered cattleyas grow. It grows along the Rio Negro, the Black River, which is colored by the tannins and other compounds derived from the swamp vegetation through and around which it flows. The confluence of the Rio Negro with the Amazon is both startling and famous, for the mixture of the two rivers can be followed by their differences in color.

Plants were first imported from Brazil into Europe by Linden in about 1866, and one in flower was exhibited by him in Paris in 1867 under the

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Forbes' Cattleya

Brazil

Cattleya forbesii Lindley. 1823. *Coll. Bot.* sub t. 33
Subgenus: *Intermedia*

Synonyms

Epidendrum pauper Vellozo. 1825 (1790). *Fl. Flum.*, 9, t. 13.
Maclenia paradoxa DuMort. 1834. *Hort. Belge* 2:198, pl. 44.

short though frilly on the edges, so it is wise to hybridize this species with other forms having larger lips. Otherwise, the dominance of the *forbesii* lip with its small size comes through. The white lateral lobes of the lip and the internal, strong carmine, veining patterns are also dominant qualities in its role as a parent. The basic color of the lip is white, but internally it is pale yellow with the veining and central streak a strong yellow. The column is yellow, spotted and stained with red.

It grows on trees and rocks, or on bushes under trees, together with *C. harrisoniana,* near the sea in the vicinity of Rio de Janeiro and south toward São Paulo, Brazil. It thus grows in a hot and humid environment mediated by sea breezes. The plants flower in spring and summer with a peak extending from April to July, according to Hamilton.

The natural hybrids of *C. forbesii* and *C. harrisoniana* are *C. venosa.* Where it contacts *C. leopoldii* they are *C. isabella.*

It was introduced by the Horticultural Society of London, England, in 1823, through their collector Forbes, whose name it bears. Actually, Vellozo described it as *Epidendrum pauper* in 1790, but his work was not actually published until much later, 1825, after *C. forbesii* was already established as the name. It is thus one of the first species of this complex to be described, together with *C. elegans* and *C. guttata.* They were all called *Epidendrum* at the time, as the genus *Cattleya* had not yet been established.

Gaskell's Cattleya

Colombia, Venezuela

Cattleya gaskelliana Rchb. f. 1883. *Gard. Chron.* n.s. 19:243.
Subgenus: *Cattleya*
Section: *Cattleya*

Synonym

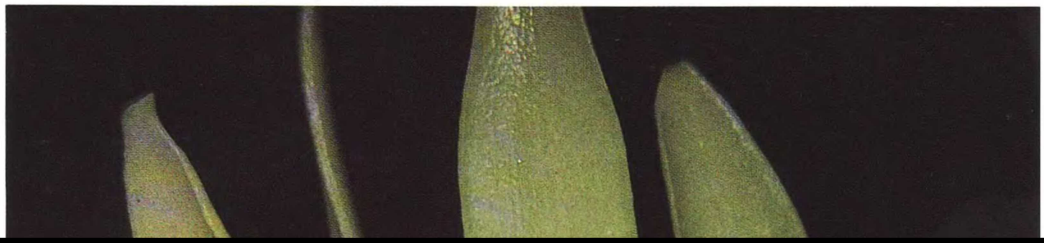
Cattleya labiata var. *gaskelliana* N. E. Brown. 1883. *Gard. Chron.* n.s. 19:310.

Flowers large, sometimes nearly equaling *C. warscewiczii,* the largest flowered species in the entire alliance. The petals and sepals are purple-violet suffused with white. The generally pale color is sometimes deeper and more uniform, and the petals rarely have a central lighter rib. The distinctly trumpet-like lip is similar in color to the petals, though the lower part may be paler. The front edge has a pale rose-mauve crisped margin. The throat is an orange or tawny yellow bordered with a zone of yellow-white in front of which is a mottled patch of rich amethyst-purple.

Plants of this species flower in summer from July through September, developing rapidly once the leads start to grow. It is famous for its vigorous growth, the flowers appearing sometimes in less than two months from the breaking of dormancy of the lead bud. It grows well in a cool position and requires less moisture than other cattleyas, being kept practically dry during the resting period.

The species was dedicated to Holbrook Gaskell of Woolton, near Liverpool, England, an orchid collector and grower. Originating in northeastern Venezuela it was introduced and named by Messrs. Sander of St. Albans, who first flowered and sold it at Stevens' Rooms in 1883.

Varieties include *alba* with white sepals and petals and a lip creamy white with yellow markings remaining in the throat; semialba types with white sepals and petals and normally colored lips; *coerulea* forms with pale blue-mauve color, especially one called 'Blue Dragon'; and variety



column closely. The isthmus is elongated and distinct, usually one half or more of the total lip length, a distinguishing feature of the species. Its specific name refers to the granules or papulae which cover the front lobes of the lip and often the tips of the lateral lobes as well. It ordinarily flowers in summer from a green sheath as the growth matures.

For many years it was reported as coming from Guatemala in 1840, whereas it actually had only been sent from Brazil by Hartweg, via Guatemala, to England. Hartweg sent the plants to the Horticultural Society of London, England without any accompanying information, and thus the controversy arose. Its native habitat is in hot humid places with well-marked seasons.

Fowlie (*Orchid Digest,* Sept.–Oct., 1986) describes the typical habitat as rolling hills near swampy areas by the ocean. Summer temperatures vary from 70°s to almost 90°F (23–31°C), and winter values run from 71–82°F (22–28°C). Late summer, when plants are through flowering and become dormant is cooler but drier save for the humid sea air. In more interior locations at 1800–2000 ft. (600–900 m.) there is more rain and cooler temperatures but temperatures and rainfall do not vary much from season to season, as it is so close to the equator. Summer there is December, January and February. Spring is in September, October and November, the reverse of our northern temperate seasons. Plants bloom in the spring—meaning there from September on.

The many described varieties differ in the markings and spottings of the sepals and petals and the brilliance of the lip coloring. Both *alba* and semialba forms are found. *C. schofeldiana,* once considered a variety, is now treated as a separate species. In the interior habitats flowers tend to be less green, more bronzy, more wingy and with a more intense red purple on the lip. There is also an occasional plant of a wild natural hybrid with *C. labiata* to be found in the mountains. It is called *C. Le Czar,* and the lavender flowers show a general *granulosa* shape, especially in the lip, with widened petals derived from the *labiata* influence.

Guatemalan Cattleya

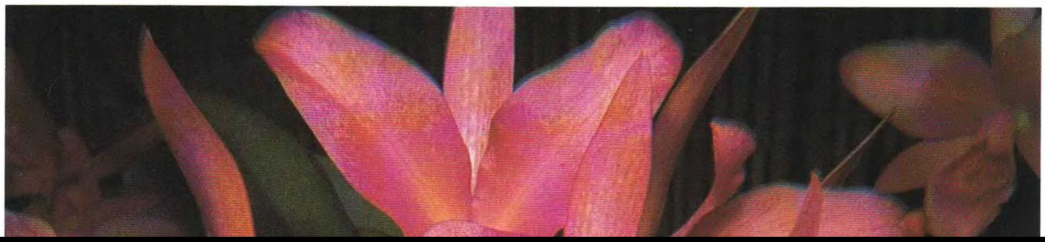
Guatemala

Cattleya guatemalensis Moore. 1861. *Fl. Mag.* 1: t. 61.
Subgenus: *Circumvolva*

Synonym

Cattleya pachecoi Ames and Correll. 1943. *Am. Orch. Soc. Bull.* 11:401, pl. 11.

A plant of this natural hybrid was sent by George Ure-Skinner to England. He noticed that it grew on the same tree with both *C. skinneri* and *C. aurantiaca,* so the parentage was in little doubt. It is amusing to note today that Veitch, in his *Manual of Orchidaceous Plants* of 1887, noted that the plant "has long since disappeared from cultivation". Not only are natural examples still eagerly sought and grown today in Guatemala, the combina-



tion has also been artificially produced several times in cultivation.

The flowers of this hybrid swarm may vary from white through yellow and orange, to salmon, pink, rose, purple and even red. The special colors are highly prized and rewarded with varietal designations. One of the best of all is 'Fuego', a deep bright red, but some of the white or yellow forms are equally striking, especially when grown into specimen plants. The name *pachecoi* was used for one of the pale lemon-yellow forms, which we realize now is simply one of the color variations in this hybrid swarm.

lip, all having rosy-purple colors or often salmon colors as well. The more *aurantiaca* they appear, the narrower the flower segments become, the more pointed and scoop-like the lip appears, the petals tend to project forward and distinct veining occurs in the throat. In addition, the flowers tend toward yellow, white or orangy red colors that reflect the carotenoid components of the *aurantiaca* flowers rather than the lavender anthocyanin mixtures of *skinneri.*

The origin of the white forms is still a puzzle, since most are more like

Spotted Cattleya

Brazil

Cattleya guttata Lindley. 181. *Bot. Reg.* 17: t. 1406.
Subgenus: *Falcata*
Section: *Guttatae*

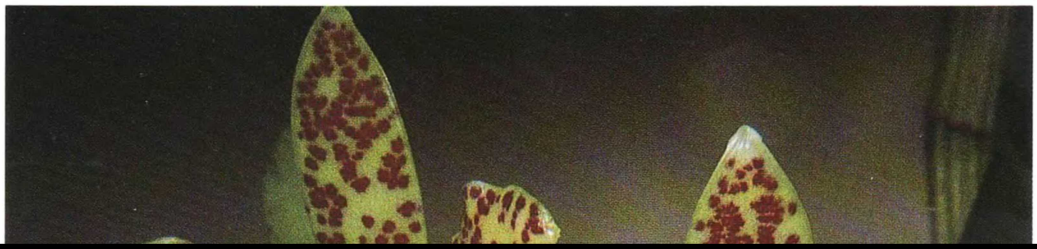
Synonyms

Epidendrum elegans Vellozo. 1825 (1790). *Fl. Flum.* 9.
Cattleya elatior Lindley. 1831. *Gen. and Sp. Orch. Plants.*, p. 117.
Cattleya tigrina A. Richard 1848. *Portfuille des Hort.* 2:166, plate.
Cattleya sphenophora Morren. 1848. *Ann. de Bot. le Gand.* 4:17, t. 175.
Epidendrum elatius Rchb.f. 1862. *Xen. Orch.* 2:33.

This species produces medium-sized plants with slender stems, from 24–40 in. (60–100 cm.) high when well grown. There are 2 fleshy leaves. The racemes are 5–10 flowered, and the flowers are 2–3 in. (5–8 cm.) across. The sepals and petals are yellow-green, finely spotted deep purple or crimson. The basal part of the lip is white externally, purple veined internally, while the midlobe is amethyst-purple, traversed by several lines of small verrucosities. The isthmus of the lip is short, only about one fourth the length of the lip, thus distinguishing this species from *C. granulosa.* Further, the flowers are generally greener, smaller and less brightly colored. According to some books, the plants flower in the late fall from dried sheaths formed earlier the same summer as the growths matured. Hamilton's data indicate, however, a July flowering peak, but the spread of this data is no doubt confounded by the continued confusion of this species with others, especially *C. leopoldii. C. guttata* is a warm-growing species, requiring at least 55°F (16°C) in the winter during dormancy, and preferring warmer, wetter conditions in its development phase.

The typical species, not very attractive to the beginner's eye, with green flowers small in relation to the larger size of the plants, was sent to the Horticultural Society of London, England, from Rio de Janeiro, Brazil, by the Right Hon. Robert Gordon about 1827. It was actually collected and named earlier by Vellozo in 1790, together with *Epidendrum pauper* (see *Cattleya forbesii*), making it one of the first two cattleyas to be described. His description, however, was not published until much later, and there is debate whether it was the same species. In comparison to other bifoliate species, real *guttata* is not often seen today, and yet selected clones are well worth growing. It was long confused with *C. leopoldii,* which was considered to be a variety of this species, but *leopoldii* is now better classed as a separate species.

The Richard name and plate of *C. tigrina* with its rosy sepal tips would seem to match closely the type of *C. guttata* in the *Botanical Register,* thus making *tigrina* another synonym. Some researchers consider it, however, a distinct species, and I am so inclined, but feel we need to know a little more about it first before making the separation. The spotting, for which it is named extends even to the ovaries and pedicels of the flowers. The plants are smaller than those of the usual *C. guttata* with no more than 2–3 flowers per growth; and the flowers are also small, about 1½–2 in. (4–5 cm.) across. Braem seems confused on this issue, mixing *C. tigrina* with *C. leopoldii* rather than *C. guttata. Tigrina* is, incidentally, an appropriate name since the



The confusion that has existed over the years as to whether *C. leopoldii* is a variety of *C. guttata* stems from the general similarity of the flowers and the wide color and size variability within both these species, plus the fact that they interbreed in some localities. It is difficult to distinguish clear-cut not just relative characteristics to separate the species. Generally speaking *C. guttata* plants are smaller, with smaller and fewer flowers, than plants of *C. leopoldii*, and horticulturally they are less exciting or interesting. The *guttata* flowers are fleshier, greener and more compact. The flowers of

Hardy's Cattleya

Colombia

Cattleya hardyana Williams. 1886. *Orchid Album.* 5: t. 231.
Subgenus: *Cattleya*

The early orchid fanciers considered this cattleya to be one of the finest and grandest. It is a natural hybrid between *C. aurea* and *C. warscewiczii* and is included here because of its early importance. There are many other natural hybrids within this Alliance, but none of the plants achieved the status of this one, nor were as many plants repeatedly found. The plants of this population closely resemble the *warscewiczii* parent in growth, producing 3–5 flowers as much as 8 in. (20 cm.) in diameter.

The sepals and petals are bright rose-purple and are paler at the base. The frilled lip is 3 in. (8 cm.) across, of a pure magenta-crimson, with the throat and upper portions veined a rich yellow. The two richer yellow "eyes" of the lip are indicative of its parental background, particularly of its "gigas" side. One must assume from all the older plates and descriptions of varieties that the members of the *hardyana* population not only did interbreed among themselves in nature, they also backcrossed to parental types as well. Such prolific interbreeding provided a hybrid swarm with all sorts of colors and shape combinations. I can recall a block of *C. hardyana,* produced by pollinating selected parents, at A. N. Pierson Co. in Connecticut, USA, that produced magnificent flowers in various color combinations from white with red lips to creamy or all lavender forms, all with prominent eye markings and full-veined lips. They were a sight to behold, and it was a sad day when they were discarded in favor of modern plants with more secure flowering dates for the major spring holidays. The plants ordinarily flower in summer and require the same treatment as *C. warscewiczii.* The flowers are strongly scented, a quality derived from their *aurea* background.

This hybrid was first imported into England with a shipment of *C. warscewiczii* and appeared in the collection of G. Hardy at Pickering Lodge, Timperly. It appeared later in other collections and was subsequently produced artificially in cultivation, scarcely two plants completely alike in flower or configuration. There were at the time many named color variants, but these, like so many other older cultivars, are no longer around so listing them seems academic.

In an address to the New Jersey Florists Club in April, 1920, quoted in White, P. J. Mossman said, "To get an ideal flower, it would be useless to take a fine form of Cattleya gigas and hybridize it with the pollen of Cattleya intermedia. If, however, Cattleya gigas be crossed with the pollen of Cattleya Dowiana or Cattleya aurea, all the described results are obtained, a compact flower with a rich gold veining in the lip or else large golden yellow discs on the side lobes of the lip: the lip of Cattleya gigas much enlarged and with the finely frilled lip of the parent. In a cross such as this, the one thing to observe is to select a type of Cattleya Dowiana which does not have the habit of twisting its lower sepals".

Twenty five years ago plants of *hardyana* could still be found in collections. It is rare today and should be remade with an eye toward hybridizing superior parents and possible tetraploid forms.

Harrison's Cattleya

Brazil

Cattleya harrisoniana Bateman ex Lindley. 1836. *Bot. Reg.* 22: sub t. 1919.
Subgenus: *Intermedia*

Synonyms

Cattleya harrisoniae Bateman. 1838. *Paxt. Mag. of Bot.* 4:247.
Cattleya harrisonii P. N. Don. 1840. *Florists' Jour.*, p. 183.
Cattleya intermedia variegata Hooker. 1844. *Bot. Mag.* t. 4085.
Cattleya papeiansiana Morren. 1845. *Ann. de Bot. de Gand.* 1:57, t. 5.
Epidendrum harrisonianum Rchb.f. 1861. *Walp. Ann. Bot.* 6:317.
Cattleya loddigesii var. *harrisoniae* Veitch. 1887. *Man. Orch. Plants., Cattleya,* p. 42.

This *Cattleya* has been considered a variety of *C. loddigesii,* with which it apparently overlaps in natural distribution and interbreeds. These facts have been the source of much confusion. In addition the two have been confused by taxonomists, particularly Bateman who called it *harrisoniae* instead of *harrisoniana,* its proper epithet. In hybrid registration the two species are still considered synonymous by the Royal Horticultural Society. There is no way, therefore, to know which species or a natural hybrid, in fact, was used in producing any given hybrid, unless the clonal names of the parents are known and they can be traced back and identified. In most cases this will, of course, make no difference at all.

The plants of this species grow to 20 in. (50 cm.) and bear 2–3 in. (5–10 cm.) flowers. They are a lilac-rose color with yellow on the tip. The sepals and petals usually have a heavy substance and a flat configuration considered attractive by the judging standards of today. The lip is also marked with violet-purple at the base. The flowers usually lack the purple spotting at the base of the sepals and petals that is typical of *C. loddigesii.* The plants are floriferous and bloom readily in later summer, or at various other times. They can be well grown in baskets. It is an easy species to grow in cultivation.

When compared to the flowers of *C. loddigesii,* these flowers are less spotted, larger in size, have some or certainly more yellow on the lip, more pronounced reflexing of the margins of the lateral lobes of the lip, and the plants are slender and taller with narrower leaves and flower from green sheaths. The sepals are usually wider than the petals in the subgenus *Intermedia* that includes this species, but some finer forms may have wider petals.

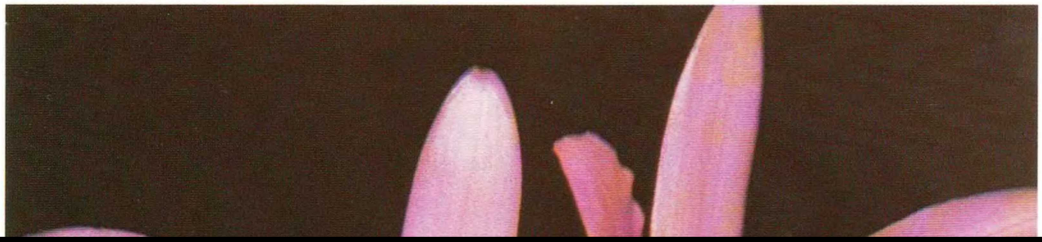
A number of varieties or color forms have been described in the literature, including white with yellow only on the lip, spotted clones, extra dark or extra rosy colored forms and even so-called blue types.

The species was introduced as a variety of *C. loddigesii* by Mr. Harrison of Liverpool, England in 1836. It grows on bushes in swampy areas near Rio de Janeiro, and in Minas Gerais, Brazil, under warm, humid conditions.

The natural hybrid *C. sororia* is presumed to be *C. harrisoniana* × *C. bicolor,* which is a synonym of *C. wilsoniana,* a prior name for the same combination. *C. brownii* is possibly another *bicolor-harrisoniana* combination from introgressive hybridizations, and yet another name would be *C.*

braziliensis (see under *C. amethystoglossa* and also *C. bicolor*); *C. wilsoniana,* again, would have the priority. *C. duveenii* combines *harrisoniana* with *C. leopoldii* var. *leopardina;* in *C. pittiae* it mixes with *C. schilleriana;* and in *C. venosa* with *C. forbesii.*

was given because its flower was intermediate in size between already known cattleyas, in particular *forbesii* that was smaller and *labiata* that was larger. Some had known it previously as *C. amabilis,* a horticultural name for a vigorous variety of *intermedia* which made two growths per year. There are more than 100 recognized clones of this species in Brazil, pointing up its great variability in color and form. There are, to my eye, both short and tall populations, about 10 in. (26 cm.) in the shorter and up to 20 in. (52 cm.) in the taller types, neither of which can be attributed to the



acre there are many thousands. One has to wade to the knees in mud and swampy water. The gnarled crowded trees are stunted by the wind to a seven foot growth. Every trunk and limb teems with sturdy intermedias, their roots stretching to the perennial moisture below. In April and May the flowers are resplendent. . . . The island is about 200 miles southwest of Rio de Janeiro and 300 miles northeast of the island of Santa Catarina."

The Pessoas, in their informative article in the July, 1986, *Am. Orchid Soc. Bull.*, describe and picture a similar habitat with intermedias growing in

purple lines extending toward the apex.

There are, incidentally, only two *Catttleya* species with definitely pointed lips, *iricolor* and *aurantiaca.* All the others have rounded or retuse midlobes, though *maxima, mooreana* and *araguaiensis* approach pointedness.

The plants are distinctive in that the leaves are long in proportion to the slender pseudobulbs, and are narrow and upright to 15–20 inches (35–45 cm.) and about 1 inch (2–3 cm.) wide. It is reported that selfed seedlings of the species are being raised in cultivation, and a few plants have been

Jenman's Cattleya

Venezuela

Cattleya jenmanii Rolfe. 1906. *Kew Bull.* 20:85.
Subgenus: *Cattleya*
Section: *Cattleya*

Described initially in 1906, this cattleya was always obscure, was then "lost" to cultivation, and was finally rediscovered in 1969 by G. C. K. Dunsterville when he found and described *Cattleya "Guayana"*. Questionable plants had appeared sporadically from the Venezuelan Guyana, a location difficult to reach, but after Dunsterville 's field collections they were confirmed as *C. jenmanii* by Prof. Garay at the Orchid Herbarium of Oakes Ames at Harvard University. One of the problems was that the flowers were not particularly distinctive and could easily be mistaken for one of the older types of labiate hybrids rather than a wild species.

This is a unifoliate species, single sheathed and with sweetly scented, rose-purple flowers. The lips have a darker central patch toward the apex, white "eye" spots to the sides and orange and yellow veinings in the throat. The lip has a definite trumpet-shape, the midlobe producing the flare at the end. Most plants of this species flower in December bearing one to three flowers.

The species is native to deep forests along rivers at about 1000–2000 ft. (300–600 m.) altitude. The forests merge into savannahs, so the plants are exposed to good light and air.

Some growers are now raising them from selfed seed, and although the species has no immediately noticeable outstanding qualities for hybridization, we should have a population for further study and appreciation in cultivation.

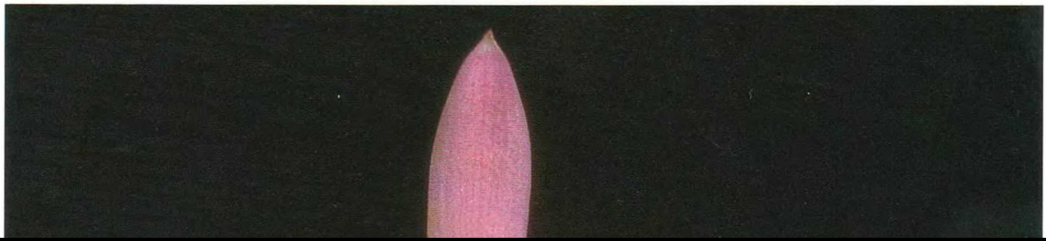
Kerr's Cattleya

Brazil

Cattleya kerrii Breiger and Bacalho. 1976. *Bradea* 2:61–62.
Subgenus: *Intermedia*

Pictured and well described by Fowlie and Duveen in the March–April, 1986, *Orchid Digest,* this cattleya comes from southern Bahia, Brazil. Although the flowers and the long, thin pseudobulbs are reminiscent of *C. harrisoniana,* this is a distinct species. The plants are commonly monofoliate, but are also bifoliate, and are found growing in a warm, wet coastal zone on trees along swamp margins. The area of distribution is not large but provides comparative shade, high humidity and high rainfall. The flowers develop from within a well-formed sheath.

Typical of the subgenus, *Intermedia,* proposed here, the flowers' lateral sepals are sickle-shaped and the petals generally narrower than the sepals, all of a uniform rose-purple color. The petals are long, attenuated, taper to a



number does not typically conform. It is almost as though it is a bifoliate cattleya flower on a monofoliate plant. If we were to subdivide the *Intermedia,* this species would have to be placed in a separate section. Nothing is yet known about the plants in cultivation, though many seedlings are being grown.

Crimson or Ruby-lipped Cattleya

Brazil

Cattleya labiata Lindley. 1821. *Collect. Bot.* t. 33.
Subgenus: *Cattleya*
Section: *Cattleya*

Synonyms

Cattleya lemoniana Lindley. 1846. *Bot. Reg.* 32 t. 35.
Epidendrum labiatum Rchb. f. 1861. *Walp. Ann. Bot.* 6:313.
Cattleya labiata vera Veitch. 1887. *Man. Orch. Plants, Cattleya,* p. 14.
Cattleya labiata var. *autumnalis* Linden. 1887. *Lindenia* 3:35, t. 112.
Cattleya warocqueana Linden. ex Kerchove 1890. *Jour. des Orch.* 1:219.
Cattleya labiata var. *warocqueana* Rolfe. 1890. *Gard. Chron.* 3rd s. 7:735.
Cattleya labiata var. *genuina* Stein. 1892. *Orchideenbuch,* p. 124.

After several labiate cattleya species were discovered an extended debate raged over whether they should be named separately or all considered varieties of this species, the first labiate to be described, and the type for the genus, *C. labiata* was then further distinguished with the epithet *vera,* the *true* labiate cattleya. Others called it variety *autumnalis,* the fall-flowering labiate cattleya, to separate it from others.

The species was introduced by William Swainson into England in 1818 from the Organ Mountains about 60 mi. (100 km.) north of Rio de Janeiro, Brazil. It was such a free-growing and popular species that collectors eventually nearly exterminated the plant in that locality. Now it is found in less accessible locations. By 1898 Cogniaux listed more than 70 named varieties.

In this species the bud sheath is typically double, a characteristic which also frequently appears in *C. warneri,* sometimes in *C. mendelii,* and two or three others, such as *C. bowringiana;* as well as in hybrids of these species. Two to five flowers which are 5–6 in. (13–15 cm.) across are produced on the spike. The wavy petals and the sepals are rose-color faintly toned with mauve, while the crisped lip is rich crimson-purple bordered with rose-lilac, which varies in intensity. The throat is yellow with a white "eye" on either side of the central area.

An immediate favorite in cultivation because of its flower size, vigor and richly colored lip, *C. labiata* was also one of the first major orchids to be line-bred depending upon self pollination of highly selected clones. The improved third and fourth generation clones were more homozygous for these qualities than wild forms and thus contributed greatly to a number of modern polyploid hybrids. Occasionally, line bred plants produced by Joseph Urmston, who carried out this work in California, USA, are still to

Society, London, England.

C. lawrenceana is a variable species, a member of the labiata group, and good forms, by modern standards, are difficult to find in collections today. In nature it grows on trees in the jungle at elevations of 6000–8000 ft. (250–3000 m.) and requires moisture and warmth, especially in the summer.

The variety 'Rosea Superba' was more robust with larger flowers of rose-purple striated with white. Also, there is a rare 'Concolor' that is

changed to hybrid status might do. The plants grow in coastal forests at altitudes up to 300 ft. (100 m.). There are decided daily temperature fluctuations between day and night, and high humidity and rainfall are followed by seasonal dryness. It usually flowers in mid to late summer.

A number of varieties are recorded in the literature, as well as in the greenhouses of contemporary collections. The one we perhaps have seen most was originally identified as *C. guttata* var. *alba.* It is correctly *C. leopoldii* 'Alba'. But by now plants resulting from two or three generations of self pollinations of the original form have relegated the original clonal name to varietal status covering a whole population of such forms. Individual new clones now demand a fourth epithet to distinguish them from others if *alba* is retained in the name. Other named varieties have included the following: 'Immaculata' was mauve-brown without spots and with a white lip; 'Leopardina' was an orange-tan color with crimson spotting; and 'Williamsianum' was dull cream-purple spotted with deep purple. Variety 'Pabstia' is a peloric form with petals veined and marked like the lip in red-purple.

The Royal Horticultural Society still does not recognize *C. leopoldii* as a separate species so the seeker of parentages for cultivated hybrids must take this into account when dealing with the natural hybrids and intergrades among *leopoldii* and *guttata.*

The natural hybrid of *C. forbesii* and *leopoldii* is *C. isabella; C. scita* is possibly *leopoldii* × *C. intermedia* (in which case it would be synonymous with *C. intricata*) or, more likely, is *C. intermedia* × *C. porphyroglossa. C. duveenii* is, according to Fowlie, the hybrid, between *C. harrisoniana* and *C. leopoldii* var. *leopardina.*

Loddiges' Cattleya

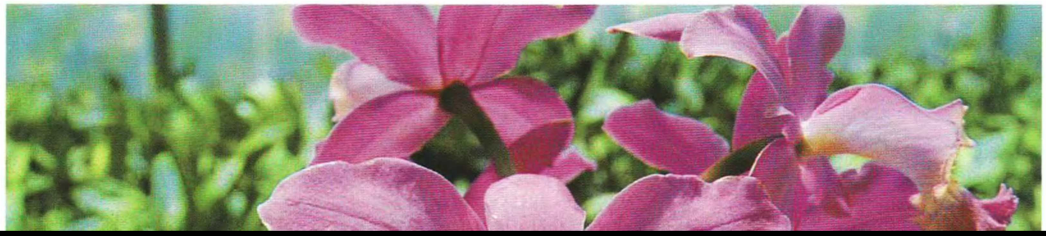
Brazil and Argentina

Cattleya loddigesii Lindley. 1823. *Collect. Bot.* sub t. 33, t. 37.
Subgenus: *Intermedia*

Synonyms

Epidendrum violaceum Loddiges. 1819. *Bot. Cab.* t. 337.
Epidendrum canaliculatum Vellozo. 1825 (1790). *Fl. Flum. Icones,* 9, t. 10.
Cattleya ovata Lindley. 1838. *Bot. Reg.* sub t. 1919.
Cattleya arembergii Scheidweiler. 1843. *Allg. Gartenz.* 11:109.
Epidendrum loddigesii Rchb. f. 1861. *Walp. Ann. Bot.* 6:316.

Plants are 12–15 in. (30–39 cm.) tall with robust round stems. Two elliptic-oval leaves form at the top. The flowers are 2–9 in number and about 4 in. (10 cm.) across. The sepals and petals are pale rose tinged with lilac and usually speckled with darker purple. The lip is pale amethyst-purple to white with a crisped margin. The pale disc is marked with faint yellow and noticeably raised central veins but none are on the lateral lobes as in *C. harrisoniana.* This species prefers warmth, light, a good rest period and ample watering during growth. It generally blooms in the fall to early



Lueddemann's Cattleya

Venezuela

Cattleya lueddemanniana Rchb. f. 1854. *Xen. Orch.* 1:29.
Subgenus: *Cattleya*
Section: *Cattleya*

Synonyms

Epidendrum labiatum var. *lueddemannianum* (Rchb. f.) Rchb. f. 1861. *Walp. Ann. Bot.* 6:315.
Cattleya dawsonii Warner. 1862. *Select. Orch.* Pl. 1: t. 16.
Cattleya speciosissima Hort. 1868. *Gard. Chron.* p. 404.
Cattleya speciosissima var. *lowii* Anderson. 1868. *Gard. Chron.* p. 404.
Cattleya labiata var. *dawsonii* (Warner) DuBuysson. 1878. *Orchidophile,* p. 240.
Cattleya speciosissima var. *buchananiana* Hort. 1882–97. *Wms. Orch. Album* 6: t. 261.
Cattleya roezlii Rchb. f. 1882. *Gard. Chron.* n.s. 18:457.
Cattleya labiata var. *roezlii* Rchb. f. 1882. *Gard. Chron.* n.s. 18:457.
Cattleya labiata var. *lueddemanniana* (Rchb. f.) Rchb. f. 1883. *Gard. Chron.* n.s. 19:243.
Cattleya malouana Linden. 1885. *Lindenia* 1:90, 99, t. 47.
Cattleya labiata var. *wilsoniana* Rchb. f. 1887. *Gard. Chron.* 3rd. s. 2:460.
Cattleya bassetii Hort. 1887. *Man. Orch. Plants. Cattleya,* p. 19.
Cattleya mossiae var. *autumnalis* Hort. 1887. *Man. Orch. Plants., Cattleya,* p. 19.

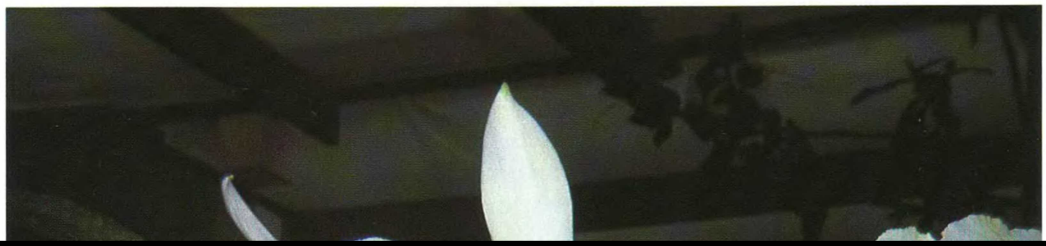
The complicated synonymy of this species cannot be readily explained. Since it is an outstanding species, with larger flowers than average, perhaps many wanted the honor of having it named after them. At one point, according to older writings, it was even considered identical to *C. gaskelliana,* so there was also considerable confusion as to its characteristics. The earliest notice of this cattleya was by Reichenbach in *Xenia Orchidacea* and described a plant in the collection of Pescatore at St. Cloud in Paris, France. It received the name *lueddemanniana* in recognition of his gardener, who was then one of the most skilled orchid growers in France. The species was later recognized as being the same as the British *speciosissima.* In the meantime, it had been cultivated before 1863 at Meadow Bank near Glasgow, Scotland, by Dawson and named *dawsonii* by Warner. And so the list of names grew until communication about the plants improved.

The plants characteristically produce 3–4 flowers of good substance and better than average form. The flowers can measure 8 in. (20 cm.) across. The petals are nearly three times wider than the sepals. The sepals and petals are a delicate rose-purple suffused with white, some forms having a darker tone. The lip is the same color except for the front which is amethyst-purple with yellow in the throat and then has characteristic tesselated magenta markings on the midlobe.

The plants typically flower in the spring, but some say it is not as free-flowering as other types of cattleyas. Occasionally, seasons may pass with few or no flowers produced. It must definitely be grown in a warmer part of the greenhouse and needs plenty of light and fresh air, reflecting its sea level habits, not the mountain altitudes of its cousins. Dunsterville says it grows in "lower warm-to-hot parts of the north facing slopes of the Coastal

Range. . . . and in fairly low scrubby hills". Poor culture from growing it "cool" instead of "warm" or "intermediate" could account for its apparent scarcity in modern temperate collections.

Many forms have a naturally good shape from the point of view of judging, and it is a popular species today in Venezuelan shows. Various color forms are known: the white, blue, and particularly the darker colored types are sought after. Among the older varietal names we find albas with white flowers and only a stain of yellow on the disc; 'Baron Schroeder' was



Pale Yellow Cattleya

Ecuador, Peru, Brazil and Bolivia

Cattleya luteola Lindley. 1853. *Gard. Chron.*, p. 774.
Subgenus: *Stellata*

Synonyms

Cattleya flavida Klotzsch. 1856. *Allg. Gartenz.* 24:73.
Cattleya meyeri Regel. 1856. *Gartenfl.* 5:116.

Flowers are 2 in. (5 cm.) across in sprays of 2–5. They are a pale lemon-yellow concolor, in the type, except for the anterior margin of the lip which is white. The side lobes of the lip may be streaked with purple, and there may be a rose flush or pale purple spot on the front of the lip, but these colors are not mentioned in the type. It flowers in late fall or early winter.

The earliest mention of this species was in the *Gardener's Chronicle* of 1853, but it had been cultivated previously in several collections. In Brazil, where it was cultivated on orange and other trees, it was reported to grow throughout the year and be almost continuously in flower. Most plants today come from Peru or Ecuador, and do best mounted on cork, tree fern or driftwood with ample exposure to light, air and room for rambling roots. It has a distinct winter dormancy when water should essentially be withheld. Its sprawling growth habits should be allowed for in its mounting.

C. luteola has been in much favor recently for its role in producing miniature hybrids. The yellow flowers contribute to colorful combinations, such as in *Sc.* Beaufort, where it is crossed with *Sophronitis coccinea.* Though the species has had a catenation of names in the older literature, there are no particular descriptions of distinct clones as it apparently does not vary greatly.

C. blossfeldiana is the natural hybrid of *C. luteola* with *C. rex.*

Greatest Cattleya

Venezuela, Colombia, Ecuador and Peru

Cattleya maxima Lindley. 1831. *Gen. and Sp. Orch.*, p. 116.
Subgenus: *Cattleya*
Section: *Maximae*

Synonyms

Epidendrum maximum Rchb. f. 1861. *Walp. Ann. Bot.* 6:316.
Cattleya malouana Lind. and Rod. 1886. *Ill. Hort.* 33:102.

Stems varying from 4–15 in. (10–39 cm.) or longer are indicative of the two distinct races, ecotypes, of this species, one vegetatively larger than the other. It is named, not for its large flowers as Veitch questions, but because the lowland race of plants is vegetatively tall, greater than any of the other monophyllous cattleyas in size. The pseudobulbs on well-grown specimens are enormous, and with leaf added may reach 2 ft. (61 cm.) in height. The upland types are of usual cattleya size, not out of the ordinary, but the original specimens were the lowland sorts, thus the name was appropriate.

The upland types bear 3–5 flowers while as many as 12–15 can appear on the lowland sorts, all about 5 in. (12.7 cm) across. The perianth is pale rose on large plants, and much darker and more intense on smaller upland plants. The petals are waxy-margined, often turned back along the midrib, and the lip is colored like the petals, having a deep crimson network of veins and a distinctive yellow band extending from the throat to the apex of the lip. There may be a paler ruffle about the border.

The leaves and pseudobulbs of the upland types tend to be mottled

with red, while those of the lowlands are plain green. The plants bloom in winter to early spring, but mostly October and November according to Hamilton. They make two growths a year under good growing conditions.

Around Guayaquil, Ecuador the maximas grow high on horizontal branches of old ceiba trees in dry coastal hills; the upland types are found on limestone outcroppings; on small trees, along rivers; as well as in comparatively dry areas with cactus and scrubby thorny vegetation. I have seen them growing to perfection out of doors in Florida at Fred Fuchs' range in

The species was first introduced in 1870 by Messrs. Low and Co. and shortly after by Messrs. Backhouse who named it to compliment Sam Mendel of Manley Hall, near Manchester, England. It flowered for the first time in cultivation in June, 1871 in the collection of John Day.

Its native home is on the slopes of the Eastern Cordillera between Pamplona and Bucaramanga, Colombia, the Dept. of Santande where it often grows on exposed precipices and bare rocks. Variety 'Alba' had pure white flowers; 'Bluntii' was white with yellow on the lip; 'Bertii' was rose tinted; 'Lachneri' had a broad, dark purple, marginal band on the front of the lip and an inner band of light purple; and there were yet others.

Though the variable flowers are of large size with broad segments, their softer texture has made them somewhat less desirable than other labiate species for hybridizing. The plants are making a comeback today as interest in species increases, and they are once again available, especially through some of the Japanese commercial growers with nursery connections in Colombia.

Moore's Cattleya

Peru

Cattleya mooreana Withner, Allison and Guenard. Sp. nov.
Subgenus: *Stellata*

Pseugobulbis robustis, erectis, satis compressis, clavatis, 18–20 cm. longis, 2.5 cm. latis; folio monophyllo, crasse coriaceo, erecto, 17.5 cm. longo, 7 cm. lato; spatha singula; pedunculo crasso, 1 cm. diametro; floribus mediocribus, 4–5; sepalis et petalis lateralis obtusis, olivaceis pallidis, sepalis longioris, petalis procurris anticis; labello flavo-albescens extus, leviter recurva, intus albidi, luteia et purpureia, optusis, sine sinibus loborum lateralorum; ovariis crassiusculis. D. Allison and A. Guenard, s. n., Peru, 1986, flowered in cultivation August, 1987. Deposited in Orchid Herbarium of Oakes Ames, Harvard University.

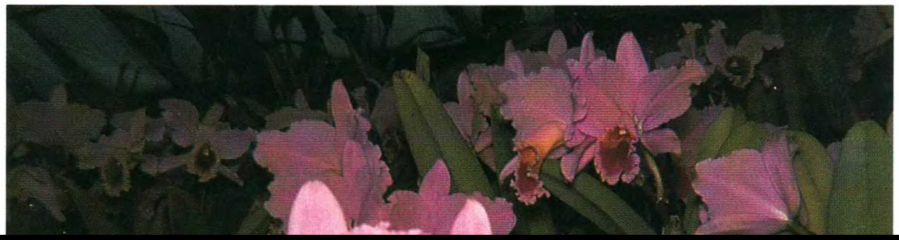
I first saw this cattleya in flower in 1958 at the Brooklyn Botanic Garden. It came from Lee Moore, a Floridian living and collecting in Peru where he ran tourist trips under the name of The Osprey Adventurer. He had sent a plant to me saying it was a new species, and to name it after him, if I would. The plant was in poor condition, produced two flowers on an unestablished new growth and then promptly died. Somehow, not thinking the plant would perish, I had not preserved the remains to press as a type specimen, so it was impossible to name the species until another specimen became available. I did, however, have a photograph as a reminder. Finally, on September 2, 1987, it was possible to obtain another specimen, write this description, recover this manuscript from the publisher and insert *Cattleya mooreana* as a last minute revision before the book went into production.

Although I had been to Peru in 1962 inquiring and searching for this plant with my picture as a guide, no trace was to be found, and people commented it was just some sort of *C. luteola.* It is not, as the plant habit imme-

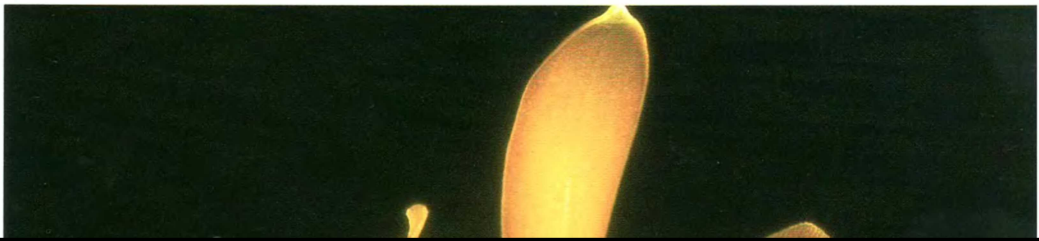
diately shows. Finally, David Allison and his wife, Canadian friends from Vancouver, who were living in Lima and intensely interested in collecting and growing orchids, were advised to be on the lookout for this cattleya that I had not seen again for more than 20 years. They did find some likely specimens, brought one back to grow in their greenhouse, and we impatiently awaited flowers. Two lead growths were finally produced, each with two flowers, and we have reluctantly but dutifully clipped off the one growth to be pressed and sent to the Ames as the type specimen.

These plants grow on large riverside trees where the situation is bright and warm. The altitude is from 4000–6000 ft. (up to 2000 m.). The plant size and habit distinguish it from *C. luteola* immediately, and from other possible cattleyas in Peru found many miles away with no connections. The flowers are also distinctive as a quick comparison with other species will show. The species fits well into the subgenus *Stellata* along with *luteola, iricolor* and *araguaiensis.* The specimens are not common in their habitat, occurring as isolated individuals, so we must await selfed seedlings

tinge of rose on the lip; and *coerulea* is mauve-blue, both in the perianth and veining. Forty six fine, named clones were described as early as 1885 in the 6th edition of Williams' *Orchid Grower's Manual.* The 'Wageneri' cultivar, affectionately known as "mossy wag", is white save for the yellow on the lip and is the most famous in the lineage of modern white hybrids. Several subvarieties of 'Wageneri' were also recognized. The other famous clone was 'Reineckiana', white with a purple lip, a major progenitor of many semialba hybrids, and also one with more than one subvariety. Modern



distance of about 50 ft. (15 m.). The flowers along the top of the wall were an unforgettable sight. They were backed by a poinsettia hedge in full color. Roadside vendors were selling small wooden baskets containing 4–5 lead growths with flowers, yanked off mature plants in the wild. We could not resist purchasing a few and happily most of them sprouted and grew even without the rest of the plant for backing. This manner of collecting and propagation cannot, however, be recommended as a wise way to acquire cattleyas, though it seemed to work for this one!



Co. to England and was painted by Day. The plants had been found a few at a time in small pockets in swampy forests near the coast, and the plant Low obtained was mixed up in a shipment of *C. harrisoniana* to which it bears a considerable vegetative resemblance, and with which it apparently grows. Sander, the English firm, obtained their stock from Minas Gerais, Brazil in 1891. In later years it had been thought extinct until it was rediscovered by Dr. Laramja and Jorge Verboonen in a small area on islands of the Rio Paraiba in the interior of the State of Rio de Janeiro. It was epiphytic on low trees near the water.

The variety 'Sulphurea' from Low and Co. was yellower than others, indeed lemon-colored, and the lip was white instead of purple. No hybrids are recorded up to 1985 by Sander. *C. batalinii,* named after Batalin, Director of the Imperial Gardens at St. Petersburg at the time, had been a puzzle until Pabst, as reported by Fowlie, checking the type specimen at Kew noted it to be of this species. *C. batalinii,* the natural hybrid, is a combination of *C. bicolor* × *C. intermedia* and would have nothing to do with *porphyroglossa.*

Four-colored Cattleya

Colombia

Cattleya quadricolor Batem. 1864. *Gard. Chron.* p. 269.
Subgenus: *Cattleya*
Section: *Cattleya*

Synonyms

Cattleya chocoensis Linden and Andre. 1873. *Illus. Hort.* 20:43, t. 120.
Cattleya labiata var. *trianae* subvar. *chocoensis* Veitch. 1887. *Man. Orch. Plants., Cattleya,* p. 25.
Cattleya candida Lehm. 1895. *Gard. Chron.* 3rd. s. 18:466.
Cattleya caucaensis Roezl ex Ballif. 1896. *Monit. d'Hort.,* p. 229.

This species was considered by Veitch to be a subvariety of *Cattleya trianaei,* because it flowers in the same season. But, it was first called *C. quadricolor* in reference to the white, lavender, purple and yellow on the lip. Roezl in 1883 remarked that he did not know why the plant had been called *C. chocoensis* since it came from the Cauca in Colombia, not the Choco, so he attempted to correct this in 1896 with the name *C. caucensis.* However its native locale and its proper name may have been confused, the name *chocoensis* is still recognized by the RHS as a parent of hybrids, though *quadricolor* has the priority.

The flowers of this species do not open as widely as in most labiate cattleyas, a key characteristic it shares with *Cattleya aurantiaca, C. mooreanea* and *C. porphyroglossa.* They remain characteristically cupped or half-open, the petals projecting forward, a feature that has no doubt contributed to its lack of popularity or use in hybridizing. And yet, the sepals and petals are of good size, large and broad, and are often white or sometimes flushed with pale lilac and have wavy margins. The lip is yellow and stained in front with deep purple. The amount of yellow varies with the clone, the balance of the lip being white or pale lavender. The flowers are noted for their


550/1

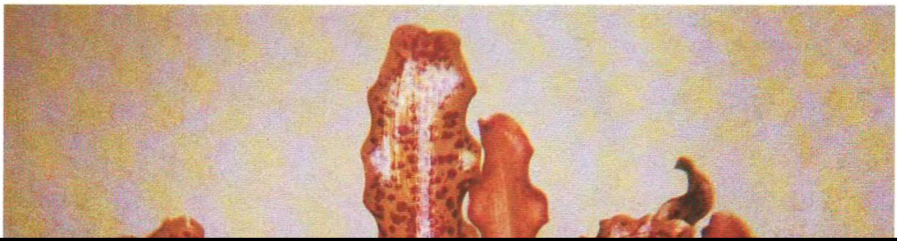
Fig. 58.
Cattleya quadricolor varieties.
Plate 120 from
Illustration Horticole, 1873,
as *Cattleya chocoensis.*

King of Cattleyas

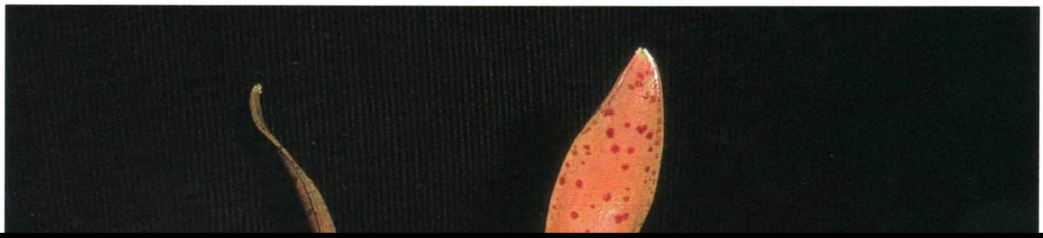
Peru

Cattleya rex O'Brien. 1890. *Gard. Chron.* 3rd s. 8:684.
Subgenus: *Cattleya*
Section: *Xantheae*

This species remains comparatively poorly known, and in Schweinfurth's *Orchids of Peru* only a single herbarium specimen is cited and that



was so often the case with orchids, the first plant of a given *Cattleya* species was sent mixed in with other plants and not purposely included. Today one can only imagine what excitement a new flowering generated from such serendipitous events! Plants of this species have never been common in collections and are now being raised from seed, even in Brazil. Two years after the original flowering a plant in the English collection of Backhouse bloomed and was sent to Kew where Hooker described it as variety 'Concolor' since it lacked the usual spotting.



larger size, their dilated and rounded tips and their characteristically downwardly curved shape. The lateral sepals are definitely flat and very "bowlegged". Waras, in Fowlie, aptly describes the flowers as appearing "awkward".

This cattleya is named after G. Law Schofeld, who first flowered it in England in 1882, after a purchase in 1879 in Stevens' Rooms, the auction firm that handled so many orchids in those days. A sketch was sent to Reichenbach who noted its differences, especially the shape of the petals, and described it as a new species. As yet, no particular varieties have been described that are unusual. The species is poorly known.

The plants prefer light and air as they are epiphytic on trees growing on rocky slopes or cliff faces. According to Fowlie, it prefers moss or lichen covered sloping trunks where the roots may extend for 2 ft. (75 cm.) or more. Its rest period is neither marked nor protracted. At least one hybrid is listed under this name in the recent RHS records, so apparently it is no longer considered only a variety of *C. granulosa* by them.

Baroness Schroder's Cattleya

Colombia

Cattleya schroderae Sander 1888. *Gard. Chron.* 3rd s. 4:94
Subgenus: *Cattleya*
Section: *Cattleya*

Synonyms

Cattleya trianaei var. *schroederae* Rchb. f. 1887. *Gard. Chron.* 3rd s. 1:512.
Cattleya labiata var. *schroderae* Sander. 1888. *Reichenbachia* 1 (2):37.

Veitch spells it Schroeder, but Duval says Schroder, Reichenbach says Schroder, and the RHS says Schroder, so we will use Schroder. Although I've also seen the name *Schroederiana,* it is a mistake and only leads to confusion with *Cattleya schroederiana,* also given by Reichenbach, which is a synonym for *C. walkeriana.* Plants of this species flower in April. It was named after the Baroness Schroder, wife of a distinguished English orchidiphile at that time. The confusion over the spelling probably came from an umlaut in the original German family name. This is usually translated as an "oe" diphthong into Latin or English, or the umlaut is sometimes completely ignored.

The flowers are light rose to white, deeper on the lip, and are much crisped and of soft substance. They are very fragrant. The pale petals are wide and well-shaped. The throat has a distinctive orange-yellow spot. The particular fragrance, the crispness of the lip and petals and the prominent orangy spot distinguish it from *Cattleya trianaei,* of which it was first considered a variety, and then a natural hybrid. Also, it does not have the club-like pseudobulbs characteristic of *trianaei.*

Not much has been recorded of its origins save that it came from Colombia, New Granada as it was then called, about 1885 or 1886. It was called the Easter Cattleya due to its spring-flowering period, but it ought not be confused with *C. mossiae,* also called the Easter Cattleya, but from

Venezuela. The Colombianos, according to Lager's account called these flowers *lirios* (lilies, now), and they came from the eastern mountains, from the San Martin plains to Cazanare. He commented on its great form but pale color and that the lack of roads made the plant difficult to get.

Several varieties are described. There were at least three *alba* clones, pure white; also *albescens,* almost white; *coerulea* was bluish; while 'Citrina' had white petals tinted rose and the lip and throat was bright yellow with a margin of rose. The species has been a good parent thanks to the large size

Skinner's Cattleya

Guatemala to Panama

Cattleya skinneri Bateman. 1838. *Orch. Mex. and Guat.* t. 13. Misc., p. 83.
Subgenus: *Circumvolva*
Section: *Moradae*

Synonym

Epidendrum huegelianum Rchb. f. 1862. *Walk. Ann. Bot.* 6:312.

flowers of this species, but some forms may have superior shape with overlapping wide petals, such as 'Hetti Jacobs' FCC/AOS. One distinctly pink type has been observed, one clone is definitely 'Lilac' and the other shows a small purple petal splash against a pale background. Another is definitely peloric, 'Mem. Matilde de Herrera' JC/AOS, with petals the same color as the lip and with a prominent, central, white band. These variants have been observed in Guatemalan collections and represent thousands of plants that have been screened for possible deviations from the norm. Mostly, the species has garnered cultural awards for good specimen plant growers, such as the clone 'Isabel', belonging to Marie Eugenia de Roy in San José, Costa Rica, and awarded by the American Orchid Society in 1984 with 52 inflorescences and 520 flowers! This single plant was 4½ ft. (1.5 m.) across; a record among records for all time! Although cleistogamous populations of both *C. aurantiaca* and *C. deckeri* are known, this process of self pollination does not seem to occur in *C. skinneri.*

This species is an excellent one for the beginner. Tolerant of heat or lack of humidity, it can readily summer out-of-doors hanging in an apple tree to complete its growth, then flower the following spring on the windowsill in full light.

Cattleya guatemalensis, the natural hybrid swarm between this species and *C. aurantiaca* is discussed separately.

Slender-stemmed Cattleya

Brazil

Cattleya tenuis Campacci and Vedovello. 1983. *Circulo Paulista de Orquidofilos* 1: 1–3.
Subgenus: *Schomburgkoidea*

Just when we think that all the cattleyas have been described, another one makes its appearance! Often they exist as one or two plants of a natural hybrid combination, not a real population, endemic though it may be. Other times the species status seems confirmed. This implies that the taxon has distinguishing features, key characteristics, if you will, which differentiate it from other species and will continue for generations in nature. Such is the case with *C. tenuis,* described originally in a Brazilian journal and reprinted with more complete details by Fowlie in the *Orchid Digest* (July–Aug., 1986) in which he describes a trip to the Chapada Diamantina in inland Pernambuco. Fowlie states that it "was the thinnest *Cattleya* species for its height we had ever seen."

The plants are bifoliate, with thin, narrow, pointed leaves with the habit of *C. bicolor.* The thin stems are as much as 3 ft. (1 m.) or more, tall. They grow on small trees 10–15 ft. (3–4.5 m.) above the ground and have extensive root systems running several feet along the trunks. The trees were in dense semi-arid thickets on hilltops at 3000 ft. (about 1000 m.). The dense branches helped support the plants so they could reach the light and air.

The flowers appear a red-tan to a rich mahogany color with a rose-purple lip bordered in rose or white. Occasionally a few dark spots appear

on the sepals and petals. The lateral lobes of the lip are pale and do not completely enclose the column, its curved back protruding between them. The petals, in typical bifoliate fashion are narrower than the sepals and may have wavy margins and blunt tips. The broad isthmus and midlobe, together with the vegetative habit readily place this species among the *Schomburgkoidea* along with *C. elongata* and its closer relatives. In fact, as with the stems of *C. elongata* and *C. bicolor,* this cattleya may also be propagated from dormant stem cuttings. It also hybridizes naturally with

Dr. Triana's Cattleya

Colombia

Cattleya trianaei J. Linden and Rchb. f. 1860. *Bot. Zeit.* 18:74
Subgenus: *Cattleya*
Section: *Cattleya*

Synonyms

Cattleya labiata var. *trianae* Duchartre. 1860. *Jour. Soc. Imp. Hort.* p. 369, t.13.
Epidendrum labiatum var. *trianaei* Rchb. f. 1861. *Walp. Ann. Bot.* 6:315.
Cattleya kimballiana L. Linden and Rod. 1887. *Lindenia* 2:85, t. 89.
Cattleya bogotensis Linden ex Morren. 1897. *Dict. Icon. Orch.*, p. 5.

Another popular species over the years, this vies with *Cattleya mossiae* in the number of named varieties and the thousands of plants imported after its discovery. Cogniaux lists about 125 clonal names in the *Flora Brasiliensis*, and the Burrage collection in Massachusetts, USA, formed in the 1920s, alone contained more than 2800 plants of this species.

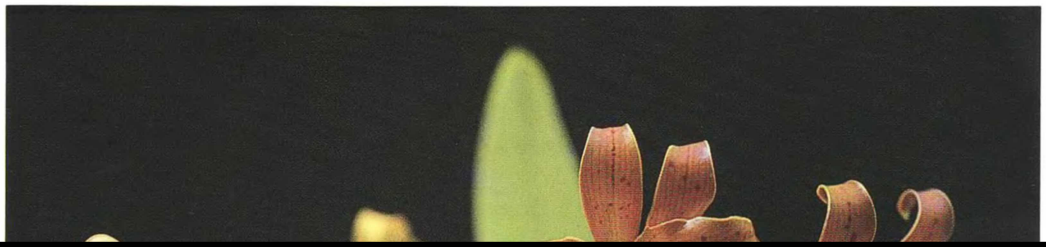
Reichenbach received a plant from Linden, and named it *C. trianae* in 1860 honoring Dr. Triana, a botanist and citizen of Bogotá, Colombia. Earlier a plant had been sent from the Magdalena River in Colombia to Rucker in England who flowered it in 1851. Lindley named this plant *C. quadricolor*, but that name was not validly published until 1864 by Bateman. Some have considered this *C. quadricolor* a synonym of *C. trianaei*, but others, including myself, consider it the proper name for a different *Cattleya* species, not *trianaei*. (Please see under *C. quadricolor*.)

As of the 1961–70 *Addendum* to *Sander's List of Orchid Hybrids* published by the RHS the name is to be spelled with an *i* at the end, a technicality about forming the proper Latin ending for a species name indicating male gender. The former *ae* indicates it was named after a female, the complication being that Dr. Triana's name already ended in an "a", and only adding an "e" changed his gender. Now, with the *i* added as well, all is secure once again!

There are so many named varieties, some with horticultural names indicating the largest, the most delicate, the grandest, the white color, 'Blue Bird', etc.; while others read like a roster of the orchid elite of the time 'Dodgson', 'Massange', 'Colman', 'Hardy', 'Day', 'Provost Russel', 'Osman', 'Backhouse', 'The Czar', etc. There were even his and hers: 'Baron Schroder', 'Baroness Schroder', 'Mr. Lee', 'Mrs. Lee'; and, for a change, even the Americans were in on the act: 'A. C. Burrage', 'Mrs. Burrage', 'F. E. Dixon', 'E. Corning', 'Clement Moore, 'The President', and so on. Some of these varieties are still in cultivation. They can be outstanding in size of the petals and width of the dorsal sepal, and generally have dark color and a fine configuration that have led to many of our best hybrids.

The flowers of this species are 3–4 in number and 6–9 in. (15–22.8 cm.) across. They vary from white to rose to amethyst-purple, most forms being a medium color of lavender. The lip is more tube-like than those of other cattleyas, narrower and less crisped. The tube is lavender-colored like the petals with the front a rich crimson-purple and the throat white and orange. These plants bloom in the winter, December to April, real Winter Cattleyas, or Christmas Cattleyas as the old common names indicate. They

when white orchids were all the rage with Bow Bells, Joyce Hannington, and other tetraploid whites sweeping the field. This plant, called variety 'Aranke Germaske' after his mother, was eventually sold for a large sum to an orchid breeder in Florida, but it never served as a parent as it turned out to be a triploid, and triploids are generally sterile. The competition to obtain the plant was intense, and yet no one then thought of counting the chromosomes first. This was and still is a difficult procedure to do accurately but it might have saved a lot of money had it been done. I was



among the taxonomists. In addition, good library facilities, able to provide obscure books and journals were not widely available, and of course it was not as simple a matter to visit various collections and herbaria as it is today.

J. Barbosa Rodrigues always seemed to miss out on the first naming of *Cattleya* species in spite of writing the first orchid flora for the whole of Brazil. Vellozo was also unfortunate in that he wrote his *Florae Fluminensis,* meaning the plants of Rio de Janeiro state, in 1790 but the plates were not published until 1825 and most of the text in 1881, so that the majority of his names also became synonyms.

Reichenbach not infrequently changed his mind about cattleyas calling one a separate species one time, a variety of another species another time, and even switching genera from *Cattleya* to *Epidendrum* and back! Not much wonder the synonymies are complicated when put all together. One marvels at the speed with which Reichenbach and others published, usually the same year the plant was imported or flowered, another indication of the competition. We could not easily do that today!

In any case, this species was published first as a hybrid of *C. bicolor* with *C. guttata* of some type or other with which it had been imported by chance. It was flowered in the collection of J. Broome at Didsbury, near Manchester, England, who had imported the plants. Later importations of additional plants proved that it was a species not a hybrid.

We recognize the plants as distinctive with their reed-like stems 10–15 in. (25–40 cm.) high producing two or three pointed leathery leaves. Flowers are 1–4, often 2, and have a unique spicy sweet fragrance.

The flowers are often of poor shape, the segments crisped and reflexed giving an impression of curliness, so that selection of clones for breeding is important. The blooms are 3–4 in (7.6–10 cm.) across, with orange-yellow-mustardy sepals and petals spotted with purple. The lip is white, tinted with yellow and veined with violet, with small side lobes that incompletely cover the column. The flowering period is generally late summer, August and September, according to Hamilton.

In their natural environment they grow in small clumps of brush scattered on plains where there is plenty of light but little of which directly reaches the plants. The Pessoas describe it growing with *C. bicolor* in coastal mountains with warm summers and cool winters and year around rainfall. There are, as with other cattleyas, certain ecotypes that do not always grow in the identical type of habitat.

This species has not done particularly well in modern collections and tends to die out after a time, possibly a reason for so few hybrids or varietal designations.

Violet Cattleya

Guyana to Peru, including Venezuela, Ecuador and Brazil

Cattleya violacea (Kunth) Rolfe. 1889. *Gard. Chron.* 3rd s. 5:802.
Subgenus: *Schomburgkoidea*

Synonyms

Cymbidium violaceum Kunth. 1816. *Humb. and Bonpl. Nov. Gen. et Sp. Pl.* 1:341.

baskets which provide perfect drainage for the coarse roots. They flower from June to August. The other species showing the same requirements and partially overlapping the same regions is *C. eldorado.* Their natural hybrid is *C. brymeriana.*

The stems are 10–12 in. (25–30 cm.) high with two rounded leaves. They bear 3–5 or more flowers of heavy texture, 3–4 in. (7.6–10 cm.) across. They are uniformly bright rose-purple, sometime suffused or tipped with white at the ends of the segments. The lip is crimson-purple blotched at the

Walker's Cattleya

Brazil

Cattleya walkeriana Gardn. 1843. *Lond. Jour. Bot.* 2:662.
Subgenus: *Rhizantha*

Synonyms

Cattleya bulbosa Lindley. 1847. *Gard. Chron.*, p. 623.
Epidendrum walkerianum Rchb. f. 1862. *Walp. Ann. Bot.* 6:416.
Cattleya gardneriana Rchb. f. 1870. *Gard. Chron.*, p. 1473.
Cattleya princeps Barb. Rodr. 1877. *Gen. et Sp. Orch. Nov.* 1:68.
Cattleya schroederiana Rchb. f. 1883. *Gard. Chron.* n.s. 20:102.

The plants of this species have stout rhizomes with bulb-like pseudobulbs up to 6 in. (15 cm.) high and produce one or, usually, two leaves 2–4 in (5–10 cm.) long. The 1–2 flowers are rosy purple to pink-lilac in color and about 4 in. (10 cm.) across. The lip is a richer color with a white or pale yellow base and an anterior border of amethyst-purple. The flowers are very sweetly scented.

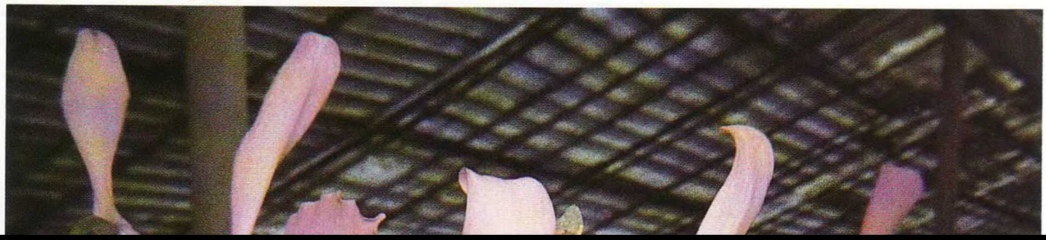
The plants can bloom almost any time of year according to Hamilton, but show two flowering peaks, one in May, the other in December. The flowers form from small specialized shoots about 1–2 in. (2.5–5 cm.) tall that emerge from the rhizome near the base of the previous growth. This stem is first clothed with green bracts that soon dry, after which the flowering peduncle appears from the apex. After flowering a new bud is formed at the base, which develops into the next foliar stem. In addition to producing flowers on a separate growth, only characteristic of two or three other members of the entire Laeliinae complex (i.e. *Epidendrum stamfordianum, Alamania punicea*), flowers are also produced terminally from leafy growths in the usual fashion. Both processes may occur on the same plant though ordinarily not at the same time.

The plants are popular in Brazil due to their annual free-flowering qualities and ability to withstand rigorous climatic conditions with little care. Some of the best I ever saw in cultivation were growing on a cow's skull that had been stuffed with shredded tree fern and hung on a concrete-block garden wall in full sun in São Paulo. The plants completely covered the skull, the fleshy roots winding everywhere and finally extending over the concrete blocks for considerable distances. They were probably taking to the lime of the skull and the blocks, duplicating their natural habitat on the rocks of limestone cliffs along rivers. The plants should dry quickly after rain or water, an essential for their proper survival.

Cattleya walkeriana was discovered about 1839 by Gardner during his travels in Brazil, and was named after Edward Walker who accompanied him on some of his journeys. A few years later, Libon, a collector, sent plants back to Belgium. In May, 1847, Lindley identified a cattleya of unknown origins as *C. bulbosa,* by which name the plant became known for a time. Finally, the matter was corrected with the proper name receiving priority. The *bulbosa* epithet is now used in Brazil as a varietal name to distinguish plants that have short, almost round psuedobulbs, darker colored flowers and, says Fowlie "more symmetrical, less ungainly, flowers". It is rarer than the usual forms and has a more restricted distribution.

orchid business, Orquidário Binot being one of the most respected firms in South America, being operated by the third and fourth generation, the Verboonens.

The flowers number 3–5, are large, 6–8 in. (15–20 cm.) across, and of an open and wingy shape. Sepals and petals are rose-shaded with amethyst-purple, while the lip is somewhat darker, the expanded portion red-purple marked with purple veins. The finely fringed margin in front is rose-mauve, while the throat is orange-yellow striated with lilac or white



bright yellow "eyes". This cattleya flowers in the summer and requires more exacting growing conditions than other cattleyas for good flower production. It needs a definite resting period reinforced by keeping the plants dry. It does well hanging in baskets and likes a great deal of light and moderately cool conditions. The fragrance has been compared to hyacinth mixed with rose geranium.

In Colombia it is called *Flor de San Juan* or *Flor de San Roque.* Since St. John's escape from martyrdom was on May 6, and his feast day is Dec. 27, I'm not certain how he is connected to this species.

Warscewicz discovered this cattleya about 1848 in the province of Medellín, but his plants were lost in a shipping accident. Reichenbach had to publish his description of the new species from the pressed herbarium specimens that did arrive. More plants were later received by Linden from Dr. Triana of Bogotá, but it did not become common in collections until Roezl more or less rediscovered it in 1870 in Medellín. It was found over a large area of all three Cordilleras in Colombia (see *Cattleya quadricolor*), from Frontino, source of variety 'Imperialis', south to beyond Medellín, and from LaPalma to beyond Flores in the eastern range, source of the form 'Sanderiana'. Lager stated the species was found much in Antioquia, the 'Sanderiana' in Cundinamarca.

The varietal name *gigas,* indicating the large size of the flowers, was originally used for plants with finer than usual, dark rose petals and a darker purple-magenta lip. Soon this name began to be used for the entire species, probably because it was easier to pronounce than *warscewiczii,* but this is not an acceptable practice.

Many other varieties, most of which are no longer in cultivation today, were named, perhaps the most famous of which was 'Firmin Lambeau', a white form much used in breeding white cattleya hybrids. It was discovered by John Lager Sr. who sold it to Stuart Low and Co., Crowborough, England, who named it. A comparably important clone was the semi-alba 'Frau Melanie Beyrodt', usually shortened to 'F.M.B.'.

A plant or two of these clones may still exist, and, if so, should be mericloned to preserve them as "International Historical Treasured Parents". The same is true, of course, of many other clones of various species if plants could still be found at this late date. These highly selected clones represent invaluable portions of the gene pools of these species and may never be duplicated again, especially in light of the present rate of forest destruction in the tropics. If they should also be virus-free, it would be a miracle after all this time, but they would be worth preserving under any circumstance.

In connection with the size of *gigas* variety flowers, I recall one older French hybrid in the collection of John Lager in Summit, New Jersey, USA. It had flowers measuring 12 in. (30 cm.) across, almost unbelievable if not seen. It was not a great specimen for its habit was poor, the sepals and petals were long and ungainly, comparatively narrow and pointed, and furthermore sagged at the tips. But, this hybrid did demonstrate the potential for a flower of a size that cannot be forgotten.

Fig. 77. *Cattleya warscewiczii* 'Franconvillensis'.
Plate 505, *Orchid Album,* 1907, as *Cattleya gigas* 'Franconvillensis'.


PL. 505

CHAPTER 6

Questionable or Doubtful Species

Other species of *Cattleya* have been published, but we still know little or nothing of them beyond brief initial descriptions. There is no way to know if they are single plants that turned up as a result of natural hybridization, probably the most likely explanation in most cases, or whether they may indeed represent species. So far as the horticultural world is concerned they have not been available in catalogs nor described in journal articles. But the same could have been said of *C. araguaiensis* and *C. kerrii* a short while ago, before recent information appeared. We now know that these plants do represent species populations even though they are still rare in nature and in collections. *Cattleya tenuis* is still more recent.

The still questionable species, with whatever information I can locate, are listed below. I cannot say the list is absolutely complete, but I know of no others at the present writing.

Cattleya brasiliensis Klinge. 1898. *Acta Horti Petropolitani* 17:7, t.1. This plant appeared in a shipment of *Cattleya bicolor* and was thought to be a natural hybrid of *C. bicolor* and *C. aclandiae.* One look at the illustration in Fowlie or Pabst and Dungs tells you that those are not the parents. It does appear to be a hybrid, but more a combination between *C. bicolor* and *C. harrisoniana.* Any hybrid of *aclandiae,* we know today, will likely have more spots and a dwarf plant habit, both of which are dominant genetic qualities. In addition, in Espirito Santo, Brazil, where *bicolor* grows and this plant was found, *harrisoniana* is also found. Since that combination was already named *C. wilsoniana,* and Rolfe reported in 1905 a duplication of the taxon by crossing *C. bicolor* and *C. harrisoniana* in cultivation, *Cattleya brasiliensis* would become a synonym under that name. (See *C. bicolor*).

Cattleya brownii Rolfe. 1894. *Kew Bull.*, p. 156. This plant was imported from Minas Gerais, Brazil, and appears to be a form of *Cattleya harrisoniana.* Although listed in the index of Pabst and Dungs, it is frustratingly not to be found in the text of the book. There is, according to Fowlie, no type specimen and no picture of this species, so the original description is all

there ever will be.

Cattleya elatior Lindley. 1831. *Gen. Sp. Orch. Pl.*, p. 117. Fowlie, after studying the type, believes this to be some sort of variant of *Cattleya guttata,* as Lindley had also decided. Pabst, on the other hand, concluded it was a synonym of *C. porphyroglossa.* In any case, the name does not appear to represent a separate species. Again, it is listed in the index of Pabst and Dungs, but is not in the text.

Cattleya silvana Pabst. 1977. There is a color illustration 831A under this name in the Pabst and Dungs, Vol. 2. It is undoubtedly a hybrid with *Laelia purpurata,* whatever the other parent may be. It does not appear to warrant a new name except as a hybrid.

Cattleya tetraploidea Brieger. 1978. This is a *nomen novum* in the 3rd edition of Schlechter's *Die Orchideen,* on p. 597 of the tenth part, for *Cattleya measuresiana* (Will.) Blumensch., not the *measuresiana* Williams. Brieger says he found the only remaining two examples of a once larger population in the mountains between Rio de Janeiro and São Paulo, Brazil. He noted that it could be differentiated by its longer stems, smaller leaves and double chromosome number of 80. The flowers, however, were identical to those of *C. bicolor.* Since these qualities are insufficient reason for a new species epithet, deserving only a clonal designation, we can safely say that this name, whatever the technicalities, is synonymous with one of the named races of *C. bicolor.*

Cattleya tigrina, discussed under *C. guttata,* may be deserving of species status. Further analysis of species characteristics and natural populations could answer the questions about it.

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