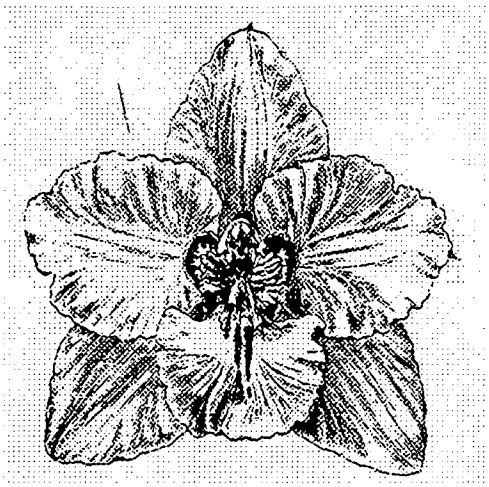
❖Odontoglossum Alliance❖

Newsletter August 1997



Toronto Program Set

The Odontoglossum Alliance annual meeting will be held Saturday, 9 May 1998 in Toronto, Canada. This will be held in conjunction with the Southern Ontario Orchid Show, 7-10 May 1998. This is also the Mid-America Congress, Eastern Orchid Congress and the AOS Trustees meeting. The Odontoglossum Alliance program has been organized with the lectures beginning at 8:30 AM and continuing until noon. There are four lectures. Following the lectures will be a luncheon which will include a business meeting and an auction of fine and unusual Odontoglossum Alliance material.

Program

"Temperature Tolerant Oncidiinae Intergenerics" by Milton Carpenter

This presentation discusses the more prominent of the various intergeneric Oncidiinae combinations which have been found to tolerate wide temperature variations at the speakers growing facility in South Florida. The talk, illustrated by slides, also focuses on the numerous characteristics contributed to their progeny by the species involved.

Everglades Orchids Oncidiinae hybridization program has as it's goal, the creation of "Temperature Tolerant " Oncidiinae which have the beauty of modern Odontoglossum hybrids, but a much wider range of shapes, colors, and patterns, plus the ability to grow vigorously and bloom successfully in most climates of the world.

Milton Carpenter, a native of the Florida Everglades, attended schools in Palm Beach County, the University of Florida and the Massachusetts Trades School in Boston, Massachusetts. He has been growing orchids for 37 years and is the owner of Everglades Orchids in Belle Glade, Florida. He is a past president and life member of the Orchid Society of the Palm Beaches. He is also Executive Vice President and a life member of the American Orchid Society. He is an accredited Judge of the AOS.

"Those Other Glossums" by Sue Golan

This is a discussion of the Rhyncostele tribe, which formerly was the Lemboglossum tribe. Included in the class are bictoniense and rossii, among the more well known. These plants are native to Mexico and other countries that are closer to the US than the Odontoglossums of South America.

Inside This Issue

Spectacular Cyrtochilums	Page 3
Enigmatic Odontoglossums	Page 5
Dues Reminder	Page 7
Feeding Odontoglossums	Page 8
The Orchid World	Page13

The talk will cover the plants within the Rhyncosteles group, illustrated by slides. It will cover the history of the group hybrids and the attributes they impart to hybrids.

Sue Goal lives in the Chicago, Illinois area and in the last five years of her amateur growing has become interested in growing the Odontoglossum Alliance material. She has two greenhouse, one cool and one intermediate. Sue is an Accredited AOS Judge.

"A Greenhouse for Odontoglossums" by John E. Miller

The climate for growing Odontoglossums in New England is modestly acceptable. There are a number of features that can be included in a greenhouse to enhance growing. After building a number of greenhouses at various locations, the accumulated experience and ideas were incorporated into a new greenhouse specifically designed and constructed for growing the odontoglossum alliance. The greenhouse has been in operation now for ten years. The design success and failures are described and illustrated.

John Miller started growing orchids in Lexington, Massachusetts in 1951 in a window greenhouse. He was an early member of the Massachusetts Orchid Society. In 1953 the family moved to Dayton, Ohio where greenhouses were constructed at two homes. He joined the Miami Valley Orchid Society. In 1958 the family moved back to Massachusetts, first to Weston and later to Brookline where greenhouses were constructed at both houses. It was then that John started growing Odontoglossums. He built up a collection by buying community pot size plants from Charlesworth and CO until they were acquired by McBean's. In 1986 construction was started on a new home in Westport Point, Massachusetts where yet another greenhouse was designed and constructed. John is the editor of the Odontoglossum Alliance newsletter and secretary/treasurer of the Odontoglossum Alliance. He lives with his wife, Janice, at Westport Point, Massachusetts.

"Odontoglossum bictoniense to Odontocidium Cherry Fudge: Nature's pallet yields a masterpiece" by Doug Kennedy

Odontoglossum bictoniense has proven to be a prodigious parent within the Oncidium alliance. Starting with the first generation, we see an infusion of desirable traits; e.g. spike habit, warmth tolerance, and color. Subsequent generations continue to show this strong positive dominance. This is aptly reflected in the first recipient of the Robert Dugger AOS Award - Odontocidium Cherry Fudge 'Swiss Mocha' AM/AOS. A hybridizers dream come true!

Orchids in Our Tropics - a hobby gone wild! In Vandorf, Ontario, the greenhouse offers Doug Kennedy not only a respite from -30°F Canadian winters, but affords him an opportunity to hybridize with his many award plants. From instantly falling love with Paph Winston Churchill 'Indomitable' FCC/AOS 25 years ago, Doug has progressed (or regressed) through all the alliances. A significant number of these are still represented in his greenhouse, but his present obsession is his Oncidium intergenerics with a splash of Lycastes. This obsession has recently (1996) been reinforced by winning the first Robert Dugger Award with Odontocidium Cherry Fudge 'Swiss Mocha' AM/AOS.

With his wife Terry, he has exhibited his orchids in numerous shows from coast to coast including the 11th World Orchid Conference in Miami in 1984. The 55 AOS show trophies and countless other awards document the success of these shows.

Doug is a past Vice President of the Mid America Orchid Congress. He has also served several terms as president and show chairman of the Southern Ontario Orchid Society and continues to act as a long term director. Having taken early retirement earlier this year, he can now devote full time to his family and vocation - orchids.

Spectacular Cyrtochilums

by Dr. Howard Liebman

Part II

Another Ecuadorian cyrtochilum of striking beauty is C. loxense. Loja province is the only region where Cyrtochilum loxense is found. In fact, loxense is the old name for the city of Loja. This species grows in the hills east of the city. The species is noted for its large yellow lip and rich olive brown sepals and petals. The substance and texture is the best in the cyrtochilum genus. In many ways, the flowers and growth habit of C. loxense are so markedly different from other Cyrtochilum species that one could easily justify the placement of C. Loxense in a different genus. The limited range of C. Loxense, habitat destruction and the demand for plants by orchid growers has made this the most endangered Cyrtochilum species in Ecuador. I believe that C. Loxense has great potential as a parent and the three hybrids made with this species that I have seen have been exceptional. These include hybrids between C. loxense and macranthum, C. loxense and serratum and a fascinating hybrid between C. loxense and Odm retusem. Seedlings of C. loxense with Odm edwardii and C. monachicum are also being raised and should produce exciting flowers.

Three spectacular species distinguished by their rank growth habit with rhizomes occasionally measuring 0.5 to 1 meter between bulbs are C. pastasae, C. orgyale and C. carderi. Cyrtochilum pastasae is a species found only in Ecuador and appears to exist in two color forms. One is typified by flowers measuring 4 to 6 cm with red-brown sepals and petals tipped with white. The petals of this color form frequently recurve. The second color form of the species has a red-purple color and a flatter form. I have successfully produced an outcross of the second color form of pastasae and I am curious to see if this type breeds true, Both forms have a striking dark purple lip. Cyrtochilum pastase is considered one of the most difficult cyrtochilums to bloom, but I have personally found it less difficult to bloom than C. orgyale. Cyrtochilum orgyale is found in both Venezuela and Colombia. Dunsterville describes this species in his Orchids of Venezuela and originally misidentified the plant as Oncidium carderi. In fact, a CBR was awarded by the AOS in the 1960's to a plant of C. orgyale under the name of Oncidium carderi. Cyrtochilum orgyale is characterized by 6 cm flowers with red-brown sepals and red-purple petals. The petals of older flowers frequently recurve. Both C. orgyale and C. pastasae have inflorescences running 3 to 4 meters with side branches having 4 to 5 well spaced flowers. The inflorescence and color of C. orgyale are quite dominant in hybrids. A good example of this is Brassidium Medellin Miracle (Brassia verracosa X C, orgyale), a unique hybrid made by Juan Felipe Posada of Medellin, Colombia. This remarkable plant has a 2 meter inflorescence with 10 cm brassia shaped red-purple flowers. The 56 chromosome Cyrtochilum orgyale was obviously dominant for inflorescence and color over the 60 chromosome Brassia.

Cyrtochilum carderi is a species found in Colombia and northern Ecuador. This large-flowered cyrtochilum has dark brown sepals and petals, with the petals tipped with various amounts of white. The most striking color forms have nearly 50% of the petals clear white. The plants grow as semi-terrestrials which grow up bushes, over tree branches or boulders. Like C. pastasae, C. carderi has a dark purple lip. I have been fortunate enough to have all three species in bloom at one time, It is evident when examining the flowers from all three species, that they are closely related and may have evolved from a common ancestry. I would be interested to see a molecular analysis of genetics of these three species.

A distinctive and different cyrtochilum found in Ecuador is C. cuencanum. When Dennis D'Alessandro, an expert in Ecuadorian orchids, originally described this species to me, I thought that it might be the lost white

and pink Cyrtochilum leopoldianum. Cyrtochilum leopoldianum was collected in southern Ecuador and Peru in the early 1900's, but now appears to be extinct. Cyrtochilum cuencanum has small (4 to 5 cm) white flowers with purple-brown spots. The botanical description of this species is in Kranzlin's 1922 monograph on cyrtochilums. The growth habit of C. cuencanum is similar to C. pastasae and C. carderi. Two other closely related cyrtochilums with white based flowers covered with brown or purple spots or bars are C. zebrinum and C, engelii. Both species have been collected in both Venezuela and Ecuador. Although morphologically distinct, these three species share enough growth habit and floral characteristics to suggest a common ancestry. I have been excited by the hybridizing potential of these white cyrtochilums and now have made several crosses with both C. cuencanum and C, zebrinum. In addition, a cross I have made between the two species should produce some excellent light colored cyrtochilums.

Three attractive and closely related cyrtochilum species seen in cultivation are C. trifucatum, C. cryptocopis and C. xanthodan. All three species are characterized by 4 to 5 cm flowers colored light to dark red-brown on a white background. The flowers are clustered as 3 to 5 flowers on side branches on a 3 to 4 meter inflorescence. The flowers have a waxy texture which reminds me of the texture of the otoglossums. The growth habit of these species is similar to C. macranthum. Cyrtochilum trifucatum is found in Ecuador, C. crytocopis is reported to have been collected in Colombia, Ecuador and Peru and C. xanthadon has been collected in Colombia and Ecuador. I have only succeeded in blooming C. trifucatum, but have seen plants of C. cryptocopis in bloom in Ecuador.

No discussion on cyrtochilums would be complete without mentioning two spectacular and unique species, C. microxiphium and C. volubile. Cyrtochilum microxiphium is one of the few cyrtochilums found in Bolivia. It has small (2 cm) flowers which are uniquely colored with white ventral sepals and dorsal sepals and petals with chestnut-brown markings on a white ground. The plant is very compact growing, something which is also unique in cyrtochilums. Sadly, this growth habit is not dominant in breeding since seedlings of C. microxiphium X orgyale are dominated by the rambling growth habit of C. orgyale.

Cyrtochilum volubile is a striking species from Peru. The 5 cm flowers of C. volubile are characterized by a broad lip similar to that observed with C. loxense. This form of lip is unique among cyrtochilums, which generally have narrow sickle shaped lips. However, the growth habit of the plants are classic cyrtochilum with long rhizomes between pseudobulbs. The flower color of C. volubile is also striking. The sepals and petals are a salmon-peach to chestnut-brown color with variable amounts of purple on the median portion of the petals. The lip is a dark purple color. At the turn of the century, a striking color form of the species was collected under the name of Oncidium corynephorum. These flowers were all white with petals tinged with light pink-purple and broad rose-purple lip. The brown pigments were absent from these flowers. Since a number of plants of this color form were collected in the early part of this century, I believe that plants of this color form of the species probably still exist in Peru and may reappear as more species are collected by Peruvean collectors.

A number of new cyrtochilum species continue to be found by collectors in Ecuador and Peru. I have seen photographs of at least 4 uncharacterized cyrtochilum species from these two countries and expect that other undescribed species probably exist in Venezuela and Bolivia. Sadly, as the environment of these Andean nations continues to deteriorate with rampant habitat destruction and the rapid clearing of forests, all cyrtochilums are endangered. Therefore, the preservation of these beautiful orchids will require repeated selfings and sibling crosses of the plants presently in cultivation. CITIES cannot protect the remaining cyrtochilums from habitat destruction, but dedicated orchid lovers can grow and preserve these beautiful orchids.

Editors Note: Part One of this article is in the February 1997 Odontoglossum Alliance Newsletter

Enigmatic Odontoglossums, Part 3

The Odontoglossum cruentum Complex, Part 2

By Stig Dalström

odontoglossum armatum Reichb.F. was originally collected by Jameson on the Andean slopes west of Quito in Ecuador. Later it was described by Reichenbach (1877). Some typical characteristics mentioned are the V-shaped lateral callus keels on the lip. Few characteristics separate this species from the other members of the *Odontoglossum cruentum* complex, but unlike the type species of the group, *Odm armatum* is a rather variable and complicated taxon. Why this is so may be difficult to comprehend, but one can distinguish certain interesting facts that assist our understanding.

It is still possible to encounter *Odm. armatum* in the wet and mountainous area where Jameson found this plant more that 100 years ago. Frequently, it grows along road cuts, terestrially or as an epiphyte on mossy trees. It grows sympatrically (= together with, without producing natural hybrids regularly) with several other rather distinct *Odontoglossum* species --*Odontoglossum aspidorhinum* Lehm., *Odontoglossum cirrhosum* Lindl. and *Odontoglossum hallii* Lind, Unfortunately it also grows semisympatrically with a couple of less distinct species that perhaps give us one of the keys to the rather unclear species profile this innocent-looking plant demonstrates.

Slightly to the north of the original collection site it may be possible to find yet another key. At the Ecuador-Colombia border --- on what I will call the "Tucan Bridge" -- the Andes are high, but not as wide as farther to the north and south. This fact probably influences rather subtly but firmly in the ever-changing evolutionary scenario.

For instance, it must be significant that we rarely find the same *Odontoglossum* species on both sides of the Andes. However, the high-altitude ones may more freely spread their seed with the help of the wind at this elevation.

A species such as *Odontoglossum ramosissimum* Lindl. is an example of a high-elevation plant. It normally occurs above 8,200 feet (2,500 m), on both sides of the Andes as well as in between where possible (the Andes in Ecuador generally consist of two parallel ridges). Here and there, certain populations of plants may appear different from others. On the western side of the Tucan Bridge, flowers of *Odm ramosissimum* are large and commonly of a beautiful, clear yellow color, covered with numerous bright purple dots and markings. On the eastern side, plants usually have flowers with a paler and more washed-out coloration. However, morphologically they are the same.

It appears that due to geographical isolation, local differences have developed, through minor mutations. But since a certain flow of genes nevertheless must occur between the different populations at this altitude, though seed dispersal, they have maintained their morphological identity relatively well so far. For a species such as *Odm armatum*, which occurs at a slightly lower elevation (up to approximately 8,200 feet (2,500 m), this gene flow between populations on either side of the Tucan Bridge is less likely to happen, or at least should occur with less frequency. This way the different populations may develop more independently into distinct species. Consequently, populations of *Odm. armatum* on the western slopes of the Andes resemble each other more closely than their "cousins" on the other side of the mountain chain (in this case "cousins" are other members of the *cruentum* complex).

As mentioned earlier, plants of *Odm. armatum* grow semisympatrically with a couple of other less distinct species. One is *Odm. cristatellum* Rehb.f. This particular orchid belongs to another troublesome complex of plants that I will refer to as the "*cristatum* complex." Members of this group are characterized by a much smaller developed lip callosity, commonly with bright streaks in yellow red and purple.

At the Tulcan Bridge, plants of *Odm cristatellum* (which generally occur at elevations between 8,200 and 9,190 feet (2,500 m and 2,800 m)), can be found on both sides of the Andes. Otherwise, this is so far a strictly eastern-slope species in Ecuador. But as it happens, plants of *Odm. cristellum* and *Odm. armatum* can be found side by side on the western slopes of the Bridge area. Occasionally plants are observed that clearly

look like natural hybrids between them. They share characteristics with both of the supposed parents and have an intermediate appearance. For instance, the column has sometimes "semideveloped" wings in contrast to the wingless features of *Odm. armatum* and the well-developed wings of *Odm. cristatellum.* They also have a much more developed lip callus than *Odm. armatum* but generally not as large as *Odm. cristatellum.* The callus sometimes has colored streaks.

In addition, the coloration of the lip might not have any significant taxonomic value, but it is still worth studying. Practically all plants of *Odm. cristatellum* have a large brown spot covering most of the surface of the lumina, except for along the edges of the lowermost part of each side of the callosity. Here the brown area is split up in smaller dots of various sizes and very often by what has been described as a "yellow band" across the lip. For some reason, plants of *Odm. armatum* also share a similar feature, while plants of the other members of the *Odm. cruentum* complex from the eastern slopes of the Andes usually do not. Is this characteristic due to inbreeding with *Odm. cristatellum* or did it go the other way around? Have the other members of the *Odm. cruentum* complex developed from plants lacking the gene that produces this coloration pattern or simply lost it somewhere along the way?

Going back to the area west of Quito where Jameson found his first plant of *Odm. armatum*, there is also another obscure "species" floating around. Lehmann, who frequently collected in this area during the 19th century, first discovered and mentioned this taxon, which he called *Odontoglossum denticulatum.* Apparently he never validly described it, although there is a designated type specimen at Kew. This "species" resembles *Odm. armatum* but differs in being larger and by having a much broader and fimbriate front lobe of the lip as well as a larger callosity. In fact there are many similarities between plants of *Odm. denticulatum* and the suspected natural hybrids of *Odm. armatum* and *Odm. cristatellum.*

In the area west of Quito, *Odm. cristatellum* is not found. Plants of *Odm. denticulatum,* on the other hand, occur rather regularly here and have a fairly consistent appearance. It "looks and acts" as a good species that happens to be intermediate between *Odm. armatum* and *Odm. cristatellum.*

It has a rather distinct combination of characteristics that may well justify describing it as a separate species. The very broad and fimbriate front lobe of the lip together with the semideveloped column wings and the large callus on the lip make it different from most other species in the area. However, many of the plants from the Tulcan Bridge that belong to this taxon are suspiciously irregular, suggesting a hybrid origin.

One feature that taxonomists frequently use in separating questionable species is the shape of the lip. In the case of *Odm. armatum* this feature seems to be of limited use. There are plants with an almost round lamina or with semideveloped front lobes. There are also plants with a deltoid lip, with very prominent white front lobes (*Odm. portmannii* ssp. *cohriae* Bockem.) Except for this variation of the lip the morphological features are the same.

For plants of what has been described as *Odm. portmannii* by Bockemühl (syn. *Odm. juninense* Schltr.), the deltoid shape of the lip seems to be very consistent on plants in nature. But when this plant is brought into cultivation the flowers occasionally change their shape. Sometimes the lip shrinks and parts disappear, like the large front lobes. The plant then looks like a different species. Consequently, it is clear that the shape and size of various parts of the flower also depend on the size and health of the plant.

Bockemühl described *Odm. portmannii* ssp. *cohrsiae* in *Die Orchidee* (vol. 39, p. 15, 1988). It was based on a plant that had been collected on the western slopes of the Andes in southern Colombia. The author claims that Lehmann first found plants of this entity (= *Odm. dentculatum)* but since he never validly described it this "new" name took priority. Personally I disagree that these taxa are the same. Although they are undoubtedly closely related, I would prefer treating the *Odm. denticulatum* more as a branch off the *Odm. cruentum* complex, possibly as a link into the *Odm. cruentum* complex (which will be dealt with later), and reduce "subspecies *cohrsiae* to a form of *Odm. armatum* rather than *"portmannii."* For instance, *Odm. "portmannii"* (and *Odm. cruentum)* generally lack the "yellow band across the lip," while the "subspecies *cohrsiae* shows this feature clearly.

Going north from Ecuador, reaching the northern limit of the Central Cordillera in Colombia,

yet another species that fits into this discussion is found. It is a seldom-seen plant that was discovered by Wallis and described by Reichenbach as *Odontoglossum praenitens Gardeners* in *Chronicle* (vol. 1, p. 524,1875). Reichenbach suspected it to be a natural hybrid of some kind but it seems, however, to be a good and constant species. It shares many features with the other members of the *Odm. cruentum* complex, but is distinguished by a relatively long column with well-developed rectangular wings. The coloration pattern on the lip as well as most other morphological features is very similar to the eastern populations of the complex in Ecuador.

As a brief summary of my personal experience with the *Odm. cruentum* complex, I would prefer treating it as one species (or "superspecies") --*Odontoglossum cruentum* -- but with several geographically restricted subspecies, which sometimes blend together in areas where they meet. I believe that this approach might simplify the understanding of these plants. It might also eliminate some of the confusing name errors that can be seen in almost all publications.

Some of these taxa are in *Icones Orchidacearum Peruviarum* (Bennett and Christenson, 1993). Plate 126 is labeled *Odontoglossum armatum* Rchb.f., but corresponds to *Odm. juninense* Schltr. Plate 129 is labeled *Odontoglossum cruentum* Rchb.f., and which corresponds to the type of this species. Finally Plate 132 is labeled *Odontoglossum juninense* C. Sweinf. (should be Schltr.) that corresponds to *Odm. cruentum* Rchb.f., as well.

References

Bennett, D.E. and E.A. Christenson 1993.*Icones Orchidacearum Peruviarum.*

Bockemühl, L., 1989 *Odontoglossum, A monograph and Iconograph.* Brucke Verlag Kurt Schmersow. D3200, Hildesheim

Dalström, S. 1995. Enigmatic odontoglossums, part 1, the epidendroides complex. *Amer. Orchid Soc. Bull.* 64(11):1218-1223.

_.1996. Enigmatic odontoglossums, part 2, the cruentum complex, part 1. *Orchids* 65(12):20-25.

Reichenbach, G.H. 1875.*Gardeners Chronicle.* Vol.1.page 524

_.1877. *Linnaea* XLI, page 32

This is a continuing part of the series by Stig Dalström reproduced here with permission of the author and the American Orchid Society.

Additions to the Robert Dugger AOS Odontoglossum Trophy

The Odontoglossum Alliance recently contributed an additional $1000.00 to the Robert Dugger Odontoglossum Trophy. This contribution was the collection of generous contributions of the members of the Odontoglossum Alliance. The endowment fund is now $6000.00. As contributions are received by the Treasurer they are deposited in a separate savings account. When this account accumulates a significant amount the moneys are sent to the American Orchid Society for deposit in the trophy endowment fund. The income from the fund is awarded annually to the winner of the Robert Dugger Trophy. These winners are selected each fall by the AOS committee for awards.

Last Reminder for Dues

This is the Final reminder for those that have not paid there membership dues. If there is a notice enclosed with this newsletter, then, according to my records, you have not paid your dues. If there is NO notice enclosed, then I have received your dues. For those of you who have not paid, if you wish to continue to receive the newsletter, then I shall need your dues before the 1 November 1997 mailing.

Feeding Odontoglossums and Other Cool Growing Orchids

by Robert Hamilton

Plants, like all living things, possess the ability to self-assemble. The instructions for such self-assembly are buried in a plants genetic code. In addition to self-assembly, with time, living things can modify these instructions to best suite the environment (adaptation & evolution). I grow plants, specifically odontoglossums, because of their great beauty and their challenge. I try and grow my plants well. My opinions on culture follow, with an emphasis on **feeding** odontoglossums and cool growing orchids.. Most growers, using simple fertilizing procedures should have good results. I have written this article with some detail for those interested. To summarize my recommendations I have bolded the most germane text.

Fundamentals

Plant growth requires the input of both matter and energy. Matter comes in several forms:

- Water which constitutes about 90% of most plants mass
- Minerals and chemical compounds, supplied in solution with water
- Carbon, which is derived from the atmospheric gas carbon dioxide.

Energy comes in two forms:

- Light
- Heat

Light energy is utilized for the well-known process, photosynthesis, which is the process of building chemical compounds through the interaction of light with small molecules. Heat drives respiration (gas exchange), more specifically, transpiration which is the upward movement of sap within a plant as water evaporates from the leaves. Without light and respiration plants cannot grow.

Andy Easton, New Zealand's infamous orchid grower and breeder offers simple advice for growing orchids. "Give them the correct amount of light, the correct amount of feed, the correct amount of water, and the correct temperature and orchids will grow like weeds". Invariably, the question is, "how much of each of these variables is correct"?

Insufficient light deprives a plant of energy needed for growth, resulting in slow and weak plants. It is best to provide odontoglossums with the correct amount of light all year long. This is not easy to do. Classic odontoglossum species grow close to the equator where day and night periods are equal all year-round. Most of us live far away from the equator and our day and night periods vary with the season. For those of use who grow in a greenhouse, we must vary the shading during the year to achieve optimum light levels. There is not much we can do to compensate for the short day length during the winter months. **Most growers agree that light levels around 1800 - 2200 foot candles produce good growth in odontoglossums**. The choice of light levels will depend on how the temperature of the greenhouse can be controlled during the hot summer months. **It is better to sacrifice some light than allow odontoglossums to grow too warm.**

Temperature is an easy parameter to define. **Day temperatures around 21C - 26C (70F through 80 F) grow excellent plants. While night temperatures around 10C-14C (50F - 55F.) produce the best growth.** Robert Dugger points out good results can be obtained during the summer months if a sufficient temperature drop occurs from day to night, even if the optimum temperature cannot be achieved. **Much of the chemical activity of a plant occurs at night. It is important that the temperature and humidity are correct in the evening**.

Odontoglossums evolved in the cool, buoyant neo-tropics. Their physiology, roots, vascular system and leaf structure cannot replace water lost through transpiration if the surrounding atmosphere is not correct.

The primary purpose of this article is the discussion of fertilizing orchids. Next to water, fertilizer is the source for most of the building blocks for a plant (an exception is carbon which is derived from CO and obtained through respiration). Fertilizer is typically purchased as a powder in a bag or in liquid form, which is added to

water in Mr. Easton's recommended amount — "the correct amount". This nutrient solution, composed of both fertilizer and water, has mineral concentrations which are the sum of the fertilizer plus the minerals already dissolved in your water. Some of us have water low in minerals while others of us have water with moderate or high amounts of minerals dissolved in it. Unless you know the quality of the water you start with you cannot know what you are feeding your orchids. This is one reason it is hard to compare grower "A" with grower "B".

N-P-K

Fertilizer is labeled with the quantity of macro elements, nitrogen, phosphorus and potassium sold in the package. In the US, labeling must conform to guidelines imposed by the State Governments, referred to as the N-P-K value; nitrogen, phophorus and potassium. (Although each state has its own regulations, all are essentially the same.) Why then "K" for potassium? The K comes from the German word for potassium, kalium. K is the internationally accepted symbol for the element potassium. To confuse matters, the N in N-P-K is the percentage of nitrogen and this nitrogen can occur in several forms such a nitrate, ammoniacal nitrogen and urea. P is the percentage of phosphorus as expressed by the molecule P2O5 even when the phosphorus source is not PO and similarly K is the potassium (kalium) percentage as expressed by the molecule K2O. (For this discussion these packaging quarks are not particularly important; however, they point to a lack of cogency of US regulations — there is better nomenclature available).

In addition to N-P-K, fertilizer contains micronutrients, nutrients needed by plants in very small quantities. Regulation requires that micronutrients exist in certain measurable amounts before they can be listed. Regrettably, these measurable amounts. can approach or exceed phytoxic levels for plants before they can be listed. Micronutrients already exist in our water supplies and as impurities in the constituents of fertilizer, even when they are not listed. A confusing aspect of nomenclature is ratio. A 30-10-10 fertilizer has the same ratio as 15-5-5 fertilizer; the former twice as strong per unit of weight but the ratio is the same.

Back to plants. Plants are about 90% water, 10% solids. The ratio of nitrogen, phosphorus and potassium in plant tissue once the water is removed is about N = 3% - 4.5%, P = 0.3% - 0.6% and K=3% - 4.5% (Ca = 1% - 2% and Mg = 0.2% - 0.5%). So what do plants need to be supplied for good growth? Plants are adaptable and are not damaged by moderate amounts of N, P, or K, regardless of the ratio. Experimentally, a ratio was determined some decades ago which supported excellent growth in orchids. This ratio is 3-1-2 ratio. My own experience shows this ratio works well. I have reviewed the fertilizing schedules of two superb commercial odontoglossum nurseries and both use a ratio of 4-1-2. In other words, nitrogen is added in the largest percentage, with phosphorus significantly lower than nitrogen and potassium somewhere in between. My recommendation: **go for a feed close to the 3-1-2 ratio, long accepted as ideal.** Ironically, articles on orchid culture often recommend a "balanced" fertilizer such as 20-20-20. If I recommend a "balanced" diet of a pound of meat, a pound of butter and a pound of carbohydrate I would rightly be called nuts! 20-20-20 is NOT a "balanced" fertilizer according to the needs of plants; however, the numbers are even and this sells the product. Why do fertilizer companies make 20-20-20? High phosphorus levels in fertilizers are intended to compensates for phosphorus lost in reactions with constituents in some soils, making the phosphorus unavailable to plants. These reactions do not occur in consequence with our soiless orchid mixes therefor high P ratios are not needed.

Providing an element in excess of a plants needs means you cannot feed other elements at an optimum rate.

The ratio of a fertilizer does not express its strength. One can add a small amount or a large amount of fertilizer of a given ratio to water, thus varying strength. What strength should we feed? Orchids are relatively light feeders compared to other plants. Some orchids, like disas are exceptionally sensitive to feed and are injured at modest feed strengths. I have not found odontoglossums particularly sensitive to moderate feed strengths. How strong you make your feed is partly dependent on how many salts (the word "salts" used here means dissolved compounds, not sodium chloride or table salt) you have in your water before you mix in fertilizer. If your water is relatively pure, you can add more feed than if your water starts high in salts. **The important factor is not to exceed a certain total value of dissolved salts**. The total quantity of salts in a nutrient solution effect a value called the "salt index". As the salt index increases there is less water transport across the roots. Excessive

salt index will result in plants loosing water through transpiration faster than it can be replaced by the roots. If a plant is unable to replace water lost from transpiration a condition called leaftip die-back results. Warm days or a poor root system exacerbates this problem as does drying out of the mix (more correctly called the substrate). What is a good, safe level for nutrient solutions? **In simple terms, about ½ the application rate found on most fertilizer bags is a foolproof rate**.

Is there a better way to express fertilizer strength? On the side of most bulk fertilizer bags are the calculations for achieving a certain number of parts per million (ppm) of nitrogen. This is usually in pounds of feed per 100 gallons of water. If you can do the arithmetic and extrapolate the rate for your feed program, **I recommend feeding at about 80 - 100 ppm nitrogen**.

Conductivity Meters

There is even a more sophisticated methods of determining feed strength. Pure, distilled water has exceptionally low conductivity and virtually all the compounds relating to feed programs, dissolved in water, significantly increase the conductivity of the solution (urea is an exception). Until recently, the conductivity of a solution was expressed in conductivity units, the mho. (Mho is ohm spelled backwards, and the reciprocal of the resistance unit, the ohm, i.e., 1/ohm's = mho's. For the solutions we work with in plant culture conductivity numbers are easier to interpret than resistivity values. To confuse matters, the International Committee on Scientific Units has changed the mho to the Siemen honoring the famous German scientist of that name. In keeping with convention, all international units now honor a scientist and are capitalized. Scaling units, such a milli or micro are written lower case.

The conductivity of a solution is referred to as its EC (electrical conductivity). Feed stocks vary in EC depending on crop needs. The EC for most horticulture crops falls within a range of 0-2000 µSiemens (0-2 millimhos). EC meters are available for around $50 and these make determining the conductivity of a feed simple. These meters are available in units of parts per million (ppm) or µSiemens. I recommend the Siemans meter and use a 0-1990 µSiemens range meter every time I mix feed. Why not a ppm meter? For most purposes ppm and Siemens have a relatively simple conversion, typically something like 100ppm = 200 µSiemens. The hitch is, 1 ppm of ammonium nitrate does not have the same conductivity of say 1 ppm of ammonium sulfate. Thus, when measuring a mixture one does not measure true ppm's, only an approximate equivalent. The errors are not large but I prefer conductivity units in Siemans. Another approximate conversion factor:

EC in µSiemans x 0.64 = ppm.

Using a conductivity meter allows one to set the level of feed (water + fertilizer) to a particular concentration of total salts. Since it is most productive to run feed at a level high enough for good growth but not excessively high, with the accompanying risk of leaf-tip die-back and root damage, a simple EC meter makes adjusting feed strength easy. What is a good EC value? **I recommend an EC of 800 µSiemens in the summer months and about 2/3 this rate in the winter. These are conservative values**.

Those of us who have water supplies which are relatively pure can run more of the nutrients plants need for growth than those who start with water high in the salts which plants do not need. Supplying the N-P-K levels to a plant at optimum ratio and strength provides the correct quantities needed for good growth. Add the correct amounts of energy in the form of light and heat and one is growing "spot on". The grower who does this for the most months out of the year ends up a winner.

Urea

Urea is a cheap form of nitrogen often used in fertilizer. It has low conductivity in solution and in its better grades makes a good nitrogen source for plants which are grown at temperatures that are above 16C (60F). It is not a good source of nitrogen for cool growing crops, particularly during the winter months because bacteria populations needed for nitrifying urea are in low population. Urea requires bacterial action before its nitrogen is available to plants. Periodically, growers recommend using urea as a foliar application of urea to "green up" plants — works like magic. Skeptically, I ran tests on an excellent and vigorous cross made by Philip Altmann of Australia. Fifty plants of Odm (nobile x Augres) were selected and divided into two groups of about equal size

plants. For two months I fertilized both with my standard, 3-1-2, urea-free feed. I then followed up with a foliar spray at 100 ppm urea on a group of 25 plants. I have not seen any evidence that the treated plants "greened up". To quote a plant physiologist friend, Dr. Shiv Reddy, "there is no magic in the bag".

In some situations, for example when bad bark is used, it starts decomposing in the pot and the decomposing bacteria consumes nitrogen you are applying to the plants. This in turn results in less nitrogen available to the plants. So, it is better to begin with a good mix or know the mix and compensate for its deficiencies.

Spray & Pray

Various elixirs are sold purporting super results. These invariably have some superlative in their name. These will appeal to growers with a pension for mysticism or who grow in pyramid shaped greenhouses. While you "spray and pray", the sellers of these brews simply prey.

Mix

The mix (again, more properly the substrate) we grow in varies considerably from grower to grower. Ingredients, such as fir bark and peat are not consistent products. As the mix ages, increasing amounts of bacteria, which contribute to mix breakdown, progressively consume larger and larger amounts of nitrogen thus reducing the nitrogen available to the plant. It is important to change the mix before it excessively decomposes. In addition, orchids are plants which require good amounts of air at the roots. The air-fill-porosity of a mix decreases with decomposition. Repotting maintains good air-fill-porosity and maintains a consistent level of nitrogen available to the plant. **I repot yearly.**

Bloom Promoters

Some feed programs purport to induce flowering by switching from a high N feed program to a low N, high P program once growth has been made up. I suspect these formulas, often with superlative trademark names are not of much use. The same results can be had by simply reducing or eliminating feed once growth has been made up. Some orchids will grow vegetatively and never bloom when fed continuously. I have not found this true of odontoglossums. **Use the same feed ratio all year long.**

Summary

In summary, **a good fertilizer for odontoglossums and other cool growing orchids have an N-P-K ratio of about 3-1-2.** Avoid fertilizers which use urea as the source of nitrogen as it is not well utilized in cool growing crops and therefor, this nutrient, which is needed in the largest percentage, will not be available in sufficient quantity. **Feed at about 80-100 ppm nitrogen level or about ½ strength of most manufacturers recommendation, every watering**. If you have a moderate collection you may find a liquid feed convenient and cost effective. **If your water is high in salts, fertilize at a lower rate**. You may want to buy a simple EC meter in the 0-1990 μSeimens range to aid in mixing and measuring feed strength. **Avoid elixirs unless they have mental health benefits for you. Strive for a good root system and you will be growing well.**

During my piano study (never was any good), I learned a quote of Wanda Landowska's, famous harpsichordist. Her critical comment to a colleague, "you play Bach your way and I'll play Bach his way". I think my way is a pretty way!

Bob Hamilton 8/97

THE COMMENCEMENT OF COOL-HOUSE TREATMENT.

AUGUST 25th, 1863, just fifty years ago, marked the real commencement of the cool-house treatment in Orchid culture. It was on this day that James Bateman, of Biddulph Grange, read before the Floral Committee of the Royal Horticultural Society a Paper on the principles of cool-house treatment for Orchids, and to prove the success of his methods he exhibited a beautiful plant of Epidendrum vitellinum, to which a Special Certificate was awarded.

Before giving particulars of Bateman's notes, it will be well to state that for many years after Orchids were first introduced into England the only atmosphere thought suitable to their culture was a hot, steamy and unventilated stove-house. Even when the celebrated John Lindley was appointed secretary to the Royal Horticultural Society, an attempt was made by the Society to cultivate Orchids in a specially prepared house. The results were at first unsuccessful; the plants were lost as quickly as they were received. Lindley, however, continued his experiments, and eventually obtained some measure of success with those plants suitable to high temperature and excessive humidity. This treatment remained in vogue for a long period. It is only fair to Lindley to remark that when correct details of the habitats of certain Orchids came to hand he always did his utmost to advise his friends. In 1835, he wrote: "If a great majority of epiphytal Orchids swarm in damp tropical forests, there is a considerable minority which live in an entirely different climate."

Joseph Cooper, gardener to Earl Fitzwilliam at Wentworth, must have been a man of considerable intelligence, for when Sir William Hooker visited the place in 1835 he remarked: "I must confess that the sight of this collection, whether the vigorous growth and beauty of the foliage, or the number of splendid specimens blooming at the same time, be considered, far exceeded my warmest anticipations." Cooper's method consisted of a lower temperature and the admission of fresh air into the house.

In 1838 Sir Joseph Paxton also achieved no small measure of success by maintaining a purer atmosphere. At the same time, Lindley was much startled by these new conditions of culture, and we find him writing as follows: "The success with which epiphytes are cultivated by Paxton is wonderful, and the climate in which this is effected, instead of being so hot and damp that the plants can only be seen with as much peril as if one had to visit them in an Indian jungle, is as mild and delightful as that of Madeira."

From this time onwards we can find a few, but only a very few, growers who attempted the cool-house ideas. Among these was Donald Beaton, who for a few years cultivated Mr. Harris's plants at Kingsbury. The means for spreading knowledge in these early days were few and far between, so much so that the general community of Orchid amateurs reaped little benefit from these isolated methods of success. It remained for the Royal Horticultural Society to give to the horticultural world the full particulars of James Bateman's method, which may reasonably be said to have inaugurated the cool-house treatment which proves such a welcome addition to our Orchid collections of the present day.

The following is a report of the Paper read by James Bateman, August 25th, 1863.

"I have much pleasure in forwarding for exhibition before the Floral Committee the specimen of Epidendrum vitellinum that accompanies this Paper, and which I have little doubt the Committee will agree with me in regarding as eminently beautiful. It is not, however, with a view to the merits of the plant as an attractive object that I now wish to direct attention to it, but rather in so far as it may be taken as an illustration of the success which has attended the adaptation of the principle of cool treatment in dealing with Orchids from cool countries.

"My first plants of the species were received from Oaxaca, nearly thirty years ago, but although in excellent condition at the

time of their arrival, they succumbed to the intensely hot régime to which, in common with all other epiphytal Orchids, they were subjected in those days. Other individuals were subsequently received by Mr. Barker, some of which he flowered, though so weakly and imperfectly that no true idea had ever been formed of the beauty of the plant until the publication of the figure, prepared from dried specimens, in Dr. Lindley's *Sertum Orchidaceum*. With this figure there appeared also the following remarks, which it is due to Dr. Lindley's prescient sagacity to quote in full:—

"'Epidendrum vitellinum is undoubtedly the handsomest of its genus when it is in a state of perfect health, a condition in which no one has yet seen it in this country. Let us hope that the accompanying representation, taken from specimens gathered by Mr. Hartweg on the Cumbre of Totontepeque at 9,000 feet above the sea, and in which nothing is in the smallest degree exaggerated, will rouse the possessors of it to exertion, and induce them to give it the care to which its singular merits entitle it. In what is known of its habits in its native country we possess the key to its proper management, and the explanation of any failures that have accompanied its cultivation up to the present time. It is, strictly speaking, an Alpine plant, rooting among lichens, jungermannias, and other inhabitants of a cool, moist climate, and never exposed on the one hand to a higher temperature than 75 degrees, nor on the other to one lower than 45 degrees, but undoubtedly in its season of rest enduring so small an amount of heat as that. Indeed, the circumstances mentioned by Humboldt that at an elevation of 9,000 feet on the mountains of Mexico there are found dog-roses and strawberries mixed with pepper-worts, and the manita indicates with some accuracy the kind of climate enjoyed by Epidendrum vitellinum.'

"Similar advice came from Mr. Skinner, who found the species in Guatemala growing luxuriantly at an elevation where the thermometer ranged from 58-38 degrees; we cannot therefore wonder that the plant should have found itself ill at ease when placed among East Indian Orchids that will thrive in a temperature nearly twice as high as that which is proper to itself. The real marvel is that we should have persisted so long in a course of unnatural treatment that, at a great sacrifice of comfort, labour, and expense, resulted in a uniform failure from which an adherence to the ordinary principles of cultivation would have effectually saved us.

"Something, perhaps, might be due to the circumstance that, in the infancy of Orchid growing, *one* house was expected to receive in its comprehensive embrace all epiphytal Orchids whatsoever, no matter whether they came from the sultry and pestilential coasts of Africa and the East Indies, or from the mild and pure air of the Mexican and Peruvian Andes. Still, after every allowance has been made for circumstances and conditions which, however applicable to Orchid growing in its early days, have long since ceased to operate, the extraordinary fact remains unquestioned, that for five-and-twenty years we have constantly refused cool treatment to Orchids from cool countries, and because they pined and died under the hot treatment to which alone they were admitted, we have all but despaired of their cultivation. In dealing with other plants we have never acted so unreasonably, and I have yet to learn that our ancestors ever attempted to grow potatoes in a hothouse or pine apples in a cold frame.

"Happily the spell was at length broken by Messrs. Jackson, of the Kingston Nursery, and shortly afterwards by Messrs. Veitch, who, having tried in 1860 the effects of placing some Guatemala Orchids in a cool house, were almost astonished at their own success. Still more recently, Mr. Rucker and Mr. Day have built cool houses with the most satisfactory results, while Mr. Skinner, dispensing with all the usual horticultural appliances, has found that Lycaste Skinneri is perfectly at home in an ordinary drawing-room.

"Encouraged by these examples, and being well aware of the beauty of many Mexican and Peruvian Orchids, I was induced this

Spring to undertake the construction of a small house, the temperature of which should scarcely exceed that of an ordinary greenhouse. Taking advantage of an unemployed portion of a back wall, about 20 feet long by 10 feet high, I reared against this a row of glazed sashes, which rested at rather a steep incline upon a front wall about 4 feet in height. Against this was fixed a stone shelf 4 feet wide, which, with a passage of about the same dimensions along the back wall, made up the entire width of the house. A hot-water pipe that may be used or not, according to circumstances, was borrowed from an adjoining plant-stove, and air was admitted by ventilators at a low level in the front wall and at a high level in the wall behind. To this wall there was also affixed an open trellis-work shelf about a foot wide at a short distance from the glass.

"It is clear that nothing can be simpler than these arrangements, which at the expense of about £35 have supplied me with an Orchid house that has already yielded me more enjoyment than I ever derived from houses of ten times greater pretension. The plants, consisting of Odontoglossums, Lælias, Lycastes, etc., have now been half a year in this house, and have charmed me by the progress they have made, and which is quite as striking in a variety of other examples as in the case of the Epidendrum vitellinum that I have now selected for exhibition. I shall, however, reserve my remarks on other species for a future occasion, and shall, in the meantime, strongly urge upon the Fellows of the Horticultural Society, and indeed upon horticulturists generally, the expediency of constructing small cool houses, and of thus judging for themselves as to the fund of interest and pleasure that is at length opened to us in the cool treatment of Orchids from cool localities.

"I ought to add that a cool house must be kept damp as well as cool, particularly during the summer months, and while the sun is vertical it ought to be shaded with tiffany for a few hours in the day. The plants may be grown either on logs of wood or in pots. Many of the Lælias and Epidendrums succeeding best upon the former, while the latter are invariably preferred by the Odontoglossums. For these last I employ a mixture composed of broken potsherds, fibrous peat, and sphagnum in nearly equal proportions, which my gardener, Mr. Sherratt, finds preferable to all others."

ORCHIDS FOR AMATEURS.

THE month of August is never a very interesting time for English amateurs, it may well be called the holiday season, for both the owner and his plants appear to have their minimum amount of trouble. For many past weeks the heat-loving Orchids have had a very beneficial season, in fact, one closely resembling that of their native home. There has been no anxiety on the mind of the cultivator regarding the maintaining of suitable night temperatures, even the heating apparatus has had its holiday, and may now be carefully examined for any defects and consequent necessary repairs. It is bad policy to wait until some serious breakdown occurs, for to attend to alterations and repairs during a severe frost is exceedingly risky, and yet this is usually the time when accidents occur. While fine weather lasts every opportunity should be taken to have all structural repairs finished before the advent of winter. No one fully realises the immense amount of damage done to plants through leaky roofs and cracked panes of glass which allow a constant draught of cold air to fall upon the plants.

Towards the end of August many Cattleyas and similar species will have completed their new bulbs. As soon as this is noticed every care must be taken to get the bulbs fully ripened, for unless this is properly done the plant is unable to show forth its full beauty when the flowering season occurs. This ripening process must take place gradually. Any sudden exposure of a tender plant to direct sunshine and dry air will cause considerable damage to be done to the foliage and render the bulbs unsuitable for good growth to be made during the following

MESSRS. JAMES VEITCH & SONS: THEIR ORCHID COLLECTORS.

WITH the forthcoming retirement of Sir Harry Veitch, the present is an opportune occasion to briefly review the leading points in the history of the firm of Messrs. James Veitch and Sons, Chelsea, more especially regarding their connection with Orchids. For more than a century Messrs. Veitch have been interested very prominently in horticulture, and few Orchidists of the present day know to what extent they are indebted to them for their laborious work in past years.

It is hardly necessary to point out how comparatively few were the known species when Messrs. Veitch decided to despatch travellers for the purpose of collecting plants in distant lands. William Lobb, being a proficient botanist, was selected to go on a mission to various parts of South America, and he sailed from Plymouth in 1840 for Rio Janeiro. On his arrival in Brazil he first proceeded to the Orgãos Mountains, where he met with several beautiful and notable Orchids which at that time were extremely rare in English gardens. He continued travelling until 1857, making during this time several visits to England, but died at San Francisco, in the autumn of 1863.

Thomas Lobb, brother of the above, left England in 1843 for Java and the adjacent islands. Upon his return home he decided to visit Calcutta, leaving England on December 25th, 1848. During the twenty years or upwards he travelled for the Veitchian firm, he visited the Khasia Hills, Assam, and other parts of North-east India, and subsequently Moulmein and parts of Lower Burmah, sending home from these districts most of the finest Orchids found there, many previously known to science, but introduced by him to cultivation for the first time. Worthy of mention are Vanda cœrulea, Cœlogyne lagenaria, C. maculata, Aerides Fieldingi, A. multiflorum Lobbii, A. m. Veitchii, Dendrobium infundibulum, Calanthe rosea, and Cypripedium villosum. From the southern parts of the Malay peninsula he sent home Vanda tricolor, V. suavis, Cœlogyne speciosa, Calanthe vestita, Cypripedium barbatum, and others. Lobb subsequently went to the Philippine Islands, and collected Phalænopsis intermedia, the first natural hybrid to be proved by artificial means. He also collected many herbarium specimens, a list of which is given by Planchon in *Hooker's London Journal of Botany*, 1847. Thomas Lobb died on April 30th, 1894, at Devoran, in Cornwall, at a very advanced age.

Richard Pearce was sent to Chili, Peru and Bolivia during the years 1859-1866, but although regarded as one of the best of botanical collectors, he does not appear to have been very successful with Orchids. He died at Panama, July 17th, 1867.

John Gould Veitch was a collector in Japan, South Sea Islands, and Australia, from 1860-1870. His chief collections comprised many choice coniferous trees. His death took place in August, 1870, at the early age of 31.

Bowman left England early in 1866 for Brazil. His journeys, however, were short, for he died on June 25th, 1868, and was buried in the British Cemetery at Bogota.

Henry Hutton went to Java and the Malay Archipelago. He commenced his work in 1866, but the climate proved too much for his delicate health, and he died in 1868. His name is associated with Cymbidium Huttoni, which he introduced from Java, together with Saccolabium Huttoni, from the same country, and Dendrobium Huttoni from the island of Timor in the Malay Archipelago. He was also successful in re-discovering and sending home Vanda insignis.

Carl Kramer was despatched to Japan in 1867, and afterwards to Costa Rica. He proved quite unsuitable for the work he had undertaken. His name is associated with

Odontoglossum Krameri, a species which he introduced from Costa Rica in 1868.

Gottlieb Zahn travelled in Central America, 1869-1870. The main object of his journey was the introduction of the rare Miltonia Endresii, discovered by Warscewicz about 1849, but which had previously resisted all attempts at introduction. Zahn was equally unsuccessful with this plant. In 1869 he was proceeding to Costa Rica, when he perished by drowning.

George Downton received his early training in horticulture when under Mr. T. Challis, V.M.H., at Wilton House, Salisbury. In 1870 he went to Central America, from whence he sent several consignments of Orchids to Chelsea. He met Endres, who was also plant collecting for Messrs. Veitch in Costa Rica, and served in the honour of assisting to bring Miltonia Endresii safely to England. Downton made several other journeys, but on the termination of his engagement in 1873 settled in Central America, where he died in 1895.

J. Henry Chesterton was a very successful Orchid collector over a wide area in South America during the period 1870-1878. His special task was the introduction of Miltonia vexillaria, which had been made known by other travellers, although no living plants came to this country. After considerable difficulty Chesterton not only discovered its habitat, but succeeded in getting live plants to Chelsea, where the first one flowered in 1873. Odontoglossum crispum also received his attention, a variety bearing the name of Chestertonii being at one time well-known. He also sent home the beautiful Masdevallia coccinea Harryana. This noted man continued to collect plants, although in later years on his own behalf. He died in South America, 1883.

A. R. Endres was engaged to continue Zahn's work, who, as previously mentioned, was drowned. Endres collected Miltonia Endresii, Cattleya Dowiana, and many others of somewhat poor horticultural value. His connection with Messrs. Veitch terminated in April, 1873.

Gustav Wallis was born May 1st, 1830, at Lüneburg, Hanover, and was deaf and dumb until six years of age, yet, strange to relate, he subsequently became very proficient in foreign languages. In 1856 he went to Brazil in connection with a German horticultural establishment, and in 1858 he was engaged by Linden, when he commenced his remarkable journey across the continent of South America, from the mouth to the source of the Amazon. In 1870, he entered Messrs. Veitch's service, and proceeded to the Philippines in search of Phalænopsis, but does not appear to have met with much success. In 1872 he was sent to New Grenada, and in 1875 he explored the north and central regions of South America. Wallis next visited Panama, where he was dangerously ill with fever, from which he somewhat recovered, but a second attack proved fatal, and he died there, June 20th, 1878. He will best be remembered by Masdevallia Wallisii and Epidendrum Wallisii.

Walter Davis went to Chelsea in 1870 and served under John Dominy in the New Plant Department, eventually becoming foreman of the Nepenthes and Fine Foliage Plants. In 1873 Davis was selected with the special object of visiting South America, for the purpose of securing a quantity of Masdevallia Veitchiana, then very scarce. He met with much success, and also sent home others of this genus, one of which, proving to be new, was named Masdevallia Davisii by Professor Reichenbach. Some idea of the remarkable enthusiasm of this man may be obtained from the fact that during his stay in South America he crossed the Cordilleras of the Andes in Peru and Bolivia no less than twenty times, at elevations of 14,000 to 17,000 feet, and he traversed that vast country from one side to the other, along the whole length of the Amazon valley.

Peter C. M. Veitch collected in Australia, South Sea Islands and Borneo, during the years 1875-1878. The whole of his collection of plants made in the Fiji Islands was lost in a gale at sea, and in 1877, when again visiting Australia, he had the misfortune to be shipwrecked off the north coast of that country, and for a second time everything

was lost. Although fairly successful with many plants, he does not appear to have done much with Orchids.

Guillermo Kalbreyer left England in 1876 for the West Coast of Africa in search of tropical plants. In July, 1877, he returned to England, bringing a collection of plants which included two new Orchids:—Brachycorythis Kalbreyeri, a terrestrial species, named by Reichenbach in compliment to the discoverer, and Pachystoma Thomsoniana, an epiphyte, named, at Kalbreyer's request, in honour of the Rev. George Thomson, a missionary in that unhealthy district. His next journey was to Colombia, his principal plants being Odontoglossum Pescatorei and O. triumphans. In July, 1878, he again visited Colombia, and sent home some extraordinary forms of Odontoglossum Pescatorei, including O. Pescatorei Veitchii, and O. triumphans, O. tripudians, O. hastilabium, O. coronarium, O. crocidipterum and O. blandum, the latter a very difficult species to import alive. Kalbreyer returned to England with a large and choice collection of Orchids. In September, 1879, he commenced his fourth journey to Colombia, this time travelling down the River Magdalena to the Central and Western Cordillera. It was here that he found the wonderful Anthurianum Veitchii, with leaves over six feet in length, climbing trees more than 60 feet in height. Orchids were again collected, and included Odontoglossum ramosissimum, O. sceptrum, Miltonia vexillaria, Cattleya aurea, C. Warscewiczii, Cypripedium Rœzlii, C. Schlimii alba, and several interesting Masdevallias. Several consignments of these were sent to Chelsea, and in September, 1880, Kalbreyer returned to England, bringing with him many living plants and a great collection of dried Ferns, comprising some 360 species, of which 18 were new to science. His last journey for Messrs. Veitch was commenced in December, 1880, when he once again visited Colombia. Odontoglossum crispum was mainly collected, the plants being brought to England in June of the same year. Not content with this country he decided to finish his days in Colombia, so once again he crossed the ocean, and arriving at Bogota started business as an Orchid exporter. His death took place in the autumn of 1912.

Christopher Mudd, son of a former curator of the Cambridge Botanic Gardens, went on an expedition to South Africa in 1877. The mission was practically a failure, and Mudd eventually settled in New Zealand.

F. W. Burbidge started for Borneo in 1877, his special object being the introduction of certain Pitcher Plants known to inhabit that island. His Orchids included Phalænopsis Mariæ, Dendrobium Burbidgei, and Aerides Burbidgei, all rare. On his return from Borneo in 1879, Burbidge was appointed curator of the Botanical Gardens at Trinity College, Dublin. His death took place at Dublin, December 24th, 1905.

Charles Maries was engaged during the years 1877-1879 as a collector in Japan and China. He does not appear to have had any connection with Orchids.

Charles Curtis, collector in Madagascar, Borneo, Sumatra, Java, and the Moluccas, 1878-1884. His first trip was to Mauritius and Madagascar, where he collected several interesting Orchids. On the trip to Borneo Curtis was accompanied by David Burke, who returned with the collection made in Sarawak. The plants brought home by him included Cypripedium Stonei, C. Lowii, and many Vandas. Curtis next proceeded to Pontianak in Dutch Borneo, with the object of acquiring a consignment of Phalænopsis violacea, then very rare. On the termination of his engagement in 1884, Curtis was appointed Superintendent of the Botanic Gardens at Penang, from which he retired in December, 1903. In commemoration of his services to botany, Cypripedium Curtisii bears his name.

David Burke was born in Kent, 1854, and after entering the employ of Messrs. Veitch was sent on a trial trip to Borneo with Curtis. His next mission was to British Guiana, in 1881, where he gathered the rare Zygopetalum Burkei. Subsequent journeys included two to the Philippine Islands for Phalænopsis, two to New Guinea, and one,

in 1891, to the then newly-annexed provinces of Upper Burmah for Orchids. During the years 1894-1896 he made three trips to Colombia for Cattleya Mendelii, C. Schröderæ, C. Trianæ and Odontoglossum crispum. Burke's last journey was to the Moluccas, and in the island of Amboina, belonging to the last-named group, he died, April 11th, 1897.

James Herbert Veitch travelled to India, Malaysia, Japan, Corea, the Australian Colonies and New Zealand, 1891-1893. He cannot be said to have taken much interest in Orchids, for there is little recorded in connection with his journey.

E. H. Wilson journeyed to Central and Western China and on to the Tibetan Frontier, 1899-1905. His remarkable collections of Chinese plants and seeds have been freely spoken of in the various horticultural journals. Some idea of their magnitude may be gained from the fact that during five years they amounted to 25,000 dried specimens, representing some 5,000 species; seeds of 1,800 species; and no less than 30,000 bulbs of new and rare species of Lilium, etc. Cypripedium Tibeticum was introduced by Wilson, and flowered with Messrs. James Veitch and Son, June, 1905. Cymbidium Wilsoni also bears his name.

ROYAL HORTICULTURAL SOCIETY.

SUMMER EXHIBITION AT HOLLAND HOUSE.

July 1st, 2nd and 3rd, 1913.

MEMBERS of the Orchid Committee present: Sir Harry J. Veitch (in the chair), Mr. James O'Brien (hon. sec.), Sir Jeremiah Colman, Bart., Messrs. de B. Crawshay, W. Bolton, Gurney Wilson, A. Dye, S. W. Flory, R. G. Thwaites, W. H. White, W. P. Bound, Walter Cobb, A. McBean, Stuart Low, Wilson Potter, W. H. Hatcher, H. G. Alexander, J. E. Shill, H. J. Chapman, R. Brooman-White, R. A. Rolfe, W. Waters Butler, G. F. Moore, F. Sander, J. Charlesworth, C. J. Lucas, J. S. Moss and A. A. Peeters.

Sir Jeremiah Colman, Bart., Gatton Park, Reigate, was awarded a Large Silver Cup for a very beautiful exhibit of Orchids. A special feature was the fine show made by specimen Odontiodas, one of which received Cultural Commendation. Many varieties of Odontioda Papilio gattonensis were staged. Cypripediums included callosum Sanderæ with eight flowers; Odontoglossums were well represented, one of the best being Od. Lady Roxburgh cirrhosum × percultum). The yellow Lissochilus speciosus, Sobralia Colmaniæ, Miltonia Lambeauiana, as well as numerous botanical specimens made up a most effective and praiseworthy group.

Messrs. Sander and Sons, St. Albans, were awarded the Coronation Cup for the finest exhibit in the Show, and a Gold Medal. The group contained many superb specimens of Phalænopsis Rimestadiana arranged on an elevated centre, while underneath their graceful spikes were masses of Miltonia vexillaria. At the extreme ends of the group were magnificent specimens of Cattleya Warscewiczii Sanderiana, many of which had from five to seven flowers on a spike, and possessed very dark and large labellums. Miltonia Sanderæ and Cattleya Mossiæ Dreadnought were two specialities that obtained awards. Well-flowered plants of Dendrobium Dearei, the new Miltonioda Cooperi, Acineta chrysantha, the pretty Cypripedium Charles Sladden and Odontoglossum Uro-Skinneri album were also shown. Along the front row were various species of botanical interest, many of which, if not new, were very rare, while in prominent positions were selected varieties of the numerous hybrids for which Messrs. Sander have long been famous.

Messrs. Charlesworth and Co., Haywards Heath, were awarded a Gold Medal for a magnificent exhibit of beautiful hybrids and rare species. A novelty was to be seen in Odontioda Brewii (Charlesworthii × Harryanum) with a large flower of deep bronzy-red

Castle Rock Orchids, Ltd.

Office: P.O. Box 67; Crystal Bay, MN 55323
Phone: (612) 476-2682 FAX: (612) 449-0649
E-mail: wsinkler@castlerockorchids.com
Web: http://www.castlerockorchids.com
Greenhouse: 7978 County Road 11; Maple Plain, MN 55359
Phone: (888) 851-7999 Toll Free; (612) 972-3479; FAX: (612) 972-6175

Miltoniopsis Flasks

Ms. [(Alderwood x Eureka) 'Gommie' x Timberline 'Solar Flare'] The pod parent has good round shape, is a good clear yellow; 'Solar Flare' is with a burgundy mask. $45 per flask. CR6671

Ms. (Lorene 'Jannika' x *santanaei* 'Great Spirit') - 'Jannika' is a well-shaped white flower with deep red showers; the *santanaei* is very well-shaped and fragrant. $50 per flask. - CR6502

Ms. (Lorene 'Phantom' x Edmonds 'Dale Anderson') - 'Phantom' is a well-shaped yellow with a dark brown mask graduating to falls; the pollen parent is yellow with large red eyes and a red splash below a rusty mask. $45 per flask. - CR6701

Ms. (Lycaena 'Stamperland' FCC/RHS x Sekayouma 'Art Deco') Lyceana is red and white; Sekayouma is an elegant pink and white from (Venus x Melissa Baker) - thus falls are a possibility. $45 per flask. - CR6779

Ms. (Momoe 'Peachy' x Agate Beach 'Addison') 'Peachy' is a yellow with reddish eyes; 'Addison' has a yellow background that fades to a white; large pink petals. $45 per flask. CR6769

Ms. *phalaenopsis* ('Riopelle' x 'Posada') - A sibbing of this seldom-offered species. $55 per flask. CR6701

Ms. *santanaei* ('Seagull's' x 'Great Spirit') A sibbing of two of our finest clones of this fragrant species. $45 per flask. CR6637

Ms. (*santanaei* 'Chelle' x Timberline 'Solar Flare') A white with a yellow mask crossed to a white with a burgundy mask. $45 per flask. CR6560

Ms. Yuko Hatsui (*roezlii* 'Moonwalker' x Lorene 'Mieke') One of our best *roezliis* crossed with a red and white Lorene. $45 per flask. CR6802

Miltoniopsis Seedlings

Ms. Ada Evelyn Winborne (Saffron Surprise x Patricia Baker) - Both parents are yellows.- $10 per 2.5 inch pot size. #BCA

Ms. (Agate Beach 'Addison' x Rose Carpenter 'Pam') 'Addison' is a full-shaped yellow that fades to white; it has pink eyes. 'Pam' is a small white flower with pink eyes. $10 per 6 inch leaf span seedling. CR6509

Ms. [(Alderwood x Eureka) 'Dove' x Bleuana 'Happy' The pod parent is a large, well-shaped, pale yellow with light rose eyes in the petals; the pollen parent is white with a yellow mask; we expect yellows or creams, some with pink eyes. $10 per 6-8 inch leaf span seedling CR5397.

Ms. (Auburn Solstice 'Southern Belle' x *roezlii* 'Balancer') A floriferous *roezlii* look-alike with a fine *roezlii*. $10 per 6-8 inch leaf span seedling. CR5287

Ms. (Beacon Hill x Bob Hoffman) Beacon Hill is (Shilshole Bay x *vexillaria*); it is crossed with a red. $10 per 2.5 inch pot size. #BCC

Ms. Bleuana (Bleuana 'DJ Torrance' x Bleuana 'Artic Moon')) Daniel J. Torrance is a white with blush eyes; the tetraploid Artic Moon is white with a copper-pink mask and small pink eyes. $10 per 10 inch leaf span seedlings. CR5217

Ms. Chinook Pass (Robert Hull 'Friend Bob' x Patricia Baker 'Sundance') A yellow with a rich pink flush crossed with a yellow with a dark red-brown mask. $10 per 2.5 inch pot size. #BCD

Ms. Cora Alberta Startzell (Tod Dirks 'Riopelle' x Alexandre Dumas) Yellow with roezlii eyes and and brown masks. - $10 per 2.5 inch pot size. #BCE - sell 20

Ms. (Dearest x Sierra Snow) A pink with a white. -$10 per 2.5 inch pot size. #BCF

Ms. (Dearest 'Profusion' x Linda Marie Sellon 'Sheridan Heights') - A pink crossed with a pink-lavender. $10 per 2.5 inch pot size. #BCG

Ms. Discovery Bay (Tod Dirks x Patricia Baker) Two yellow parents. $10 per 2.5 inch pot size. #BCH

Ms. Eunice Frank (Patricia Baker x Tom Lyczko) Expect a yellow with purple eyes; mask dark red-brown. $10 per 2.5 inch pot size. #BCI

Ms. (Eureka 'Allan Clark' x Harold Ripley 'Mavis') - A yellow by a large pink.-$10 per 2.5 inch pot size. #BCJ

Ms. (Hamburg 'Dark Tower' x Anamaria Baptista 'Raku') A red by a red with a white waterfall. $12.50 per 5-8 inch leaf span seedling. CR5212

Ms. (Harold Ripley x Patricia Baker) Two yellows. $10 per 2.5 inch pot size. #BCK

Ms. Hoquiam (Linda Marie Sellon 'Sheridan Heights' x Patricia Baker 'Sundance') Two yellows. $10 per 2.5 inch pot size. #BCKK

Ms. [Hudson Bay 'Royale Dream' x (Alderwood x Eureka) 'Milagro] 'Royale Dream' is a pale yellow with heavy dark red petals and a burgundy mask; 'Milagro' is a yellow. $10 per 4-6 inch leaf span seedling. CR5275

Ms. (Jersey 'Rincon' x Memoria Ida Seigal 'Rassman')) Jersey is a red and white; 'Rassman' has red-violet sepals and petals; the sepals with dark markings basally, a lip which has a white ground, pink at the apex, and a deep burgundy mask which becomes waterfalls. $10 per 6-8 inch leaf span seedling. CR5284

Ms. Lee Highlands Horswill (Desert Falls x Memoria Glenna Kleinbach) - A white with a rust-red dripping falls by a yellow with a dark mask and roezlii eyes. $10 per 2.5 inch pot size. #BCL

Ms. Limelight ('Imogene Smith' x self) - A classic red and white. $10 per 2.5 inch pot size. #BCM

Ms. Littlebrook (Milla Hull 'Chocolate Sundae' x Woodinville 'Evergreen Brilliant') - A white with chocolate falls by a cherry red with a black butterfly mask. $10 per 2.5 inch pot size. #BCN

Ms. (Lorene 'Butterfly' x Timberline 'Solar Flare') 'Butterfly' has a very heavy red upper flower; is basically white with a deep burgundy mask; 'Solar Flare' is a white with a burgundy mask. $10 per 5-8 inch leaf span seedling. CR6503

Ms. Lover's Point (Lorene 'Summer Showers' x Meadowdale 'Greenwood') 'Summer Showers' is a white with burgundy showers; 'Greenwood' is white with a black mask and pink eyes. $10 per 5-10 inch leaf span seedling. CR5368

Ms. Memoria Glenna Kleinbach (Tod Dirks x Union Bay) Yellow. $10 per 2.5 inch pot size. #BCO

Ms. Memoria Will Chantry (Saffron Surprise x Lil Severin) Two yellows.- $10 per 2.5 inch pot size. #BCP

Ms. (Milla Hull x Emotion) A white with a chocolate mask by a pink. $10 per 2.5 inch pot size. #BCQ

Ms. Nanette Evelyn Cognac (Nancy Binks x Union Bay) A pink by a white. - $10 per 2.5 inch pot size. #BCR

Ms. Patricia Baker ('Evergreen' x self) Yellows. $10 per 2.5 inch pot size. #BCS

Ms. (Robert Hull x Eureka) A cream by a yellow. $10 per 2.5 inch pot size. #BCT

Ms. *roezlii* ('Balancer' x 'Balancer Grande') A sibbing of selected clones of this species. $10 per 6-8 inch leaf span seedling. CR5220

Ms. Roy Chase (Bob Hoffman 'Storm' x Sean Kane 'Lucille' HCC/AOS) A red by another red. $10 per 2.5 inch pot size. #BCU

Ms. Walla Walla Washington (Saffron Surprise x Ivory Belle) A yellow by pale yellow with deep red eyes and a gold mask. $10 per 2.5 inch pot size. #BCV

Ms. (Sean Kane x Emotion) A red by a famous pink parent. $10 per 2.5 inch pot size. #BCW

Ms. (Sean Kane x Nancy Binks) A red by a pink. $10 per 2.5 inch pot size. #BCX

Ms. Spokane (Alger x Union Bay) Both parents are whites with black masks. $10 per 2.5 inch pot size. #BCB.

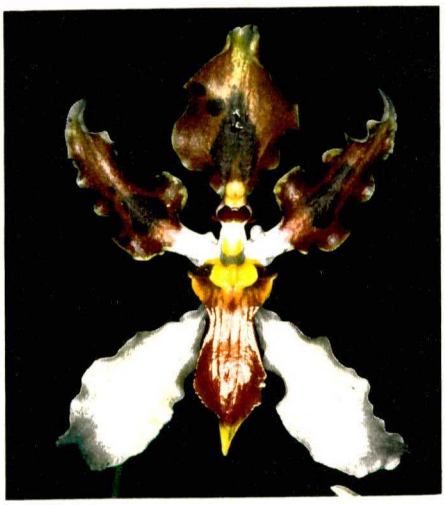
Ms. Thai Airways International (Patricia Baker 'Evergreen' x Woodinville 'Evergreen Brilliant') A yellow by a red. $10 per 2.5 inch pot size. # BCY

Ms. (Tom Lyczko x Alderwood) Two yellows. $10 per 2.5 inch pot size. #BCZ

VISA, Mastercard accepted.

Castle Rock Orchids, Ltd

Cyrt. insculptum

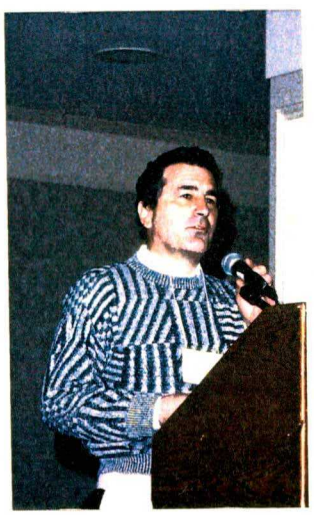


Onc. microxiphium

Odm. uro-skinneri x Onc. macranthum

Oda. Carmine x Cyrt. carderi
(= Wils. Rock Island)

Onc. Postasce 'Rustic Canyon'



Dr. Howard Liebman

Odontoglossum armatum

Odontoglossum denticulatum

Odontoglossum cristatellum

Cyrt. volubile

Oncidium ? (Ecuador)

Onc. microxiphium

Cyrt. Maxine 'Goldstrike' AM/RHS